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Handbook of Work Disability

Prevention and Management

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ISBN 978-1-4614-6213-2 ISBN 978-1-4614-6214-9 (eBook)
DOI 10.1007/978-1-4614-6214-9
Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2012956193

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Foreword

As a college student in late 1960s, I was very interested in how our minds can impact our bodies. As I continued my studies in graduate school, I began exploring alternate forms of treatments that used the mind to control various physiological functions assumed to influence pain. It was assumed that there was a direct link between some physiological process and pain, and if one could just directly alter the physiological process via some type of self-control procedure, (e.g., biofeedback, meditation, relaxation response) pain reief would likely be achieved. At the San Francisco Veteran's Administration Hospital, where I was an intern in clinical psychology, I learned that patients could be taught how to manage chronic pain by the use of hypnotic self-regulation strategies. In these cases there seemed to be a direct link between what was occurring centrally in the brain and the experience of pain. This really peaked my interest in the use of the "mind" to directly influence pain.

My first academic position was at McGill University in Montreal. I worked in the same department as Dr. Ronald Melzack, the biologically oriented psychologist who developed the gate control theory of pain, which has influenced pain research and practice to this very date. I was fortunate to spend time with Dr. Melzack and his team at the Montreal General Hospital where I saw firsthand how various pain problems could be explained using experimental and anatomic evidence related to various biobehavioral pathways of pain. I was exposed to another mind-body connection—bidirectional pain regulation (top-down and bottom-up) that had some biological plausibility. The gate control process, which could be influenced by many central nervous system factors such as past learning, memory, and stress to influence the perceptions of pain and associated behavior, was explained in the clinical context of actual patients experiencing uncontrollable pain. This theory and supportive evidence helped generate the rationale for many innovative approaches to pain management that facilitate change in pain and improvement in function according to systematic literature reviews.

Some years later, as director of a clinic staffed by a multidisciplinary team of anesthesiologists; orthopedic surgeons; medical, surgical, and psychiatric nurses; physical therapists; and psychologists, we began assisting patients with a range of pain disorders. At this Pain Treatment Center (PTC), we noticed that many of the factors observed to impact pain patients in the Melzack clinic also could explain what was observed in the PTC. By evoking many of the gate control theory concepts to help guide the evaluation and

treatment planning, we were able to help many patients with persistent unrelenting pain conditions. However, we rarely observed improved functional outcomes related to work in patients who were experiencing musculoskeletal pain and functional limitations and were also involved in the workers' compensation system. This was the case despite a clinically significant reduction in pain and a modest improvement in function. Insurance carriers who referred many patients to us with the expectation of a return-to-work outcome were concerned that our approaches while helpful for pain were inadequate since despite our efforts we were unable to improve return-to-work outcomes at a rate that was acceptable to patient, provider, employer, and third-party payer.

At that time, I was conducting site visits for the Committee for Accreditation of Rehabilitation Facilities (CARF) of pain programs and general rehabilitation clinics. As I observed many different programs across the United States, it was clear that these programs focused either on managing pain, improving function, or facilitating return to work through vocational rehabilitation. It was a rare facility that integrated the staff in a manner that addressed the multiple factors that research was beginning to tell us could influence pain, functional limitations, and return to work. At the same time, the field of human factors and occupational ergonomics was evolving and focusing on workplace methods that could mitigate physical stressors that were observed to be related to fatigue, pain, function, or productivity in the workplace. There was emerging evidence that occupational ergonomics could assist with the prevention of work-related musculoskeletal injuries and illnesses. These types of problems were commonly reported on shop floors, warehouses, offices, and physician offices in many industrialized nations.

During this exciting time, Drs. Tomas Mayer and Robert Gatchel developed a new paradigm for the rehabilitation of pain, function, and work disability. This biobehavioral approach focused on chronic low back pain and included a sports medicine orientation to rehabilitation (i.e., active rehabilitation) along with pain and stress management for the injured worker. In general, the focus was on rehabilitation of both body and mind. These pioneers reported substantial return-to-work outcomes in cases with long-term chronic low back pain and work disability. It remains the case, as it was then that once out of work for 6 months, the probability of a successful return to work in most of these cases is modest at best. This was very exciting. Our group toured the Dallas program and the program modeled after it in Burlington, Vermont, at the University of Vermont Medical Center run by Dr. Rolland Hazard. We also learned much from Dr. Lennard Matheson through attending his vocational rehabilitation professional training program. I learned a great deal from these leaders and from many more, such as Dr. Robert Jones, a physiatrist for years at Eastman Kodak in Rochester, New York, who was well versed in occupational musculoskeletal rehabilitation and ergonomics. Drs. Sue Rodgers, Don Chaffin, and Tom Armstrong provided me with an understanding of the role of the physical work environment and the demands of work on our physiology, health, and ability to work productively in many types of work.

Armed with the knowledge from the CARF site visits, teachers mentioned above, and the experience of running the multidisciplinary Pain Treatment Center for several years, I set out with my colleagues to establish The University of Rochester Occupational Rehabilitation Center in 1998. This center was the effort of many including the board and senior management of Strong Memorial Hospital and the University's Medical Center. This comprehensive center with state-of-the-art facilities for physical conditioning, work conditioning, pain and stress management, vocational rehabilitation, and case management was staffed by very dedicated and skilled physicians, psychologists, occupational health nurses/case managers, physical therapists with years of experience in pain, occupational therapists, exercise physiologists/ergonomists, and in-house vocational counselors. The Rochester Model of work disability was developed at that time to help organize our clinical and research approaches to the problem of work disability [1]. The model was also the basis for the development of the *Journal of Occupational Rehabilitation*. Since its initial years, the journal has expanded its focus on several health problems and many stakeholders involved in the epidemiology, prevention and management of work disability. Over the past two decades, the journal and the field evolved from a focus on the development of measures, uncontrolled trials of various intervention approaches, to documentation of diverse perspectives of stakeholders and controlled individual and systems level interventions with policy-related implications from countries around the globe [2].

The journal published its first issue in 1991 [1]. Since then, the journal has provided an important impetus for the science of work disability at a time when many stakeholders were out for themselves in an environment that was spiraling out of control. The abstract written for the initial issue of the journal stated that it was time to consider the multivariate nature of work disability that included a biomedical, biomechanical, and psychosocial framework. It also talked about the importance of prevention, evaluation, research, and practice and the need to develop new knowledge and strategies.

However, as one might expect, given our center's focus on rehabilitation, the conceptual framework presented in the initial paper was primarily person-oriented with a focus on what can be done to modify or rehabilitate the individual including individual worker-workplace ergonomic analysis and intervention. That is, even in ergonomics, which typically focused on workplace processes involving many workers, the primary question was, "what can be modified to make it more likely that this individual will be able to return to work with modified exposure to ergonomic risk for pain and/or discomfort?" Such concepts as the worker's medical status, physical capabilities vs. work demands, and psychological/behavioral resources were the focus. This approach, while multidimensional in its coverage and representing a clear departure from the exclusive focus on the widely held assumption of the direct link between medical impairment and work disability, was entrenched in a "fix-the-person" approach, with some emphasis on self-management and ergonomic change at the person level at the workplace. The model failed to consider the overarching system in which work disability operates. This aspect was not included, despite the frequent observation that in order to

achieve an optimal outcome at the rehabilitation center, staff needed to work with a number of stakeholders, rehabilitation nurses, claims agents, supervisors, and employers [4].

While Dr. Patrick Loisel and his colleagues were also focused on the need for a multidisciplinary approach to clinical management of musculoskeletal-related work disability and integrated the diverse literature related to pain and work disability, the system that can impact work disability was added explicitly. Unlike the Rochester Model of work disability, the Work Disability Prevention Management Model expanded the focus beyond the individual worker and workplace to include the health care and compensation systems [3]. This model provided a more comprehensive perspective on work disability and the prevention of work disability than our original clinical model and provided the foundation for the present handbook.

The authors of each of the chapters in this handbook provide up-to-date reviews and perspectives on the current evidence base and future directions in their respective areas. The book covers a range of important areas from the epidemiology of work disability to the biobehavioral mechanisms of pain and disability. The chapters cover the essential elements of work disability prevention of interest to any stakeholder. It also expands the focus of work disability research and practice beyond its almost exclusive focus on occupational musculoskeletal pain and function in the field in the past.

Drs. Loisel and Anema and coeditors (Drs. Costa-Black, Feuerstein, MacEachen, and Pransky) had the objective of compliling the essentials of the present knowledge on work disability in a comprehensive book. There was no book available that provides both a public health perspective and a focus on individual factors related to work disability. The book also provides what a true interdisciplinary effort can achieve. Throughout the production of this book, various experts in different areas interacted with one another and the editors to generate a more balanced account of work disability prevention. As such, this handbook provides the requisite foundation for the next generation of researchers, practitioners, and other stakeholders to work toward solutions to the global public health problem.

Bethesda, MD, USA Michael Feuerstein

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Preface

This handbook addresses the problem of work disability. Work is central in people's lives and is one of the most powerful social determinants of health, as acknowledged by the WHO. Overwhelming evidence shows that work is generally good for health. Conversely, work disability has become a worldwide major public health problem. In the past, practitioners, policymakers, and researchers considered work disability to be primarily a socioeconomic and political problem, having biomedical causes or alleged biomedical causes rather than a public health one. For this reason, little attention was paid to work disability for many years in the general medical and public health literature. Only recently, the insight has grown and convincing evidence has been amassed that indicate that long-term work disability contributes to 2–3 times increased risk of poor general health, 2–3 times increased risk of mental health problems, and 20% excess mortality [1,2]. Work disability is a considerable burden to workers, workplaces, and society. It impacts workers' health and well-being, workplace productivity, and the social security safety net of a country.

> In this handbook, we define work disability as occurring when a worker is unable to stay at work or return to work because of an injury or disease. Work disability is the result of a decision by a worker who for potential physical, psychological, social, administrative, or cultural reasons does not return to work. While the worker may want to return to work, he or she feels incapable of returning to normal working life. Therefore, after the triggering accident or disease has activated a work absence, various determinants can influence some workers to remain temporarily out of the workplace, while others return, and others may finally not return to work at all.

Key practitioners and researchers of lower back pain were promoting work disability as a topic of interest to the health-care field some 30 years ago. Alf Nachemson, a Swedish orthopedic surgeon, wrote a "revolutionary" paper in an orthopedic journal entitled *Work for All, for Those with Low Back Pain as Well* reminding orthopedic surgeons of the functional side of their work and the fact that treating back pain should not put patients at risk of losing their job but rather help them to return to a productive working life [3]. In fact, the goal of work disability prevention and management is not to fix a disorder or take care of an illness. It is identifying and effectively addressing

the determinants of work disability at the personal (physical and psychological), workplace, and societal levels through evidence-based interventions. Work disability prevention also involves devising appropriate evidence-based interventions to address the determinants related to the work disability situation. Therefore, interventions in this field should address not only the worker but also the stakeholders and systems, as all have responsibility for and contribute to the work disability situation. Recent studies demonstrate that these determinants look remarkably similar among a wide variety of disorders. This perspective explains the way we have developed and organized the chapters not around the various disorders that may be associated with work disability but to directly address the work disability problem as a central issue independent from condition. Only Chapters 16–19 discuss specific points pertaining to the disorder leading to work disability.

The editorial team (Patrick Loisel, Johannes R. Anema, Michael Feuerstein, Glenn Pransky, Ellen MacEachen, and Katia M. Costa-Black) includes researchers from surgery, occupational to medicine, psychology, sociology, and physiotherapy who worked together and are dedicated to advancing the field of work disability prevention (WDP). All chapters are authored or coauthored by well-recognized researchers and leaders in work disability from diverse disciplines and several countries. In our view, this transdisciplinary team approach provides a united vision across the diversity of disciplines and countries. We expect that this handbook will be a valuable resource for practitioners to prevent and manage work disability of their patients. Administrators, researchers, and students will find state-of-the-art information on essential knowledge for improving their understanding of the complex WDP field. Considerable work has been done in this field over the last 30 years; however, this knowledge is dispersed across diverse journal articles and books that tend to be topic specific and not focused specifically to the WDP field. This handbook assembles in one place the most recent, transdisciplinary, and relevant information on work disability prevention and management to date. Throughout the handbook, care has been taken to avoid needless repetition, and many cross-references between chapters are provided. These cross-references are intended to reinforce the interrelatedness of work disability elements across the individual, workplace, and societal levels, thereby helping readers to complement their understanding of the diverse elements in the work disability field.

As a trailblazer in the field, and a coauthor of chapters in this book Michael Feuerstein has graciously contributed the Foreword, placing the handbook in context of the evolution of this field. Drawing on clinical and research experience, his vision led to the development of early conceptual frameworks and, more than 20 years ago, to the creation of *Journal of Occupational Rehabilitation*, which is now the leading journal in the work disability field. Following the Foreword, the book is divided into 6 parts: Part I discusses *The Burden of Work Disability*, Part II presents *Unraveling Work Disability Prevention*, Part III considers *Work Disability Determinants and Diagnosis*, Part IV discusses the *Effective Work Disability Prevention Interventions*, Part V discusses *Work Disability Issues on Specific Disorders* and Part VI presents *The Challenge of Implementing Evidence* in this field.

We thank the numerous authors who have joined this endeavor, providing the reader with the most comprehensive and timely evidence on work disability prevention available today. These authors have dedicated much of their time and scientific skills to bring the best of present knowledge in the specific topic they have addressed to make this truly the first authoritative evidence-based handbook in "Work Disability: Prevention and Management."

Part I (Chapters 1 to 5): The Burden of Work Disability
In Chapter 1, *Sickness Absence and Disability: An International Perspective,* Rienk Prins describes the societal burden of work disability in relation to persons affected and triggering illnesses, using an epidemiologic and international perspective. In Chapter 2, *The Work-Disabled Patient*, Marie France Coutu, Daniel Côté, and Raymond Baril consider the situation of the work-disabled worker from anthropological, psychological, health, and clinical perspectives. In Chapter 3, Marc Koopmanschap, Alex Burdorf, and Freek Lötters tackle the problem of *Work Absenteeism and Productivity Loss at Work* (or presenteeism), discussing related policy questions. Chapter 5 authored by Patrick Loisel and Pierre Côté presents *The Work Disability Paradigm: Revealing Its Public Health Implications,* discussing the societal causes of work disability and arguing for a public health approach to the problem.

Part II (Chapters 6 to 9): Unraveling Work Disability Prevention
Chapter 6, *Work Disability Models: Past and Present*, authored by Katia M. Costa-Black, Patrick Loisel, and Michael Feuerstein, presents a historical perspective of the conceptual models and discusses their rationale in this new work disability field. In Chapter 7, *Measurement of Outcomes in Work Disability Prevention*, Glenn Pransky presents *Conceptual and Methodological Considerations and Recommendations for Measuring Outcomes*, drawing on various perspectives. Chapter 8 on *Pain, Chronicity, and Disability* by Michael Sullivan, Marc-Olivier Martel, and Zina Trost, approaches the role of chronic pain in prolonged work disability with related treatment implications. Chapter 9, dedicated to *Methodological Issues in Work Disability Prevention Research*, authored by Sheila Hogg-Johnson and Ellen MacEachen, discusses the various methodological approaches and challenges that can advance our understanding of work disability research, incorporating perspectives from the workplace and other stakeholders, and related ethical issues.

Parts III and IV (Chapters 10 to 19): Work Disability Determinants and Diagnosis: Work Disability Issues on Specific Disorders
Üte Bultmann and Sandra Brouwer in Chapter 10, *Individual-Level Psychosocial Factors and Work Disability Prevention*, provides an overview of these factors, and link them to theoretical models in work disability prevention. In Chapter 11, *Workplace Issues*, William Shaw, Vicki Kristman, and Nicole Vézina summarize the evidence for specific workplace issues as significant factors in work disability. Katherine Lippel and Freek Lötters provide a comparison of cause-based and disability-based income support systems in Chapter 12, *Public Insurance Systems*. In Chapter 13, Carel Hulshof and Glenn Pransky address *The Role and Influence of Care Providers on*

Work Disability and argue that work disability is still a blind spot for many practitioners and that occupational health care should be integrated into mainstream health care. In Chapter 14, *Understanding Work Disability Systems and Intervening Upstream,* Ellen MacEachen discusses the real impact of key policies at a government level and their relation to work disability outcomes. Marie José Durand and Quan Nha Hong, Chapter 15, offer *Tools for Assessing Work Disability*, an overview of work disability assessment tools and criteria for instrument choice. Part IV is dedicated to issues related to the specific disorder having induced the work disability process. It is divided into four parts, each dedicated to a specific disorder. In Chapter 16, *Predicting Return to Work for Workers with Low-Back Pain*, Ivan Steenstra, Jason Busse, and Sheila Hogg-Johnson report on factors that best predict disability outcomes for workers with LBP evaluated early in the course of work disability. In Chapter 17, *Mental Health Problems and Mental Disorders*, Marc Corbière, Alessia Negrini, and Carolyn Dewa discuss the determinants of work participation and work functioning for these disorders. Chapter 18, *Cancer Survivorship and Work*, authored by Courtney Collins, Alicia Ottati, and Michael Feuerstein, discusses the epidemiology of cancer survivorship and work and the long-term effects of cancer and treatment exposures on work. Chapter 19 on *Traumatic Brain Injury*, Carol Cancelliere, David Cassidy, and Angela Colantonio discusses novel rehabilitation programs and assistive technologies that may improve employment outcomes in this work-disabled population.

Part V (Chapters 20 to 25): Effective Work Disability Prevention Interventions

Chapter 20, *Clinical Interventions to Reduce Work Disability in Workers with Musculoskeletal Disorders or Mental Health Problems*, authored by Bart Staal, Angelique de Rijk, Inge Houkes, and Martijn Heymans, presents a research synthesis of effective interventions aimed at reducing work disability in these populations. Sandra van Oostrom and Cécile Boot discuss in Chapter 21, *Workplace Interventions*, the effectiveness of workplace interventions implemented to facilitate return to work and challenges in their implementation. In Chapter 22, *Sickness and Disability Policy Interventions*, Johannes R. Anema, Christopher Prinz, and Rienk Prins compare the effect of policy measures on work disability reduction through three examples in different international contexts. Chapter 23, *Cost-Effectiveness of Interventions for Prevention of Work Disability*, authored by Kimi Ueguaki, Allard van den Beek, Emile Tompa, and Maurits W. van Tulder provides an overview of the evaluative methods to determine the cost-effectiveness of interventions to prevent work disability and presents examples of economic evaluations. In Chapter 24, *Informing the Public: Preventing Work Disability and Fostering Behavioral Changes at the Societal Level*, Douglas Gross, Sameer Deshpande, Maxi Miciak, Erik Werner, Michiel Reneman, and Rachelle Buchbinder demonstrate the potential impact of mass media campaigns on work disability reduction and discuss future possible strategies. In Chapter 25, *Return to Work Stakeholders' Perspectives on Work Disability*,

Amanda Young considers the various stakeholders' motivations, interests, and concerns in relation to work disability and return to work.

Part VI (Chapters 26 to 28): The Challenge of Implementing Evidence
In Chapter 26, *Extracting the Core Elements of Interventions*, Katia M. Costa-Black uses a literature synthesis to extract the essentials of evidence-based interventions for implementation in other settings. Jean Baptiste Fassier presents in Chapter 27, *Obstacles and Facilitators in Implementation of Return to Work Interventions*, which considers necessary conditions for innovative and effective interventions in a different sociopolitical context. Chapter 28, *Building an International Educational Network in Work Disability Prevention*, authored by Patrick Loisel, describes a Canadian-based educational program, with international participation, to train researchers and trainers in work disability prevention.

Finally, in an Appendix, *Work Disability Theories: A Taxonomy for Researchers*, Angelique de Rijk describes and classifies the multiple theories that have been published related to work disability prevention. This Appendix may help the reader-researcher in this field to identify appropriate theories as possible foundations for their projects.

In editing this handbook, we have attempted to provide a comprehensive vision of this relatively young field of work disability. We expect that many readers from diverse disciplines, perspectives, professions, and countries will find this book useful and helpful in their professional life. We would be delighted if the information in this book provides a framework for future efforts to significantly decrease the global burden of work disability.

We thank the numerous authors who have joined this endeavor, providing the reader with the most comprehensive and timely evidence on work disability prevention available today. These authors have dedicated much of their time and scientific skills to bring the best of present knowledge in the specific topic they have addressed to make this truly the first authoritative evidence-based *Handbook in Work Disability: Prevention and Management.*

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Part I

The Burden of Work Disability

Sickness Absence and Disability: An International Perspective

1

Rienk Prins

This chapter introduces some basic international features as shown by sickness absence and disability dependency rates. It also identifies three challenges: increasing mental health problems, growing numbers of young persons with disabilities, and the weight of chronic diseases.

1.1 Introduction

Disability is a crucial problem for society: it excludes persons from full participation in society, training and employment and increases their dependency on social security and care. Before going into various aspects of the subject (backgrounds, developments, policies and interventions) an elementary introduction into the scope and major characteristics of the phenomenon will be needed.

In this chapter we will first summarise some elementary features of disability, considered from a global perspective. Subsequently, we focus on characteristics of temporal and permanent disability in persons of working life age, as manifested in sickness absence and disability rates. Finally, we sketch three challenges in the disability area that employers, workers, health care providers and disability managers (already) are facing in many countries: the growth in numbers of persons with work disabilities due to mental health problems, the growing numbers of young persons with work disabilities as well as the epidemic of work disability due to chronic diseases.

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1.2 Some Demarcations

This chapter is primarily devoted to some empirical features of our subject. We first try to demarcate work disability, both in the light of conceptual clarity and availability of comparable statistics. Elsewhere in this book the concepts of disability (in health care, in social security, in human resources management) will be dealt with as well as theorems or models of disability (medical/social). This chapter does not concentrate on morbidity, rehabilitation or care aspects of disability in society. The main focus is on disability in the context of work or employment: so our interest in prevalence, backgrounds, developments and interventions focuses on *persons with disabilities in working life age* as well as their employment or economical setting. Before concentrating on the economically active part of populations we will explore prevalence and developments in the general populations.

Second, this restriction to persons in employment or in employment age (in general aged 16–65 years) also defines the concepts and statistics we will use. There are two concepts related to persons in working life age that express the health- or impairment-related restrictions:

(a) *Short-term or temporal work* disability (work incapacity), in general labelled as "*sickness absence*"

P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_1, © Springer Science+Business Media New York 2013

(b) *Permanent work* disability (permanent work incapacity), be it partially or fully, be IT combined with (part time) employment or with dependency on benefits (e.g. disability benefit/pension)

The borderline between both categories differs across countries (and continents). In most European countries sickness absence refers to spells covered under public sickness benefit schemes or employer wage payment programmes, which often last up to 12 months. In some countries the definition may include even longer spells. Apart from variations in the duration of sickness benefit payment and modes of transfer to disability benefit schemes, also job protection regulations (allowing or forbidding dismissal during or due to sickness) cause cross-national differences in definitions applied.

Another feature of sickness absence is the following: persons sick listed mostly have minor ailments and—most importantly—work incapacity in the overwhelming majority of cases has a *temporary* character. When a sickness absence due to a health condition continues and gets a permanent character, commonly the term "permanent work disability" is used.

The focus on temporary and permanent work incapacity excludes some categories of (sub)populations with disabilities from our exploration, namely childhood disability and persons in working age but never participating in paid work in the labour market, e.g. because of education or performing care tasks ("house wives have no sickness absence….").

1.3 Sources

The focus on sickness absence and disability in the active population is supported by the fact that more and more comparable statistics have become available since 2001, at least in the context of the European Union and OECD. Both for sickness absence and work disability, some prevalence sources can give a sound insight into scope, characteristics and trends.

1.3.1 Epidemiology of Disability

As to the epidemiology of disability in the general population worldwide, some very recent data from the "World Report on Disability" (World Health Organization and World Bank 2011) and from WHO on chronic diseases will be presented. These sources compile and discuss data on disability from several sources and focus on various aspects (epidemiology, barriers, measures, policy recommendations). However, several methodological problems show to restrict the cross-national comparability of national disability prevalence rates (Mont 2007). There is no single definition of disability and different methods of data collection also affect outcomes of national studies. This heterogeneity of concepts and sources also leads to variations within countries: for example the reported disability prevalence rate (2001) for Canada ranged from 13.7% to 31.3%, depending on the types of questions used in surveys (Mont 2007). Consequently, the variation across countries is even greater, so comparative data still should be interpreted with care.

1.3.2 Sickness Absence Levels

Until the nineties, cross-nationally comparative sources that allowed a valid insight into levels of sickness absence were not available. In many countries reliable *nationwide* statistics on sickness absence are still incomplete. *Cross-national* comparisons—further—are limited due to differences in definitions, benefit arrangements, legitimating procedures ("certified" sickness absence), recording and reporting habits as well as basic sources (e.g. employer surveys, benefit administrations). These are the core issues of this chapter.

Currently within the EU two types of comparative sources on sickness absence can be found (Eurofound 2010a):

(a) Self-reported sickness absence, as measured in regular surveys of workers or employers (e.g. European Working Conditions Observatory, EU Labour Force Survey)

(b) Sickness absence rates derived from health insurance statistics (on sickness benefit payments)

Compared with 10 years ago, the availability (and popularity) of data based on surveys has increased considerably. For example within the EU in each country a similar methodology (questionnaire, sampling) is used, and often a range of subjects, related to income, labour, working conditions and health aspects, are covered. However, the limited nature of the survey does not provide detailed insight into the full extent of sickness absence, as the duration of sickness absences is not covered. The latter aspect (length of spells) is often better measured in administrative data (from employers, insurers, or national registries), but have as a restriction that they underestimate short-term spells (which—in many countries—are paid by the employer).

1.3.3 Disability Prevalence

For a cross-national insight into the scope and features of disability in persons at working age also two types of sources can be used:

(a) Surveys measuring (self) reported health and disability (e.g. in household panels, in living conditions surveys, in health surveys)
(b) Comparative data derived from social security administrations (on disability benefit/pension recipients, benefit expenditures, etc.)

Mont (2007) analysed the strengths and weaknesses of currently used definitions and data collection methods on disability prevalence. The two categories discerned do not give the same information on the same populations. Sources mentioned under a. not only cover persons in employment; moreover the prevalence of disabilities is measured as reported by the interviewed person, in the context of diagnosable conditions, ADL (activities of daily living) or participation. Moreover, cultural differences as to public awareness and attitudes towards persons with disabilities (e.g. stigma) may affect responses. The second source (b.) only regards insured persons with disabilities that fulfilled the administrative and medical eligibility criteria. Further, a minimum loss of earning capacity and other client characteristics have been assessed by medical and vocational experts, and this loss is compensated. For this specific subpopulation comparatively more information is available (as to diagnoses, costs, employment, trends, rehabilitation measures, return to work efforts, etc.), but legal and institutional criteria that affect the inflow in the schemes differ considerably across countries (see Chap. 22).

1.4 Disability: A Global Perspective

After this exploration of some conceptual, methodological and administrative sources of bias in comparability of data, we now focus on the prevalence of work disability in a global context.

In particular, developing countries face considerable limitations in data on the scope, types, causes and regional distribution of the problem. The "World Report on Disability" estimates that more than a billion people live with some form of disability or about 15% of the world's population (based on 2010 global population estimates). Around 785 million (15.6%) persons aged 15 years and older live with a disability, while 2.2–3.8% are estimated to have "severe disability" (referring to conditions like quadriplegia, severe depression or blindness).

In most countries the number of people with disabilities is growing, as populations are ageing—older people have a higher risk of disability. But also other conditions increase the prevalence of disabilities, in particular the global increase in chronic health conditions associated with disability, such as diabetes, cardiovascular diseases and mental illness (see Sect. 1.7.3). Moreover, patterns of disability in a particular country are not only influenced by trends in health conditions but also by trends in environmental and other factors (e.g. road traffic crashes, natural disasters, conflict, diet, substance abuse).

Disability in particular affects vulnerable populations: higher disability prevalence is found in lower income countries than in higher income countries. People living under the poorest conditions, women and older people also have a higher

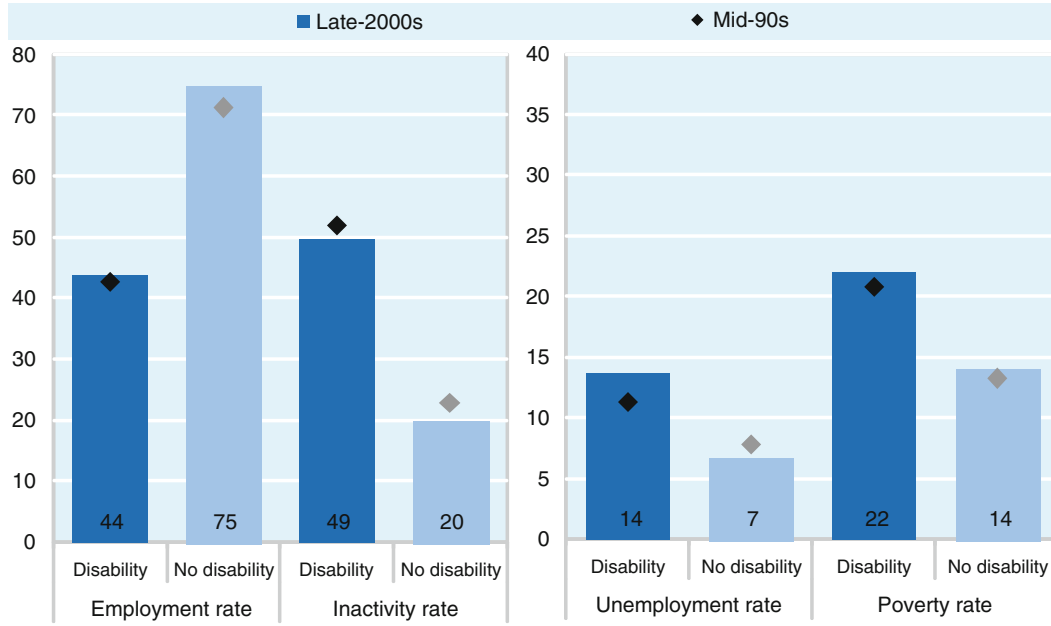

Fig. 1.1 OECD average employment rate, selected groups of the population, late 2000s (OECD 2010a)

prevalence of disability. In OECD countries disability rates in the population are higher among groups with lower education.

Disabilities affect persons in various ways. People with disabilities experience poorer levels of health than the general population. Three broad categories of health conditions—infectious diseases, chronic conditions and injuries—are the most prominent factors. In particular the increase in diabetes, cardiovascular diseases (heart disease and stroke), mental disorders, cancer and respiratory illnesses will have a profound effect on disability (World Health Organization and World Bank 2011).

Figure 1.1 shows that persons with (functional) disabilities also are more likely to be unemployed and generally earn less compared to those who are employed (OECD 2010a). Moreover, the data show that—in over 10 years—the employment situation for the disabled hardly has changed. Global data further demonstrate that employment rates are lower for disabled men (53%) and disabled women (20%) than for non-disabled men (65%) and women (30%). Working-age persons with disabilities experience significantly more labour market disadvantages than working-age persons without disabilities. On average, their employment rate, at 44%, was over half that for persons without disability (75%). This estimate does not take into account the participation in the informal economy.

In developing countries a major underlying cause of disability is poverty, related to nutritional deficiency, war-related causes (e.g. landmine explosions) and traffic accidents. A growing cause is the number of persons with HIV/AIDS. Moreover, in many developing countries HIV/AIDS is viewed as a disability due to the discrimination of persons living with HIV and AIDS (Thomas 2005).

Persons with disabilities in developing countries face several barriers, like poor access to education for children with disabilities and lack of access to training, employment and health or rehabilitation services, including supportive devices. In the development of roads and public transport systems, the needs of persons with disabilities often are not accounted for. Persons with disabilities further have a disadvantaged position in terms of access to information and communication. Finally, substantial social barriers are created

due to negative views and prevailing attitudes, in which persons with disabilities are considered as helpless and having no capacities to develop.

1.5 Sickness Absence

Based on surveys held in the EU some elementary features of sickness absence can be demonstrated now in a cross-national perspective. Firstly, due to cross-national differences in institutional contexts (benefit levels, job protection, certification procedures) there are substantial differences in levels of sickness absence. The EU data from the Working Conditions Observatory (2007) are included in Fig. 1.2 (Eurofound 2007).

Also other sources, e.g. a study based on the European Labour Force Survey (Livanos and Zangelidis 2010), confirm the pattern that is visible in this diagram: highest sickness absence rates are mainly found in the Scandinavian countries, with percentages of working days lost consistently above 4%. On the other end many Eastern European and Balkan countries, like Bulgaria, Estonia, Greece, Latvia, Lithuania,

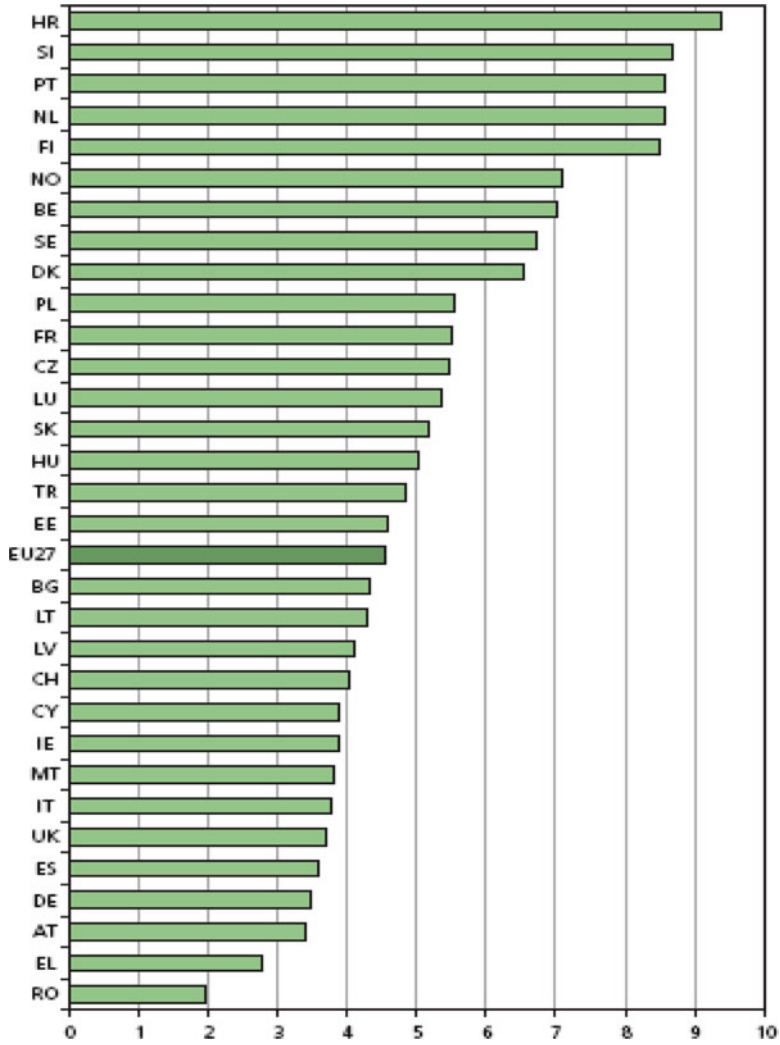

Fig. 1.2 Average number of health-related leave days per worker (all workers), by country (Eurofound 2007)

Table 1.1 Health-related leave, by sector, EU27 (%) (Eurofound 2007)

Sector	
Agriculture	14.2
Manufacturing	25.9
Electricity, gas and water	26.4
Construction	21.3
Wholesale and retail trade	19.4
Hotels and restaurants	18.8
Transport and communication	25.0
Financial intermediation	22.5
Real estate	18.2
Public administration and defence	30.7
Education	29.9
Health	25.4
Other services	18.5
EU27 average	22.9

Note: Percentage of workers who took health-related leave over previous 12 months

Romania, and Slovakia have reported sickness absence rates below 1% (working days lost). Disregarding measurement biases these differences may be associated with the level of social protection (level and duration of benefits payment) and degree of job protection (for those that are frequently or long-term sick).

Despite these cross-national differences many similarities are found across countries, when exploring sickness absence levels and trends, for example:

- Seasonal variations: particularly, in the winter and autumn months, absence rates are higher than in the spring and summer
- Sickness absence increases with age, which may be explained partly by the positive correlation between age and illness
- Women workers almost universally show higher sickness absence than men (attributed to their increased household responsibilities and childbearing role)
- Sickness absence also increases with seniority (which may be accompanied with increased job responsibilities, greater job latitude or higher levels of stress)

Table 1.1 demonstrates annual sickness absence rates by economic sector. In general employees in public administration, education and the manufacturing sector show the highest sickness absence levels, whereas lowest rates are (traditionally) found in persons working in agriculture, (other) services and hotels/restaurants.

Initial data from the most recent EU Working Conditions Observatory also give information about being at work while sick (Eurofound 2011). Figure 1.3 shows the percentage of persons who reported to have (at least once) worked in the past 12 months, although being sick. The lowest percentages are mainly found in EU member states from Central and Eastern Europe.

Personal factors (loyalty to employers and colleagues) as well as contextual factors (e.g. employer's sickness policy, risk of dismissal) may affect the decision by a person whether to report sick when feeling unable to work, or not. Consequently, the actual level of sickness absence cannot be considered as a valid measure of health status in the working population.

1.6 Disability Benefit Dependency

Most European countries regularly conduct health surveys on self-perceived health status (using questions like "How is your health in general?"). Despite the subjective nature of this question, indicators of perceived general health have been found to be a good predictor of people's future health care use and mortality. For the purpose of international comparisons however, cross-country differences in perceived health status are difficult to interpret as responses may be affected by social and cultural factors (OECD 2010b).

One definition of disability regards whether a person is or has been limited in his usual daily activities (not only work) because of a health problem. In the EU 24% of adults answered that they had limitations, with 8% of respondents "strongly limited" and 15% "limited to some extent" (2008). Moreover, about 30% of adults reported they had long-standing illnesses or health problems. As Fig. 1.4 illustrates adults in Finland (41), Slovenia (39), Hungary (38) and Estonia (38) showed highest percentages. These conditions were least reported in Romania (19%), Greece (22%) and Italy (23%).

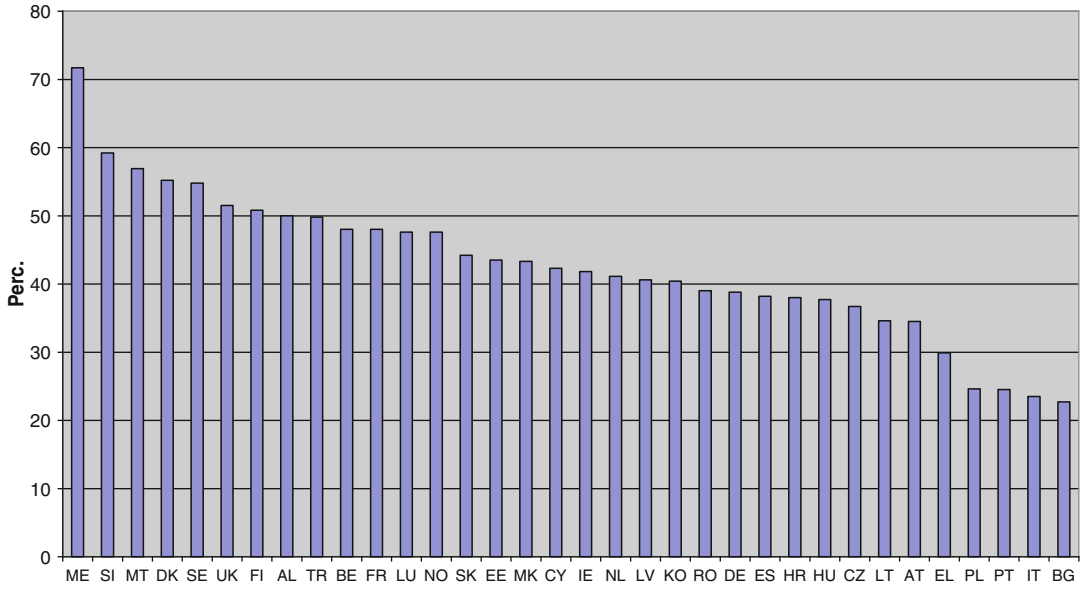

Fig. 1.3 Percentage of persons who worked (over the past 12 months) when they were sick (all workers), by country (Eurofound 2012)

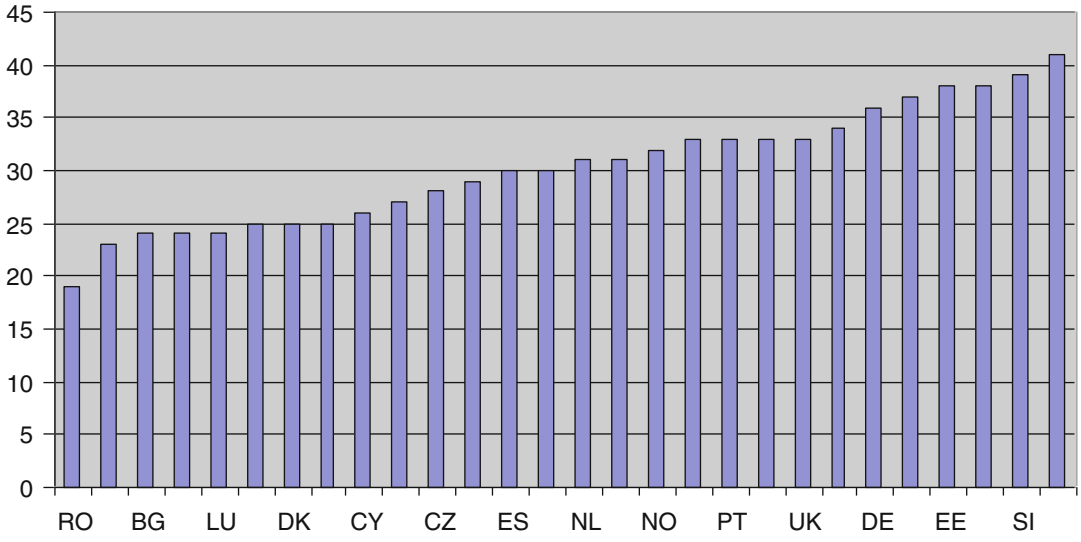

Fig. 1.4 Adults' self-reported health status, selected countries, 2008 (OECD 2010a)

Cross-national differences in disability also are visible in statistics derived from disability benefit or pension programmes. Figure 1.5 shows disability benefit dependency rates: the number of disability benefit recipients in per cent of the population aged 20–64.

It not only shows large international variations. For most countries between 1980 and 2007 a huge increase in benefit dependency due to disabilities can be noted (with the exception of three countries where rates have decreased). In 2007 the Scandinavian countries and the Netherlands showed the highest prevalence rates for beneficiaries in the disability arrangements, but two of them managed to reduce disability benefit prevalence.

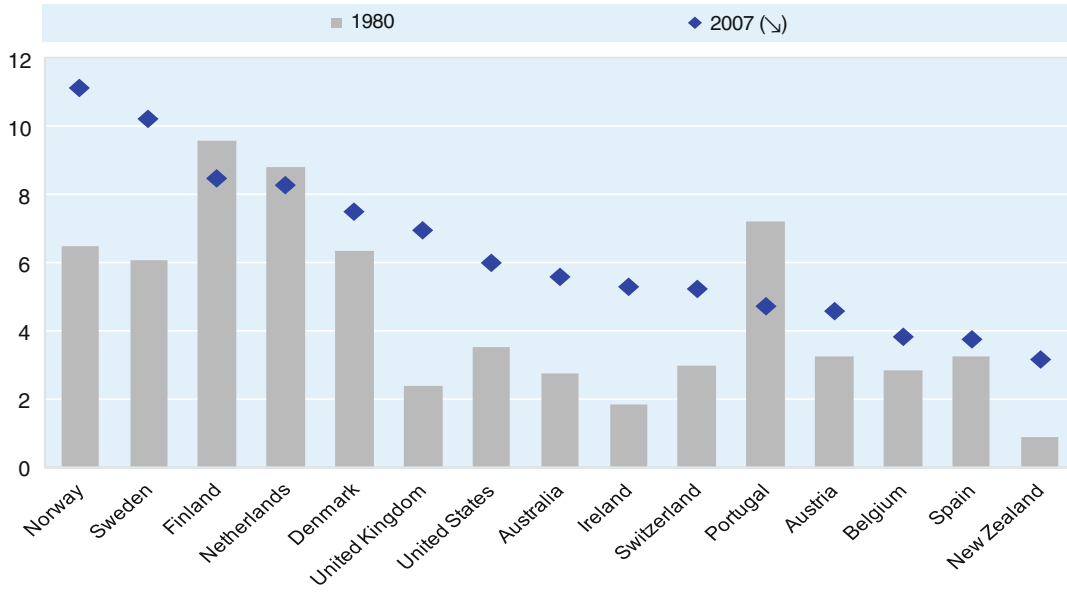

Fig. 1.5 Disability benefit recipients in per cent of the population aged 20–64 in 15 OECD countries, early 1980s and 2007/2008 (OECD 2010a)

An important feature of rising disability benefit dependency is the semi-permanent character of the phenomenon. The problem is not only with increasing inflow rates: a common phenomenon in most developed countries is the very small numbers of persons leaving the disability benefit programmes (OECD 2010a). Consequently, the older the age groups, the higher the number of benefit recipients (per 100 persons). In several European countries this has led to a quite stable pattern of persons aged over 50 who have to rely on disability benefits (cf. Fig. 1.6). In many countries only the youngest age groups in benefit recipients show (moderate) outflow rates. The majority of recipients leaving the disability benefit schemes do so because of demographic factors, like reaching statutory old-age pension age or death.

1.7 Challenges

So far we sketched some quantitative features of disability, firstly from a global perspective and subsequently with the focus on persons in working life age (as illustrated in sickness absence and disability benefit rates). At the end of this introduction three challenges can be noted. They already are obvious in statistics and investigations, pilot projects and action programmes, which more and more can be found in high-income countries. These challenges regard the growth in disabilities due to mental health problems, the growing numbers of young persons with disabilities and the impact of the steady worldwide growth of chronic diseases.

1.7.1 Disability due to Mental Health Problems

In many countries health data and disability benefit administrative data show since the 1990s that the pattern of impairments is shifting. In developing countries trends are away from infectious diseases and towards chronic diseases, which bring increased limitations and increasing dependency. In many developed countries a related pattern shift is visible. In the diagnostic patterns of new recipients of disability benefits the musculoskeletal disorders no longer comprise the largest proportion in inflow statistics; instead, disabilities related to mental health problems now predominate (Prins 2006). Figure 1.7 shows that—over a 20-year period—the

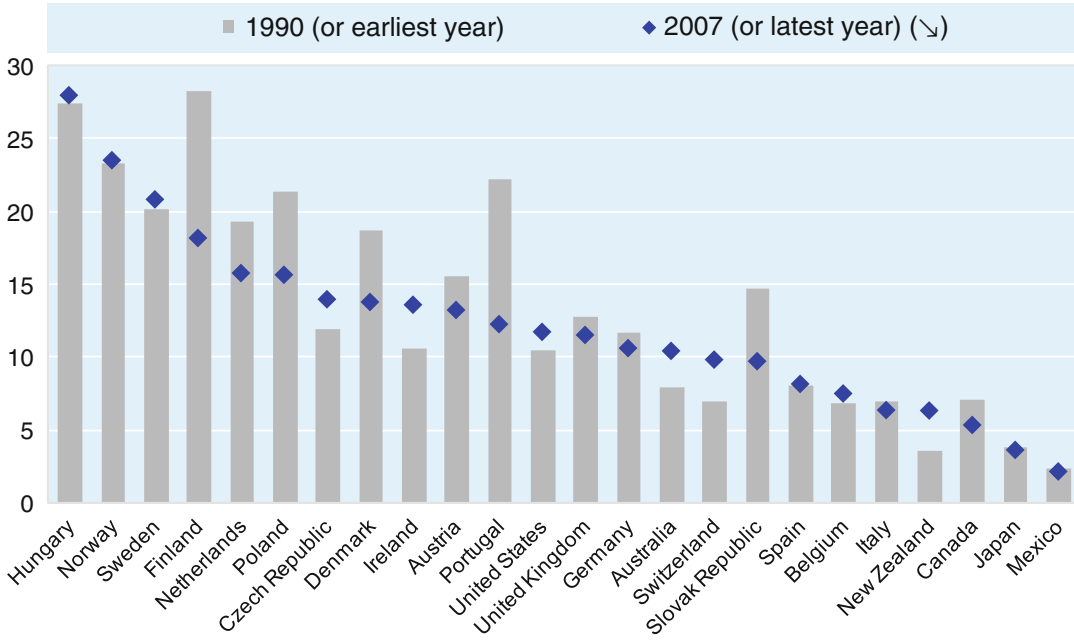

Fig. 1.6 Disability benefit recipients aged 50–64 in percent of the population aged 50–64 in 24 OECD countries, 1990 and 2007 (OECD 2010a)

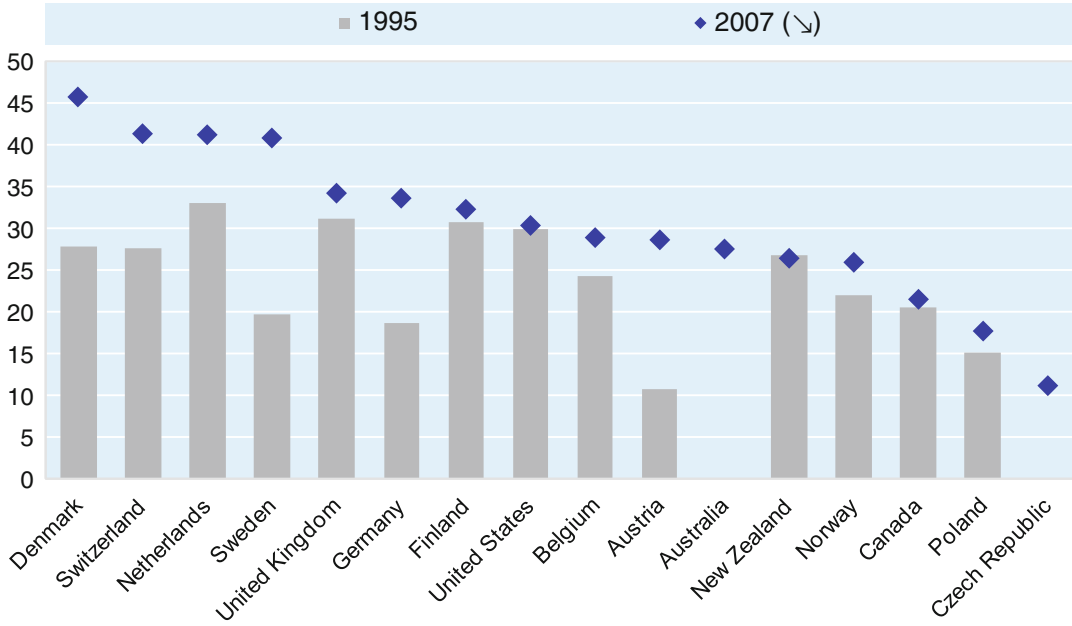

Fig. 1.7 Proportion of inflows into disability benefit due to mental health conditions in 16 OECD countries, mid-1990s and 2007/2008 (OECD 2011)

proportion of work disability due to mental conditions is increasing in almost all countries surveyed. This growth pattern, however, is hardly visible in Australia, the USA and Canada. It is estimated that across Europe mental health problems account for 25% of all inflow to disability benefits; OECD estimates that even between 1/3 and 1/2 of new disability benefit claims are for reasons of mental ill health. This phenomenon is attributed to a variety of factors: changes in health conditions and in the organisation and conditions of employment but also cultural factors are considered like reduced stigma and greater public awareness of the issue (OECD 2011). The trend is "still rising", and EU member states from Central and East Europe also note the beginning of this shift in morbidity patterns in their disability benefit claims.

OECD studies indicate that in high-income countries depression is the leading cause of disability. Further they reported that most of the costs related to mental health problems are not those due to health care but those due to reduced productivity at work, sickness absence, early retirement and receipt of disability benefits. Persons with mental disorders also receive disproportional more unemployment or social assistance benefits.

Mental disorders also influence the stage before inflow into a benefit scheme, namely sickness absence. Most people with mental health problems are in work, but many mental disorders are persistent and have high recurrence rates. Moreover, co-morbidity may play a role: several mental disorders often co-exist with other mental health or physical health conditions. Compared to workers without such problems an employee with *severe* mental disorders in average reports 10 extra days sick (OECD 2011). Finally, people with a severe mental disorder face a considerable employment disadvantage: their employment rate is about 1/3 lower compared to persons with no disorder. Persons with *moderate* mental disorders show about 10% lower employment levels.

1.7.2 Young Persons with Disabilities

Not only have the ageing of populations and reforms to restrict possibilities for early retirement affected the growth in numbers of persons with disabilities in employment age. Since 2000, an additional age-related pattern becomes visible in many EU and OECD countries: ill health and disabilities cause more and more young people to leave the labour market. Across Europe there has been a substantial increase in the number of younger persons with health problems entering the disability benefit schemes.

Young persons (aged ranging from 16 to 34 years) with disabilities may face various barriers to labour market inclusion. Eurofound (2010b) concluded that increasing numbers of young people from this age group are entering the disability benefits system, as they meet barriers in the transition from education to employment. Others had a job and face loss of employment due to health factors, or they had to move to sheltered employment.

This phenomenon goes beyond the "medicalization" of ill health and disability: personal factors, structural factors (e.g. connection between education and employment) and employer-related factors (type of jobs available, attitudes) have also to be taken into account. As the phenomenon is quite recent and more prevalent in some countries than in others, OECD suggested several countries to address this issue (OECD 2010a).

Figure 1.8 shows substantial differences regarding the prevalence of (self-reported) disabilities in young persons. Regarding trends it can be noted in several countries that the take-up of long-term disability benefits by young people has been increasing. This led to changes in the structure of the disability benefit populations in, for example, the Netherlands, Norway and the UK. Among young adults claiming disability benefits, over 70% of claims are related to mental ill health (OECD 2011).

1.7.3 Chronic Diseases

The lives of an increasing number of people in the world are being affected by chronic diseases, like heart disease, stroke, cancer, chronic respiratory diseases and diabetes. The term chronic diseases refers to diseases which have one or more of the following characteristics: they are permanent, leave residual functional disability,

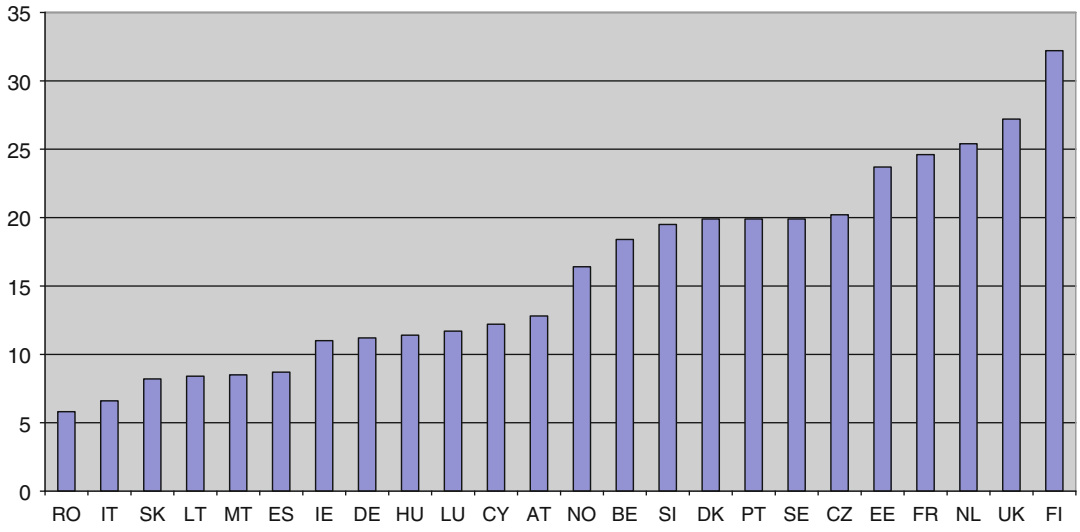

Fig. 1.8 Disability levels (%) among young people (16–29 years), Eurofound (2010)

are caused by nonreversible pathological alteration, require special training of the patient for rehabilitation or may be expected to require a long period of supervision, observation or care.

Chronic diseases not only cause 60% of all deaths in the world but also are the major cause of adult illness. They cause morbidity and disability, often for decades of a person's life. Many chronic diseases share common risk factors, which are well known, preventable and lifestyle related: tobacco use, unhealthy diet, alcohol abuse and lack of physical activity. The increase of convenience foods, labour-saving devices, motorised transport and more sedentary jobs means people are getting more overweight/obese, which will lead to more health problems including disabilities (van Eijndhoven and Prins 2010). In developing countries, other factors include chronic infectious diseases, accidents, armed conflicts, childhood malnutrition and other diseases.

As the likelihood of developing a disabling chronic condition increases with age, the number of persons with chronic diseases will increase due to a growing proportion of older people in the population. WHO sources stress the substantial impact of chronic diseases as the major cause of death and disability worldwide (WHO, 2009). But there also is a substantial impact of successful health care that has transformed mortality to morbidity and increased survival.

Three major health conditions affect the growth of chronic diseases. First, there is an emerging global epidemic of *diabetes,* which can be traced back to rapid increases in overweight, obesity and physical inactivity. Second is *cardiovascular disease,* another substantial category of chronic diseases. The global epidemic of cardiovascular disease is not only increasing but also shifting from developed to developing nations, partly as a result of increasing longevity, urbanisation and lifestyle changes (World Health Organization 2007).

Finally, *depression* is a common mental disorder that shows a rising tendency. Its symptoms are a depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy and poor concentration. These problems can become chronic or recurrent and may lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities. Depression is an important global public health problem due to both its relatively high lifetime prevalence and the significant disability that it causes. It occurs in persons of all genders, ages and backgrounds; it is common, affecting about 121 million people worldwide, and is among the leading causes of disability worldwide.

Chronic diseases and their relationship with (public) health and disability will be discussed more thoroughly in Chap. 5.

1.8 Conclusions

Disability in the context of labour is mainly manifested in sickness absence rates (short-term or temporary work incapacity) and figures on inflow from employment into disability benefit schemes. Since 1990, considerable progress has been made by EU and OECD in improving research tools (e.g. surveys) and data bases (e.g. on disability) that allow comparisons with sufficient cross-national validity. Such sources show in most countries that the number of persons with disability is growing. High prevalence rates are found in persons living in poorest conditions, women and older people.

Sickness absence rates vary considerably across countries; this shows to be related to the level of social protection (e.g. duration of benefit payment), job protection rules and employer dismissal policies. However, sickness absence patterns also have similarities when compared across countries: in most countries higher rates are found in women, in older age groups and in public administrative and manufacturing sectors.

Also long-standing illnesses and health problems demonstrate some international variations but also similarities. The latter became particularly apparent in OECD countries: only with very few exceptions did the number of disability benefit recipients increase substantially between 1980 and 2007. The increasing inflow into benefit dependency is not the only problem; most countries face many years with very low outflow (into employment). Comparatively few people leave the disability benefit schemes: for a huge majority of recipients, dependency on disability benefit is a permanent status.

The need to address this challenge is more urgent as three widespread developments may increase the "stock" of recipients: first, the rise of disabling mental health conditions in the general and working-age populations; second, in several countries, there is growing number of young persons with disabilities, who face barriers in the transition from education to employment; and finally the growth of chronic diseases, a worldwide phenomenon, which is associated with ageing of populations, spreading of lifestyle-related risk factors but also success of health care that transformed mortality to morbidity and increased survival. These developments increase the need for addressing short- and long-term disability, not only in public health policies but also within the employment and labour context.

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The Work-Disabled Patient

2

Marie-France Coutu, Daniel Côté,
and Raymond Baril

This chapter analyses work and its influence on the worker from anthropological, psychological, health and clinical perspectives.

2.1 From an Anthropological and Psychological Perspective

2.1.1 What Is the Meaning of Work?

Studies in the anthropological and psychological field have documented "the meaning of work" people attribute to their jobs and, to some extent, how this can impact well-being. There is no consensus on the definition for the meaning of work. A synthesis review on the meaning of work defined it as the part that work plays in one's personal life (Baldry et al. 2007). According to specific contexts of work and social position, some individuals may be oriented to the fulfilment of economic needs while others focus on career development and commitment, and will develop or present a strong occupational identity (Baldry et al. 2007). Despite being less studied in the field of work rehabilitation, a few authors also identified religious beliefs as a factor influencing the meaning of work. Thus, some workers may view their work engagement in terms of a "calling" or "predestination" (Davidson and Caddell 1994) or attach ethical behaviours to it (Weaver 2002). The context of work will influence the process leading to the elaboration of the meaning of work. This context will provide the material and relational grounds for developing, among other things, feelings of self-achievement, recognition, positive relationship and purposeful activity (Morin 2008).

Morin (2008) identified three components in the meaning of work. The first is the presence of significance in work. It is the value of the work from the worker's perspective and representation. A representation can be defined as a set of values, opinions and ideas about something or a specific object constructed through various life experiences in interactions with others, and built on information models acquired through education and socialisation processes (Coutu et al. 2007; Jodelet 1989). Significance in work underlies the importance that is given to work in the totality of personal life and the possible interference with other domains of life such as family, leisure or community involvement. Moral correctness may also play a role in work significance by questioning the consequences of a work activity (Morin 2008). Is it harmful to someone's integrity, health or safety? Does it cause environmental hazards? Work significance is idiosyncratic, since it must meet

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_2, © Springer Science+Business Media New York 2013

criteria defined by the individual. The second component of work is orientation in terms of providing goals and expectations for the worker. Work orientation is the worker's direction at work, what he/she is seeking in a specific work activity. For example, a socially valued occupation may provide a sense of self-worth and usefulness and, therefore, be a source of motivation, pride and satisfaction (Baldry et al. 2007). The third component of work is a sense of coherence. This component provides integration between a person's expectations and values, and the work activities he/she performs (Morin 2008). Work coherence may be viewed as the balance between one's own representation of work significance and the actual conditions of work, and the balance between one's own expectations and values and the actions performed every day in the work environment. For example, a worker's strong family commitments may be incompatible with working long hours; a worker's sense and aptitude for autonomy may be at odds with an authoritative managerial style and may result in dissatisfaction and distress.

2.1.2 Socio-Historical Aspects of Work

Every person will create their own meaning attached to work, but this meaning is shaped and influenced by the environmental contexts from which they evolved. World views regarding paid work may be subject to variations according to social and historical norms and cultural values (Gill 1999). Consequently, the meaning of work has significantly changed over time and geographic area (Baldry et al. 2007). In Western societies, work was progressively depicted in a more positive sense, especially from the medieval epoch with the rise of craftsmanship, trades and technicians, all of which have a strong sense of professional/occupational identity (e.g. guilds, corporations) (Popper 1966). The rise of the industrial era in the West from the eighteenth century has initiated major changes in labour (Guest et al. 1997). This period also witnessed many changes in family structure (nuclear), community and territorial organisation, law, etc. In changing from domestic- or household-based manufacturing to factory and larger scale production, work activities became amalgamated to wage-earning activities or "paid labour" (Godelier 2000). Work progressively began to be a specific activity, distinct from leisure (to which it might be opposed), family or community life, which underlined a division between private and public space, and between family/community life and workplace/professional engagements (Godelier 2000). The meaning of work also reflected changes with the rise of liberal democracies, a politically influent class of entrepreneurs ("bourgeoisie") and the concomitant growth of a working class (Baldry et al. 2007; Winkelman 2009). Work became a central vector of socialisation, contributing to the definition of social position and integration and, to some extent, stressing the features of self-worth (usefulness) (Castel 1996).

Virtanen et al., a Finnish team of researchers, studied the sickness absence practices at the level of the community and work organisation (Virtanen et al. 2000). They described generative and structuring schemes of practices and representations prevalent in three Finnish towns where sickness absence problems were highlighted by local authorities. Virtanen et al. were inspired by Bourdieu's notion of "habitus" defined as a set of acquired body schemes, sensibilities and tastes generating and structuring practices and representations (Virtanen et al. 2000). Sickness absence practices were analysed in this way, leading to "community diagnoses" in correlating sickness absence frequencies and attitudes toward it. Distinctive "class-related body schemas" emerged from the data, showing different styles of being incapacitated, reflecting, on one hand (working class), an "alienated relationship to work" and, on the other hand, a strong "commitment" to work (middle class) (Virtanen et al. 2000) which can be associated with the contemporary concept of meaning of work. Strong commitment to work was discussed in light of the ideals and values of work where virtue has been made necessity or "individual obligations" (Virtanen et al. 2000). In this case, it may be more difficult to disengage from work responsibilities, and therefore, the meaning of work may disrupt the balance between work and other important social domains, such as family.

Paid work has become a central institution of modern advanced industrial societies, providing or fulfilling psychological needs that were provided for outside paid work in earlier or traditional pre-industrial societies where social status was given by birth or through the channelling of hereditary functions and lineage (Jahoda 1982). In modern times, people have the possibility/freedom to choose what they want to do and to make themselves the person they want to be according to their own tastes, preferences, expectations and beliefs, despite strong cultural and social environmental influences on choice (Cross and Gore 2003). This is the construction of the self as a worker.

While work engagement can be associated in some aspect to the pursuit of happiness and the development of a positive and gratifying self-identity, the reality of work is not always "idyllic". Changing patterns of work in a globalised economy reminds us about the harsh reality of contemporary work conditions: precariousness, increased work demand, insecurity, etc. (Lallement 2010). For example, job dissatisfaction (Notenbomer et al. 2006), dysfunctions in organisational dynamics (MacEachen et al. 2010), and larger systemic and organisational issues (D'Amato and Ziljstra 2010) can play a significant role in the process of resuming work after an occupational injury. Environmental, ergonomic or psychosocial hazards can also have negative health effects (Ahonen et al. 2010). In such a situation, the positive effects of a rehabilitation programme may be dampened by an inauspicious climate at work (e.g. relations with employer/supervisor, relations with colleagues) and are likely to predict longer work absence (Notenbomer et al. 2006). Also, a recent population survey on working conditions and occupational health and safety in Québec (Canada) showed that physical and psychosocial stresses are more prevalent in job categories located at the bottom of the hierarchy (Vézina 2011). Consequently, pre-injury jobs may be considered as an inherent feature of the situational vulnerability to which workers are exposed when elements for a positive meaning for work are not met (Morin 2008).

2.1.3 Work, Construction of Self- and Social Integration

Self is generally defined as the way people see themselves in relation to their personal life expectations and goals and in relation to their social environment (Oyserman 2004). Along with financial security, work activities provide a sense of self-worth, a sense of identity and social role, social relationships and networks (Gill 1999; Godelier 2000; Leufstadius et al. 2009). In terms of social role, the component of coherence in work will fulfil identity, such as who am I and to which group do I belong to that address the sense of belonging and relationship (Morin 2008), or how do I fit in (Oyserman 2004). Self-identity as a worker can change over a lifetime, according to social interactions, personal experience and life circumstances, some of which may be disruptive or even tragic when they affect the sense of self in its projective dimension or how do I see myself in the future (Lawton 2003).

Job loss or prolonged sickness absence due to work disability may take a tragic turn in one's personal life (Docherty and McColl 2003; Johansson and Tham 2006; Shaw et al. 2002). Feelings of self in such a context become entangled with a feeling of "loss", a diminished self, so that a positive self-image must be re-channelled or "rediscovered" (Charmaz 1994).

Rebuilding a positive self-image through illness and healing is an important issue in the process of occupational rehabilitation, and work re-entry may be central in that process (Vrkljan and Miller-Polgar 2001). The meaning of work is set in a similar way in a study in medical anthropology among chronic pain sufferers who were described as active professionals (DelVecchio Good 1992). In this study, work was described as "an arena for self-realisation and effective performance". However, those who are not professionals or those who are working in an adverse or harmful climate might see work in a different way. Also, in a qualitative study performed with workers undergoing cardiac rehabilitation and working on an assembly line in the automobile industry, performance was mentioned but work was also seen as an important life activity and a

part of recovery. Nevertheless, in some cases it was also seen as an undesirable necessity (O'Hagan 2009; O'Hagan et al. 2012).

Another qualitative study found that for injured occupational therapists the meaning of work was associated with helping others, which contributed to having a sense of importance, accomplishment and satisfaction (Alnaser 2009). The concept of centrality of work was again noted: it was described as an opportunity to socialise with co-workers and patients and to further develop relationships (Alnaser 2009). In a context of prolonged work disability, a person may be particularly vulnerable to experiencing at least a feeling of "loss" of self-image, possibly even a collapsing self-image, with no or few acceptable options to replace it (Charmaz 1994). Long-term work absence may lead to identity gap, filled by self-depreciation, loss of significance of previous accomplishment and loss of social relationships (Alnaser 2009; Martin and Baril 1996). Chronic or persistent conditions of illness influence the meaning of life, in general, and provoke a reconsidering of one's own values attached to work engagement, especially when professional identity is strong (Alnaser 2009; Johansson and Tham 2006; Ockander and Timpka 2003). Rebuilding a self-image through illness may then pass through the reconsiderations of life priorities so that work centrality may be reconsidered and social dimension may become more important, such as family, friends and community volunteer work (Coutu et al. 2010; Johansson and Tham 2006; McCloughan et al. 2011; Svajger and Winding 2009).

In terms of reconsideration, Coutu et al. (2010) observed a process called an "illness transformation" through which the illness identity (handicapped, crippled, etc.) was abandoned during the work rehabilitation programme, even when pain symptoms persisted, because these symptoms were now seen as controllable. This illness transformation implies that participants may be mastering pain-coping strategies and that pain may be seen as "normal" even if some aspects of their lives are not, or never will be, "the same as before". However, this "transformation" was only observed in workers who successfully returned to work, after an average of 1 year off work.

Being engaged in work activity and the making of self-image are well entangled in the process of social integration. Social integration is linked to social role, identity and the perception of doing something useful, or being productive in the context of a highly competitive market economy which values commitment, productivity and adaptability, and where the workplace tends to be transformed into a "community" (Baldry et al. 2007; Vrkljan and Miller-Polgar 2001).

2.2 From a Health Perspective, What Is the Value of Work on Health?

From an anthropological and psychological perspective, the centrality of work and the meaning of work have a positive influence on a worker's life. However, from an occupational health and safety perspective, work has been studied in terms of possible hazards to one health. Therefore, one can wonder, "what is the value of work on health after all?" Waddell and Burton (2006) performed a best evidence synthesis covering the literature from 1990 to 2006 on adults of working age, which enabled them to rate a level of evidence regarding the effects of work on health. Their synthesis took into account age, by specifically looking at young adults (16–25 years old), middle working age (25–50 years old) and older workers (50 years old and over). They also included the more prevalent disorders associated with work disability, including mental health disorders, musculoskeletal disorders and cardiovascular disorders. The added value of this synthesis is its neutral assumptions. Compared to occupational health and safety literature, that may see work as a potential hazard and with adverse effects on health, this synthesis searched for the positive and negative effects of work and, ultimately, aimed at analysing whether the benefits outweighed the risks.

When comparing work and unemployment, Waddell and Burton (2006) found strong levels of

evidence that employment is associated with physical and psychological well-being as well as health. In order to have these positive effects the authors stress the importance of a safe work environment. Also, the pay must be sufficient and a low level of job insecurity is needed (Waddell and Burton 2006). It is important to note that some studies have found a healthy worker effect. The effect is that the healthiest workers are more likely to work and experience well-being, when compared to unemployed individuals (Claussen et al. 1993; Hamilton et al. 1993). However, other studies were unable to support this hypothesis (Graetz 1993; Kessler et al. 1989; Mathers and Schofield 1998; Tiggemann and Winefield 1984). For example, when comparing data on school leavers at baseline and 1-year follow-up, those who were employed at 1 year rated higher self-esteem, lower depressive moods and greater adjustment. At baseline, there were no significant differences. In this case, results seemed to have improved for the employed participant rather than having deteriorated among the unemployed participants (Tiggemann and Winefield 1984). A review performed by Mathers (Mathers and Schofield 1998) on the healthy worker effect found some evidence of this effect, but for these authors, a review of longitudinal studies provided reasonable evidence that the lack of employment had a stronger effect than socio-economic status, risk factors and prior ill health.

2.2.1 What Are the Consequences of a Sickness Absence due to Work Disability?

Sickness absence may undermine workers' mental health. In general, studies of individuals experiencing persistent pain due to a musculoskeletal disorder (MSD) have observed mixed anxiety and depressive symptoms (Hellström et al. 1999; McCracken et al. 1999; Naidoo and Pillay 1994; Plehn et al. 1998; Turner et al. 2002; Von Korff and Simon 1996; Walker and Sofaer 1998; Waters et al. 2004). The prevalence of anxiety (35.1% vs. 18.1%, $p<0.0001$) and mood (20.2% vs. 9.3%, $p<0.0001$) disorders among individuals with persistent low back pain is significantly higher than in a general American population (McWilliams et al. 2003). Similarly, in the Canadian population, the prevalence of mood disorders in those experiencing persistent low back pain was 19.8% (Currie et al. 2002). The anxiety component in workers with a persistent MSD is far from negligible. Generalised anxiety disorder (GAD) is 2.5 times more prevalent in individuals with low back pain, i.e. 6.2% vs. 2.5% in the general population of Americans (McWilliams et al. 2004). A population survey revealed a 6.9 times greater risk of having a GAD in individuals with an interview-diagnosed somatoform disorder, after controlling for age, gender, depression, substance abuse and physical comorbidities (Beesdo et al. 2009). In these studies, the level of disability was not specified; however, the prevalence was similar to the Von Korff et al. study (2005), carried out in the context of the National Comorbidity Survey Replication (NCS-R) on 9,282 respondents over age 18. In this study, the prevalence, at 12 months, of respondents reporting chronic pain was 19%. Of these, 6.4% were found to meet the GAD diagnostic criteria according to the DSM-IV, using the World Health Organization's Composite International Diagnostic Interview (CIDI). This study population mainly involved workers, with 76.5% reporting no disability days.

A recent study (Coutu et al. 2013) using participants with a work disability for an average of 1 year and who were actively involved in a 10-week rehabilitation programme found a very high percentage of participants who met the GAD diagnostic criteria. Based on the results of the Worry and Anxiety Questionnaire (WAQ) (Dugas and Freeston 2001), 50% of the participants presented with the symptoms of a GAD as defined by the DSM-IV (American Psychiatric Association 1994). By including the participants with subclinical symptoms, this rate increased by 14%, representing a total of 64% of the sample (Coutu et al. 2013). The subclinical aspect refers to symptom intensity, i.e. that the participants indicated a rating of "3" rather than "4" on a scale ranging from 0 to 8, on the WAQ. Interestingly, despite the presence of high levels of anxiety in

the participants a significant reduction in anxiety levels at both clinical and subclinical levels was observed during the rehabilitation programme, specifically during the first hours of the graduated work exposure (Coutu et al. 2013).

As this study reveals, an additional proportion of workers reported being in distress, when considering the subclinical level of GAD. In fact, many workers may not be diagnosed with a specific psychiatric disorder, but still display significant levels of distress. Distress can be defined as negative reactions to an adaptive demand, which is perceived as taxing and exceeding a person's resources (Dysvik et al. 2005; Haugli et al. 2003; Lazarus and Folkman 1984; Matthews 2000). These reactions include depressive, anxiety and irritability symptoms, as well as cognitive problems (Préville et al. 1992). Many studies have observed greater distress among individuals who are not working (Averill et al. 1996; Ektor-Andersen et al. 1999; Feuerstein and Thebarge 1991; Grotle et al. 2004; Jackson et al. 1998; Magni et al. 1994; Vowles et al. 2004). Also, Jackson et al. (1997) found that even if pain-related factors are important determinants of distress, the characteristics of unemployment, such as perceiving oneself as having less structure and no day-to-day routine through work, predicted more emotional distress in individuals experiencing persistent pain due to an MSD.

When the level of distress was assessed in participants having a work disability for an average of 1 year due to persistent pain, very high levels of distress ($M = 39.15$; SD = 21.38) were found. In the general Quebec population, a score greater than 30.95 corresponds to the 85th percentile, which is indicative of very severe distress (Boyer et al. 1993; Légaré et al. 2000). When compared with normative scores, 64% of the workers had scores over the 85th percentile. Only 16.6% of them were under the mean score (BenDebba et al. 1997; McWilliams et al. 2003) of the Quebec general population (Coutu et al. 2007). In this study, factors associated with high levels of distress included having more than 181 days of absence from work, perceiving high occupational stress, perceiving high disability and higher fear avoidance behaviour. The studies reviewed highlight the association between sickness absence and psychological distress or disorders. Unfortunately, there is little evidence for the mechanisms that could explain the association (Waddell and Burton 2006).

For individuals having a work disability, work re-entry may prevent degradation of psychological well-being and sustain social relationships (Vrkljan and Miller-Polgar 2001). In fact, Waddell and Burton (2006) have found strong evidence supporting an improvement in well-being (Ferrie et al. 2001; Kessler et al. 1989). However, in order to have a positive impact, the workplace must have health policies to manage absenteeism and return to work (NICE 2009a, b; Pomaki et al. 2010; Seymour and Grove 2005; Waddell et al. 2008). When the conditions are optimal, getting back to work may become a healing and recovery process, restoring lost social bonds and reinserting individuals into a valued social existence (Vrkljan and Miller-Polgar 2001).

Expert opinion tends to view work as therapeutic for people with disabilities since it promotes recovery and health outcomes and may reverse the negative consequences of being on sickness absence (Waddell and Burton 2006). In a qualitative study, work was defined as a means toward a therapeutic end, but, for musculoskeletal patients, it was considered as "a haven from pain and loss" and as "a vehicle for control over the intrusiveness and daily intrusiveness of pain" (DelVecchio Good 1992). Other studies have not found a direct link between return to work and well-being or quality of life (Franche et al. 2005; Guzman et al. 2001). Several hypotheses can explain the lack of association. First, it depends on the timing of the assessment. When work-disabled individuals are assessed during their first week of full return to work, they may still be in an adaptation period and, therefore, have not fully reached recovery and optimal quality of life. In fact, a population-based study found higher levels of distress in the first 6 months of an employment transition (Benzeval et al. 2005). Moreover, there are currently no gold standard measures of quality of life. Many health-related quality of life instruments are available, but these focus on health and functional status (Farquhar 1995).

However, in the case of musculoskeletal disorders, the consequences go well beyond the dysfunction (Wood-Dauphinee 2001). When assessing a dynamic construct such as quality of life, a valid instrument should capture the possible shift in the person's perspective in terms of personal priorities and goals (Plehn et al. 1998). The Quality of Life Systemic Inventory quantifies the gap between a person's present state and the state they aspire to, as well as his or her perception of the impact of the disease. It also takes into account whether a person is moving away from or toward the aspired situation. Using this inventory, a study found in individuals who successfully returned to work an improvement in their quality of life, when compared to the beginning of the work rehabilitation programme (Coutu et al. 2005). Another study using the same inventory was performed with individuals at an average of 6 months post-discharge from work rehabilitation. Working participants had better quality of life domains requiring physical capacities, such as house maintenance, physical health and leisure, when compared to nonworking participants having similar income and educational levels (Moliner et al. 2007). To increase the level of evidence about the therapeutic nature of work, future studies adopting the perspective of the worker should consider using longer follow-ups, such as 1 year after discharge from the work rehabilitation programme. Also, quality of life outcomes need to be carefully considered to take into account the dynamic nature of this concept.

2.3 From a Clinical Perspective

2.3.1 Workers' Representations of Pain and Disability Embedded in a Social Context

When considering the whole worker and taking into account the self and the interaction with the environment, it is important to go beyond the workers' beliefs about the disease and consider the work disability representations. In this regard, a study of 1,591 patients with low back pain revealed that pain representations constitute a better predictive factor for disability than do fear avoidance, catastrophism and depression (Foster et al. 2010). Moreover, the results of a systematic review of the literature on "illness" representations suggest that they could impact the work participation of patients suffering from somatic diseases. "Illness" refers to the subjective experience or personal perception of the presence of a disorder, discomfort, functional limitations and distress (Toombs 1987). Therefore, workers may still report pain, even if the initial injury no longer shows objective signs of "disease". An injured worker experiencing work disability resulting from persistent pain could thus be considered "ill" but not "diseased". Differentiating between "illness" and "disease" may seem to be too much detail. In practice, however, it may help explain gaps in understanding and miscommunication between health care professionals and patients/injured workers, since each has their own perception of reality (Courvoisier and Mauron 2002). For example, a physician may not see any sign of a specific disease for a persistent pain and conclude that the patient can start an interdisciplinary work rehabilitation programme. Conversely, the patient may feel the physician is not taking him seriously because the patient is in an illness paradigm when he observes that pain intensity did not decrease as expected. The patient may see the pain as "abnormal" and begin to worry about the duration of the pain and its consequences. Therefore, workers may start to look for answers to eradicate the pain, by searching for second opinions or asking for additional tests (Coutu et al. 2010). A negative emotional experience with health care professionals was also found to be an important obstacle to return to work in low back pain patients (Svensson et al. 2003).

Based on the common-sense model of self-regulation of health and illness (Leventhal et al. 2003, 1980), patients will create their own representation/understanding of their illness, based on varying sources of information, then develop an action plan to resolve the situation and, lastly, assess whether the gap between their current situation and their target goal has increased or decreased (Leventhal et al. 2003). An illness representation is defined as all the thoughts, beliefs

and attitudes associated with (a) the perceived diagnosis and symptoms (Leventhal et al. 1984); (b) the causes of the illness (Leventhal et al. 1992); (c) the course of the illness (acute, cyclical or chronic); (d) the illness' immediate and long-term consequences (Croyle and Jemmott 1991); and (e) the control exerted over the illness, including treatment (Bandura 1977) and self-efficacy expectancies (Bandura 1977, 1997), and the actual skills required to cope with the situation (Leventhal and Diefenbach 1991). Self-efficacy is defined as the belief a person has in his or her own abilities to successfully adopt a behaviour regarded as necessary to attain a given result (Bandura 1977, 1997). Self-efficacy is one of the best-known and most frequently investigated concepts in the field of behaviour change in health psychology (Kaplan and Simon 1990). A person's self-efficacy will affect the choices and efforts made, response to stress and persistence shown in the face of difficulties (Bandura 1977). Work-related self-efficacy, which is the belief that one is able to successfully return to work, was found to be a main determinant of return to work in low back pain patients after 2 years of follow-up (Dionne et al. 2004).

The components of illness representations are shaped by prior illness episodes experienced or witnessed by individuals and by their perception or anticipation of somatic sensations. Their interaction with the social environment, including friends, family, health professionals and the media, will also have an important influence (Leventhal et al. 2003). Representations help us to understand people's reasoning behind their behaviours. This reasoning process is not necessarily "rational" as it can be based on various experiences and conflicting information. Therefore, the originality of the common-sense model of self-regulation lies in the fact that it allows for a decentralising of the individual perspective and allows for its relocation in the context of broader personal experience by integrating environmental factors such as work, family and social network. Previous studies have found illness representations of various diseases, as defined by the common-sense model of self-regulation, to be associated with the degree to which patients adopted health behaviours (Buick 1997; Heijmans 1999; Moss-Morris et al. 1996; Petrie et al. 1995, 1996; Scharloo and Kaptein 1997), substantiating the validity of the model.

In health psychology, illness representations are also referred to as illness schemata or illness prototypes (Baumann et al. 1989; Bishop 1991). These studies identified three implicit rules of illness that help a person to assess if she or he is "ill". The first *symmetry rule* refers to the need to have symptoms associated with a diagnosis and vice versa (Easterling and Leventhal 1989; Meyer et al. 1985). The patient's need for symmetry helps explain why they may not report being ill or comply with treatment recommendations if they feel they do not have the symptoms of the condition. Conversely, workers may experience symptoms of a work-related musculoskeletal disorder (WRMSD), but no specific diagnosis can be given. This can trigger the search for a diagnosis for the worker and further promoting miscommunication between the worker and a health care professional. The second *age-illness rule* (Croyle and Jemmott 1991) was identified by Beaton et al. (2001). Workers having a WRMSD did not define themselves as ill because they associated their low level of pain with the normal aging process. The third *duration rule* (Mora et al. 2002) was also observed in Beaton et al.'s study: participants mentioned being ill after experiencing long-standing and intense pain. What is interesting in Beaton et al.'s study (2001) is that participants experiencing a WRMSD did not necessarily define themselves as ill. When describing an illness, many stated influenza (the "flu") as the classic example of illness because it encompasses several characteristics used to define the state of sickness or the signs of illness (Baumann et al. 1989; Bishop 1991; Coutu et al. 2011). The main characteristics defining an illness are identified as having specific and circumscribed symptoms that could be associated to a diagnosis and time frame, if the illness is not chronic (Baumann et al. 1989; Coutu et al. 2011). With a diagnosis also comes social legitimacy, allowing the person to withdraw from responsibilities, such as work.

As in Beaton et al.'s study (2001), another qualitative study conducted with individuals

having a work disability, on average, once per year also found that participants did not define their current WRMSD as an illness. However, in the latter, representations of health and illness were generally found to be important (Coutu et al. 2011). In fact, they served as a guide and point of reference in the workers' discourse related to their current state and to their rehabilitation trajectory. In fact, in Coutu et al.'s study (2011) the workers saw health as a state which, more often than not, depicted them in the pre-injury stage or in the future they aspired to at the end of the work rehabilitation process. Illness was also seen as a state representing them during the period immediately following their injury. The components of this representation then served as reference points for evaluating the evolution of their current WRMDS. For example, participants who noted that fishing and other leisure activities were consequences of health used these activities as a reference point when asked whether their situation had improved. Health and illness representations are, therefore, more than just attitudes (Radley and Billig 1996). Consequently, a clinician needs to understand the injured worker's reference point, since it will serve as a comparator in assessing if he/she is reducing the gap between the actual situation and the aspired goal (e.g. fishing, holding grandchildren, being able to work overtime). By systematically assessing the worker's health, illness and current WRMSD representations, clinicians can avoid imposing their own representations, such as the level of culturally contextualised independence and autonomy. In fact, differences have been found in East Asian culture where independence and autonomy do not emerge in health representations (Iwama et al. 2009; Kondo 2004). On the other hand, in Western society independence and autonomy have been identified as important themes in the discourse of participants having a work disability problem due to an MSD, a stroke or a severe mental health problem (Chan and Spencer 2004; De Souza and Frank 2011; Laliberté Rudman 2002; Soklaridis et al. 2011).

In various studies over time with various populations, health and illness have been represented as a functional model (capacity/incapacity; independence/dependence) (Coutu et al. 2011; Herzlich 1969; Radley and Billig 1996). In this model, the level of activity constitutes an important indicator of illness (Coutu et al. 2011; Herzlich 1969). In Radley and Billig's study (1996), illness was directly related to employment status, namely, sickness absence was an indicator of illness. However, Coutu et al. (2011) revealed a more complex view. Participants who were work disabled with a prolonged sickness absence found themselves in-between classical health and illness. The important message here is that when workers experience pain or work disability, it does not necessarily mean that they do not consider themselves healthy. Their perception of their health will rely on the results of weighting capacity/incapacity or autonomy/dependency in their functional model.

As mentioned, representations are built through interaction with the environment. Thus, representations that are incongruent with the current illness episode can trigger a disruption in a person's life trajectory (Bury 1982). A disruption may be defined as a turning point that may provoke discontinuity in the person's daily routine (Becker 1997). This may lead patients to doubt their own representations, which they previously accepted without necessarily going through a conscious process or systematic thought (Baril et al. 1994; Jodelet 1989). This disruption may, therefore, force the individual to develop new strategies to cope with the situation (Bury 1982). From a clinical perspective, this disruption may constitute a good opportunity for an intervention designed to introduce new adaptive behaviours that may contribute to reduce work disability. However, the strategies used by the clinician must make sense to the worker for them to adhere to the recommendations (Coutu et al. 2012). It is thought that the positive results observed by the worker may then help change the representations of the current WRMSD (Coutu et al. 2010). In fact, in Coutu et al.'s study (2010), workers who returned to work after work rehabilitation reported that on beginning the work rehabilitation programme, they experienced positive results in their physical capacities and in their tolerance or reduction of pain intensity. These workers

experienced a new way of thinking and changed their current representation of pain. This reconstruction of meaning helped them "rationalise their experience" (Herzlich 1969) and, in retrospect, find some overall sense to their pain and their episode of long-term disability. Participants who failed to return to work did not find any sense in their current experience. They did not differ in terms of type of job, but more workers who did not return to work had a perception that the legitimacy of their pain was questioned.

What would, therefore, be the relation between the meaning of work and the meaning of illness, especially when the latter disrupts the personal life and jeopardises future plans? Anthropology and sociology of health and illness explored religious/spiritual coping (Johnstone et al. 2006; Thuné-Boyle et al. 2006) to help people "normalise" and endure pain and impairment with serenity instead of fostering anger and resentment (Lofvander 1999). In psychology, the concept of resilience is also emerging as a social concept, where the environment, such as the community and social environment, may be an important facilitating factor that helps the worker bounce back from the work disability episode (Anaut 2005). This needs further consideration to better understand the return to work process, intentions, motivations and behaviours at the interface between inner psychological, socio-economical, political and cultural processes.

Gender issues are, among others, one interesting path for exploring the return to work process. It has been noted that gender role identification may delay RTW (Côté and Coutu 2010). As pointed out by (Ockander and Timpka 2003), gender role expectations may take a different tangent, with women often expected to be a mother, a spouse, as well as a (productive) worker. In a situation of long-term work absence, it is not clear which of those "identities" will prevail when the reconstruction process is in progress, and the centrality of work (and therefore the therapeutic value of work), regardless of financial incentives, is not at all clear. As a result, conflicting values in the meaning of work and the meaning of other socially rewarding activities may influence the return to work (Ahlgren and Hammarström 2000; Baldry et al. 2007; Ockander and Timpka 2003). Depending on the values attached to one or the other, the portion of time allowed to full employment may also vary (Ahlgren and Hammarström 2000; Ockander and Timpka 2003). It is not clear what counts for being therapeutic in that context, but a positively reconstructed post-illness self may be valued as therapeutic, in itself.

2.4 Concluding Remarks

The aim of this chapter was to look at work and its influence on the worker. From a health perspective, work is a positive value for health and well-being, specifically when it provides good working conditions. Various studies have found that being on prolonged sickness absence, because of a work disability, is associated with greater psychological distress and disorders. From anthropological and psychological perspectives, various meanings have been attached to "work" through the ages, from one society to another and from various sets of predisposing conditions. From an anthropological point of view, the cultural category of "work", as a category of meaning, is grouped with categories such as "leisure", "family", "education", "socialisation", "health and welfare", "sickness", "ideas about nature and man" or "religious practices", among others (Bernard 1995), and may be subject to variations from one society to another as well as from one individual to another within the same cultural environment. Possible conflicts between work and family have been raised, and solutions proposed in the light of *work-family balance* (Gustafsson-Larsson and Hammarstrom 2005; Rossi et al. 2009). Religious values may also provide workers a set of normative representations about duty and commitments encompassing one's own work activities and the socio-environmental settings that allow some types of meaning to develop. The meaning *of* work and the meaning *at* work encompass this dimension where work demand, work relations, work autonomy and, as Morin puts it, coherence between the workers' expectations, values and

the actions they perform at the workplace exist (Morin 2008).

Work plays an important role in the making of self-identity, well-being and personal expectations in life. In the context of a changing world of work and economic uncertainty, individuals may feel more vulnerable and powerless toward the "quirks" of the market economy (e.g. downsizing, delocalisation, flexible hours and contract jobs). It means that a strong identification to work may force the workers to reconsider who they are and what they expect when passing through the adverse feeling and financial insecurity of a job loss. Is the meaning of work to change through that process? Is the meaning of work to change the same way in the adversity of a chronic illness? Is the meaning of work to change the same way when illness conditions are due to an occupational injury? Are there other elements to build one's own identity upon? In the post-modern time, the centrality of work is challenged, and people attach core and structuring meaning to other dimensions of life equally quoted as significant and socially valuable.

In the context of a prolonged sickness absence due to a work disability, workers may experience a disruption in their illness representations that might have not been previously questioned. How they will be accompanied in the process of giving new meaning and coherence to their current work disability will have great impact, and the influence of work and other social agents in the workers' life will be important.

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Work Absenteeism and Productivity Loss at Work

3

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This chapter will present principles of economic evaluation of disability, sickness absence, and productivity loss at work (also called presenteeism). Relevance and policy questions regarding health-related production loss are discussed.

3.1 Introduction

The economic consequences of illness and disease have emerged as a key area of research, whereby cost of illness studies have invariably reported that the disease of interest will result in considerable costs due to disability, sickness absence, and productivity loss at work. One of the first studies on societal costs due to back pain estimated the total costs to be approximately 4.2 billion euros (1.7% of the Gross National Product) in the Netherlands, whereby back pain was the fifth most expensive disease for medically related costs and most expensive for indirect costs due to sickness absence and work disablement (van Tulder et al. 1995). The indirect costs (hereafter called productivity costs) contributed 93% to total costs, illustrating the importance of the consequences of disease for work performance. An update showed that the total costs decreased from 4.3 billion euros in 2002 to 3.5 billion euros in 2007, which corresponded to a decrease in the share of the Gross National Product from 0.9 to 0.6% (Lambeek et al. 2011).

Various studies on different diseases have shown similar results. A cost of illness study on asthma in Germany reported high costs for the German social insurance system, with productivity costs amounting to 75% of total costs and payment of sick benefits through the sickness funds amounting to 58% of these indirect costs (Stock et al. 2005). In a large study on almost 400,000 workers in the USA the direct and productivity cost were estimated for ten common health conditions. The productivity costs substantially exceeded the direct costs for all but one disease (heart disease). Within the productivity costs categories productivity loss at work while being limited due to a disease were far more important than sickness absence and short-term disability. In fact, these so-called presenteeism costs represented 18–60% of all costs for the ten conditions (Goetzel et al. 2004). A recent review of three studies indicated that for 18 different diseases presenteeism contributed between 14 and 73% (average 48%) to the total direct and indirect costs (Schultz et al. 2009). This chapter also demonstrated that studies on costs of illness may present widely varying results due to the methods used and the definition of indirect costs. Whereas the earlier studies have limited indirect costs to sickness absence-related costs, more recent studies have also incorporated presenteeism in indirect costs.

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_3,

These studies have demonstrated the importance of considering productivity costs in economic evaluations of provisions of (occupational) health care, such as return to work programs. In general, cost-effectiveness analyses are determined largely by the productivity costs and, thus, their appropriate assessment in economic evaluation is of paramount importance. However, the comparability across cost of illness and cost-effectiveness studies is hampered by substantial differences in costs items considered, methods used for measuring sickness absence and presenteeism, and actual valuation of, for example, a day absent from work.

This chapter will present principles of economic evaluation of disability, sickness absence, and productivity loss at work. First, some basic concepts and definitions are discussed in Sect. 3.2. Section 3.3 further explores the relevance of elements of productivity loss in specific counties and disease categories. Section 3.4 describes and comments on the important methodological debates regarding the valuation of productivity costs, whereas Sect. 3.5 addresses the perspective of the analysis. We conclude with a brief discussion and research agenda in Sect. 3.6.

3.2 Some Basic Concepts

A central concept in this chapter is the term productivity costs. In health economics in general and especially in the field of economic evaluation of health care and occupational medicine, we define productivity costs as "the costs associated with production loss and replacement due to illness, disability and death of productive persons, both paid and unpaid" (Brouwer et al. 1999). Although the definition above refers to paid and unpaid work, in practice, most research focuses on productivity costs related to paid work.

Productivity costs can be substantial when illness and treatment affect the productivity of workers. Productivity costs are present in the following circumstances:

- In case of unscheduled absence from work (due to health problems)
- In case of reduced productivity at work: one might work with health problems that will constrain and limit a worker to carry out his regular activities and, this may lead to a lower productivity (also called efficiency loss or presenteeism)
- In case of permanent disability to work
- In case of death (before the age of retirement)

Normal functioning at work, absenteeism, and presenteeism can be interrelated. Brouwer et al. (2005) showed (see Fig. 3.1) that presenteeism often occurs before or after absenteeism, when health problems do not completely inhibit workers being productive at work. Presenteeism is also relevant for return to work programs, when partially recovered workers return to their work place, as illustrated by Lötters et al. (2005).

Productivity costs are sometimes also called indirect nonmedical costs, as these costs represent a more indirect economic consequence of disease, which become manifest outside the health care sector. (For comparison, hospital treatment costs for a disease are a part of the so-called direct medical costs.) However, for clarity we prefer the term productivity costs.

In economic evaluation studies that analyze the cost-effectiveness of occupational interventions, several perspectives can be taken, i.e., the societal perspective, governmental perspective, firm perspective, or workers' perspective (Drummond et al. 2005; Tompa et al. 2008) (see Chap. 23). For economic evaluation studies of health care programs Drummond et al. (2005) strongly advise to use the societal perspective, as the costs and benefits of health (occupational) care programs often affect several actors in society (differently) and are often financed by public resources.

All perspectives have to deal with prospects and consequences. By now some workplace-based intervention studies undertake economic analyses (Tompa et al. 2008). Most of these economic evaluations of workplace interventions were conducted from the perspective of the firm/company (Tompa et al. 2008). This is understandable, as the employer is an important stakeholder, who in the case of sick workers is primarily confronted with productivity losses and costs to maintain the production. However, as productivity costs might depend on eligibility criteria of social security benefits and allocation

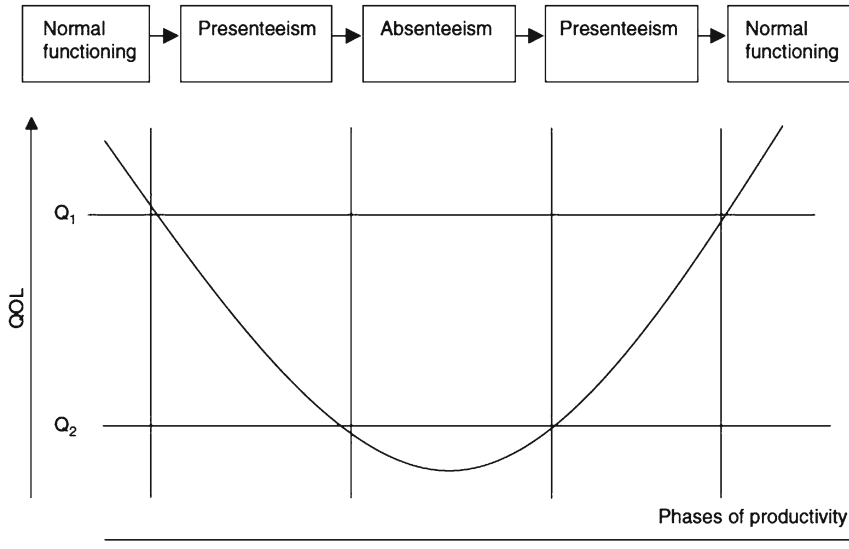

Fig. 3.1 An illustration of the possible relationship between productivity and QOL. Q_1 represents the level of health above which a person is fully productive and below which one experiences presenteeism (i.e., a person is present at work but with reduced productivity); Q_2 represents the level of health below which a person will be absent from work

of these costs to different stakeholders, and are also influenced by access and quality of occupational health and health care (that may fall on other actors than the employer), it is in general advisable to take the societal perspective. However, the cost of productivity losses as an argument/motivator to change policies and implement occupational health interventions makes the individual and company perspectives also important because these stakeholders have different interests or do not have the same benefits. The situation may even be more complex in North American and Australian jurisdictions, where responsibility for costs depends on work-relatedness of the illness and work accidents and occupational disorders are being separately dealt with by Workers Compensation Boards (WCB). In these jurisdictions, the employer may be charged back for disability following experience rating, depending on the number and severity of previous work disability cases. Also, a worker having a very reduced productivity level due to an occupational accident or disorder may be less costly "at work" than absent as his/her salary is not augmented by supplementary charges from the WCB: presenteeism with zero productivity is less deleterious from the perspective of the employer than absenteeism and is much less costly from the perspective of the WCB (see Chaps. 12 and 10).

3.3 The Relevance of Productivity Losses and Costs

During the last decades abundant material has been published, demonstrating the large amount of productivity losses and associated costs related to illness. We cannot discuss all evidence, but we will summarize the main highlights, illustrated by results of recent research.

3.3.1 Absenteeism

In an extensive study by the OECD it appears that worldwide the absence from work in general varies between 1 and 7% of total working time (OECD 2010). The Nordic European countries show the highest absence rates, e.g., Norway almost 7%, Sweden 5%, and Finland 4–5% belong to the top three (OECD 2010) (see Chap. 1).

Absenteeism as a result of health problems is clearly most prominent for musculoskeletal disease (mainly back pain) and mental disorders (especially depression) (Goetzel et al. 2004). For example, McDonald et al. (2011) reported that among US workers with musculoskeletal pain 7% lost workdays due to absenteeism. In the Netherlands, 46% workers with low back pain being treated by a physiotherapist were absent at least one day from work during the previous 6 weeks (Hoeijenbos et al. 2005). From patients with subthreshold depression, Smit et al. (2006) estimated the mean annual costs of absence from work to be 3,279 euros. Another example of the prominence of mental disease is bipolar disorders. Almost half (43%) of the patients experiencing this disease were absent from work (on average 55 days per year), resulting in US$ 3,037 productivity costs per person (Hakkaart-van Roijen et al. 2004). For other diseases that constitute a smaller proportion of sick leave in most occupational groups, less detailed information is available from some studies (Goetzel et al. 2004; Schultz et al. 2009).

3.3.2 Reduced Productivity at Work

The magnitude of reduced productivity at work (i.e., presenteeism) due to health problems is not negligible. In an extensive review, Schultz et al. (2009) reported two nationwide studies among workers with chronic health problems, and for 11 out of 18 diseases presenteeism exceeded 50% of to total costs. About 22% of respondents in these studies reported some time lost to nearly one-third of adults whose health problems interfered with their work tasks.

Brouwer et al. (1999) reported in 1999 among workers in a trade company that 7.9% had reduced productivity during a week. Nonetheless, this resulted in less than 1% of working time lost. Meerding et al. (2005) found that 12% of workers in high physical load jobs had reduced productivity. Among those with productivity loss the average lost work time was 2 h per day. For patients with low back pain being treated by a physiotherapist, 52% reported reduced productivity at work, which resulted in 2 h production loss per day (Hoeijenbos et al. 2005). For the USA, McDonald et al. (2011) reported that 30% of workers with musculoskeletal pain were less productive at work.

The average annual costs due to lower productivity at work for patients with subthreshold depression were estimated to be 3,175 euros (Smit et al. 2006).

In a study by Lötters et al. (2005) among Dutch industrial and health care workers, loss in productivity was measured after returning to work fully in the regular job after a substantial sick leave period (median 84 days). Among those with self-reported productivity (using the QQ method) (Brouwer et al. 1999; Koopmanschap 2005) the median of productivity loss on an 8-h working day due to MSD was 1.6 h shortly after RTW.

A worse physical health, more functional disability, and a poorer relation with the supervisor were associated with the presence of productivity loss shortly after RTW (Lötters et al. 2005). These findings correspond to the presenteeism preceding and following absenteeism as illustrated in the beginning of this chapter. Productivity losses might occur due to the fact that the worker is not fully recovered, despite the fact that he has regained his normal working activity.

All these studies have shown that presenteeism contributes substantially to the estimated total costs of disease among workers. The comparability across studies is poor, since methods of lost productivity and associated costs vary substantially and are also influenced by local and national arrangements with regard to compensation for illnesses and diseases.

3.3.3 Permanent Disability

Data on permanent disability differ substantially across countries, as a result of variation in social security arrangements. Social security arrangements (such as for unemployment or early retirement) may act to some extent as communicating vessels depending on specific eligibility criteria.

As with sickness absence rates, the Nordic European countries also show high disability

benefit rates going from 7 to 10% of the working force (WHO 2010). This is reflected in the high proportion of GDP spent on disability and sickness compensation. While the OECD countries spent on average approximately 1.9%, Norway, Sweden, and the Netherlands are clear outliers with 4.8, 3.6, and 3.7%, respectively. Compared to countries such as Canada (0.5%) and United States (1.7%) this is certainly high (see Chap. 1).

Given the importance of absence from work and reduced productivity at work as shown above, it is very surprising that a recent meta-analysis of economic evaluation studies of health care interventions targeted at patients with depressive disorders showed that only 25 out of 81 studies included productivity costs (Krol et al. 2011). As outlined in the introduction, the decision whether to include presenteeism in productivity costs has also compromised comparisons of cost of illness studies across different diseases. However, given the importance of productivity costs, we expect that the number of economic evaluation studies including both sick leave and productivity loss at work will increase in the nearby future.

3.4 The Price Component of Productivity Costs

After correct measuring and estimating, productivity loss due to health problems should preferably be valued in monetary terms, in order to facilitate comparison of costs across disease categories and intervention programs.

The monetary valuation of productivity loss has been the subject of considerable debate during the last decade (Koopmanschap et al. 1995; Brouwer et al. 1997). Thus far no complete consensus exists among health economists with respect to the best approach. The debate on valuation of sickness absence and disability focuses on the duration of economic consequences to be considered, as exemplified in the human capital and friction cost methods. With respect to the valuation of sickness absence as well as productivity loss at work another debate centers on compensation mechanisms, whereby productivity is not (completely) lost but shifted towards a later period or towards other workers. Hence, we first present the two main methods used to value productivity losses and then discuss compensation mechanisms.

3.4.1 The Human Capital Method

The human capital method values total production lost due to illness, disability, or premature death by calculating the total period of absence (or disability or from death until the retirement age) and subsequently multiplying this by the wage rate (or an average expected wage rate for the relevant period) of the absent worker.

The mainstream neoclassical economic theory suggests that the productive value of a worker equals his or her wage rate, at the margin. Since in the cases of disability or death the patient is absent for a long period of time, the cost calculations in these cases will be especially high. Replacement of workers is not considered to reduce productivity costs at the societal level in this method, since full employment is assumed.

In particular, cost calculations for premature death and disability yield very high results in this method, and several authors have argued that the estimations of productivity costs calculated with the human capital method would be a maximum estimate, estimating possible productivity costs rather than actual productivity costs (Koopmanschap and van Ineveld 1992).

3.4.2 The Friction Cost Method

The criticism of the human capital method is that it ignores the possibility, at the societal level, that an absent worker is replaced, and this induces the development of the friction cost method (Koopmanschap et al. 1995).

The essence of this method is that absent workers will be replaced after an adaptation period (the friction period), and in this way further production losses may subsequently be prevented. The friction period was assumed to be equal to an average vacancy period, the period it

takes to find a suitable replacement of an absent worker on the labor market, plus an additional period (roughly estimated as 4 weeks) allowing employers to start searching on the labor market and training after hiring a new employee (Koopmanschap et al. 1995). Recently, Erdogan, Koopmanschap, and Bouwmans estimated the friction period in five European countries in 2008 to be between 60 and 95 days (Erdogan submitted). The value of the production losses is not estimated by using wage rates, but by estimating the added value of a worker. After the friction period, there are no additional productivity costs, except for longer-term macroeconomic costs, as relatively high national levels of absence and disability from work might raise labor costs per unit of production which lowers competitiveness on the world market, limiting export and economic growth (Koopmanschap et al. 1995). Zhang et al. (2011) commented that the friction cost method is not an alternative for the human capital approach (as suggested by some authors), but a refinement, as it adjusts for worker replacement in a friction period. Whether adjustment or refinement, it should be noted that the estimates of productivity costs differ substantially between these methods; see for example Koopmanschap et al. (1995). (For details on friction and human capital methods, see Chap. 4.)

3.4.3 The Debate on the Length of Economic Consequences

The proponents of the human capital approach and the friction cost method discussed the way to value productivity costs in the health economic literature. The main critical remark regarding the friction cost method was that it would not value the scarce time sacrificed by the person who replaced the sick worker. However, the friction cost method assumes that the leisure time sacrificed by the formerly unemployed person who takes up a new job to replace a worker fallen ill will be valued in terms of quality of life. At the level of society, the amount of leisure time remains the same (the sick worker has more leisure time, the replacer less). The fact that the sick worker might be less able to enjoy this increase in leisure time fully is being captured in terms of quality of life. For further details on this discussion, see for example Weinstein et al. (1997), Brouwer et al. (1997), and Zhang et al. (2011).

3.4.4 Compensation Mechanisms

It is crucial to understand whether the two main valuation methods as discussed above may lead to different approaches to measure and value the elements of productivity costs, especially short-term absence from work and reduced productivity at work. Both approaches need information on frequency and length of absence from work due to disease and, when relevant, reduced productivity at work. However, the friction cost method leaves open the possibility that work lost during short-term absence might partially be compensated by the sick worker after return to work or by colleagues. Hence some authors ask patients/workers questions regarding these compensation mechanisms (Jacob-Tacken et al. 2005). Incorporating these compensation mechanisms further lowers estimates of productivity costs. On the other hand, authors as Pauly et al. (2002) state that absence of specific crucial workers (e.g., in small teams) might have multiplier effects on productivity of others. This would imply that productivity loss/costs due to absence of one worker could be higher than the value of his/her individual production. When this is relevant in specific cases, measurement instruments for productivity loss should take this into account.

Another element of the working situation of the sick worker that might affect the magnitude productivity loss/costs is the relevance of deadlines. The more important the deadlines, the less possibilities to postpone work or compensate work loss at low cost (Pauly et al. 2002; Nicholson et al. 2006). Meeting deadlines in case of illness might necessitate labor reserves within organizations, which also has costs.

Also workplace-related factors have shown to be related to productivity loss in general (absenteeism and presenteeism), such as lack of control

on the job, relation with the supervisor, thermal climate, lightning condition, and regular disturbances (Alavinia et al. 2009; Lötters et al. 2005; Niemela et al. 2002, 2006). Although work-related factors surely are important to consider when taken into account, productivity loss, the severity of health problems, and work limitations to these problems seem to have more effect on productivity loss (Alavinia et al. 2009; Lötters et al. 2005; Meerding et al. 2005).

3.4.5 Presenteeism

Reviews about measuring presenteeism show that several different measurement instruments are commonly used (Mattke et al. 2007; Zhang et al. 2011; Schultz et al. 2009), which generate widely varying estimates of productivity loss (Zhang et al. 2011). On the basis of the collective opinion of stakeholder representatives (using the Delphi method), recommendations for estimating the cost of productivity loss across all types of health problems from a company's perspective have been formulated for presenteeism. The core recommendation is to determine the volume of work loss, and subsequently multiply this volume by an average or function-specific (daily or hourly) salary. Furthermore it is suggested to add the cost related to coworker overtime, if paid out, and to subtract the amount of normal working hours that direct coworkers take over work from their less effective colleague as a buffer (Uegaki et al. 2007).

This brings about another discussion around presenteeism, namely whether or not it is feasible to monetize the measure of productivity due to presenteeism loss in a valid and precise way (Schultz et al. 2009). As appeared from the above-mentioned Delphi study by Uegaki et al. (2007), several corrections can be applied on the costs and consequences calculated from presenteeism; furthermore, other studies additionally have indicated that other factors such as teamwork determine the magnitude of the consequences of presenteeism (Pauly et al. 2008). So the effect of productivity loss might have different implications in different work settings; this hampers a valid uniform measurement of productivity loss, especially the presenteeism part.

A related complicated question is how to handle long-term presenteeism. In case of chronic diseases, workers might be working structurally below normal standards. According to the human capital approach, one might hypothesize that the wage of such workers might be adjusted downwards, in order to match their lower productivity. Applying the friction cost method, it probably depends on the employer's response. If the employer observes the reduced productivity (sooner or later), he might try to reduce the wage (or fire the worker) and/or look for another (part-time additional) worker, who can make up for the work loss. The amount of productivity costs involved will depend on many circumstances, among which the flexibility of the labor market and the level of unemployment.

There is evidence of a clear downward trend in career development for people with a health problem. Considering certain chronic (or long-lasting) diseases such as depression, rheumatoid arthritis, and diabetes, it shows that there is clear work disability due to these diseases (Adler et al. 2006; Baanders et al. 2002; Tunceli et al. 2005; Lavigne et al. 2003; Ng et al. 2001). For instance, for diabetes this work disability is due to fatigue and concentration problems, having to perform shift-work and suffering diabetes complications (Baanders et al. 2002; Tunceli et al. 2005; Lavigne et al. 2003; Ng et al. 2001).

Eventually, these health problems might even lead to a structural lower number of working hours as compared to workers without a chronic health problem; this indeed was shown in a comprehensive research among OECD countries conducted by the OECD (WHO 2010). From this study it appeared that when employed, persons with disability work part time more often than other persons in paid employment (10% points) (WHO 2010).

Another problem around measuring presenteeism is the correlation real-time measured productivity loss. Only a few studies measured actual production output and related that to self-reported

measures of presenteeism. In a study among floor layers by Meerding et al. (2005), using the QQ scale (Brouwer et al. 1999), it was shown that actual production output was significantly correlated with the mean self-reported productivity of the team ($r=0.48$). However, in the same study it was not feasible to measure the individual production of members of road pavers teams (3–6 persons), which illustrates the complexity of measuring individual production in many work settings. In a study by Lerner et al. (2003) among call center employees using the Work Limitation Questionnaire (Lerner et al. 2001) as a measure of productivity loss, it was found that every 10% increase in the job limitations reported with the WLQ, the actual production output declined approximately 4–5%.

3.4.6 Expenditure on Social Security as Proxy for Costs?

It might seem sensible to use the amount of social security benefits paid related to absence and disability as a proxy of societal productivity costs. However, this is not advisable, as the premiums and benefits are just transfer payments, a redistribution of wealth within society from premium payers to benefit receivers. For society at large, this does not represent an economic loss or gain. What *society* really loses when workers get ill and work disabled is the value of production loss, which decreases wealth and increases the scarcity of societal resources (Drummond et al. 2005). Besides this redistribution of wealth within a country it needs to be emphasized that social security systems across countries differ. Costs, benefits, and incentives to return to work (for both employer and employee) can be very different and subsequently will influence the time-window in which this takes place. For example, in the Netherlands the employer pays 2 years of sick pay before the social security benefit comes in. So, the incentive for an early return to work largely falls on the employer. The costs made in this regard are often not allocated as being societal costs.

3.5 Productivity Costs, Whose Concern?

In economic evaluation studies of health care programs, taking the societal perspective is advocated (Drummond et al. 2005). As a consequence, productivity costs, when relevant, should be included in studies that address the cost-effectiveness of health and occupational interventions. Within health care this is quite straightforward, as the users of these economic evaluation studies are policymakers, who have to decide whether to include an intervention in the basic benefit package that is financed by taxes and/or social security contributions (i.e., public resources) (see Chaps. 12, 4, and 23).

But, when the Minister of Health has to choose between a saving of ten million euros on the health care budget or a saving of ten million euros in productivity loss (for society's wealth at large it should make no difference), the minister might prefer the budget saving. This balance might only be shifted when other parts of the government (or employer organizations) underline the importance of the productivity gain. When looking at occupational interventions, the benefits of an intervention might be twofold: better health for the workers and productivity gains for the employer. When the productivity gains are substantial and the intervention is not too expensive, the cost–benefit ratio might be positive for the organization, which can view it as a sensible private investment. In case of net costs and health gains, the intervention might be cost-effective for society (it costs, e.g., only 3,000 euros per QALY gained), but not profitable for the organization to start up as only investor. An example of a skewed distribution of cost and benefits is a recent evaluation of interventions for occupational asthma and rhinitis among bakery workers (Meijster et al. 2011). This study showed that for an intervention employers were responsible for 63% of the required investments, but reaped only 48% of the benefits. In this specific situation cofinancing of the intervention (or other types of financial incentives) by government and/or health insurers might

facilitate implementation of such a program. It must be stated that in other situations and jurisdictions, the distribution of costs and benefits over stakeholders may be different and, thus, one would arrive at a different conclusion.

3.6 Discussion and Research Agenda

In this paragraph we will briefly discuss the key findings and especially the unanswered questions related to the costs of work absenteeism and productivity loss at work.

Reviewing the literature, it is clear that the costs of disease-related absence from work and productivity loss at work can be substantial, especially for musculoskeletal and mental disorders. However, more information is needed on the work situations where health problems result in productivity loss and those work situations where this will not be the case (van der Berg et al. 2011). The debate regarding the valuation of absenteeism reveals that especially the extent of compensation mechanisms and the impact of team production, deadlines, etc. on the value of productivity loss should be considered in future analyses.

In addition, we observed many ways to measure and value productivity loss at work (presenteeism). Initiatives to improve the measurement and valuation of presenteeism are currently being undertaken worldwide. Especially, the measurement and valuation of long-term presenteeism (e.g., due to chronic and/or episodic disorders) should become subject of future research, as it might have a substantial impact on the employability and working careers of these chronically ill persons.

As observed, the number of cost-effectiveness studies of occupational health interventions is growing, but is still too small to guide policy makers in choosing between interventions. These cost-effectiveness studies should include productivity costs (as these are the main cost driver), which is still not often the case.

Economic evaluation will increasingly play a role in decisions about provision of occupational health programs for ill workers or workers on sick leave. Information on cost-effectiveness of different intervention programs may guide the occupational health professional towards improved decisions regarding priorities in work rehabilitation. Some caution is required, since the cost–benefits of an RTW intervention among workers on sick leave is not only determined by the estimated effectiveness of the intervention and associated costs and benefits of the intervention, but also heavily depend on the natural course of RTW in the target population, the timing of the enrollment of persons into the intervention, and the duration of the intervention. These latter three factors are seldom taken into consideration in decisions about implementing an RTW program (van Duin et al. 2010).

The progress in evidence-based occupational health care will require further development and refinement of tools and methods used for economic evaluation. Insight into the economical consequences of adverse effects of illness in addition to consideration of the many work-related risk factors on workers' health and disability can provide unique opportunities to demonstrate to decision makers in companies and government the necessity of implementing workplace interventions and adequate provisions of occupational health services that can reduce the burden of work disability.

A complication for policies that potentially reduce productivity costs is the fact that costs and benefits (both financial and health) often do not fall upon the same actor, limiting the will to implement these. There is no simple solution for this, but showing the total societal gains and designing (financial) incentives for various actors might help to motivate parties to work towards common goals. Much more active input from all parties could facilitate innovative evidence-based interventions that could pay off!

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Measuring the Burden of Work Disability: A Review of Methods, Measurement Issues and Evidence

4

Emile Tompa

This chapter describes issues and measures related to the burden of work disability, including both direct costs (i.e. health care, wage replacement benefits and rehabilitation services from various public and private insurance providers) and indirect costs (i.e. labour productivity and output losses).

4.1 Introduction

This chapter describes issues and measures related to the burden of work disability in a variety of developed countries. The burden encompasses working age adults whose engagement in the labour force is temporarily or permanently compromised due to a health condition. The burden includes both direct costs (i.e. health care, wage replacement benefits and rehabilitation services from various public and private insurance providers) and indirect costs (i.e. labour productivity and output losses). The full extent of the burden of disability can and does encompass nonfinancial and sometimes intangible outcomes such as individual role functioning outside of the paid labour force and health-related quality of life. We touch on these matters, but focus on work disability burdens.

A number of studies have investigated the financial impact of specific health conditions such as low back pain, depression, arthritis and diabetes, but fewer studies have considered the financial impact of all health conditions. The few that have, find the costs to be substantial. For example, in the Unites States (US), health-related lost productivity was estimated at $226 billion/year or $1,685/employee per year in 2002 (Stewart et al. 2003). The largest proportion of this cost, 71%, is attributable to reduced performance while at work (i.e. presenteeism). These estimates consider only a fraction of the cost of work disability because they only include individuals actively engaged in paid employment. Not included is lost output associated with individuals who were not employed due to a work disability. Estimates have been made for Canada that attempt to capture both short-term and long-term disability, the latter which includes individuals not actively engaged in the labour force (Health Canada 1989, 1996, 1998). For 1998 the estimate is $16.9 billion or 1.05% of gross domestic product (GDP) (Health Canada 1998). This amount does not include the costs of presenteeism as does the US estimate. Neither the US nor Canadian estimates include the value of lost productivity in social roles outside of work, nor the health care and other related costs associated with the various conditions that gave rise to the disabilities.

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_4,

Another way to assess the burden of work disability is through the number of working aged individuals who are not employed/out of the labour force due to a work disability, or the converse, how many are employed. Canadian estimates for the time period 1989–2001 of the proportion of people with disabilities employed at some point during the year are much smaller than for people without disabilities, 43–63% compared to 84–88% (Tompa et al. 2006). Fewer still are in the labour force all year and/or employed all year, 43–58% for the former, and 29–49% for the latter. These trends have remained relatively stable over the time period considered in that study.

Chronic conditions contribute enormously to the work disability burden, and are likely to increase in proportion as the population ages in many developed countries. A study in the USA for 1995–1996 found that 6.7 days per month were lost by individuals with impairments aged 25–54 (Kessler et al. 2001). This aggregates to 2.5 billion work-impairment days per year. The major conditions found to be contributing to impairment days in the USA were cancer, ulcers, major depression and panic disorder.

From the above examples, it is clear that the burden of work disability can be substantial in developed countries. Undoubtedly, the issue of work disability and its prevention warrants attention by governments at all levels and society at large, since there is much to be gained in terms of productivity and growth opportunities if the burdens can be appropriately addressed.

In this chapter we provide an overview of the burden of work disability in financial terms and with other measures. We begin with an explanation of the value of measuring the burden of disability and specifically work disability. This is followed with a brief discussion of the importance of evaluating the economic returns of work disability prevention initiatives. This topic is elaborated upon in Chap. 23 of the handbook. We follow with an overview of disability prevalence and benefits receipt across OECD countries and a description of the extent of the burden for several developed countries. We conclude with a summary and suggestions for the way forward.

4.2 Burden Studies and Their Role

Burden of disease studies measure the total value of lost healthy time (i.e. morbidity and mortality) from a particular disease or health condition, the costs of treating individuals with the condition, the cost of other services provided due to illness and disability and the impact of the health condition in terms of lost output and productivity. Though burden studies do not measure the probability of success of treatment options or the opportunity costs of interventions that might be undertaken to reduce the burden, these types of studies serve an important information role. They provide insights into the magnitudes of the health loss and the cost of a health condition to society. This information can be used to assess how burdens may have changed over time, how they compare to burdens for similar conditions in other jurisdictions or how they compare to the burden of other health conditions. Such information can be invaluable to policymakers for priority-setting purposes. Burdens that appear particularly onerous may bring attention to the need for (1) increasing funding for intervention options known to reduce the burden, (2) evaluating the merits (both in terms of health and resource implications) of burden reduction resulting from known treatment options that have not yet been evaluated and (3) investing in research to discover treatment options to reduce the burden in cases where no new alternatives currently exist.

Estimates of expenditure (e.g. health care costs) in burden studies are typically assessed for a specific calendar year and are based on costs in that year for all individuals diagnosed with or living with a particular health condition. These aggregate costs are also referred to as prevalence costs, because they encompass costs for individuals across the health trajectory, including the newly diagnosed, long-term survivors as well as those at the end of life. Burden studies can also report health care costs longitudinally, starting from diagnosis, and only include newly diagnosed patients. The time period for these longitudinal or incidence cost studies ranges from several months to the patient lifetime following diagnosis. These two general

types of burden studies are not directly comparable, because of differences in the time periods measured and the inclusion criteria.

One method of modelling health care costs for a particular health condition is the phase of care approach. This approach divides services and costs following diagnosis into distinct periods or phases (e.g. initial, continuing, last year of life) and can be used to estimate either incidence or prevalence costs. When phase of care-specific cost estimates are applied to survival probabilities for an incident cohort, the result is analogous to an incidence cost estimate. When phase of care-specific cost estimates are applied to phase-specific person-years of survival within a specific year, the result is a prevalence cost estimate.

Costs incurred by disability insurance providers for wage replacement are generally not included in societal/country-level burden studies because such compensation is considered a transfer of purchasing power from one group of individuals to another, rather than an expenditure of resources by society. Nonetheless, they are of relevance at the disability system level, and the magnitude of these costs is an important consideration for insurance providers, whether public or private. Additionally, insurer costs associated with service provision, such as health care, return to work coordination and physical and vocational rehabilitation, need to be included in the burden estimate, since these are truly expenditures of resources associated with the treatment of a health condition.

Estimates of lost output and productivity (sometime labelled 'indirect costs') associated with work disability from a health condition are also assessed for a specific calendar year when using the prevalence approach. For this approach, estimates are based on output/productivity losses in that year for all individuals diagnosed with or living with a particular health condition. How these estimates are calculated is less standardized than the measurement of other expenditures. However, two approaches are commonly used—the human capital approach and the friction cost approach. These two approaches are elaborated upon later in this chapter (See also Chaps. 3 and 23). To estimate the burden of premature mortality from a health condition, the output or indirect costs over the remainder of the forgone working career are generally included in the estimate. Here too the human capital approach or the friction cost approach can be used. The two approaches diverge substantially in their estimates of indirect costs for such incidents.

Estimates of lost output and productivity using the incidence approach require calculating the lifetime losses associated with all new cases of a health condition. Here too the human capital approach or the friction cost approach can be used. As noted, the two approaches will have dramatically different estimates, particularly if the health condition being evaluated has long-run disability implications.

4.3 Concepts and Measurement of Disability

Disability, and specifically work disability, is associated with a health condition, but is more than just the existence of a condition itself. There is an extensive theoretical literature on disablement that is largely centred on two conceptual frameworks: those of Nagi and the World Health Organization (WHO). Nagi's work from the 1960s is one of the first comprehensive conceptualizations of disablement (Nagi 1965). In his framework, disablement is a series of four interrelated concepts that describe the impact of a health condition on a person's body, activities and involvement in society (Nagi 1965, 1991). These four concepts are pathology, impairment, functional limitation and disability. Disability can arise from a functional limitation or directly from an impairment. But not all impairments and functional limitations give rise to disability. A critical factor is the degree to which the social environment creates barriers to involvement for an individual with an impairment or functional limitation.

The WHO developed a conceptual framework for disablement comparable to, but independent of, the Nagi model (World Health Organization 1980, 2001). This framework describes the consequences of disease as four interrelated concepts: disease (health condition), impairment (body structure/function), disability (activity) and handicap (participation). The WHO model

appears similar to that of Nagi, with the disease (health condition) dimension comparable to Nagi's pathology, the term impairment (body) being used in both models for the second concept, the disability (activities) dimension comparable to functional limitations and handicap (participation) to disability. Both frameworks are based on the notion that disability is not a characteristic of an individual, but a relational concept that derives from the interaction of an individual's abilities and other personal characteristics with a particular social and built environment.

The socio-medical concept of disability described above is difficult to operationalize, particularly for the purpose of assessing partial work disability. Consequently, many disability compensation programmes only compensate for total disability. One of the few exceptions is workers' compensation programmes which offer fractional pensions based on various formulas for assessing partial disability (Dembe 2000; Peterson et al. 1998). In general, workers' compensation programmes use one of four approaches to compensate for permanent impairment: (1) a medical assessment of the degree of permanent impairment, (2) an estimate of loss of wage-earning capacity, (3) an estimate of actual wage loss or (4) a hybrid of the former three (Pauly et al. 2002). Three types of hybrids are common: (1) one that uses a different system for different types of injuries, (2) one that pays both impairment benefits and benefits for loss of wage-earning capacity or actual wage loss or (3) a system in which the same injury can lead to either an impairment-based benefit or a benefit based on loss-of-wage-earning capacity or actual wage loss.

The measurement of burdens from health conditions and related disability generally focuses on financial metrics. But burdens can also be depicted with nonfinancial data such as the number of cases in a population, the severity of cases, and for work disability, the number of individuals absent from work/unemployed, out of the labour force or receiving disability benefits. Statistics on the number of people with disability is often assessed through self-reported health survey. Employment, unemployment and out of the labour-force statistics are often drawn from self-reported labour-force surveys, which are undertaken on a monthly basis in many developed countries. Some such surveys also inquire about reasons for unemployment or disengagement from the labour force, with one of the categories being injury, illness or disability. Census data may also provide the relevant information, but is less frequently collected. Counts of the number or proportion of individuals who are disability benefits recipients are generally developed from administrative data sources associated with the various disability compensation programmes. Such data cannot provide an accurate estimate of the number or proportion of disability individuals in a population, since programmes may not be universal. Furthermore, not all eligible individuals may apply or receive benefits for a variety of reasons. Interpreting differences in disability recipiency across countries is particularly a challenge, because the criteria for eligibility may vary dramatically from country to country. The World Bank has developed a metric exclusively designed to estimate the burden of disease in society, known as the disability-adjusted life year (DALY) (Murray 1994). See Sect. 4.3.1 below for details on this construct.

4.3.1 Disability-Adjusted Life Years

A DALY is a time-based measure of the burden of disease that combines years of life lost from premature mortality and years of life lived in less than perfect health. Age weights are used for the value of time at different ages to reflect the dependence of the young and older individuals on working age adults. These weights are associated with societal values of productivity and investment in education. Severity weights for different disability states are also used to adjust the value of time with health conditions. These weights are between zero and one and are based on a value of death as zero and perfect health as one. Future DALYs are discounted to the present time using a discount rate, customarily 3% (World Health Organization 2011).

The DALY measure can provide a comparable metric for assessing burdens across different categories of health conditions, or across different countries. For example, Polinder et al. (2007) uses DALYs to compare injury-related burdens across six European countries. Because DALYs are constructed in a unique way with underlying assumption built into their weighting system, they are not readily comparable to monetary measures of burdens. In particular, indirect costs (generally associated with productivity losses) are accounted for through standardized age weights with DALYs, rather than based on actual measurement of losses.

4.4 Measuring Societal-Level Indirect Costs Associated with Work Disability

Some indirect costs of adverse health and related work disability can be immediate (e.g. lost output due to sickness absence), while others unfold over longer periods of time (e.g. reduced capital accumulation due to reduced savings over the life course). One of the principal indirect costs associated with adverse health of the working age population is reduced productivity and output. The effect of health on labour-force participation and earnings is sometimes described as health as a capital or an investment good, because it is seen as a stock of capital that one can draw on over time to earn a livelihood (Grossman 1972). Reduced productivity and output associated with health may arise through health-related absenteeism and presenteeism, or reduced labour-force engagement such as unemployment or nonparticipation due to poor health (Sharpe and Murray 2010). More generally, health may affect labour quality, i.e. healthy adults have higher energy levels and mental acuity than less healthy adults, and therefore may be more productive. At the organizational level, absenteeism and presenteeism may affect team productivity and output (Nicholson et al. 2006; Pauly et al. 2002). Other contributions at the organizational level to output, such as social contribution (i.e. payroll taxes) and profits, may also be affected by lower levels of productivity and output as measured by the wages of workers.

Longer run pathways by which adverse health and disability may affect productivity and output include child health and its association with educational attainment, reduced saving and its implications for capital accumulation and socio-demographic factors such as fertility levels and female participation in the paid labour force (Bloom and Canning 2000; Bloom and Sachs 1998). Premature mortality will also affect labour-force size and output. Sharpe and Murray (2010) suggest that for developed countries, only the first of these longer run pathways is likely to be relevant. Table 4.1 summarizes the various pathways by which health and disability might impact output.

Poor health can also compromise participation in activities outside of paid work. These roles may include parenting, home maintenance, community involvement, religious activities and leisure activities. The impact of health on such participation might be described as health as a consumption good, as per Grossman (1972). The Grossman model of the demand for health, which is used widely in health economics, is less refined about social roles outside of the paid labour force, since it is designed around the traditional economic paradigm of work and leisure. A more holistic approach to the impact of health on individuals was described above, i.e. the Nagi (1965, 1991) and the WHO (1980, 2001) frameworks. Good health also has intrinsic value in and of itself. Being healthy allows one to enjoy life more fully in all social roles, whether in the paid labour force or outside of it. This intrinsic value of good health is sometimes called health-related quality of life, and would also be put under the category of health as a consumption good.

Time spent seeking care may also take individuals away from paid work and/or participation in other social roles. Further, other individuals in the family unit and in the community may be affected by an individual's health. Family, friends and neighbours may provide informal caregiving. There may also be some substitution in the roles of family members, such as a spouse entering the paid labour force if an individual is unable to participate in this role due to poor health. Quantifying the monetary value of time spent seeking care and time use of other individuals can be a challenge.

Table 4.1 Summary of pathways from health and disability to output via the paid labour force

Adult health and output	Current health → presenteeism, absenteeism, employment, labour-force participation, size of the labour force – Output per hour due to presenteeism (team production may also be affected) – Output per person due to absenteeism (team production may also be affected) – Output per labour-force participant due to health-related unemployment – Output per working age population due to health-related nonparticipation – Size of the labour force due to premature mortality
Child health, educational investment and output	Child health → educational attainment → human capital → productivity and output over the life course
Life expectancy, savings and capital investment	Life expectancy → savings for retirement → capital investment → productivity and output
Child health and demographic effects	Child health → fertility → size of the working age population → output Child health → fertility → female participation in paid labour force → output

Table 4.2 Aspects of indirect costs of health and disability

Output of paid labour force	Adult health, productivity and output (including organizational and societal-level effects) Child health, educational attainment, productivity and output Savings, productivity and output Demographics, fertility, mortality, size of the paid labour force and output
Participation in roles outside of paid work	Parenting Home care Community involvement Religious activities Leisure activities Education
Health-related quality of life	Intrinsic value of good health
Time use of other individuals	Family/community time in caregiving Family role substitution

To summarize, Table 4.2 below highlights the various aspects of indirect costs of adverse health and disability.

Estimating the total burden of adverse health and disability across all the above-noted categories is a substantial measurement task. Consequently, many burden studies focus only on the indirect costs associated with loss of output/productivity of adults experiencing the condition, as well as the loss of health-related quality of life of all individuals with the condition. Time use of other individuals in the family and community would also be relevant in such cases, but would likely be of a smaller magnitude and are less often included.

4.5 Measuring Indirect Costs of Adult Onset of Disability

Figure 4.1 below depicts how one might classify productivity and output losses from injury or illness at the individual level. The schema distinguishes between temporary impairment, permanent

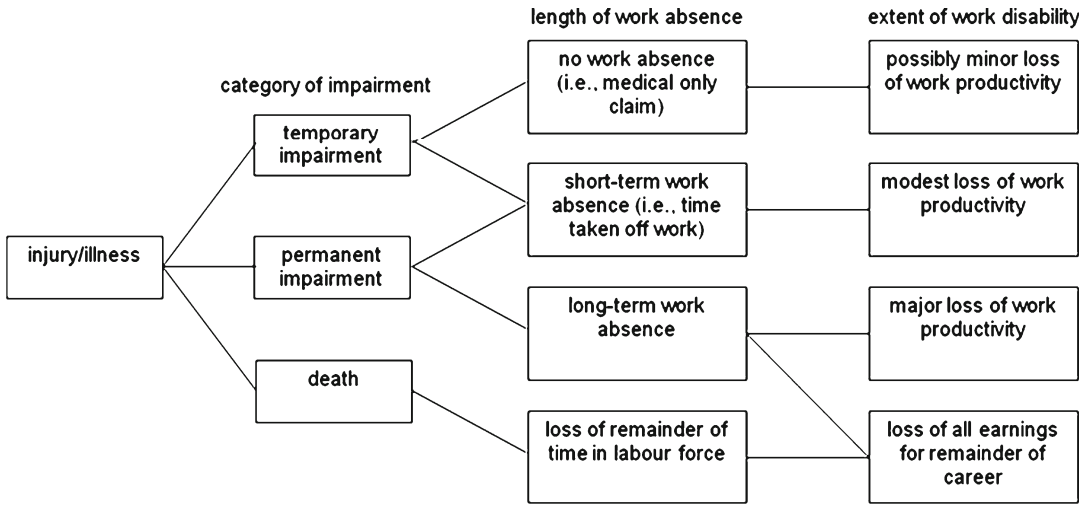

Fig. 4.1 Schema for categorizing work disability (adapted from Weil 2001)

impairment and fatality, as well as between absences and loss of work output and productivity at the individual level. Not depicted in the schema is the possibility of long-term losses through non-disability labour-market outcomes such as job loss or loss of promotion that can lead to further losses over one's career. This may be associated with any category of impairment, work absence or work disability. Many individual losses are not identified in the schema. Impairment from a work injury or illness may result in nonwork disability (i.e. disability in other social roles). Nonwork losses associated with impairment from a work injury or illness may also include loss of health-related quality of life (intrinsic value of health). There may also be uncompensated out of pocket costs associated with health loss.

A key controversy in measuring the burden of injury/illness and disability is how to measure the value of lost output and productivity associated with long-term work disability. Historically, the human capital approach was used to measure productivity losses associated with work disability. The approach assumes full employment (usually only implicitly), and that it is impossible to replace injured or ill workers from the ranks of the unemployed. In the absence of an intervention, productivity losses are assumed to continue until return to work, or in the case of permanent work disability and death, until age of retirement. The approach has a very strong zero-substitution assumption that is more or less permanent. Koopmanschap et al. (1995) describe the human capital approach as a measure of potential productivity losses. It might best be considered an upper-bound estimate of the long-term burden. In the short term, losses might actually exceed the wage cost of the absence due to the disruption in the production process resulting from the occupational injury or disease.

Essentially, the human capital approach is an estimate of the counterfactual, that is, what the individual would have earned or produced had they not been injured or ill. Actual wages are used to calculate labour-market losses and assumed to be either fixed over time (this is the basis on which many workers' compensation wage replacement programmes operate) or adjusted for lifetime earnings growth. Adjustments are based on data from population statistics (stratified where desired by occupation, educational attainment and other relevant labour-market earnings characteristics) or collected through matching of injured individuals with a healthy cohort on socio-demographic characteristics and contextual factors that bear on earnings potential (see Weil 2001 for a summary of methods). For nonwage work, the opportunity cost of time or replacement cost approach might be used to estimate potential productivity losses in these roles (see Drummond et al. 2005, p. 216 for details).

In considering how a work absence might affect a firm's productivity, we describe the key factors that might bear on the magnitude of these consequences. A firm's adjustment to an occupational injury or disease can be achieved in various ways, depending on the nature of the production process and the duration of absence (short-term vs. long-term). With short-term absences, some work can be postponed, some might be taken over by colleagues (during regular work hours or on an overtime basis) and some might be completed by a replacement worker from internal labour reserves or from a temporary employment agency. With longer-term absences, a temporary or permanent replacement may be hired or the extra work can be distributed among the existing staff by cutting less time-sensitive work.

If the firm maintains its production rates during the early period of the absence, it may incur additional costs such as overtime payment for other employees, a premium for temporary replacement workers or the costs of hiring a permanent replacement worker and associated incremental costs such as training costs. The total value of these productivity related consequences during this period will consist of the value of lost production (if any), the additional labour costs and recruiting and training costs. The length of the early period of losses will depend on the state and efficiency of the labour market as well as the occupation of the injured worker, the industry in question and the associated learning time required for a new recruit to get up to speed. If the level of unemployment in the economy as a whole is higher than the level of frictional unemployment, firms will be able to replace injured workers more readily. Identifying whether the unemployment rate exceeds the frictional level may be a challenge; though on average unemployment has been sufficiently high in most developed economies over the last two decades for it to have probably exceeded the frictional rate for much of the time. Additionally, firms have increasingly relied on flexible hiring practices, such as temporary and on-call contracts and temporary employment agency hires, thus providing them with a pool of backup labour to adjust to market shocks (see Tompa et al. 2007 for review of the literature).

The 'friction cost approach' (Koopmanschap et al. 1995) is one approach to measuring the productivity consequences of health improvements at the aggregate level. This approach is discussed in more detail in Chap. 3. According to this approach there is a short-run friction period during which a firm and society may incur losses as an adjustment is made to a worker's absence. In the long run no losses are held to occur because the injured worker either returns to work and performance returns to the pre-injury level or the firm replaces the injured worker with a new hire and performance eventually becomes comparable to what it was before. Table 4.3 provides an example of an analysis using both the friction cost and human capital approaches applied to data from the Netherlands. As is apparent, the friction cost approach consistently identifies much smaller productivity losses than the human capital approach.

Friction costs methods are likely most appropriate for marginal changes in absenteeism and work disability associated with health and safety interventions. When considering substantial changes in labour-force participation, such as an increase in the engagement of working age individuals with disabilities, the impact on the macroeconomic environment can be substantial and would require a macroeconomic model to estimate the effect on the general equilibrium of an economy. Most burden studies do not take this approach because of the computational challenger associated with estimating a general equilibrium model. Rather, they rely on the human capital approach under the implicit assumption that it is an acceptable first-level approximation based on the vantage point of the existing situation.

More recent work on the productivity costs of health has focused on including consideration of losses from presenteeism (Brouwer et al. 2002). A variation of the friction cost approach recognizes that a period of reduced performance might occur before and/or after a health-related work absence, or that there might simply be a period of reduced performance without an absence. Brouwer et al. (2002) examined data from a Dutch trade firm and found that productivity losses due to reduced performance at work accounted for about

Table 4.3 Example of the divergence between friction costs and human capital approaches

Cost category	Friction cost approach	Human capital approach
Absence from work	9.2	23.8
Disability	0.15	49.1
Mortality	0.15	8.0

Koopmanschap et al. (1995) used data from the Netherlands and compared the friction cost and human capital approaches to demonstrate the divergence in values derived under each approach. A comparison is made of the indirect cost of disease in the Netherlands in 1988 in billions of Dutch guilders.

14% of total productivity losses. The literature on measuring health-related at-work performance (presenteeism) is still relatively young, though its volume is growing rapidly.

4.6 Economic Returns of Work Disability Prevention Initiatives

As noted, burden studies provide policymakers with a sense of the magnitude of losses associated with a particular health condition, and provide insight into what might be gained if interventions available to address it are implemented. If a particular burden is deemed sufficiently large to warrant attention, the next step may be a search for promising interventions to reduce it. In some cases two or more alternatives may be considered. Alternatives under consideration ought to be evaluated for both their effectiveness and cost-effectiveness before they are adopted across the board. The economic evaluation of alternatives is an important part of programme evaluations. In this handbook, Chap. 23 focuses on providing guidance on the methodology of economic evaluation with a particular focus on its application to work disability prevention programmes. There is a growing literature on this topic. A recent systematic review of the literature found strong evidence in support of such intervention based on their financial merits (Tompa et al. 2008). Most of the better quality studies identified in the review took a system- or societal-level perspective, were coordinated through an insurance provider or workers' compensation authority and served a multi-sector client base. The programmes were multifaceted, offering a range of services such as return to work coordination, ergonomics worksite visits, physiotherapy, behavioural therapy, rehabilitation and educations. Chapters 20 through 22 of this handbook provide details on a range of clinical, workplace and complex interventions designed to reduce work disability.

4.7 Disability Prevalence and Benefits Receipt Across OECD Countries

Statistics on the prevalence of disability in OECD countries suggest that it is a relatively common phenomenon. On average, approximately 14% of individuals report a chronic health condition or a disability across OECD countries (OECD 2010). The percentage varies from country to country, ranging from upwards of 20% in Estonia to just over 5% in Korea. A focus on work disability rather than disability associated with any social role will likely reduce percentages, since some individuals with health conditions may be employed in the labour market. Prevalence information provides a first-level approximation of the burden of disability across countries, but comparability is an issue because surveys used to estimate these statistics in different countries use different questions to inquire about health and function. Differences in cultural norms and other contextual factors may also influence perceptions and reporting even if similar questions are used.

One approach to estimating the prevalence of work disability is to identify the unemployment rates of people with disability. Generally, unemployment rates in this group are twice as high as for able-bodied individuals—14% on average in OECD countries compared to 7% for the non-dis-

abled (OECD 2010). Unemployment rates do not include individuals who have given up seeking work or who have exited the labour force entirely. To address this concern, another approach to estimating the prevalence of work disability is to compare the employment rates of disabled people as a percentage of all disabled working age adults compared with their able-bodied counterparts. In general, employment rates of people with disability are lower than for people without disabilities. Across 27 OECD countries employment rates for the disabled averaged approximately 44% compared to 75% for people without disabilities (data is for late 2000s, i.e. just prior to downturn in the global economy) (OECD 2010). What is not captured in these numbers is the level and type of engagement in paid work. Some employed individuals may be under employed, both in terms of hours worked and in the match between skill level and job challenges. In fact, the disabled are significantly more likely to be working part time than non-disabled employed individuals.

Low employment rates of people with disabilities are particularly a concern, given the aging of the population. For example, in some countries such as Italy, Japan, Korea and Spain, more than 1/3 of the population is projected to be over age 65 by 2050 (OECD 2010). Projections for other developed countries are also high. For example, Canada is projected to have 1/4 of the population over age 65 by 2050 (Human Resources and Skills Development Canada (HRSDC) 2011) and the USA 1/5 (Department of Health and Human Services (DHHS) 2011).

As might be expected, the disabled have lower incomes—between 15 and 30% lower (OECD 2010). Incomes are particularly lower than their able-bodied counterparts in English-speaking countries, whereas the differences are less remarkable for Nordic countries (less than 10%). The disabled also have a significantly higher probability of poverty, 22% compared to 14% for people without disabilities (OECD 2010). Poverty levels amongst the disabled are particularly high for the USA, Australia, Ireland, Korea and Canada. There is little difference in the risk of poverty in Sweden, Norway, the Netherlands and Slovakia.

A measure associated with the burden of work disability is the number of individuals receiving disability benefits. In 2007, the overall disability recipiency rate in OECD countries was 6%, with higher rates in Hungary, Norway and Sweden (approximately 10%), and low rates in the non-English-speaking OECD countries of Japan, Korea and Mexico (below 2%) (OECD 2010). In general, countries with more universal programmes had higher rates. For example, northern European countries had rates between 8 and 11%, whereas the Anglo-Saxon countries, where eligibility is more limited, had rates in the 5–7% range. Disability benefit recipiency rates are generally much higher for older workers, and even more so in countries where it serves as a transition to retirement.[1] On average, more than half of disability benefits recipients are men, though in Nordic countries the majority is women (OECD 2010). It is important to note that recipiency rates may vary from country to country for reasons other than the prevalence of disability. In particular, the types of programmes provided and their eligibility rules can vary dramatically.

Disability benefit recipiency rates have been increasing in many OECD countries over the last three decades, but are relatively stable in most recent times (OECD 2010). In particular, some countries have introduced policy changes in an effort to reduce disability inflows (e.g. Poland, Portugal, Luxembourg and the Netherlands). These policy changes in OECD countries are discussed in detail in Chap. 22. Such efforts, unless accompanied by labour-market reintegration programmes, may exacerbate unemployment and poverty rates for individuals with disabilities. Particularly noteworthy is the fact that the inflow into disability benefits on the grounds of mental health conditions has been rising in many OECD countries, and has become the leading cause in

[1] In the Netherlands disability benefits recipiency was quite high in the 1990 before the introduction of reforms to reduce the use of the programme as a substitute for unemployment or a transition to retirement. The Dutch experience with these reforms is described in de Jong and de Vos (2005) and de Vos et al. (2012).

many countries. The proportion of younger recipients has also been rising.

With the aging of the populations in many countries, recipiency rates are likely to continue to increase, all else being equal. This is particularly apparent if one looks at cross-sectional statistics on the number of people on disability benefits at older ages. For men, the proportion on disability benefits more than doubles (and in some cases triples) between the ages of 45 and 64 (Milligan and Wise 2012). For example in Italy, Spain, Germany, Sweden, Belgium, Canada, France and the Netherlands, it is under 5% for men aged 45 but increases at age 64 to over 35% for Sweden, over 25% for the Netherlands and over 20% for Germany.

Generally, few people leave disability benefits programmes; benefits serve as a permanent source of income replacement. Only around 1–2% of recipients leave for reasons other than death. The largest outflows are in the UK, New Zealand and Australia, where over 5% of beneficiaries left recipiency status for reasons other than death in 2008 (OECD 2010). Oddly, only a small fraction of outflow is into employment, specifically between 10 and 20% of total outflow.

As noted, data on recipiency rates fails to account for the fact that many disabled individuals do not receive disability benefits. In fact, only a minority receive benefits. On average it is 25%, with the proportion as low as 10–15% in Portugal and Germany and as high as 33% for Norway, Poland and the USA (OECD 2010). Higher rates do not necessarily imply higher incomes, since generosity of benefits varies from country to country. Furthermore, some disabled individuals may also receive other types of benefits, such as unemployment insurance. The proportion not receiving any benefits is 10–25% on average, but as high as 50% for some English-speaking and Mediterranean countries (specifically Canada, the USA, Spain, Greece) (OECD 2010). Some of these disabled individuals not receiving any benefits may be employed. Between 10 and 20% from these four countries have no public pension or labour-market income. For most OECD countries the proportion of no pension or labour-market income is less than 10%.

4.8 Financial Burden of Work Disability

The average spending of public disability programmes (including public sickness benefits) for OECD countries was 1.2% of GDP in 2007 (OECD 2010). Disability and sickness spending is particularly high for Nordic countries; for Denmark, Norway, Sweden, the Netherlands and Iceland, it exceeds 3% of GDP. These statistics do not include workers' compensation, private disability insurance or private sector spending. For Canada, it also does not include provincial level spending on social assistance. Consequently, comparability is an issue, particularly for countries with multiple programmes provided at different levels of government or distributed differently between the public and private sectors.

Most public disability spending is passive, i.e. in the form of benefits rather than employment (re)integration programmes. The latter is known as active programmes. Spending on such programmes is generally less than 8% of total public spending and in most cases less than 4% (OECD 2010). The exceptions, in terms of a higher proportion of spending on active programmes, are Norway, Denmark, the Netherlands, Sweden, Germany, Belgium and Poland, though for the last three countries it is low in terms of percentage of GDP.

Customarily, transfer payments are not included in burden calculations from the societal perspective because they are not a measure of resource consumption. Rather, they are simply a transfer of purchasing power from one group of individuals to another. They may be included in studies taking a disability system level perspective. Other times they might be included as a proxy measure for lost output. For the latter, they are poor approximations, since benefit levels in most disability programmes are substantially lower than the output loss associated with the disability.

Occupational injury and illness burden estimates produced by Leigh et al. (2001) provide a good example of how to estimate the burden at

Table 4.4 Total cost of occupational injuries and illnesses in California for 1992 (adapted from Leigh et al. 2001)

	Billions of dollars		Cost per incident
1.65 M nonfatal injuries per year			
Direct costs			
Medical costs	$3.67		
Medical administration	$0.81		
Indemnity administration	$0.90		
Total direct costs		$5.37	$3,266
Indirect costs			
Cost of workplace training, re-staffing, disruption	$0.29		
Lost earnings	$8.66		
Lost fringe benefits	$1.82		
Lost home production	$1.15		
Total indirect costs		$11.93	$7,250
1.33 M nonfatal illnesses per year			
Direct costs			
Medical costs	$0.47		
Medical administration	$0.07		
Indemnity administration	$0.03		
Total direct costs		$0.56	$422
Indirect costs			
Lost earnings	$0.32		
Lost fringe benefits	$0.06		
Lost home production	$0.04		
Total indirect costs		$0.42	$313
Overall total for nonfatal injuries and illnesses		$18.28	
Overall total for fatal injuries and illnesses		$2.39	

the societal level. The Leigh et al. estimates are for California for the year 1992. The study considers both direct and indirect costs. Direct costs refer to medical expenses and insurance administration expenses (the latter does not include benefit expenses). Indirect costs refer to output losses consisting of lost earnings, fringe benefits and home production. The human capital approach is used to estimate output losses. The incidence-based approach is used, where the burden is based on lifetime costs of new cases arising in the calendar year. Table 4.4 provides summary measures for the direct and indirect costs.

The total costs burden for California was $20.67 billion in 1992, with work disability costs (lost earnings and fringe benefits) from both nonfatal injuries and illnesses amounting to $10.86 billion (approximately 50% of the total). These burden costs likely underestimate the true burden because they do not consider the value of pain, suffering and loss of enjoyment of life, or home care provided by family members. The authors compare this burden to other health conditions such as AIDS, Alzheimer's disease and MSD conditions, and find that they are higher than each of them. The costs are similar to the cost of cancer, but slightly less than the cost of heart disease and stroke combined.

Using the same approach as above, Leigh et al. (1997) estimate the total burden of occupational injury and illness for the USA for calendar year 1992. In that year there were 13.2 million nonfatal injuries, 862,200 nonfatal diseases, 6,500 injury fatalities and 60,300 disease fatalities. The total direct cost across all categories for the year was $65 billion and the indirect cost $106 billion. An update on the US occupational injury and illness burden estimate for 2007

identified a total burden of $246 billion, compared to an inflation-adjusted 1992 burden of $217 billion (Leigh 2011). Other related work by Leigh et al. identifies the sectors in the USA with the top injury and illness costs in terms of average cost per worker (Leigh et al. 2004), and the states with the highest average (per worker) costs (Waehrer et al. 2004). The highest cost industries were taxicabs, bituminous coal and lignite mining, logging, crushing stone, oil field services, water transportation services, sand and gravel, and trucking. Southern and western states were more likely to be in the high cost per worker category, largely because of industry composition.

Based on Leigh et al. (2001), burden estimates for Canada were calculated for calendar year 2001 (Tompa 2002). In Canada, the direct cost of occupational injuries and illnesses exceeded $6 billion per year. This estimate includes insurance administration expenses and medical services that are paid by employers through workers' compensation premiums. The indirect cost estimate for Canada is $12 billion. This includes costs incurred by employers to accommodate injured workers who return to work, recruitment and training costs incurred for replacing injured workers, earnings lost by workers due to injury and the lost home production of workers. As with Leigh et al. (2001) these costs are likely an underestimate of the true societal burden, since they do not include costs associated with pain, suffering and loss of enjoyment of life or home care provided by family members. Furthermore, the number of claims is an underestimate of the true number of work-related injuries. Underreporting is well documented in the literature and is an issue that needs to be addressed if accurate estimates of burdens are to be calculated, since the magnitude of underreporting can be substantial (Shannon and Lowe 2002).

Estimating the burden of occupational injury and illness requires investigating multiple categories of costs associated with different stakeholders. What categories and what stakeholders will vary between countries due to differences in their disability policy systems. For example, in countries with comprehensive systems, such as Germany, Austria and Switzerland, the direct costs are paid for by companies (Rauner et al. 2005), whereas in countries with low levels of social security such as the USA, individuals often bear a large fraction of the direct costs (Leigh et al. 2000). Rauner et al. (2005) divide the entities that might bear the burden of work disability into four broad categories: (1) social security, (2) private insurance companies, (3) employers and (4) others stakeholder such as individuals and society.

To estimate the output loss associated with work disability from all health conditions (whether work related or nonwork related) requires assumptions about the number and proportion of the disabled who would be working if not for their disability. This might be approximated by assuming levels of employment similar to their non-disabled counterparts. Wage rates attributable to labour-time loss also require approximation. Statistics on employment rates and average wage rates can be used to estimate these numbers.

EBIC (Health Canada 1998) estimates the output loss from all health conditions for Canada for calendar year 1998. The study uses a prevalence approach and considers both direct and indirect costs of morbidity and mortality. Direct costs in the study include medical care and rehabilitation costs. Indirect costs include lost earnings and home production. Table 4.5 provides details on the indirect costs estimated in this study. Overall the total burden for short- and long-term disability and premature mortality is $75.5 billion, which amounts to 4.71% of GDP. The fraction attributable to work disability is 2.62% of GDP. This is a large burden and likely underestimates the true cost, since it only accounts for a few categories of costs.

4.9 Summary and Suggestions for the Way Forward

This chapter has provided an overview of the importance of burden studies and their value to the policy decision-making process. The chapter has also provided insights into the magnitude of

Table 4.5 Indirect costs of health conditions in Canada for 1998 (adapted from Health Canada 1998)

	Billions of dollars		Percentage of GDP	
Indirect costs associated with short-term disability				
Lost earnings	$3.90		0.24	
Lost home production	$5.90		0.37	
Total indirect costs		$9.80		0.61
Indirect costs associated with long-term disability				
Lost earnings	$13.00		0.81	
Lost home production	$19.20		1.20	
Total indirect costs		$32.20		2.01
Indirect costs associated with premature mortality				
Lost earnings	$13.50		0.84	
Lost home production	$20.00		1.25	
Total indirect costs		$33.50		2.09
Overall total for short-term and long-term disabilities and premature mortality		$75.50		4.71

the burden of work disability in a range of industrialized countries. The burden can be quite far reaching, encompassing working age adults whose engagement in the labour force is temporarily or permanently compromised due to a health condition. The burden includes both direct costs (i.e. health care, wage replacement benefits and rehabilitation services from various public/private insurance providers) and indirect costs (i.e. labour productivity/output losses). The full extent of the burden can and does encompass nonfinancial and sometime intangible outcomes such as individual role functioning outside of the paid labour force and health-related quality of life. Most studies on this topic have only been able to measure a part of the full burden. Even though they are not comprehensive in their accounting of burdens and costs, their findings suggest that the magnitudes are substantial. Given this fact, the issue of work disability and its prevention clearly warrants attention by policymakers, employers, labour representatives and society at large. There is much to be gained at the individual and societal level, particularly in terms of productivity and output for the economy, and also for functioning in other social roles. Once several interventions have been identified that appear appropriate for the context in which they are to be implemented, the obvious next step is to evaluate their effectiveness and cost-effectiveness before they are adopted across the board. For that, we refer readers to Chap. 23 of this handbook, which provides guidance on the economic evaluation work disability prevention programmes.

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The Work Disability Paradigm and Its Public Health Implications

5

Patrick Loisel and Pierre Côté

The work disability paradigm acknowledges the societal causes of work disability. We propose a public health approach that promotes health, prevents chronic disability, and improves the quality of life of workers through the organized efforts of society.

5.1 Introduction

Work is central in people's lives and well-being and positively impacts the physical, mental, financial, and social health of individuals and communities (Abenhaim and Suissa 1987; Adams et al. 1994). Work is a powerful determinant of health (Waddell and Burton 2006). The consequences of not finding work or being unable to work can be devastating. During the "great depression" of 1930, Jahoda et al. studied the residents of Marienthal, Germany, to observe their behaviors in these times of high unemployment. They found that: "Unemployed people do not tend to take up the violin, read more books, or enjoy quality time with their families; indeed, although people had enough to eat, use of the library dropped by a third, clubs closed down, and wives complained that formerly energetic men took extraordinary amounts of times to accomplish simple tasks. People stood on street corners, waiting. They slept more because it kept them warm, saved their clothes, and helped them forget their worries. Time weighed heavy, but they talked to each other less. And what little money around was spent not on necessities, but on trinkets" (Jahoda and Lazarsfeld 1933/1971). Compared to those who are employed, unemployed individuals report poorer health, and they have a higher risk of early mortality (Moser et al. 1986; Jin et al. 1995; Voss et al. 2004; Luo et al. 2010). Similarly, a growing body of evidence indicates that sick leave predicts future adverse economic and social conditions, disability pensioning, and mortality (Bryngelson 2009; Gjesdal et al. 2008; Kivimäki et al. 2003, 2004; Krause et al. 1998; Lund et al. 2009). Therefore, the health and growth of our communities is directly influenced by our ability to maintain a healthy workforce and maintain their place in the workforce to those who get disabled, whatever the cause for this disability. Proactive societal action using public health perspective and methods becomes mandatory.

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_5, © Springer Science+Business Media New York 2013

Since the 1960s, most industrialized countries have faced several waves of sick leave that have strained our workers' compensation and social security systems (see Chap. 1). The economies of industrialized countries, which once depended on manufacturing and resource extraction jobs, now rely largely on the service sector for growth and prosperity. The shift from manufacturing and resource-based jobs to the service industry has transformed the nature of work injuries and disability. The high rate of acute and fatal injuries observed in most countries at the beginning of the twentieth century has been replaced by a sharp increase in the incidence of compensated musculoskeletal and mental health disorders (Ostry 2000; Silverstein and Viikari-Juntura 2002; Waddell et al. 2002).

Since the 1960s we have also witnessed "epidemics" of various disorders including low back pain (Abenhaim and Suissa 1987; White 1966; 1969), carpal tunnel syndrome (Adams et al. 1994; Franklin et al. 1991), and depression (Sobocki et al. 2007; Druss et al. 2000). It is striking that the population-based burden of disability has persisted even if the type of condition triggering the disability process has varied. But what is even more striking is the fact that the course of work disability is not specific to the triggering health condition (Hogg-Johnson et al. 2000). Rather, it is influenced by the underlying psychosocial (nonmedical) and environmental (workplace issues) determinants of health. Unemployment and job insecurity cause illness and premature death (Wilkinson and Marmot 2003). This has been described as the work disability paradigm by Loisel et al. (2001) that highlighted the effects of social, societal, compensation, and workplace factors on the development of work disability (Loisel et al. 2005).

5.2 The Work Disability Paradigm

From a public health perspective, work is as important to good health as are education, diet, exercise, and other determinants of health. Within this framework, work disability is the outcome of multiple upstream forces that, regardless of the cause of an injury or disease, promote the development of work disability. In this book, several chapters have emphasized the biological, psychosocial, insurance, and societal determinants of disability and the related conceptual frameworks (Chap. 6, Black & Feuerstein). These chapters demonstrate the multifaceted etiology of work disability by exposing the complex interrelationship between risk factors located within the worker and those located within her or his workplace and social and societal environments. On the one hand, Coutu et al. (Chap. 2) describe workers' perceptions, while Sullivan et al. (Chap. 8) explore complex pain mechanisms, and Bultmann et al. (Chap. 10) discuss the psychosocial determinants of work disability. On the other hand, Lippel et al. (Chap. 12) comment on the influence of insurance systems on the disability process, Hulshof et al. (Chap. 13) explore the influence of care providers, and MacEachen et al. (Chap. 14) and Anema et al. (Chap. 22) expose various "systems" issues. Indeed, such a handbook dedicated to work disability requires the consideration of interrelationships of the perspectives, disciplines, and methodologies in order to properly address the complexity of the work disability Arena (Loisel et al. 2005) (see Chap. 6). Our perspective is not new; our team of transdisciplinary authors has argued for the adoption of the work disability paradigm since the publication of our original article in 2001 (Loisel et al. 2001). In this article, we explained why work disability must be considered within a comprehensive framework that goes beyond the confines of the medical diagnosis. We demonstrate below how the work disability paradigm has to integrate the public health perspective that is used to prevent most chronic health problems.

Work disability occurs when a worker is unable to stay at work or return to work because of an injury or disease. Worker's compensation and sickness-benefit insurance systems typically assume that a worker performs his or her job until an injury or disease limits his or her ability to work (Alexanderson and Norlund 2004; Johnson 2004). According to this logic of forensic and biomedical causality, work disability is explained by the severity of the condition, the effectiveness of healthcare interventions, the strength of economic disincentives, and the effectiveness of the employer's approach to disability management. The forensic

model suggests that the motivations an individual may have can influence their RTW decision (i.e., malingering, secondary gain, and primary gain) (Schultz et al. 2007). However, observational and experimental evidence accumulated over the past 25 years tends to refute this simplistic forensic model. Empirical evidence repeatedly demonstrates that work disability is linked to the above-mentioned psychosocial, workplace, social, and societal factors much more than to economical incentives as put forward by the forensic model (Loisel et al. 2001). Therefore, assessment of motivational factors in disability determination needs to be augmented by recognition of complexity, multidimensionality, temporal dimensions, and the interactivity of motivational constructs underlying disability (Worzer et al. 2009).

For some workers, the process of disablement is triggered by entering the vicious circle that involves numerous therapists, conflicting diagnoses, ineffective treatments, and adversarial administrative controls (such as workers' compensation appeals). These negative forces can perpetuate a worker's illness behaviors and promote absence from work (Loisel et al. 2001; Voss et al. 2004). Specific medical diagnoses are rarely responsible for work disability, especially for the prolonged and costly cases. In fact, prognostic studies of work injuries have found that worker or workplace psychosocial factors and societal factors such as the insurance systems have a greater impact on the development of disability than the triggering disorder itself (Turner et al. 2000; Shaw et al. 2001; Waddell et al. 2003; Truchon 2001). However, the system requirement for the worker to validate their compensation claim with a medical diagnosis leads to an overemphasis of the importance of the medical condition in the compensation adjudication process (see Chaps. 10, 11, and 12). For example, in the case of MSDs, pain is usually the main symptom and, at first glance, appears to be responsible for the work absence. However, as suggested by Waddell et al., pain explains only 5% of the work disability resulting from back pain (Waddell and Burton 2006). This does not suggest that pain is not important in the course of disability: rather it highlights that pain mechanisms, modulating the pain signal with past and present cognitions and emotions including reactions to the environment (Chap. 8) and the meaning of pain to a worker (Chap. 2), are determinants of work disability. Specifically, it is well known that initial pain due to an injury may lead to kinesophobia (fear of movement) and consequently disability (Vlaeyen et al. 1995). Movement and function have been shown not only to help quick recovery but also to be part of effective cognitive–behavioral therapy (Fordyce 1994) through activation and retraining of the painful body parts.

The disability process, triggered initially by a painful condition, becomes part of a complex interplay involving several stakeholders (employer, insurer, and healthcare providers) who deal with the worker during the disability process (Frank et al. 1998). Moreover, conflicting opinions given to a worker about the diagnosis and the worker's resulting uncertainty about the nature of her or his disorder can reinforce fears and misunderstandings about their health status (Coutu et al. 2007). The fear that returning to a job that is viewed as dangerous to his or her health, which may be true, creates a legitimate disincentive for a worker to go back to work and may be the path to prolonged work disability (Waddell et al. 2003).

5.3 Work Disability Determinants

A large body of literature on the determinants of work disability has accumulated since the 1980s. While this literature traditionally focused on back pain, it has progressively expanded to other disorders, and similarities of work disability determinants between the disorders are striking (Briand et al. 2007). In the following section, we discuss the determinants of disability and categorize them into four separate domains: personal, workplace, healthcare, and compensation. We will use the well-diffused "flag system" to name this taxonomy.

5.3.1 Personal Work Disability Determinants

The term "red flag" was coined in the American Agency for Health Care Policy and Research

(AHCPR) guidelines for low back pain (Bigos et al. 1994) as an initial clinical assessment of back pain in order to rule out severe rare disorders such as spinal infection, inflammatory arthritis, or cancer. These conditions are considered "red flags" because they require a specific treatment and offer the potential for a specific cure then allowing return to normal capacity (Agency for Health Care Policy and Research 1994). As an analogue to the red flags, Kendall et al. developed "yellow flags," referring to psychosocial disability determinants (Kendall et al. 1997). The yellow flags approach was based on three important assumptions: (a) injuries and impairments are rarely due primarily to psychological causes; (b) the report of injuries and pain is usually mediated by a complicated interaction of medical, work-related beliefs and behaviors, and psychosocial factors; and (c) the disability (loss of functions, withdrawal from activity and work loss) is secondary to impairment and the subjective experience of pain is commonly influenced by psychosocial factors (Kendall et al. 1998). A considerable literature now confirms the validity of these yellow flags that have been shown to include fears, distress, attitudes, perception of low social support, lack of self-efficacy, and inadequate coping strategies. A detailed description of these yellow flags is given in Chap. 10. Most often they express concerns of the workers related to their symptoms, disorder, work, or other social situation. Finally, a few physical determinants have been linked to work disability with the exception of pain radiating into the leg in workers with back pain (Loisel et al. 2002).

5.3.2 Workplace-Related Work Disability Determinants

Many workplace factors have been identified as determinants of disability. Following the flags system, these are known as "blue flags" (Shaw et al. 2009) (Chap. 11) and include fast work pace (van der Weide et al. 1999), strenuous work (Guger et al. 2004), organizational factors (Waddell 1992; Schultz et al. 2007), the availability of a progressive RTW option after injury (Krause et al. 1998), working relationships (van der Weide et al. 1999), and supervisors' attitudes (Shaw et al. 2003). The underlying causes of a worker's workplace environment may be difficult to identify and measure. This may lead a worker to have concerns about the workplace. This complex situation underlines the importance of thoroughly understanding the workplace situation in order to properly grasp the worker's concerns about returning to work (Loisel and Durand 2006). The importance of understanding this complexity is highlighted by the preponderance of evidence supporting the central role of workplace human resource management in designing and implementing effective RTW programs (Chap. 21).

5.3.3 Healthcare-Related Work Disability Determinants

Most healthcare providers are not trained to manage work disability (Chap. 13). They may be well trained to diagnose and treat a patho-anatomical lesion (such as lumbar disk herniation) but ill equipped to deal with psychosocial, workplace, and compensation determinants of disability. This can result in uncertainty in both the healthcare provider and injured worker and lead to repeated attempts to identify a patho-anatomical lesion for a work disability episode when it is not really related to a lesion. Also, different healthcare providers often label the health disorder with different names (e.g., low back pain vs. low back sprain), which makes little difference from a medical perspective, but may suggest to the patient that the nature of the problem has changed or even worsened (Chap. 2). These healthcare inconsistencies reinforce the worker's concerns, which in turn can promote the development of chronic pain and disability. In these cases, pain may be reinforced by the neurophysiological mechanisms of pain centralization. In pain centralization, the original peripheral pain is mediated by cognition and emotions. This process may persist after a worker has recovered if the workers' fears were not addressed (Lidbeck 2002).

5.3.4 Compensation-Related Work Disability Determinants

The structure of public and private insurance systems varies greatly from one jurisdiction to the next. This may conflict with the worker's actual healthcare needs, not all disease related, especially when the system is causation determined, as in the case of workers' compensation boards or private insurance systems (Chap. 12). The structure of the system may lead to the denial of care that is not directly linked to the cause of the original impairment. For example, an injured worker with persistent disability related to back pain and depression may only receive treatment for his or her back pain because the treatment of depression is not covered by the insurance system. Moreover, the obligation to prove causation may lead to litigation processes where the legitimacy of a worker's claim for work disability is questioned (Lippel 1999). These disputes are counterproductive for a worker's health because they are associated with economic tension and emotional distress, are perceived by the worker as a denial of justice, and commonly lead to delays in RTW (Butterfield et al. 1998; Baril et al. 2000) and prolong work disability (Sullivan et al. 2009). Other system factors play also a role like timing of the work disability assessment (between temporary sickness benefits and work disability pensions) or provision of a high threshold for a work disability pension (no partial work disability pension possible) (OCED 2010; Anema et al. 2009) (Chap. 22).

5.3.5 Explanatory Models for Work Disability

In the past three decades, models (or conceptual frameworks) used to understand the development of work disability have evolved from the biomedical and forensic models to the biopsychosocial model (Waddell 1992). Following this, Feuerstein developed a model including work demands (Feuerstein 1991), and more recently Vlaeyen et al. introduced a model explaining how pain mechanisms at the psychological level influence the onset of disability (Vlaeyen and Linton 2000). Finally Loisel et al. developed a conceptual framework describing how stakeholders influence the disability process (Loisel et al. 2001). This model has evolved and now integrates all stakeholders in an arena that depicts the multiple interplays between stakeholders and how they influence the disability process (Loisel et al. 2005). Details on models or conceptual frameworks are discussed in Chap. 6. The above models are complementary, and efforts are needed to develop a more comprehensive explanatory model of work disability.

5.4 Preventing and Managing Work Disability

For years, the prevention of work disability has looked downstream and focused on the treatment of the disorder that triggered a temporary absence from work. In most jurisdictions, physicians or other healthcare providers act as gatekeepers for insurance systems. Traditionally, the gatekeeper bases his or her decision to take or keep a worker off work using the assumption that the clinical severity of the disorder is the main indicator of work disability. Although physicians have expertise for making diagnoses and applying treatments, they usually have little training to assess functional limitations and key work disability determinants, such as psychosocial and workplace issues (Loisel et al. 2001). From the perspective of the work disability paradigm, specific medical treatment for the worker is needed much less than are strategies to deal with the often conflicting perspectives and interests advanced by the various stakeholders. From these conflicting perspectives, which may be triggered by decision makers displaying vested interests, can arise misunderstandings and perceptions of denial of justice leading to persistence of work withdrawal (Sullivan et al. 2009).

As demonstrated in this book, effective and cost-effective return to work interventions are now available, addressing broad causes of the work disability instead of the impairment (Chaps. 20, 21, and 23). However, these interventions may be difficult to implement because of stakeholders' misunderstandings and systemic issues,

such as medical diagnostic-based rehabilitation interventions (Frank et al. 1998). Implementation of the work disability paradigm is challenging (Loisel et al. 2005). Its accomplishment requires more than clinical practice guidelines that only address the worker, as this approach has been tried and has failed (González-Urzelai et al. 2003). The implementation of the work disability paradigm will require significant systemic changes, the evolution of laws and regulations within this framework, and appropriate education of the stakeholders and of the public. Those invested in the prevention of work disability need to adopt a public health strategy and learn from the impact of these strategies on chronic conditions. For example, the incidence of mortality secondary to lung cancer from tobacco use was not mainly reduced by surgery and chemotherapy. Rather, it is the implementation of public health policies and interventions aiming at changing the population's behaviors that have reduced its burden. Similarly, the negative health and well-being impact of work disability cannot be solved by measures only directed towards the workers. System and social disability determinants have been described as having a "toxic" influence on a workers' psychological state (MacEachen et al. 2010) (see also MacEachen, Chap. 14). A public health perspective based on the work disability paradigm is therefore required to curtail this problem. The scientific evidence clearly demonstrates that work disability is caused by factors that are well beyond the triggering injury or disorder. These determinants therefore need to be addressed directly at the societal levels as well as at the worker's level (Chap. 22). In other words, work disability needs to be conceptualized as a participation restriction that requires public health interventions to prevent its adverse effects on the health of the workers' population (WHO 2001).

5.4.1 A Public Health Perspective

Historically, prevention strategies have taken place at three levels: primary, secondary, and tertiary. Primary prevention aims at preventing a disease from occurring. Secondary prevention aims at treating an injury or a disorder in its early stages before it leads to further morbidity. Tertiary prevention aims to avoid the negative impact of disability through medical and rehabilitation interventions. All three levels of prevention are disease centered and postulate that a disease has specific causes, which are responsible for the negative consequences. For instance, back pain has a lifetime prevalence around 80%. Each year, about 25% of workers develop back pain that limit their activities (Institut de la statistique du Que´bec 2001). Fortunately only a few of these workers develop prolonged work disability. According to the evidence described above, most determinants of work disability are not within the spine but rather in workers' concerns, perceptions, workplace conditions, or stakeholders' attitudes. Therefore, it is not surprising that traditional primary prevention strategies for back pain have had little effect on work disability (Ijzelenberg et al. 2007). This view is supported by recent reviews indicating that, despite all the ergonomic efforts made and medical expenditures, especially in the two past decades, back pain remains highly prevalent in workers (Martin et al. 2008). Disability prevention, at all stages, should therefore avoid linking interventions or actions to specific medical diagnoses but address the above-mentioned work disability determinants. The involved systems should facilitate this process through appropriate regulations. Again, taking this perspective requires a public health orientation directed to all stakeholders involved in work disability prevention (see Chap. 6, Fig. 6.4).

The work disability paradigm perspective suggests that the employers need to be informed about and understand the value of appropriate human resources management. Specifically, they need to understand that temporary difficulties due to a disorder need to be accommodated and that a close and positive link between the worker and the workplace needs to be maintained. Insurers should avoid searching for a causal link between an event and the resulting disability. Rather, they need to promote strategies that fit within the work disability paradigm. These strategies will help the worker to overcome the difficulties related to returning to work. The implication for healthcare

providers is that they need to ask their patients about facilitators of work disability and promote coping strategies that will restrict work withdrawal and avoid overdependence on medical interventions. Ultimately, our governments and regulators develop laws and policies that promote return to work (Blustein 2008).

5.5 Conclusion

All these changes may only happen through public health actions aimed at improving compensation systems and educating stakeholders about the determinants of disability as described in the work disability paradigm. Examples of the implementation of the work disability paradigm in one jurisdiction are encouraging. Recently, Dutch law was modified to give employers financial and organizational responsibility for work absenteeism, including rehabilitation measures and worker salary, for the first 2 years of a sickness or injury episode. These changes have led to important reduction in work disability levels and costs in the Netherlands (de Jong et al. 2010) (Chap. 22). Another example is a major mass media campaign implemented in Victoria State (Australia) which explained to the general public that back pain is a benign condition and that disability is prevented by remaining active and at work or returning to work as soon as possible. This campaign led to an important reduction of disability and costs from back pain, as shown when compared with the neighbor state of New South Wales (Buchbinder et al. 2001) (Chap. 24).

Work disability can be triggered by many injuries or disorders (Part IV, Chaps. 16, 17, 18, and 19). However, in most cases it becomes a participation restriction influenced by personal, workplace, societal, and compensation determinants. Public health actions, aimed at the stakeholders, the decision makers, and the public, to inform and educate about the work disability paradigm are needed to make them active participants in work disability prevention. This, we believe, is the most promising avenue that may reduce unnecessary work disability and improve the health of the population of workers.

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Part II

Unraveling Work Disability Prevention

Work Disability Models: Past and Present

6

Katia M. Costa-Black, Michael Feuerstein, and Patrick Loisel

This chapter presents an overview of our knowledge evolution in conceptualizing work disability from various viewpoints. A historical perspective is presented with descriptions of conceptual models from the past that have influenced our understanding of work disability of today. In addition, contemporary models that explain the person-environment interaction are described and discussed in relation to their implications for return to work and prevention of work disability. Finally, a few premises for the development of a new model are presented.

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6.1 Introduction

A common understanding of work disability and its main dimensions is essential to improve research utilization and to promote coherent approaches to prevent a problem that is affecting millions of individuals and workplaces globally, costs society billions of dollars in healthcare, disability compensation, lost productivity, and an incalculable amount in emotional suffering (OECD 2010) (see Chap. 1). As we begin to better understand the determinants of work disability and influences on the return to work process after an injury/illness, it becomes critical to examine existing conceptual models, which usually guide disability management and prevention practices. It is also essential to determine whether these models are consistent with current research developments in work disability prevention, and the many contemporary issues faced by health services and other responsible authorities (e.g., occupational health services, social security or insurance-based management systems, and workplaces).

A conceptual model, also referred as conceptual framework, "identifies a set of variables and relationships that should be examined in order to explain the phenomena" (Kitson et al. 2008). Models are different from theories because they often provide a visual picture of empirical findings and/or the experience of practicing professionals. Scientific models might be based on more than one theory or may represent a single theory in its operationalized form. They are susceptible to

P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_6, © Springer Science+Business Media New York 2013

changes as new knowledge is gained and are frequently considered a work-in-progress or a current explanation of a phenomenon. Thus, a model developed in a point in time offers only a picture of a proposed framework of things that might work at that time allowing the generation of potentially useful hypotheses to be tested.

A distinction between conceptual models (describing mechanisms and variables of a problem with directional or reciprocal influences) and operational models (describing the optimum functioning of an intervention, decision-making approach, or management structure) must be made (Earp and Ennett 1991). Many operational models that can help guide or test an intervention, a program, a policy, or a practice are used by rehabilitation and occupational health services. A well-known example of such a model is the Sherbrooke model tested as a multifaceted intervention to prevent low back disability in Quebec (Loisel et al. 1997). Another example is the worksite disability management model which focuses on presenting the essential decision-making plan for return to work, and it provides some standardization of disability management practices across communities (Shrey 2000). There is also a well-known medical/rehabilitation management model that proposes to guide the decision-making process for a better match between job demands and worker capacities mainly based on ergonomics principles (Armstrong et al. 2001).

Both operational and conceptual models guiding an intervention or explaining a phenomenon are relevant to research translation as they allow practitioners to adjust their practice orientation and researchers to monitor and evaluate a practice or intervention with more precision. Recent reviews, book chapters, and reports have described and analyzed a number of conceptual models used in rehabilitation and disability prevention (Huang et al. 2002; Schultz et al. 2007; Masala and Petretto 2008; Jette and Badley 2000; Brandt and Pope 1997; Pransky et al. 2004). Pransky et al. (2004) summarized existing disability prevention models including the medical model, the physical rehabilitation model, the job-matched model, and the managed care model. A recently published review compared various return to work models for musculoskeletal disorders (Schultz et al. 2007).

To avoid duplication of effort, this chapter makes reference to past models that have influenced the conceptualization of work disability in research and practice. This is followed by a discussion on a few models in use today to elucidate the recent patterns of evidence on the multidimensions and determinants of work disability. A particular effort was made to identify contemporary models that represent different disciplinary perspectives in order to arrive at a more transdisciplinary discussion about their contribution, knowledge gaps, and how they may relate to one another.

This chapter uses a situational[1] definition of work disability as a person's inability to remain at or return to work during the course of or after an injury/illness. The interactive relationship between a person and his or her work is at the core of this definition. While at first glance this definition represents a simplistic view of a personal situation (i.e., his or her participation in gainful employment), it encompasses a very complex set of variables. Examples of these include the following: the behavior and attitude of social actors toward the situation, compensation schemes as well as prevention awareness taking into account an array of biopsychosocial determinants of disability, among others. This definition also implicates complex processes such as work reintegration (also referred as "return to work") and work retention or sustainability (also referred as "stay at work") after an illness/injury, which only recently has become the subject matter of extensive research.

6.2 Historical Overview of Disability Models: From the Past to the Present

In this section, a general view of different models from the past to the present and their contributions to our understanding of work-limiting disability are presented. To identify these models, a nontraditional literature search was conducted consisting of a combination of a hand searching using a

[1]Defined as the combination of circumstances at a given moment; a state of affairs (Oxford dictionary).

snowballing approach (retrieving citations from recent publications on work disability from well-known journals), with electronically searching a large gray literature database (Google Scholar). Given the authors' previous experience with model building in the field and their different expertise, relevant models were discussed with careful consideration of their valued contribution to our understanding of work disability determinants.

6.2.1 Influential Models of the Past

The *medical model* developed in the nineteenth century is still one of the most influential in our society in terms of defining the medicolegal dimensions of work disability. At that time of its conception, work-limiting disability was not fully discussed. This model focused on the problems within the patient to explain disability. It emphasizes that an absence of signs and symptoms of disease indicates health; thus if the individual has a problem and the problem is "cured," then the problem no longer exists (Nye 2003). The individual with a disability of any kind is pushed into the passive role of patient, and therefore he/she can be excused from the normal obligations of society such as going to work (this could be the case whenever a pain/disease/illness/injury was not cured).

The American sociologist Talcott Parsons, developed the sick role theory in the early 1950s. This theory has greatly influenced how medical professionals view illness behavior, and it has pushed the idea that the individual should "voluntarily accept" the sick role (i.e., "passive patient") (Parsons 1951). Parsons was concerned with explaining the role of a sick person and its integration into the medical care system. For instance, a characteristic of the "sick role" is that the sick person is exempt from carrying out normal social roles. The more severe the illness, the more one is freed from normal social roles. For acute illness, this characteristic might fit well, however, for chronic/long-term/permanent illness, which requires patients to be socially independent, this is less applicable. This theory implies many reciprocal relations between the sick person (the patient) and the healer (the physician) and has influenced the adoption of a *medical model* where the physician is one of social control. The decision-making related to the state of wellness and health of the patient is in the full hands of the medical professional (Nye 2003).

Under the traditional *medical model* (also known as the biomedical model), the experience of those with disability is evaluated in terms of the extent of impairment or degree of handicap of the person as well as his or her clinical responses to treatment. This model still guides how healthcare services manage work disability worldwide (Engel 1977). Nonetheless, most scientists agree that even in some cases in which work disability may be managed as a purely medical condition, much appreciation must be given to its nonclinical aspects. For many illnesses, full medical recovery is not always possible, and there are substantial scientific arguments of the importance of giving the worker an opportunity to maintain his or her social role via a supportive social environment (Lippel 2007; O'Brien et al. 2008; Ferrier and Lavis 2003; Grunfeld et al. 2008; Wolfenden and Grace 2009). This means that the evolving circumstances around a worker's illness and health state should be considered, including the advantages and disadvantages of being reintegrated back to work or to the labor market.

As early as 1965, Saad Nagi presented a conception of "disablement" quite different from the medical-centered one (Nagi 1965). He proposed a socio-ecological perspective less dependent on medicine and on the medical professional which was revolutionary at that time. *Nagi's model* defines the disablement process by a set of complex influences of external factors on individuals and the environment. He stated that "not all physical or mental conditions would precipitate a disability, and similar patterns of disability may result from different types of health conditions. Furthermore, identical physical and mental limitations may result in different patterns of disability" (Jette and Badley 2000). His model is marked by an understanding of the major role the environment plays in the disablement process, which later he expanded into social environment (i.e., reactions and expectations of reference individuals) and physical environment (i.e., mainly referring to physical demands encountered in

the environment) (Masala and Petretto 2008; Nagi 1991).

Although Nagi's reformulated person–environment view of disability carries less emphasis on pathology and impairment, Nagi's reference to the environment was limited to how its negative elements impinge on individual's activity limitation and function (Brandt and Pope 1997). In spite of Nagi's prominent reflection on the unique aspect of a persons' experience of disability (which cannot simply be described in terms of functional limitations and structural impairments), his view retains the central idea of the *medical model*- that disability arises from a medical condition, which can impair function. The only important difference is that in *Nagi's model* the influences of the environment are recognized as the external demands imposed on the disablement process.

Until the early 1990s, the disablement process as described by Nagi (i.e., pathology gives rise to impairment, which may result in a limitation in a particular function, and finally, it may result in work-limiting disability) was well accepted by many different healthcare professionals. Other well-known models such as the World Health Organization (WHO)-International Classification of Impairments, Disabilities, and Handicaps (ICIDH) (World Health Organization 1980); and the disability model of the Institute of Medicine (IOM) (Pope and Tarlov 1991) propose similar perspectives with slightly different nomenclature for impairment, function, and disability.

Another early model that has been very influential on the views of society on disability and has emancipated the notion of the "disabling" physical and social environment, is the *social model* of disability (Barnes 2000). This model continues to represent a very important perspective promoting the mitigation of stigmatization and evolution of social injustice. The *social model* presents disability as a problem created by the way the society is organized. For this latter reason, there are many barriers to participation in the various stages of an individual's community life. From this perspective, the origin of disability is exclusively the social environment, and its solution demands the collective efforts of society and suitability of the adaptation and change of attitude of those who believe that individuals with any type of disability should somehow be marginalized from active participation in society (Barnes 2000). According to this model, society's ideology, culture, education, and the social organization of work can shape how we all perceive disability.

The *social model* emerged in the 1970s and since then has contributed to our understanding of disability by raising questions about the value of individually based interventions—whether they be medical, rehabilitative, educational, or employment based. The individual-based treatment was particularly questioned when relevant environmental discrimination at large could affect all aspects of a person's life. As a result, the *social model* continues to have an important influence on social policy at both national and international levels (Barnes 2000).

In spite of its contributions, it is inevitable to observe that the *social model* retains a unidirectional view of disability, limiting the causes of disability either exclusively or mainly to the lack of social and environmental policies and practices that can protect the individual's rights. Today, our understanding of disability and its natural dynamism in terms of people (behaviors) and systems (influences) is advancing toward inclusion of both individual rights and broader social, cultural and economic rights. This understanding arises not only from socioeconomic and policy-related studies but also from the substantive body of research on the experience of chronic illness and on the organization of work which gives a renewed emphasis on neglected personal narratives about values and beliefs of all those affected directly or indirectly by the phenomenon (Barnes 2000).

6.2.2 Models Widely Accepted Today

More than 20 years ago, research conducted primarily on low back pain prognostic factors began to show how the probability of a patient's return to work diminished as time since injury or diagnosis increased (Waddell 1987). A possible explanation for that emerged from observational studies, which have shown that the return to work

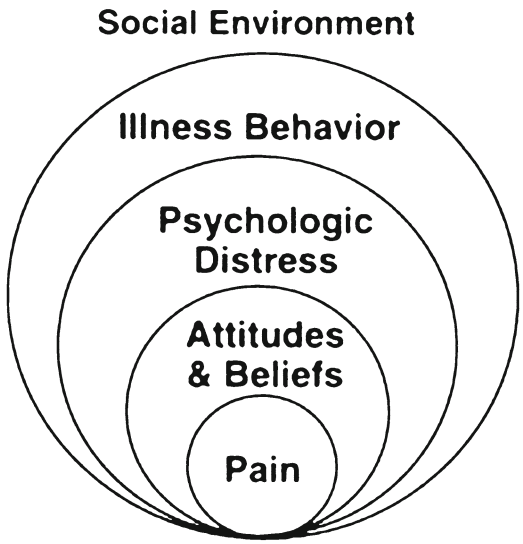

Fig. 6.1 The *biopsychosocial model* of low back pain and disability (Reprinted from The back pain revolution, G. Waddell, Copyright [1998, 2004], with permission from Elsevier).

process is sensitive to the many influences on illness behavior. For example, the longer a person is absent from work, the more he or she will have to cope with the effects of being removed from the context of work. The cumulative evidence on the nature of return to work for individuals with low back disability reinforced the need to adopt a biopsychosocial perspective in order to holistically capture human illness and related behavior. An example of a widely accepted *biopsychosocial model* is the one proposed by Waddell developed for low back pain and disability (Fig. 6.1). The "multicausality" and multidirectional nature of illness and health are explained (at least partially) by biobehavioral perspectives as the gate control theory of pain—which postulates that pain is modulated by mental, emotional, and sensory mechanisms (Waddell 1987).

The *biopsychosocial model* (or perspective) originally proposed by Engel identifies many shortcomings of the biomedical model (Engel 1980). He brought a cross-disciplinary approach to medical practice by linking subjects such as medical sociology, behavioral psychology, psychiatry, and physiological research (Engel 1980). Engel's *biopsychosocial model* highlights health and illness as the product of a combination of factors, including the biology of the individual (e.g., genetic predispositions, chemical imbalances), behavioral factors (e.g., lifestyle, stress, health beliefs), and social conditions (e.g., cultural influences, family relationships, social support). His work was inspired by the early thinking of Brody who was the first to describe health as influenced by an interaction of a hierarchy of natural systems, broadening the clinician's perspective to consider the role of biological, psychological, and social factors and their complex interactions in understanding health and illness (Brody 1973).

Engel's perspective on illness is observed today in many practices and provides a reference to how to apply a holistic approach to understand the patient and to expand the domain of medical knowledge by contextually addressing the needs of each patient. His biopsychosocial perspective represents a landmark for a changing in perspective in clinical practice, and many fundamental principles of work disability prevention are based on this holistic perspective of human illness. Thus, many contemporary models of pain, illness, injury, and work disability, have been formulated from this perspective.

An influential model that reinforces the biopsychosocial perspective in medicine and rehabilitation is the *International Classification of Functioning (ICF)* developed by the World Health Organization (WHO) in 2001, (Fig. 6.2) (World Health Organization 2001). The ICF was first published as the ICIDH in 1980 (World Health Organization 1980), modified in 1999 to the ICIDH2 (WHO 1999), and in 2001, it was fully reviewed by a large panel of international experts (World Health Organization 2001). This model was developed mainly to facilitate communication between healthcare professionals (HCPs). It integrates the social perspectives of "human activities" and "participation" into the clinical understanding of "body functions, and structures".

About 191 countries have adopted the *ICF* and have used it extensively in administrative systems and clinical settings (Masala and Petretto 2008). As a biopsychosocial model, the *WHO–ICF* describes disability (or the lack of "functioning")

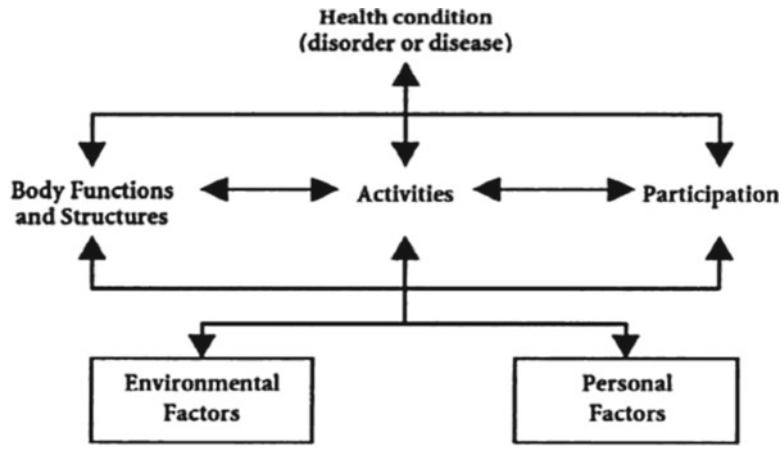

Fig. 6.2 The *WHO–ICF 2001* (World Health Organization 2001)

as a matter of how the person affected responds to life activities and social participation. In this perspective, functioning (or the lack of it) is dependent on the dynamic interaction between the individual's health condition and contextual factors that include both personal/psychological and social/environmental factors. This framework proposes a view of illness and social participation focused on the individual and his or her behavior when it comes to treatment outcome. The main components of the *ICF* represent multiple pathways linking the three levels of outcome, i.e., (1) body functions and structures, (2) activities, and (3) participation. They are related to one another and to contextual factors (consisted of environmental and personal factors). As a classification system that has received broad international attention, the *WHO–ICF* has greatly enriched practitioners and researchers' mutual understanding of many contextual factors associated with various medical conditions (of work origin or not).

Contrary to the *Nagi's model* and the *social model* described earlier, this classification shows causality in different directions (i.e., body functions, activities, and participation) and places the health condition at the center. As such, it confirms the dynamism of the health/illness process, which in previous models has been described in a more linear fashion (the individual, the environment, and the individual–environment interaction). However, presenting "disablement" as a dynamic process does not clarify which interactions are relevant, and how they play a role in determining the factors that influence the development or maintenance of "enablement" (Masala and Petretto 2008).

Because work disability is the result of complex interactions between the individual, his or her health/illness state, and the environment (political, social, and physical), it is essential to understand the dynamic disablement/enablement process in an integrative form, not only relating it to the individuals' functionalities but also to the inherent context. For instance, the actual interactions among workers at risk for work disability and various social actors might exert a positive or a negative influence on his or her incapacity status (Chaps. 12, 14 and 25) (Waddell 2006; Muschalla and Linden 2009; Frank et al. 1998). In this regard, the *WHO–ICF* framework is limited to a healthcare-centered view with attention only to individual functioning (i.e., a person's pathological state and all functional consequences), similar to the *medial model*. The roles and responsibilities of all social actors—besides the patient/client and provider—whom are also actively engaged in the disablement process (i.e., by positively or negatively influencing individual's work participation) are not considered in the *ICF*. In fact, these issues fall outside its main purpose.

Another point to consider is that the *ICF* has failed thus far to describe the mechanism by which contextual factors can affect the disability and work participation processes (Schultz et al. 2007;

Heerkens et al. 2004). For prevention of work disability, these factors are essential, and an ideal model should take into account transient contextual factors that can influence on worker's interaction with work and his or her room of maneuver (i.e., the individual's zone of adaptability) (Durand et al. 2009; Costa-Black 2009). A comprehensive understanding of the contextual influences on human functioning vis-à-vis *the WHO–ICF,* still needs further attention. Nonetheless, this framework must be commended for its efforts in enriching our understanding of an individual's health/illness process in relation to the overall social participation (Stucki et al. 2002).

In 2001, the IOM and the National Research Council (NRC) gathered several experts for the Panel on Musculoskeletal Disorders and the Workplace. The panel proposed a new biopsychosocial model of musculoskeletal disorders in the workplace. The *IOM-NRC model* describes the "person–environment" interface and the possible influence that medical, biomechanical, work environment, and psychosocial factors may play in the development of musculoskeletal disorder and disability (IOM and NRC 2001). This model was developed based on an expert consensus and literature review that included both biomechanical and epidemiological studies.

Previous to the development of *the IOM-NRC model*, many other models of physical stress and work demonstrated a link between biomechanical load and physiological factors with musculoskeletal injuries, impairments, and work disability (Huang et al. 2002). What this model brings as innovation is how it describes the influence of work organization and social context factors on pain and disability outcomes. Its graphic representation is shown in Fig. 6.3, which presents the dynamic relationship between the workplace (and its micro- and macroelements) with the person. The elements of this model are based on extensive research on workplace and personal factors said to be relevant to the occurrence of musculoskeletal pain and disability. With regards to workplace factors, the external loads are the work demands or hazards transmitted through biomechanical forces to create internal loads on the tissues and anatomical forces. They can be categorized as the elements of a micro workplace system representing all possible physical loads imposed on a person's body (workloads or work demands such as lifting, carrying objects, and awkward posture). The *IOM–NRC model* also recognizes the influences of the macro system such as work organizational factors as well as socio-technical relationships (i.e., work groups, supervisor–worker relationship, and all the social context dynamics) The external load (which involves the interaction of the individual with work demands at the task level) and the macro aspects of the workplace (including organization policies and factors related to the socio-technical system) are all interconnected with one another. Knowledge of these workplace issues are not only essential for managing health, safety, and productivity of the work force but also for proposing effective work retention and reintegration practices (Costa-Black 2009; Anema et al. 2003; Amick et al. 2000). For instance, a comprehensive view of the influences of workplace factors on musculoskeletal pain and disability, is important when determining the need for ergonomics interventions at both micro and macro levels (Costa-Black 2009). These interventions are supported by the literature on organizational behavior in terms of commitment to worker's health and safety. Recently, new studies begin to show how a comprehensive view of workplace factors may facilitate the implementation of more supportive policies to facilitate work reintegration and retention after an injury/illness (IOM and NRC 2001; Amick et al. 2000). More research is needed to uncover other organizational and structural conditions (i.e., feasibility issue) that may importantly decrease turnover and work disability rates. There is also a need to better recognize (in practice) how the psychosocial work environment of persons presenting different illnesses or injuries (work-related or not) can determine long-term work absenteeism or presenteeism (i.e., working with reduced productivity due to illness/injury). In research, the evidence of the effects of many psychosocial work factors on work disability and workers' health at the workplace continues to accumulate (Karlsson et al. 2010) (see Chap. 10).

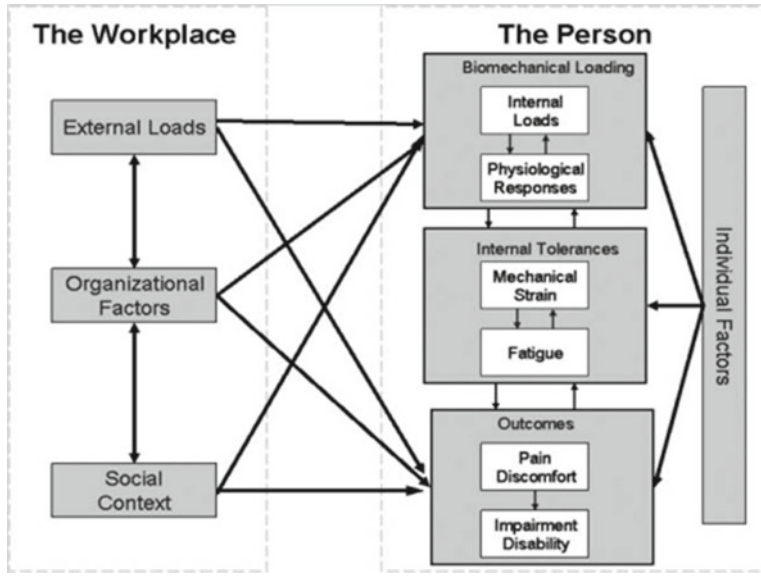

Fig. 6.3 The *IOM–NRC model* (Reprinted from Panel on Musculoskeletal Disorders and the Workplace, Commission on Behavioral and Social Sciences and Education, National Research Council and Institute of Medicine, with permission from the National Academic Press, Copyright (2001), National Academy of Sciences)

A limitation of the *IOM–NRC model* is that when explaining musculoskeletal health, the psychosocial environment is recognized only implicitly in the box representing the workplace. Conceptually, the psychosocial work environment represents a set of potential factors produced from the interaction between the person and the workplace, mediated by external load, organizational factors, and social context (Faucett 2005). Cumulative research supports the rich interaction among these three groups of factors representing the workplace, and between each of these groups with the person. In the *IOM-NRC model* representation, is clear that each interaction might influence the outcomes of pain and disability. However, the model does not illustrate or explain the more direct role these individual psychosocial factors can play in both pain and disability.

6.2.3 Reflecting on the Models of Today

The *biopsychosocial model* originally presented by Engel and later revised or modified by various disciplines and practices provides a comprehensive understanding of the person experiencing illness, pain or work-limiting disability. When it comes to work disability, one can easily observe that this perspective fails to recognize the other systems and their influences on the individual's decision to work participation. This represents as much as a research translation gap as a scientific challenge for future model building. Much has been written about the importance of working-age individuals to participate in social activities (for those with or without physical, mental, or social impairments). Work can be the psychosocial vehicle to "recover" from an illness/injury. However, work participation is a complex process that involves many social actors in order to be successfully accomplished. A better understanding of this process and the influences of the work environment on pain and disability gained from more recent research, have began to raise more awareness to the diverse group of social actors of the fact that a sole focus on personal system is not enough to prevent a person to permanently withdraw from his or her productive work life (MacEachen et al. 2010).

During the past decade, a number of scientists have advocated for a shift in attention to all the

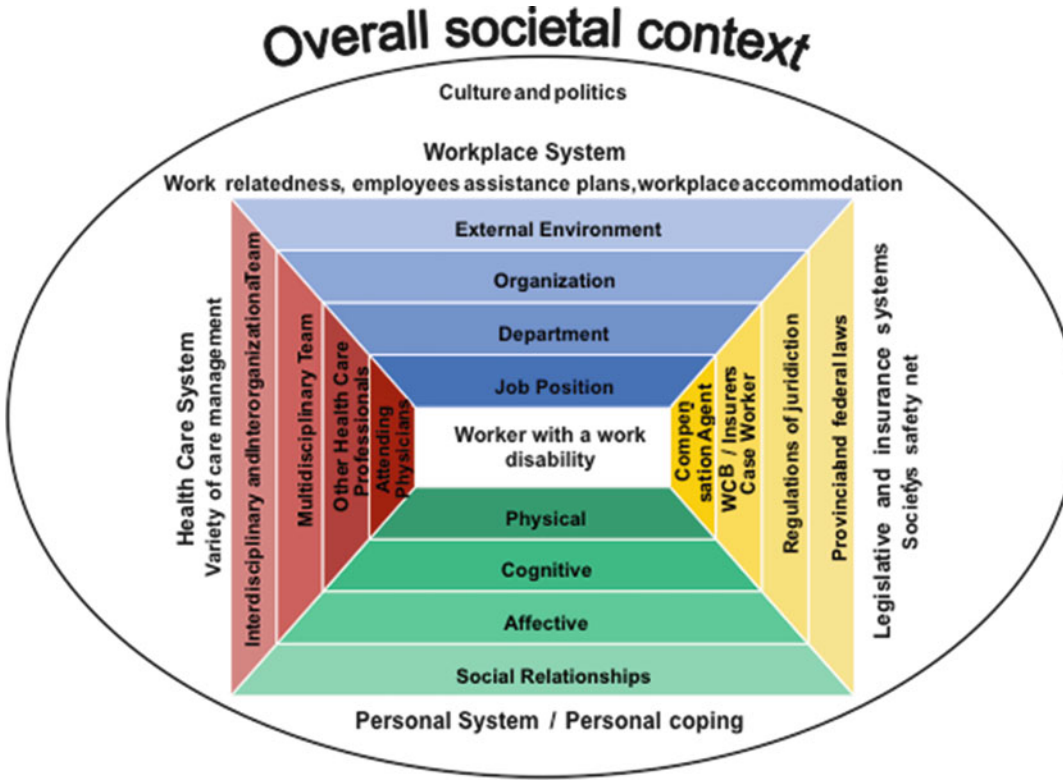

Fig. 6.4 The Arena in work disability prevention: a *case-management ecological model* (Reprinted from Prevention of work disability due to musculoskeletal disorders: The challenge of implementing evidence. Loisel, P. et al. *Journal of Occupational Rehabilitation, 15* (4). Copyright (2005), with permission from Springer)

systems implicated in the disability problem with potential solutions arising from well-coordinated management and prevention actions (Pransky et al. 2004). In response to this, new conceptual models have emerged, integrating the latest work disability research and also new evidence on the work environment influences on illness/injury and disability. The *case-management ecological model* is an important example of a recent model that gives attention to the full arena of social actors. As an operational model (used not to explain the factors leading to work disability but to guide case-management operations or for detecting the influences of systems on the disability process), it offers an excellent opportunity to capture the social disposition of people around the worker with disability. It illustrates the various social structures of all the systems (i.e., personal, workplace, healthcare, and compensation systems) and the corresponding representatives of each system (Fig. 6.4) (Loisel et al. 2005). This operational model was originally developed to orient the case management of low back disability; however, it has been proposed and largely applied in practice for any medical condition where prevention of prolonged work disability is desired. The arena (Fig. 6.4) shows the worker at the center and four main influential systems of his or her work-limiting situation, i.e., the personal system with all important dimensions and the social relationships of the person; the healthcare system with the levels of attention the worker can access or that can influence the disability situation; the workplace system with its main socio-technical structures; and the compensation system with its local regulations and involved actors. The overall sociopolitical and cultural context is also represented in the model as influential factors on the work-disabling situation.

This model offers the most complete visual representation of the multi-influencing systems impacting on work disability developed up until now. However, according to our definition of a conceptual model, this model is not a conceptual model per se in a sense that work disability is not explained by a set of testable variables related to the person–work environment interaction. In order to fully understand work disability, it is essential to examine the elements of the person–environment interaction as well as the influences of systems on the worker's decision to work participation. Up until now no one single explanatory model has successfully captured the complexity of the disability factors with attention to the multisystem dynamics, which influence individuals' decision process for work reintegration/retention.

In the absence of a single complete model representation, we have identified three recently developed models, which present the current patterns of evidence found in work disability research and represent the latest advances in model building when it comes to illness/injury leading to work disability. In the next session, a brief description and a comparison of these three models are presented. The comparison serves to elucidate some of the current research gaps and helps to highlight how far researchers have gone on explaining the person–environment interface and the influential factors present in other systems. It also substantiated our arguments for future model building in work disability prevention and management.

6.3 Comparison of Three Conceptual Models

The following conceptual models were identified and retained for comparison: (1) the expanded version of *the WHO–ICF* proposed by Heerkens et al. (2004) that can be used across different health conditions affecting workers; (2) the integrated model for control of work-related musculoskeletal disorders, which includes macro-ergonomic theories (Faucett 2005); and (3) the model recently proposed for work disability prevention of cancer survivors (Feuerstein et al. 2010).

These three distinct models were pooled from the literature for a comparative analysis of their features and dimensions in order to determine how far or how close we are from integrating the latest patterns of evidence on work disability prevention and management. These three models share in common the following features: (1) they have been proposed in the last decade and (2) they describe elements of both a personal system and a work system as the vehicles for describing work-limiting disability and related outcomes (with the input and output variables clearly identified). Each of them represents a different disciplinary perspective of work disability. The *expanded ICF* brings the rehabilitation perspective of human functioning; the *integrated model* brings the perspective of human-stress and ergonomics theories; and the *cancer and work model* brings an interdisciplinary perspective of illness applied to work participation. Their disciplinary distinction and foundation allow exploring how far current models have gone on explaining the different factors influencing work disability.

6.3.1 Models' Description

6.3.1.1 Expanded International Classification of Functioning

Heerkens et al. (2004) proposed an expanded version of the *ICF* (Fig. 6.5). This model is the first that tries to communicate in terms of the ICF work-related factors leading to problems in functioning and health. The proposition of this model is clear about interdisciplinary use and application for both research and practice. Its unified nomenclature allows psychologists, physiotherapists, physicians, occupational hygienists, and ergonomists to commonly refer to the expanded contextual components, i.e. the personal and external factors, with a level of detail depending to their specific professional background (Heerkens et al. 2004). The environmental factors are referred to as external factors of an individual's life, and they include physical, social, and attitudinal environments. These factors can either have a negative or a positive influence on a person's performance in society, on an individual's ability

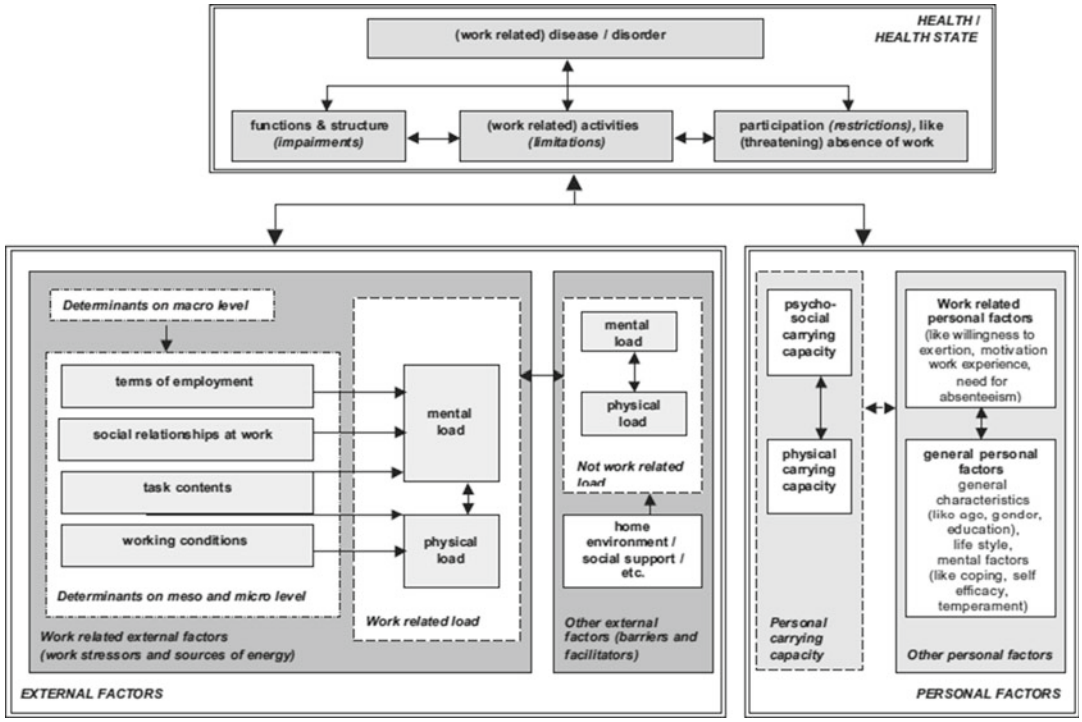

Fig. 6.5 Heerkens' expanded version of the WHO–ICF (Reprinted from The use of the ICF to describe work related factors influencing the health of employees, Heerkens, Y. et al. *Disability & Rehabilitation, 26*(17). Copyright (2004), with permission from Informa Healthcare)

to carry tasks, or on an individual's body function and structure.

The *expanded ICF* describes the workplace environment with its micro, meso, and macro determinants. It includes an element called "work conditions" which are the physical hazards present in the work environment such as vibration, noise, air quality, radiation, biological and chemical agents, and ergonomic workplace design aspects. The need for keeping up with a hazard-free environment cannot be overemphasized when it comes to acquiring successful work participation rates with sustainability and attention to the person's quality of working life. This model considers a balanced work life by listing different work stressors and source of energy replenishment, which can be either enablers or disablers of health and/or functioning (e.g., social relationships at work can have a positive or negative influence on individual's perception of physical load). According to this model, short-term and long-term effects of "work factors" and of "working conditions" on both health complaints and level of work incapacity should be part of any evaluative measures. The *expanded ICF* brings awareness to the fact that those involved in the evaluation of work disability might traditionally (as healthcare providers) place greater focus on evaluating the person's functions, activity limitation, and work participation, when in fact psychosocial factors and work environment factors (i.e., micro, meso, or macro work demands) should be carefully considered as they might have a direct impact on the person's health state.

6.3.1.2 Integrated Model for Control of Work-Related Musculoskeletal Disorders

By integrating various models and established ergonomic theories, Faucett (2005) proposed a model that includes the many external and individual characteristics surrounding the person–environment dynamics and emphasizes the role of management systems as key sources of strain

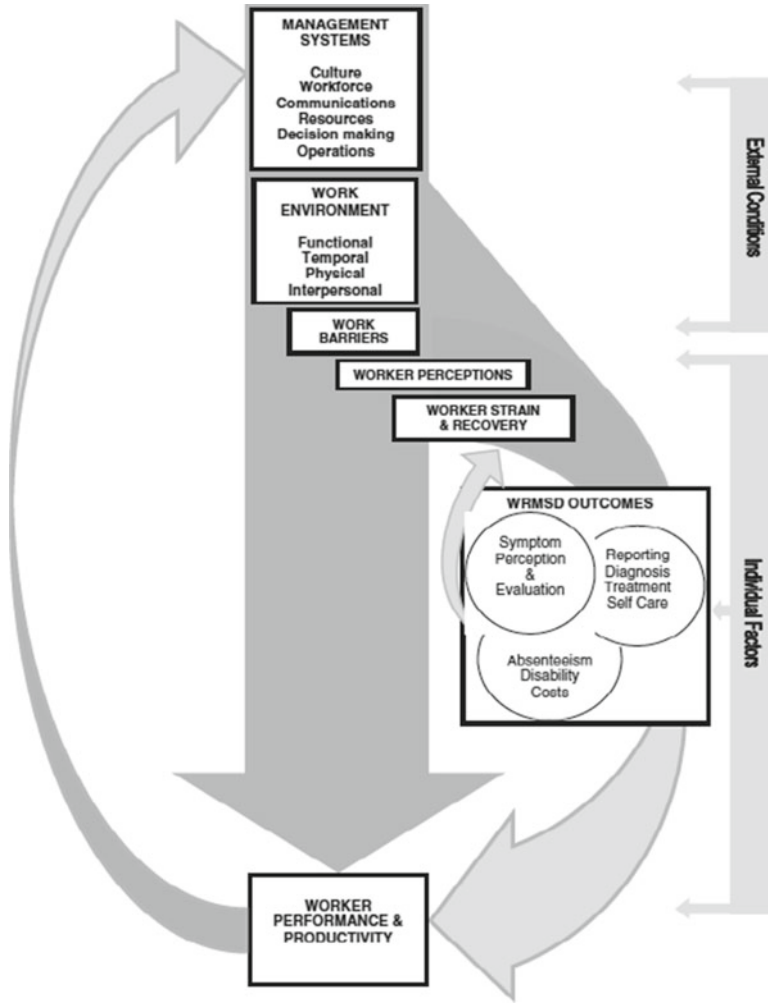

Fig. 6.6 *Faucett's integrated model* (Reprinted from Integrating 'psychosocial' factors into a theoretical model for work-related musculoskeletal disorders, Faucett, J. Theoretical Issues in Ergonomics Science, 6(6). Copyright (2005), with permission from Taylor & Francis)

(Fig. 6.6). *Faucett's integrated* model considers different types of outcomes for musculoskeletal disorders including absenteeism, costs, and disability. It also acknowledges the relationship between the strain (imposed by perceptions and the work environment) and worker performance/productivity. Furthermore, it takes into account work system functionality (i.e., compatibility between person and the socio-technical work system) by enlisting all four types of work environment (i.e., functional, temporal, physical, and interpersonal), management systems, and worker perceptions. As stated by the model's authors, "management systems drive worker performance and productivity by structuring the work environment to enhance the flow of work" (Faucett 2005). This macro-level structure may influence other external conditions that are represented in the box "work environment" (also referred here as workplace demands). The functional characteristics of the work environment involve the design, content and integration of jobs, work group disposition, communication methods, and even the data collection needed to improve work tasks and related decision about the work process (i.e., teamwork). Physical characteristics are

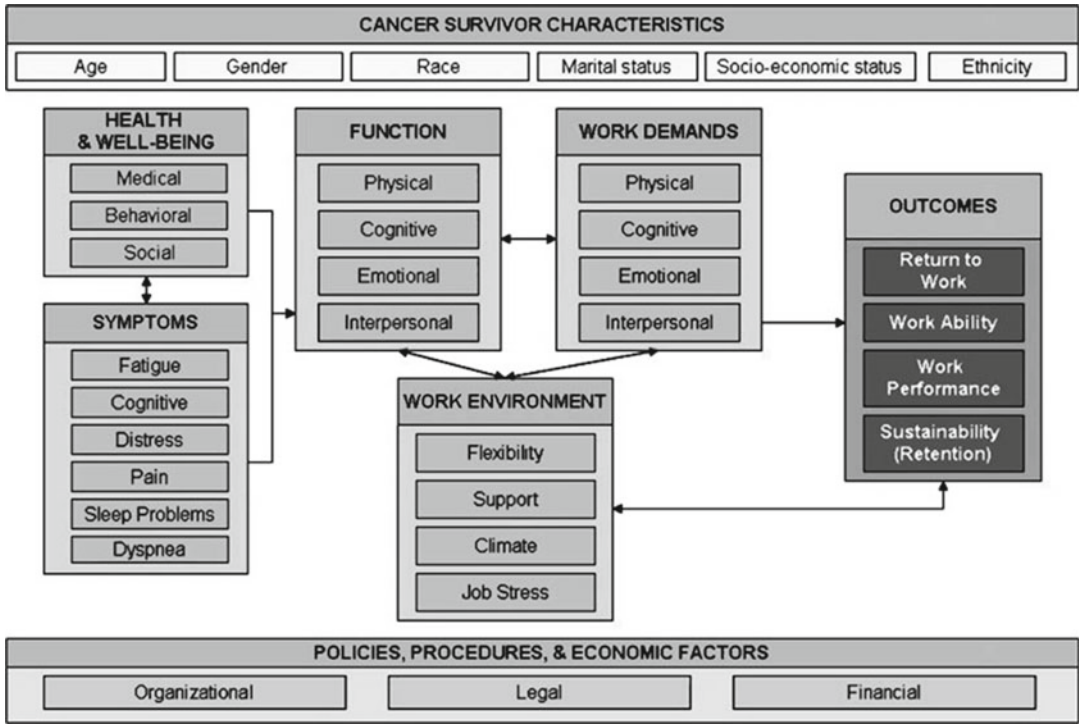

Fig. 6.7 *Cancer and work model* (Reprinted from Work In cancer survivors: a model for practice and research, Feuerstein, M. et al. Journal of Cancer Survivorship, *Oct*. Copyright (2010), with permission from Springer)

the workstation design and tools, as well as the ambient environment such as vibration, noise, and heat. Temporal characteristics are the issues related to timing for tasks, such as the pace of work (managed and required by the system), work shifts, the use of overtime, rest breaks, and timely availability of required resources. Interpersonal characteristics include socio-technical operations involving teamwork, supervision, and retention of workers. This novel proposition organizes our thinking about how the many workplace factors (job strain and those emerging from management activities) can subsequently affect musculoskeletal health and, consequently, work disability can occur.

6.3.1.3 Cancer and Work Model

The *cancer and work model* is an evidence-based model that considers health-related, work-related, and functional-related disability factors that should be addressed by healthcare provider, cancer survivor, and workplace actors (Fig. 6.7) (Feuerstein et al. 2010). It uniquely recognizes different work-related outcomes, including return to work (i.e., whether a person returns to full-time work following diagnosis or treatment), work ability (i.e., an individual's psychological, physical, and social means to engage in work), work performance (i.e., relates to absenteeism, perceived impairment while at work, level of productivity, efficiency, estimation of unproductive time at work), and finally, work sustainability (i.e., remaining employed for a period of time) (Feuerstein et al. 2010). The different work-related outcomes coupled with the multitude of factors at the individual, workplace levels, and even at the socioeconomical level (i.e., policies, procedures and economic factors surrounding organizations, legal, and financial systems) represented in this model, highlight our knowledge evolution on work disability determinants.

Unlike the other models previously described, this model focused on a nonwork-related problem (i.e., cancer), and thus, it does not include

injury causation components. However, this model refers to components related to the workplace system (i.e., work demands at the task level and work environment at the organization level) in a similar fashion as models that are focused on work-related problems and injury causation. Work participation factors of cancer survivors—especially socio-technical structure factors such as flexible workplaces, supportive systems, workplace climate, and job stress factors—are embedded in many work system balance theories for stress reduction (Carayon and Smith 2000). These ergonomic-related theories are often assimilated in models for musculoskeletal health and disability such as in the *Faucett's integrated model* (Amick et al. 2000; Faucett 2005). Another important point about the *cancer and work model* is that it was developed with an updated focus on prevention and management of work disability, and as such it brings attention to the development of potential strategies that look beyond illness recovery, impairment, and function (please refer to list of outcomes in Fig. 6.7).

6.3.2 Comparative Analysis

Table 6.1 shows a comparative analysis of the three models previously described. The graphic representation of each model was analyzed. We then compiled information on their content (input and output variables) and their main scope (focus and application) according to the following questions:

- *Focus*: What is the model central focus or theoretical basis?
- *Application*: Was the model developed specifically for work-related conditions, or it was for any medical condition (work-related or not)?
- *Input variables*: What are the factors and determinants, which are representing the phenomenon explained by the model?
- *Output variables*: What are the outcomes or exit points indicated in the model?

6.3.2.1 Models' Focus and Application

The models analyzed had the following area of focus: (1) injury causation, (2) health and well-being, or (3) work participation (i.e., return to work or work retention after illness/injury). Two of the models focused on social participation and health and well-being, i.e., the *expanded ICF* and the *cancer and work model*. The latter is the most updated in terms of identification of output variables related to the work participation process. This model was developed considering a nonwork-related medical condition, however, it has a very similar group of variables as the other two models developed for work-related conditions. For a very long time, biopsychosocial models have been in use for health problems such as cancer, AIDS, rheumatoid arthritis, multiple sclerosis, fibromyalgia, cardiovascular disorders, mental illness, and musculoskeletal injury. All these, common medical conditions, originated or not in the workplace, do not show much of a difference in work disability determinants and multisystem influences (O'Brien et al. 2008; Ferrier and Lavis 2003; Grunfeld et al. 2008; Wolfenden and Grace 2009; Pomaki et al. 2012; Briand et al. 2007; Lacaille et al. 2004). In fact, recent studies show the many similarities on the process of chronic illness across different medical conditions especially in terms of illness representations and the necessary conditions to return to work (see Chap. 5) (Pomaki et al. 2012; Briand et al. 2007).

The *integrated model* by Faucett is essentially based on research on risk factors for musculoskeletal injury occurrence. In this model, a system composed of known risks and specific hazards related to the person and the workplace is what explains the occurrence of musculoskeletal disability (as one of the outcome). Numerous epidemiological studies on prognostic and predictive factors show that at some point the disability phenomenon might distance itself from what have caused the musculoskeletal injury. Today there is very strong evidence showing that there is minimal association between the experience of the triggering impairment and work disability since the latter might be a direct response of certain behaviors, attitudes, and actions of the various stakeholders involved in the disablement process, as well as factors present in the social environment (please refer to Chaps. 2, 5 and 14). Our knowledge on factors related to return to work and work retention (specially coming from

Table 6.1 Comparative analysis of three conceptual work disability models

Cancer & work model	*Integrated model*	*Expanded ICF*			Models
–	X	–	Injury causation		Focus
X	–	X	Health and well-being		
X	–	X	Work participation		
–	X	X	Work-related conditions		Application
X	–	–	Nonwork-related conditions		
X	X	X	Individual characteristics	Personal system	Input
–	X	X	Perceptions		
–	X	X	Strain (internal tolerances)		
–	–	X	Biomechanical load		
X	X	–	Health state/recovery		
X	–	–	Symptoms		
X	–	X	Work function		
–	–	X	Self-motivation		
–	–	X	Carrying capacity (coping)		
–	–	X	Other work-related personal factors		
X	X	–	Flexibility	Work organization (macro system)	Workplace system	
X	–	X	Support		
X	–	–	Climate		
X	–	–	Job Stress		
X	X	X	Policies and procedures		
X	–	–	Economic factors		
–	X	–	Corporate culture		
–	X	X	Communications		
–	–	X	Socio-technical context		
–	X	X	Decision-making		
–	X	–	Resources available		
X	X	X	Physical	Work demands and hazards (micro system)	
X	X	X	Cognitive		
X	X	–	Emotional		
X	X	X	Interpersonal		
–	X	–	Functional		
–	X	–	Temporal		
X	–	–	Compensation/financial		Other systems	
X	X	–	Legal		
–	–	X	Social support and home environment		
X	X	X	Work ability/disability		Output
–	X	X	Pain/discomfort (symptoms)		
X	–	–	Work reintegration/RTW		
X	–	–	Work retention/SAW		
X	X	–	Work performance and productivity		
–	X	–	Costs		
–	X	–	Absenteeism		

RTW return to work; *SAW* stay at work

research on musculoskeletal health) continues to grow in the direction of a more integrated understanding of work disability. The concept of disability prevention (or control) emerged from this new knowledge and has flourished with research on return to work coming from multiple disciplinary fields (e.g., behavioral science, sociology, ergonomics, psychology, vocational rehabilitation, and economical sciences). So far this research has essentially focused on uncovering more sustainable solutions to the problem mainly focus on prevention of musculoskeletal disability.

It is not surprising that most models referring to work disability in the literature have been developed for or have been applied mainly for work-related musculoskeletal problems. Musculoskeletal disorders for many decades were identified as the main leading cause of work disability, and great concentration of research still is toward preventing low back disability. Lately, the primary focus on musculoskeletal problems has been expended to mental disorders, cancer, and stress-related disability. These problems are increasingly reported and are recognized as having an impact on workplaces in terms of turnover rates, sickness benefit, and prolonged absenteeism (Muschalla and Linden 2009; Pomaki et al. 2012).

Researchers are beginning to learn from and to use models and methods designed for workers with musculoskeletal disorders, in other health conditions (Briand et al. 2007). Although studies informing on determinants of work disability and on influences on the disablement process for other problems than musculoskeletal disorders are still scarce, there is a real need for a model representation of work-limiting disability independent of the medical condition that originated it. In the future, research efforts on model development should concentrate on validating a model that could be used across different health problems and possibly integrating all areas of focus relevant to work disability (e.g., work participation, health and well-being in the workplace, and injury/illness causation).

6.3.2.2 Models' Input

Biopsychosocial models have been at this point in time considered to best reflect or account for many aspects of individual behavior and the influences of the social environment on illness and disability. An individual's fear and beliefs about their pain, as well as their perceived disability, have been shown to be significant determinants of prolonged disability (Waddell 2006; Frank et al. 1998). Stressful work environments and low job satisfaction have both shown to be strong determinants impeding a successful return to work (Huang et al. 2002; Grunfeld et al. 2008). Lack of work autonomy and control over tasks at work has been shown to be associated with poorer return to work outcomes (Amick et al. 2000; Karlsson et al. 2010). These and many other personal determinant factors of work disability have been identified by epidemiological, mixed methods and qualitative studies (please refer to Chaps. 10–12).

More recently, specific workplace factors at the work organization level have been given greater attention and appear to play a central role in work-related injury and subsequent return to work (Amick et al. 2000; Carayon and Smith 2000). Stakeholders' attitude and behaviors can be a major influence on the decision of a worker with mental health problems to return or not to work (Pomaki et al. 2012). Furthermore, the risk of presenteeism for any given health condition is increased by factors such as difficulties in staff replacement, time pressure, insufficient resources, and poor personal financial situation (Karlsson et al. 2010). Chapter 11 in this book provides a review of the numerous workplace-related disability determinants uncovered from the literature, varying from ergonomics factors to socio-technical structures—all when present leading to consequences such as prolonged absenteeism, presenteeism, and ill-health of workers.

Although a model in itself does not tell us how to intervene, it can certainly make clear where intervention efforts should be aimed (Earp and Ennett 1991). Even if all variables of interest cannot be displayed in a single model representation, it is very important to refer to a conceptual model that can clearly demonstrates that disability factors are not only those focusing on the worker alone. The graphic representation of

Faucett's integrated model is very clear about the target of intervention being at the workplace level and at the individual level. The *cancer and work model* offers an even more comprehensive picture for possible intervention targets because it lists factors within and outside of the workplace and the personal systems (i.e., financial, legal, and compensation factors). On the other hand, in the graphic representation of the *expanded ICF*, the individual is the subject of analysis (and the main subject to an intervention)—although the influences of the external factors such as those present in the workplace on the person's heath state are clearly represented.

The challenge to represent the complexity of the disability problem in a single model must be recognized. In practice, to address the many multilayered system influences on the disablement process (beyond individual's functioning) is very challenging, time consuming, and at present costly.

Up until now, most responsible authorities that deal with the problem are only able to act in a fragmented manner. For instance, healthcare agents are often limited to use a person-centered model when dealing with work-limiting disability. Insurance agencies use a compensation-centered model for dealing with disability. Private businesses may use their own economic and human resource model (according to their own workplace policy and procedures) for dealing with sickness absence, presenteeism, and temporary loss of work capacity. With these fragmented approaches in place, the issue of coordination of actions is often left unattended.

6.3.2.3 Model's Outputs

While there is substantial evidence to suggest important input and output of work disability, we still have little evidence about processes and relationships of these variables from various stakeholders' viewpoints (see Chap. 25). Thus far, the existing models have enriched our common understanding of what work disability entails with a predominant acceptance to a biopsychosocial perspective described earlier. Failure to identify the entire range of factors (listed as input in Table 6.1) and to incorporate them in the design of interventions, is likely to lead to continued frustration, increased disability, increased costs, and human misery.

The models analyzed present relevant outputs, which are the main consequences of a disruption of health and a disruption of a productive working life due to illness/injury. These consequences can be classified as personal when it comes to human suffering and symptoms, work-related (the impact on work performance, loss of productivity, work reintegration and retention, etc.), and financial (sickness absenteeism, costs, etc.). The personal consequences have been clearly referred by various biopsychosocial models, however, most models in use today fail to consider the consequences of work disability as perceived by the employer and his financial loss.

The field of work system ergonomics might bring important contributions to expand our understanding of the effects of pain and disability in the workplace, beyond the effects on human functioning and health. It promotes the idea of a harmonized human-at-work system with respect to human–task interactions, physical workload, environmental elements, mental workload, organizational elements, social elements, and individual capacity (Shoaf et al. 2000). The integration of this inclusive view of ergonomics into disability management practices is beginning to be reported in the literature (Costa-Black 2009; Anema et al. 2003; Amick et al. 2000). This can provide an opportunity to better understand how and when to intervene in the workplace considering outcomes related to productivity, health and safety, and quality of working life. Outputs related to the work system (especially when it comes to productivity and performance and their impact on absenteeism and presenteeism) should be considered and tested in future disability models. Two of the models analyzed showed performance and productivity as the output, *Faucett's integrated model* and *cancer and work model*. In terms of the financial consequences, only Faucetts' model mentions financial outputs (i.e., costs and absenteeism) as consequences of musculoskeletal health and disability. This is an area that certainly needs further attention in future model development.

6.3.3 Synthesis of the Comparative Analysis

In combination, the models analyzed—representative of models recently proposed to understand work disability and the person–environment interface—consider a number of relevant inputs/outputs representing the personal system, the workplace system, and other supporting systems (i.e., home environment, legal, and financial systems). When looking at the models separately, however, they still rely strongly on an individual-centered perspective about pain, illness, injury, and disability. In practice, if this individual-centered perspective still prevails for addressing work-limiting disability, then we are failing to recognize an extensive body of scientific knowledge, which shows that interventions with a focus on the person alone are ineffective in reducing work disability. Evidence-based interventions for work disability must be determined and evaluated for multi-level outcomes. The *cancer and work model* is the first to propose a focus on systems other than the personal system, but it has yet to be fully tested in order to be well appreciated in clinical practice.

6.4 Premises for a Work Disability Prevention Model

The contemporary view of what is work disability has changed since *Nagi's model* and the *social model* proposed in the 70s. Our views have changed from looking only at causality factors on the side of the individual to better understand the drivers and the context of the multisystems involved in the problem. This recent epistemology of work disability represents a turning point for devising best practices and for implementing more proactive management and prevention strategies to eradicate this problem sustainably. There are still, however, questions to be raised and answered about the role of different social structures and how they can offer more effective support to the affected individual in the whole work participation process. In spite of the need for more research to address these questions, there is an urgent need in practice for a more unified vision of what means work disability—one with a full account of multisystem's contemporary issues and with enhanced capability to balance needs and interests of different stakeholders.

6.4.1 The Need for Transdisciplinarity in Work Disability Prevention

Advances in work disability research have cleared the path to build new opportunities to effectively prevent this problem. Historically, such opportunities have focused on separate and specific areas, including neuroscience, industrial engineering, physical sciences, and social and behavioral sciences. It is evident that today new boundaries of implementing preventive actions are emerging from applied transdisciplinary research in this field. Researchers researchers have come a long way to develop conceptual models that are in line with a transdisciplinary perspective of work disability (an example of such is the *cancer and work model*). The existing models lack, however, clear integration of some important prevention principles and concepts discussed previously. To reconcile these key principles and concepts, researchers and different groups of stakeholders should work together to elaborate specific systems solutions across disciplines and approaches. Up until now, most work disability models lack to propose this integrated vision and follow only the perspective of a particular group of social actors.

6.4.2 Revising the Meaning of Prevention

At the workplace level, the idea that injuries must be reduced to a minimum should be integrated with the control of possible work incapacity, absenteeism, and presenteeism. Only then, supportive measures for work participation and reintegration after an illness/injury can be promoted and tested in relation to different outcomes (e.g., performance, productivity, health and well-being, and costs). In some situations when a person experiences a chronic illness or pain, treating the

illness/pain without considering workplace reintegration strategies may generate adverse effects on those disability outcomes (Frank et al. 1998). In those cases, prevention means attending to the person's problem holistically with attention to his or her social role.

Because work disability is influenced by many external factors such as workplace support (e.g., flexible working hours) and social actors' attitudes, prevention can also mean access to services given to help workers to cope with and overcome those external factors. It can also mean creating a path for proper communication between workers and their supervisors or employers in order that early work reintegration actions are taken. The social environment is a fundamental component in the disablement process, and thus preventing disability via a supportive working environment becomes as essential as treating the health condition. In summary, work disability prevention should not be distinguished from efforts to rehabilitation, compensation, injury surveillance, primary care efforts, and sustainable return to work (please refer to Chaps. 5 and 22).

6.4.3 Promoting Stakeholders' Collaboration

Cumulative research shows that the complex phenomenon of work disability requires attention to who are the gatekeepers of this problem, what are their perceptions about the problem, and how to reconcile their conflicting actions and decisions. With this evidence in place, we are challenged by the need for more collaborative work among social actors to prevent prolonged absenteeism, presenteeism, and long-term work incapacity. Nonetheless, there is a need to better understand the complex interactions between these actors' diverse needs and points of view.

It is not uncommon to forget the influences each and every person has when interacting with a worker who is experiencing illness and work-limiting disability. The *case-management model* (Fig. 6.4) reminds us of people's dynamics and influences on the disablement process. Many disability management services such as those led by insurance companies or healthcare organizations might refer to similar model for the management and prevention of disability cases. They have yet to overcome the problem of HCPs working in silos to resolve disability cases which can only be solved with multi-professional collaborations (see Chap. 13).

Acknowledging that prevention works is not enough for bringing stakeholders together. It is necessary to examine the relevant key drivers for participative collaboration more closely. For instance, the arguments for work disability prevention must be coupled with arguments for good compensation schemes, which must not overbear the responsibility of each group of stakeholders. If prevention can be considered a universal responsibility (i.e., not one single authority or group must be accountable for it), then it is critical that society as a whole becomes more aware of what work disability prevention entails. Figure 6.8 illustrates, in a simplified manner, the needed actions for stakeholders' collaboration, which can foster work disability prevention. Several actions are centered around the major action plan: engaging relevant stakeholders. All five actions can facilitate prevention by bringing more uniformity and clarity of roles among the many stakeholders who act upon or represent different systems—the workplace, the healthcare, the compensation/welfare, and personal systems. Bringing awareness of these actions while defining and communicating the roles and responsibilities of each group of stakeholders is becoming essential in disability prevention research.

6.5 Conclusion

As scientific models mediate between theory and the real world, there is a constant need to revise the patterns of evidence and the methodologies employed by scientists to arrive at theoretical representations that guide a particular scientific practice. This chapter presents an overview of how the scientific knowledge of work disability has evolved, from the the past to the by examining relevant disability models and discussing the emerging empirical evidence on disability prevention.

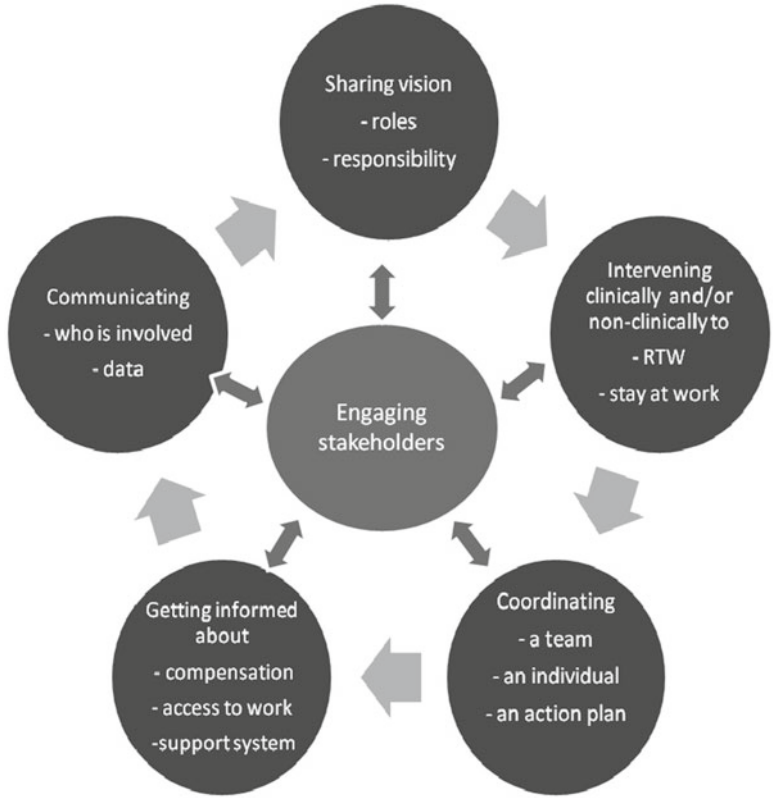

Fig. 6.8 Loop view of needed actions for work disability prevention

From extensive research on the experiences of workers with a wide range of chronic illnesses to research on the meaning and social value of work, our understanding of the influence of the environment (including the social organization of work) on the disablement process has changed dramatically. Today, research on perceptions, actions, and communication about the experience of work-limiting disability shows that the political, economical, cultural, and workplace environment may interact both positively and negatively with the worker's attitudes and decisions. Moreover, a number of qualitative research studies on the views of different stakeholders who are the gatekeepers of work-limiting disability have elucidated different aspects of individual's experiences with the phenomena and revealed with great detail, how the macro (at the organizational level) and micro (at the job level) work environment might influence work participation (Maiwald et al. 2011; MacEachen et al. 2006; Tamminga et al. 2012). This cumulative knowledge has created many new opportunities for disability prevention not only at the individual level but also at a policy and/or multisystem level as well (please refer to Chaps. 22 and 25).

Essentially, as a people- and system-influenced concept, "work disability" will continue to evolve in light of many contemporary issues faced by society. As such, this evolving phenomenon uncovers an umbrella of terms that must be commonly recognized by practitioners, decision-makers, scientists and the general public. A common language along with further advances in the area of model building may facilitate research uptake of the emerging evidence on disability prevention and many aspects of return to work (i.e., sustainability, the benefits of work, collaboration

among social actors, etc.). This chapter has described some of these issues, others are still to be uncovered by more research.

We have compared conceptual models and examined the knowledge base and, by looking closely at variables, processes and outcomes essential to explain work disability. Based on this comparison, a few premises for a new work disability prevention model have been identified. These premises (i.e., propositions upon which we build an argument for disability prevention) should be considered in future model building, and might raise awareness of how this multisystem problem can be best understood and resolved if the views of a diverse group of stakeholders, including scientists from many different disciplines, decision-makers, and practitioners, are well represented and integrated.

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7 Measurement of Outcomes in WDP: Conceptual and Methodological Considerations and Recommendations for Measuring Outcomes

Glenn Pransky

This chapter reviews the main conceptual models of work disability outcomes, and describe their implications for measurement. Examples of recommended core measures and priorities for future research in work disability measurement are presented.

7.1 Introduction

There are many compelling reasons to develop and disseminate measures of work disability outcomes—to understand the impact of health care, workplace safety, or disability prevention interventions; to describe the impact of health on work participation; and to understand how individual and societal influences impact work status as a key outcome. Accurate measurement is the basis of scientific evaluation. Standardized and reliable measures of outcomes enable objective comparisons of different approaches, treatments, and strategies. Work disability is a particularly important outcome, as it represents the majority of societal burden for many common conditions (Waddell 2006). Work disability prevention and returning to work are both processes as well as outcomes and, thus, can be measured in terms of engagement in a process, attainment of a specific status, and changes over time. Simply measuring whether or not a return to work (RTW) has occurred is insufficient to represent a broader range of related outcomes, such as how well people are doing after an RTW, what types of work they can perform, and their prospects for and concerns about future employment activities (Krause et al. 2001). Further complexity is evident when considering alternative measurement approaches and viewpoints of different stakeholders involved in work disability, where alternative priorities and values lead to different ideas about what is most important to measure and when.

In this chapter, a historical perspective on measurement of work disability outcomes and related conceptual models are presented. Systematic reviews are synthesized to present a summary of strategies to measure work disability outcomes and the RTW process. Characteristics and utility of each measure, and opportunities for development of new measures are presented. Other chapters address the closely related topics of the value of work (Chap. 2), the costs of work disability (Chap. 4), how the relative importance of various work outcomes differ by stakeholder (Chap. 25), and presenteeism as a dimension of work disability (Chap. 3).

7.2 Conceptual Views of Work Disability

For various reasons, enumerating those who are working, and those who cannot work, has been important for organized societies for thousands

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_7,

of years. Ancient Greek laws provided income support for those incapable of working due to illness or infirmity and a means for identifying those who qualified (Garland 1995). During the Industrial Revolution, demands arose for objective measures of work disability as a criterion for receiving benefits. Reflecting the dominance of medical science as the ultimate source of objectivity about functional ability, early laws created a direct relationship between specific diagnoses and presumptions about ability to work that still persist.

After the First World War, medical reports described persons with severe injuries who returned to gainful employment with the help of medical and vocational interventions (Obermann 1968). Workers' compensation organizations tracked payments for lost wages to evaluate the effectiveness of RTW interventions such as rehabilitation programs and case management. It became apparent that there was often a weak relationship between a specific medical diagnosis and work ability, for many conditions.

Another important step forward was the conceptual redefinition of health by the World Health Organization (WHO) in 1948 as encompassing physical, mental, and social well-being (World Health Organization 1948). Initially, this perspective was seen as overly inclusive, and immeasurable, as generally accepted methods to evaluate mental and social well-being did not exist at the time. Medical education and the focus on "hard" biologic outcomes and narrow definitions of health also contributed to reluctance to accept this conceptual view (Greenfield and Nelson 1992). Researchers later showed that changes in biologic parameters described only a small part of the impact of health care on an individual. In some instances, biologic improvement could even be associated with decreases in certain quality of life indicators. Measures of symptoms, mood, function in daily life, and perceptions of health and well-being were developed and validated, forming a broader perspective on quality of life outcomes. The WHO definition of health became more accepted by researchers, and more studies began to evaluate the impact of health care on a range of quality of life dimensions, including employment. This led to interest in a broader range of valid and reliable work outcome measures. Further development of conceptual models of work disability and the RTW process has also framed the evolution of work outcome measures.

7.2.1 Participation (ICF)

The International Classification of Functioning, Disability and Health (ICF) is an internationally recognized framework and classification system, intended to describe the full range of human functioning and restrictions related to health states (World Health Organization 2002). It highlights the observation that clinical, medical, and functional outcomes, including work, are highly independent (Vingård et al. 2002). Application of the ICF has led to a multidimensional perspective on WDP outcomes, especially important in evaluating capacity and participation. Work participation is included within the domain of tasks and actions, under the heading of major life areas, but the process of RTW is not specifically addressed. One of the main limitations of the ICF is that it does not describe relationships among various health states, functions, and RTW, or how changes occur over time (Imrie 2004), and fails to adequately distinguish among capacity for action, actual activities, and voluntary choice about activity (Nordenfelt 2003). The ICF defines "performance" as ability to execute actions in a typical individual life situation, where most researchers and practitioners in work disability view performance as function in a simulated or individual's specific real-life work situation (Young et al. 2005).

7.2.2 Health/Capacity Models

Several models focus on the relationship between work capacity and job demands as a critical outcome, as RTW is not possible if demand exceeds capacity. The capacity-demand comparison may simultaneously occur on several dimensions, in relation to physical, mental, interpersonal, temporal, and other job demand categories. There is widespread recognition that both work demands

and individual capacities vary over time within a given situation and that a primary target of job modification is to adapt demands to match worker capacity (Sandqvist and Henriksson 2004).

7.2.3 Developmental Conceptualization of Return to Work

This model of RTW after work absence due to injury or illness is based on role performance and career development theories. It emphasizes that RTW is a process, encompassing four phases: off work, work reintegration, work maintenance, and advancement (Young et al. 2005). Unlike the ICF, this perspective emphasizes discrete states and transitions among these states, with progression towards attainment of long-term career goals as the desired outcome. The model helps to clarify the possible meanings and subtleties of at-work and off-work states, the distinction between RTW processes and intermediate outcomes, and the required characteristics of measures to evaluate these outcomes. The most important work disability outcomes differ at each phase, as the priorities for workers and others involved with the RTW process change over time. As long-term work outcomes can be difficult to evaluate and to attribute to a particular intervention, this perspective helps to identify intermediate outcomes that are more practical to measure and more relevant to particular interventions (Young et al. 2005). A related concept is readiness to RTW—with a focus on movement towards resuming employment as a key process after sickness absence has occurred (Franche and Krause 2002).

7.3 Systematic Reviews of Work Disability Outcome Measures

Searching the biomedical literature, four systematic reviews of work outcome measures were published between 1995 and 2010 by Hensing et al. (1998); Amick et al. (2000); Elfering (2006); and Wasiak et al. (2007). These reviews provided definitions of various work outcomes, the nature, scope, application, and characteristics of specific measures related to these outcomes, and suggestions for further development. Work outcome measures recommended by these authors are listed in several tables within the chapter.

7.4 Definitions

Work status is most simply defined as the state of being employed. Even this apparently simple view becomes complex, once dimensions of extent (full or part time, amount of expected job responsibilities that are fulfilled), duration (temporary or sustained for a specified period of time), completeness of return (to prior job, with or without accommodations, or to a different job), and wages (similar or lesser pay) are added (Elfering 2006).

Work disability can refer to partial or complete inability to perform work functions; the term has also been used to indicate compensated work absence (independent of functional ability).

The process of RTW can be defined as progression from a work-disabled state to resuming employment and continuing to maintenance of employment and further job advancement (if desired). This definition emphasizes progression in the RTW process as an outcome in itself. Measures related to this process also include whether or not job seeking (in those out of work) or other efforts to acquire employment (training, education) are occurring. A related measure is the degree of readiness to RTW in those who are disabled.

7.5 Self-Reported Measures

These include employment status, description of sick leave episodes, and self-reported status relative to the RTW process.

7.5.1 Employment Status and Dimensions of RTW

There has been considerable growth in the dimensions of labor force and employment status

Table 7.1 Recommendations for measuring work status (Amick et al. 2000)

Work status (at first visit and at final follow-up for longitudinal studies)
Dimensions of work status
Job—usual job and duties, or some restriction/limitations
Leave—paid or unpaid leave, sick leave, relationship of absence to health
Unemployment—whether or not related to health
Recommended work status
Total time loss and time until RTW
Limitations in meeting work demands

Table 7.2 Questions exploring key dimensions of RTW (Pransky et al. 2000)

Have you returned to your regular job? If so, compared to before your injury, are you • Doing all of the same job tasks you did before you were hurt? • Working fewer hours than before? • Taking more breaks than before?
Compared to before your injury, do you now feel • The quality of your work • Your motivation to work • Your satisfaction with your job • Your ability to pull your own weight on the job • Your level of job responsibility • …. is better/about the same/worse?
Because of your injury, are you • Afraid that in the future you will be unable to earn a living? • Worried that your injury will get worse if you return to work or continue to work?

measures that can be evaluated. At the simplest level, recording whether an RTW has occurred in those off work is important, as this outcome is directly linked to key social roles and economic status in working-age adults (Cats-Baril and Frymoyer 1991). Typically, researchers focus on paid work, but participation in unpaid work, household work, and schooling may be relevant. To measure societal functioning in a broad sense, measures of both paid and unpaid work are necessary, but work disability prevention efforts are usually directed towards an ultimate goal of participation in paid work. The work outcome measures suggested by Amick et al. (2000) summarized in Table 7.1 address these fundamental concepts and constitute a minimal data set for researchers investigating the impacts of interventions.

Additional questions can explore the number of days and hours worked, in comparison with usual or pre-illness hours. Conversely, missed work could be expressed in hours, days, or weeks. Problems arise interpreting total days of missed work that span nonscheduled weekends and comparison of reports of missed work days in regular workers with those who have irregular shifts. Recent questionnaires attempt to provide accurate information by asking about expected or scheduled work days that were missed, and appear to have reasonable validity and reliability (Reilly et al. 1993).

RTW does not always imply a full return to the same job and same duties; some workers require significant accommodations to RTW (Kopec and Esdaile 1998). The extent of accommodations varies, depending on social status and interactions at work, nature of the job and workplace, policies and procedures, and other factors (Wharton et al. 2008). More detailed questions are required to evaluate the time course and extent of return to previous job duties and underlying reasons for these transitions. Based on input from injured workers on the most important aspects of an RTW, Pransky et al. developed and validated a brief series of questions that incorporates some of these details, summarized in Table 7.2 (Pransky et al. 2000).

Recurrent disability is relatively common—for example, about 10–15% of low back disability cases have a subsequent episode of recurrent disability attributed to the same condition (Wasiak et al. 2003). Recurrent work disability presents measurement challenges due to the complexity of the added time factors—length of the first RTW, length of the second period of disability, and durations of subsequent periods of work participation and work disability (Wasiak et al. 2009). Questions have been developed to evaluate recurrent work disability, but have not been thoroughly validated.

The reliability of questions about labor status in the short-term is good, but recall over a year or more can be less accurate, especially if questions

about specific temporal aspects are included (Holm et al. 2003; Ferrie et al. 2005; Agius et al. 1994). For specific temporal questions, some have found that recall degrades after a few months, so the design of questions and timing of administration should take these concerns into account (Severens et al. 2000). Short spells of sick leave are forgotten more quickly than longer episodes. There has been little investigation of factors associated with recall accuracy, but Burdorf et al. found that recall reliability of sickness absence recall was better for low back pain and other conditions than for respiratory problems (Burdorf et al. 1996). Because of the lack of a "gold standard," it has been difficult to conduct research that can definitively address the accuracy of self-report work disability measures.

7.5.2 Causal Attribution for Work Disability Status

Another dimension of work incapacity is whether it is attributed to a specific disease or event, to health problems in general, or is due to another reason unrelated to health. Dionne et al. found that asking patients to identify whether the cause of work disability was illness-related provided greater specificity about the impact of illness on work and the potential for work disability prevention efforts (Dionne et al. 1999). Frank et al. note that the attribution of low back pain and associated work disability to occupational causes varies significantly, depending more on social and insurance factors than on scientific evidence (Frank et al. 1996). Successful resolution of a work-limiting illness may not result in an RTW if there is no job to return to—a common occurrence in seasonal employment. RTW in a full-time capacity might be similarly limited by employer and economic factors, not health or recovery, especially in contingent or informal employment (Quinlan et al. 2001). A related distinction is RTW at the same employer vs. some different employer; although the former outcome is generally more desirable, the latter result may be expected in construction and agriculture jobs, where there is a higher rate of turnover than in the general working population (Schnake and Dumler 2000). Workers may elect to not RTW, to pursue volunteer positions, schooling, or avocations—these outcomes represent other dimensions that may or may not be consistent with a desired vocational result. A transition out of work can be viewed as a heterogeneous outcome, at times representing desired progression in the RTW process (e.g., seeking training for a better occupation) or an undesirable event (reinjury and recurrent work disability). Each of these transitions has a dimension of actual vs. expected outcome, and for each expectation, there may be different worker, employer, and insurer perspectives and expectations. Here, the stakeholder perspective is important, as the desired outcome may differ for a worker, insurer, and employer.

Causal attribution is also a potential complication with recurrent work absence—were subsequent episodes of work disability due to the same reasons as the initial work absence, due to a different condition, or due to social factors? (Wickström and Pentti 1998). Interventions that are intended to improve health-related work limitations may not have an impact on work disability caused by social problems.

7.5.3 RTW Process Measures

Numerous process measures become important when an RTW is viewed as a series of steps. Each important transition (e.g., job acclimation to a maintenance phase) becomes a potentially measurable outcome (Table 7.3). Measures have been identified that can be applied to evaluate each step in the RTW process identified in the developmental model (Young et al. 2005). Becoming ready to RTW has been investigated, and several validated measures of work readiness are now available. Franche et al. describe a psychometrically validated 22-item scale assessing stage of readiness for RTW, the Readiness for Return-to-Work (RRTW) scale (Franche and Krause 2002). Shaw et al. have recently described a 19-item validated RTW self-efficacy scale, designed to measure the confidence of workers to meet job demands, modify job tasks, and communicate needs to coworkers and supervisors (Shaw et al. 2011).

Table 7.3 RTW-related tasks and actions outcomes Wasiak et al. (2007)

Outcome	Dimension
Vocational participation	Labor force participation Vocational mode Vocational status
Work preparation	Health recovery Determination of RTW goal Preparing RTW plan Undertaking vocational rehabilitation Retraining
Job seeking	Approaching employers Applying for job Attending interviews Searching for a job Undertaking vocational rehabilitation
Job securement	Job offer and acceptance
Work participation	Abilities Productivity Duties Position (e.g., same or new) Employer (e.g., same or new) For remuneration Work readiness Working in good health At goal status
Evaluation	Job suitability Job satisfaction Satisfaction with RTW Satisfaction with current status
Work maintenance/ durability	Work disability recurrence Time at work Job stability RTW sustainability Job loss/resignation
Career advancement	Seeking advancement Promotion Pay raise

Other measures explore fear-avoidance beliefs about RTW (Waddell et al. 1993). Measures of RTW expectations and intentions are also available for use at a similar stage before RTW and are highly predictive of RTW outcome (Cole et al. 2002). Several possible questions to assess RTW expectations were described by Gross et al. in a recent study (Gross and Battié 2005). Available measures of vocational goal setting, RTW planning, and job seeking are primarily suited to those seeking a new job and new employer and have not been fully developed or validated for those who are expecting to RTW at their same employer (Young and Murphy 2002). Recent studies indicate that the early work reentry process is important in determining longevity of the RTW effort, but measures of success or problems in this phase of RTW are not well developed. Similarly, career progression measures are available from the field of vocational rehabilitation, but have not been widely applied in studies of work disability prevention in employed workers, primarily because of limited relevance and lack of validation in an RTW setting (Carson and Bedeian 1994).

One important dimension of work outcome suggested by the developmental conceptualization of RTW is sustainability. As discussed below, administrative data may provide some information on repeated disability episodes but is likely to miss failure of an RTW that leads to voluntary withdrawal from the workplace or repeated disability that is captured in a different system. Questions about expected sustainability or future work retention concerns have been developed and validated (Pransky et al. 2005). For example, Cardol et al. describe the Impact on Participation and Autonomy (IPA) scale, that includes questions capturing the individual perspective on potential for job sustainability, as part of questions on the broader topic of societal participation (Cardol et al. 1999).

Positive outcomes for an individual worker related to an RTW include the economic advantages of wages and benefits, increased social interaction, reintegration into a normal environment, and positive impact on overall health (Kahn 1981). Advantages to an employer include productivity, decreased disability expenses, and retaining the skills, knowledge, and maturity of an experienced worker. Although some quantitative estimates have been offered, direct measures of these benefits are currently unavailable. Other indirect measures related to the RTW process include the quality of RTW management and coordination, assessed in several qualitative studies, but a generalizable, quantitative measure is not yet available (Baril et al. 2003).

7.6 Administrative Measures: Employment Status and Reasons for Work Absence

Administrative data on work disability has the advantages of uniformity, consistency of data collection, broad coverage, and objectivity of the outcome of compensated work disability. There is the implicit assumption that the direct linkage to compensation would imply that care is taken in assuring that benefits information is accurate. The legally required periodic distribution of indemnity benefits does require regular ascertainment of disability status, at least relative to eligibility. Thus, some administrative systems collect longitudinal information that has advantages in evaluating outcomes, compared to cross-sectional work status data (Allebeck and Mastekaasa 2004).

Yet there are problems that limit the utility of this information. For example, the relationship of sickness absence to psychosocial factors independent of illness raises questions about how well this information truly represents the impact of illness by itself on work capacity (Volinn et al. 1988). The factors affecting the decision to file a disability claim can be highly influential on measurements of prevalence and outcomes of work disability, but are rarely measured (Stiens et al. 1996). Organizational and supervisor responses to reports of musculoskeletal disorders, available benefits, labor-management relations, and other influences have a significant effect (Rosenheck et al. 1999; Ossmann et al. 2005). Decisions by insurers about claim acceptance can have a similar impact; for example, workers' compensation claim acceptance may vary by jurisdiction, nature of injury, occupation, and job tenure (Alamgir et al. 2009). Work disability attribution based on administrative data is often limited by the absence of detailed information on diagnoses, comorbidities, and prior disability covered through other systems (Franklin and Fulton-Kehoe 1996). Usually, self-reported length of disability is longer than what is recorded in administrative systems, due to waiting periods, failure to claim for all lost days, informal lost time or salary continuation arrangements, and administrative and personal errors. Legal settlements, unavailable information on transition from one (enumerated) benefit system to another, voluntary cessation of benefits, deciding to not file a claim for benefits for work disability, and time-limited benefits all conspire to lead administrative data to underestimate the incidence and total period of work disability (Baldwin et al. 1996). In one comparison study, a sevenfold difference in disability episodes was noted when comparing self-report to workers' compensation claims data. Although concerning, the comparison is problematic due to uncertainty about the denominator—that is, whether an episode of sickness absence was recorded as work related or in a separate system for nonoccupational conditions (Dasinger et al. 1999; Pole et al. 2006). Many employer administrative leave systems do not separate short-term sick leave from other leave, and there are significant variations in how different forms of sickness absence recording are used, further complicating accuracy (Johns and Xie 1998). Furthermore, cessation of benefits does not necessarily mean an RTW (Lund and Labriola 2009).

Sickness presenteeism—when workers go to work despite significant illness—may be increasing, leading to trends in administrative data that could mistakenly be interpreted as implying less sickness impact in the workplace (Burton et al. 2004). The result could be the redistribution of work among "healthy" employees, delayed exiting of work to obtain treatment, and a resulting decrease in short-term work disability episodes but increase in long-term disability. From a measurement perspective, the likelihood of capturing all of these effects simultaneously is low, and thus, much more sophisticated, longitudinal data is needed about work disability to detect these effects.

Several different types of disability status may be attributed to a worker in administrative data. Temporary disability implies the potential for employment resumption at some time in the future. Permanent total disability, long-term disability, and approval for Social Security imply greater work limitations and lower likelihood of

ever returning to work. A somewhat related concept is whether or not work absence is compensated through insurance, continued regular pay, or uncompensated. Several well-validated surveys, such as the Health and Retirement Survey, include branched sets of questions that can accurately evaluate these nuances of work status (Zwerling et al. 1998). Some administrative systems record return to partial duties, indicated by reduced wages for less work being performed. Partial disability may imply the ability to do some types of jobs, but with limitations that might preclude full employment in a prior job, or some types of future employment. Often, a worker will come back to the workplace in a capacity that is officially listed as full duty or returning to the same job as before the work absence, but is still not able to do all aspects of the job—and thus is informally accommodated through the efforts of a supervisor or coworker. Although these informal accommodations are probably more common than formal alternative duty arrangements, they are not recorded in administrative databases, and thus little is known about the prevalence, extent, and duration of these efforts to help workers RTW or to prevent work disability (Pransky et al. 2002).

Table 7.4 Recommended measures of sickness absence (Hensing et al. 1998)

Frequency of sick leave (SL) spells/defined population (per year)
Average length of SL absence (per SL spell or per person per year)
SL incidence rate = new SL spells in 1 year/population × days at risk
Cumulative SL incidence = persons with new SL spells/persons at risk for a year
Average duration of a SL spell in the population at risk

Table 7.5 Recommended measures of sickness absence (Borg et al. 2006)

Unadjusted annual sick leave (SL) rate = sickness absence days/persons at risk per year (includes both partial and full work absence days)
Adjusted SL rate = whole sickness absence days/persons at risk (per year)
Frequency of SL = number of SL spells/persons at risk (per year)
Length of absence = days in all SL spells/persons with SL (per year)
Cumulative incidence = persons with SL (during a year)/population at risk (at start of a year)
Average SL duration = total SL days/total number of absences (during a year)
Period SL prevalence = number of persons with current or new SL spells of a certain length (during a year)/number of persons at risk for SL (during a year)

7.6.1 Population Measures Based on Administrative Data

Several authors have recommended a set of sickness absence measures for use in describing the work disability experience of a population (Tables 7.4 and 7.5). In a review of population studies, Hensing et al. identified five common types of sickness absence/sick leave (SL) measures, but found that each study used the measure somewhat differently (Hensing et al. 1998). Borg et al. suggested similar measures, based on analysis of administrative data from three countries (Borg et al. 2006). When enumerating the number of sickness absence episodes in a population over time, some studies counted persons with sickness absence at the outset, where others only included new episodes during the period of observation. The denominator can also vary—for example, some countries allow unemployed persons to transition to sickness absence, and thus these persons should be counted as part of the at-risk denominator. Problems arise when considering scheduled personal leave, scheduled vacations and plant shutdown, and homemakers and students.

Each measure has an important temporal dimension—for how long was the work (or disability) status maintained? The distribution of sickness absence duration in a population is typically skewed, leading to recommendations to evaluate median instead of mean values, and to use log length of disability measures for statistical analysis (Marmot et al. 1995). For studies evaluating factors related to length of sickness absence, the denominator should probably be restricted to persons with sickness absence. Sickness absence episodes of less than 1-week duration are not recorded in some administrative data systems. The net result is that comparison of outcomes across studies is usually difficult.

7.7 Work Capacity Measures: Medical Recommendations and Test-Based Measures

Several approaches are available to evaluate the ability to perform job tasks as one measure of work disability. The main types of approaches are self-report, treating provider recommendations, and functional capacity evaluations. Most validated self-reported measures of functional capacity used in studies of MSD do not capture detail on work capacity (Roland and Morris 1983). Some self-report questionnaires evaluate ability to do usual and unusual job tasks, current and anticipated future job demands, as well as common work activities—sitting, standing, lifting, pushing, pulling, using computers, interacting with coworkers, and other tasks and activities (Kopec and Esdaile 1998). For example, the Work Ability Index is an 11-item scale that provides a global score incorporating several dimensions of work ability (van den Berg et al. 2009). The reliability of these measures ranges from fair to good, but validity is hard to evaluate in the absence of a gold standard. Like other self-report measures, they have the disadvantages of perceived subjectivity and relatively higher cost of collecting survey data.

There is an important distinction between "recommended" and actual work status. Medical or vocational evaluators may approve RTW or determine that a person is incapable of working (at a particular job or in general). Several investigations have demonstrated that these evaluations are quite subjective, with significant inconsistencies across evaluators in "recommended" work status. Elder and Symington presented experienced medical disability evaluators with several scenarios and found a low level of agreement (kappa = 0.21) on whether or not the person was capable of gainful employment (Elder et al. 1994). Nevertheless, the direct relationship between official determinations of work ability and disability benefits may support the value of collecting both recommended and actual work status in a particular study (Elfering 2006).

Functional capacity evaluations were developed to provide a more objective measure of ability to work and specific deficits in relation to job demands (Chap. 15). Some are based on highly standardized sets of physical tasks; individual results are compared to norms for a working population, sometimes stratified by overall level of physical job demands. These types of evaluations have the advantage of standardization across time and across evaluators, and consistent reporting systems. Some claim to have built-in measures of consistency of performance that can be used to detect voluntary submaximal efforts or "faking," but these claims have not been rigorously tested (Pransky and Dempsey 2004). The main problem with these types of evaluations is the poor simulation of actual work tasks, and performance in isolation from the workplace context, so the results frequently have a weak relationship to actual work ability (Dusik et al. 1993). Those tests that involve maximal effort appear to have especially poor predictive value for actual job performance, as few jobs require the sorts of maximal efforts included in many of these evaluations. An alternative approach is job simulation; these evaluations appear to be more predictive of future work capacity and future risk for injury but do require an evaluation center that has enough resources to conduct a reasonable job simulation and an experienced evaluator (Harbin and Olson 2005). However, a job trial in the workplace is the only way to evaluate capacity in the context of the actual physical and psychosocial environment, and latitude for modifying demands and performance, that the worker will actually experience (Durand et al. 2003).

7.8 Conclusions and Recommendations for Further Research

Measurement of work disability outcomes has continued to present challenges for researchers, policy makers, employers, and other stakeholders. Despite the availability of several generally accepted measures, evolving perspectives on the

process of returning to work have created a need for measures that more fully capture the experience of returning to work. The divergent perspectives of researchers in health services, labor economics, management science, social psychology, and occupational and physical therapy will continue to lead to a wide variety of outcomes being measured. One key challenge for the field of work disability prevention is to build a greater consensus across these disciplines and stakeholders on specific outcome measures, in order to enable comparison across studies, interventions, workplaces, and jurisdictions.

Specific research priorities for measurement development can be identified. More efficient rubrics for identifying the cause for work disability is needed, along with ways of incorporating the resulting information into outcomes research. A measure of work accommodations that is generalizable across jobs would be helpful in order to consistently describe and compare the degree of resumption of regular work activities across jobs. Further validation research is necessary for almost all work disability outcomes. Studies are needed to critically evaluate how these measures are used and the impact of contextual factors on their interpretation.

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Pain, Chronicity, and Disability

8

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This chapter discusses research that has addressed the neurophysiological and psychological factors that might play a role in the transition from acute to chronic pain. The role of chronic pain in prolonged work disability and treatment implications are addressed.

8.1 The Magnitude of the Pain-Disability Problem

Chronic pain is a leading cause of healthcare utilization and disability in North America. Statistics suggest that approximately 60 million people in the United States and seven million people in Canada live with debilitating chronic pain (Moulin et al. 2002; Arden and Nevitt 2006; Kopec et al. 2007). The prevalence of chronic pain resulting from injury, musculoskeletal conditions, arthritis, and neurologic or metabolic conditions continues to rise and is predicted to double over the next two decades (Dionne 1999; Arden and Nevitt 2006).

Musculoskeletal conditions are the class of health conditions most likely to give rise to chronic pain. In a recent web-based survey of US adults (Johannes et al. 2010), 30% of 27,025 responders indicated moderate to severe chronic musculoskeletal pain for at least 6 months, with the majority of pain sufferers (89%) reporting pain duration greater than 1 year. The most commonly reported sites of pain were the lower back (48%), knee joints (38%), neck (28%), shoulder joint (27%), hip and feet joints (25% each), and legs or feet other than joint pain (27%). Back pain is the most common form of musculoskeletal pain leading to work disability.

While most people will experience an episode of back pain at least once in their lives, for the overwhelming majority of individuals, pain symptoms will not evolve into a chronic, disabling condition. Prognosis for acute episodes of back pain is quite good; even patients who seek medical attention typically recover within the first month and return to work (Pengel et al. 2003). However, 1 year after an acute episode, approximately one in five patients report persistent back pain resulting in substantial limitations in activity (Von Korff 1994). To date, the transition of acute pain to chronic pain remains an insufficiently understood phenomenon.

Once symptoms of pain and disability become chronic, available methods of managing pain,

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_8,

whether pharmacological or psychological, have only modest impact on suffering and function. Chronic pain can contribute to a trajectory of increasing distress and disability associated with discontinuation of life-role activities, progressive decline toward a sedentary lifestyle, and social isolation. If individuals at risk for prolonged pain and disability following musculoskeletal injury can be identified before the problem becomes chronic, individuals' suffering might be prevented or reduced to a significant degree.

This chapter examines what is currently known about the transition from acute to chronic pain. The chapter examines both neurophysiological and psychological mechanisms that have been implicated in the transition from acute to chronic pain. It is important to note that the presumed mechanisms by which acute pain becomes chronic must be considered speculative. Much of this research has been conducted in laboratory settings, often using experimental pain stimuli (e.g., heat, cold, electric shock) that differ in many ways from processes involved in musculoskeletal pain. Considerable research in this area has been also conducted with individuals whose pain condition has already become chronic, and consequently, it cannot be ruled out that observed differences between patient populations and healthy samples might be consequences of chronic pain as opposed to risk factors for chronic pain. As such, caution needs to be exercised in generalizing findings from basic process research to the population of work-injured individuals. Still, these research findings might be heuristic in pointing to new avenues of investigation or intervention for individuals at risk for prolonged work-related disability.

This chapter will first address neurophysiological mechanisms that have been discussed as potential contributors to the transition from acute to chronic pain. Findings will be reviewed showing that dysfunction in central nociceptive processing might increase the risk for chronicity following the onset of a musculoskeletal condition. The chapter will also examine the results of research addressing psychological risk factors for chronic pain and disability following injury. The chapter will conclude with a discussion of implications for treatment and recommendations for future research.

8.2 The Transition from Acute to Chronic Pain: Neurophysiological Factors

A consistent finding in clinical research addressing risk for chronicity following musculoskeletal injury is that high levels of initial pain severity predict poor outcome (Cote et al. 2001; Scholten-Peeters et al. 2003; Waddell et al. 2003; Gheldof et al. 2005). It has been suggested that hyperalgesic responses to musculoskeletal trauma might reflect disruption of endogenous opioid mechanisms. Over the past few decades, evidence has accumulated indicating that dysfunctions in endogenous pain inhibitory systems are likely to contribute to the development of chronic pain conditions (Tracey and Bushnell 2009). Endogenous pain inhibitory systems are known to operate at various levels of the CNS, both in spinal and supraspinal sites. Endogenous pain inhibitory systems operate primarily through brain-to-spinal cord pathways and can be triggered by a variety of internal and external factors. There are at least two major endogenous descending pain inhibitory systems that operate in parallel within the CNS: (1) a bulbospinal pain inhibitory system and (2) a cortico-subcortical pain inhibitory system. In recent years, a great deal of progress has been made in identifying the neural mechanisms subserving these endogenous pain inhibitory systems.

8.2.1 Bulbospinal Pain Inhibitory System

The bulbospinal pain inhibitory system was first described by Le Bars and his colleagues (Le Bars et al. 1979; Villanueva 2009), who found that localized nociceptive stimulation can produce diffuse analgesic effects over the rest of the body, a phenomenon termed *diffuse noxious inhibitory control* (DNIC). Research has revealed that DNIC effects are subserved by a spino-bulbo-spinal loop, which includes the ventrolateral funiculus, the caudal medulla, the dorsolateral funiculus, and the spinal dorsal horn (Bouhassira et al. 1995).

In the laboratory, DNIC paradigms have been developed to examine interindividual differences in endogenous pain inhibition and to examine the potential contribution of endogenous pain inhibitory systems to the pathogenesis of chronic pain conditions. In DNIC paradigms, endogenous pain inhibition is typically assessed by examining the extent to which tonic nociceptive stimulation reduces the pain produced by a brief noxious stimulus applied at a remote area of the body. Deficits in DNIC have been observed among patients with a variety of chronic pain conditions, including fibromyalgia (Staud et al. 2003), osteoarthritis (Quante et al. 2008), rheumatoid arthritis (Leffler et al. 2002), temporomandibular disorder (Bragdon et al. 2002), and irritable bowel syndrome (Wilder-Smith and Robert-Yap 2007). In patients with pain, deficits in DNIC have been found to be associated with higher levels of self-reported pain severity, higher levels of postsurgical pain, and higher levels of physical disability (Granot et al. 2008; Yarnitsky et al. 2008). Taken together, findings from these studies suggest that deficits in endogenous pain inhibition might contribute, at least to some extent, to the development and/or the maintenance of chronic pain and disability.

8.2.2 Cortico-Subcortical Pain Inhibitory Systems

In addition to the bulbospinal pain inhibitory system, there is a well-documented cortico-subcortical circuitry known to be involved in descending pain inhibition, which includes the frontal cortex, the anterior cingulate cortex (ACC), the insula, the amygdala, the hypothalamus, the periaqueductal gray (PAG), the rostral ventromedial medulla (RVM), and the nucleus raphe magnus (NRM) (see Fig. 8.1). Descending fiber projections have been identified from the RVM to spinal dorsal horn, one of the main sites involved in endogenous pain inhibition. A large body of research has accumulated indicating that this descending pain inhibitory circuitry operates through the activity of opioidergic, serotonergic, and noradrenergic systems (Zubieta et al. 2003).

There are indications that chronic pain might be associated with alterations in the activity of endogenous opioid systems involved in descending pain inhibition. For example, imaging studies using positron emission tomography (PET) revealed that patients with chronic pain have a significantly lower density of opioid receptor binding sites than healthy controls in several brain regions involved in descending pain inhibition (Zubieta et al. 1999; Willoch et al. 2004). These findings are in line with studies that have found significantly lower plasma and cerebrospinal (CSF) levels of endogenous opioid peptides in patients with chronic pain compared to healthy controls (Denko et al. 1982; Bruehl et al. 1994, 1999). In patients with chronic pain, lower plasma and CSF levels of endogenous opioid peptides have been associated with higher levels of self-reported pain severity and higher levels of self-reported functional disability (Bruehl et al. 2004).

There are also indications that chronic pain might be associated with decreases in gray matter density in various brain regions involved in descending pain inhibition. Gray matter atrophy in brain regions such as the prefrontal cortex, the cingulate cortex, the thalamus, and the brainstem have been reported in patients with a variety of chronic pain conditions, including back pain (Apkarian et al. 2004; Seminowicz et al. 2011), irritable bowel syndrome (Davis et al. 2008; Seminowicz et al. 2010), and fibromyalgia. It has been suggested that gray matter atrophy might lead to a disruption of neural circuits involved in descending pain inhibition and, in turn, contribute to the process of chronification (Apkarian et al. 2004; Seminowicz et al. 2010).

8.3 The Transition from Acute to Chronic Pain: Psychological Factors

Over the past two decades, considerable research has accumulated indicating that medical status variables alone cannot fully account for presenting symptoms of pain and disability associated with musculoskeletal injury (Price 1999; Turk and

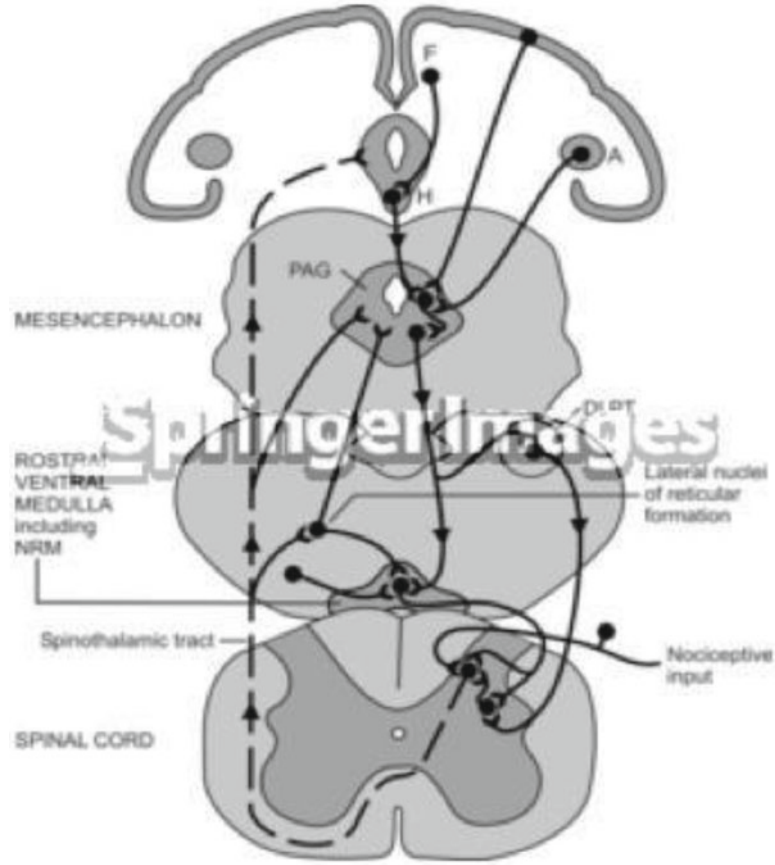

Fig. 8.1 Cortico-subcortical neural pathways involved in descending pain inhibition. *F* frontal cortex; *A* amygdala; *H* hypothalamus; *PAG* periaqueductal gray; *NRM* nucleus raphe magnus. *Source*: http://www.springerimages.com/Images/Biomedicine/1-10.1007_978-3-540-85021-2_4-27

Okifuji 2002; Waddell et al. 2003). Biopsychosocial models have been put forward suggesting that a complete understanding of pain experience and pain-related outcomes will require consideration of physical, psychological, and social factors (Turk 1996; Waddell 1998; Keefe and France 1999). Accumulating research has supported the view that psychosocial factors likely play a significant role in the transition from acute to chronic musculoskeletal pain (Sullivan et al. 2005a).

8.3.1 Catastrophizing and Pain-Related Outcomes

Pain catastrophizing has emerged as one of the most powerful and robust psychosocial predictors of adverse pain outcomes (Sullivan et al. 2001b). Pain catastrophizing has been broadly defined as an exaggerated negative orientation toward actual or anticipated pain comprising elements of rumination, magnification, and helplessness (Sullivan et al. 2001b). Over 900 studies have documented a relation between pain catastrophizing and adverse pain outcomes (Sullivan et al. 2001b; Quartana et al. 2009). Pain catastrophizing has been associated with pain severity and pain-related disability in patients with musculoskeletal pain even when controlling for medical status variables (Sullivan et al. 2001b, 2005a). Several studies have shown that reduction in pain catastrophizing is the single best predictor of successful rehabilitation outcomes for pain-related conditions (Spinhoven et al. 2004; Sullivan et al. 2005b, 2006b; Smeets et al. 2006).

Several investigations have shown that high levels of catastrophizing are prospectively associated with poor recovery trajectories across a wide range of health conditions associated with pain. In a sample of individuals who had sustained musculoskeletal injuries, Sullivan et al. (2008a) reported that high scores on a measure of catastrophizing predicted pain severity at 1-year follow-up, even when controlling for initial pain severity, depression, and fear of movement. Velly et al. (2011) recently reported that catastrophizing prospectively predicted pain and disability in a sample of individuals with temporomandibular joint disorders. In a sample of individuals recovering from total knee replacement, high levels of catastrophizing, assessed presurgically, were the best predictor of long-term postsurgical pain and disability (Sullivan et al. 2009a).

8.3.2 Catastrophizing and Pain Modulation

Research suggests that high levels of catastrophizing might interfere with the effectiveness of non-pharmacological and pharmacological interventions for pain and disability. Studies have shown that individuals who catastrophize might benefit less from rehabilitation interventions for chronic pain (Sullivan et al. 2005b). There is also research to suggest that pain catastrophizing might interfere with the effectiveness of pharmacological interventions for pain. Haythornthwaite et al. (2003) reported the findings of a study assessing the efficacy of an opiate medication for postherpetic neuralgia. Analyses revealed that initial pain catastrophizing scores predicted higher posttreatment pain ratings, even when controlling for baseline pain. Sullivan et al. (2008b) reported that catastrophizing was associated with poor response to a topical analgesic for neuropathic pain. In an experimental study investigating psychological factors related to pain perception and analgesia, Fillingim et al. (2005) found that catastrophizing was associated with poor overall analgesic responses to intravenous pentazocine.

The mechanisms by which psychological factors interfere with response to analgesics remain unclear. It has been suggested that individuals high in catastrophizing might produce endogenous nocebo-like responses due to their negative cognitions (Fillingim et al. 2005). It has also been suggested that catastrophizing might compromise processes involved in descending inhibition of pain (Edwards and Fillingim 2001). For example, in a temporal summation paradigm, Edwards et al. (2006b) found that individuals with high levels of catastrophizing reported significantly greater increases in pain ratings than individuals with low levels of catastrophizing during the application of repeated painful heat stimulation. Similarly, George et al. (2006) found that pain catastrophizing was a significant predictor of increases in pain ratings across repeated noxious heat pulses, even when controlling for sex- and pain-related fear. These findings suggest that pain catastrophizing may facilitate processes involved in temporal summation of pain or "windup" (Price et al. 2002). The findings also suggest that pain catastrophizing might interfere with descending pain inhibitory systems and facilitate neuroplastic changes in the spinal cord during repeated painful stimulation, subsequently promoting sensitization in the CNS.

Other studies have also established a link between pain catastrophizing and the operation of endogenous pain-modulatory systems. For example, two recently published papers have reported a negative association between pain catastrophizing and DNIC (Goodin et al. 2009; Weissman-Fogel et al. 2008). On the basis of findings such as these, it has been suggested that pain catastrophizing might directly interfere with the efficacy of endogenous pain inhibitory mechanisms (Goodin et al. 2009).

8.3.3 Catastrophizing and Expectancies

Research has also pointed to cognitive, affective, and behavioral pathways by which pain catastrophizing might impact on recovery trajectories. It has been suggested that pain catastrophizing impacts on pain outcomes indirectly by contributing to the development of negative expectancies

for pain outcomes (Van Damme et al. 2002). Research and theory on expectancies has drawn a distinction between "response expectancies" and "behavioral outcome expectancies." Predictions about non-volitional responses (e.g., pain, sleep, emotional arousal) are referred to as "response expectancies" (Kirsch 1985). Behavioral outcome expectancies refer to individuals' estimates of the probability of occurrence of a given behavioral outcome that is under volitional control (Bandura 1977). In the context of recovery following musculoskeletal injury, a distinguishing factor between response expectancies and behavioral outcome expectancies is that individuals do not have direct control over whether they will experience pain reduction in the future, but they do have control over the degree to which they resume household, social activities, or occupational activities. It has been suggested that the processes linking response expectancies to symptom outcomes are essentially automatic and unmediated, while behavioral outcome expectancies are likely mediated by motivational factors (Bandura 1977; Kirsch 1985). Under conditions where individuals possess the necessary skills for execution of a particular behavior and when adequate incentives are in place, behavioral outcome expectancies are said to be a major determinant of individuals' activity choices and the effort they will expend to attain desired outcomes (Bandura 1977).

Research has provided support for a relation between pain catastrophizing and response expectancies. In an experimental study, Sullivan et al. (2001a) reported that pain catastrophizing was associated with expectancies for heightened pain and expectancies for heightened emotional distress. Van Damme et al. (2002) also found a significant relation between pain catastrophizing and pain expectancies and suggested that the pain expectancies of high pain catastrophizers might promote hypervigilance to pain signals. Not only do high pain catastrophizers expect to experience more pain, but there are findings to suggest that high pain catastrophizers fail to correct their pain expectancies in the face of disconfirming evidence (Crombez et al. 2002; Van Damme et al. 2002).

Research has also provided support for a relation between pain catastrophizing and behavioral outcome expectancies. For example, several studies have shown that catastrophizing is associated with lower confidence in the ability to achieve (e.g., self-efficacy) desired behavioral outcomes (Sullivan et al. 2001b, 2011; Somers et al. 2010). It has been suggested that negative outcome expectancies have a detrimental impact on behavior or performance by compromising the effort or motivational resources that will be required to achieve certain outcomes (Seligman 1975; Bandura 1983). In the case of individuals who are recovering from musculoskeletal injury, low expectancies for the resumption of household, social, recreational, or occupational activities might reduce the likelihood that individuals will choose or initiate behaviors necessary to resume these activities or might negatively influence individuals' persistence in the face of challenges or obstacles in their goal pursuits. In turn, low levels of activity might lead to deconditioning, medical comorbidities, demoralization, and depression (see also Chap. 2).

8.3.4 Catastrophizing and Pain Behavior

Several investigations have reported findings suggesting that catastrophizing is associated with a propensity to display pain behavior (Keefe et al. 2000; Thibault et al. 2008). Pain behaviors can take varied forms including activity avoidance, redistribution of weight to alleviate pressure on affected limbs, holding or rubbing affected areas of the body, facial grimaces, and vocalizations (Hadjistavropoulos and Craig 2002). Research shows that heightened expressions of pain behavior are associated with a variety of adverse outcomes such as increased pain, depression, functional disability, and prolonged work absence (Prkachin et al. 2002, 2007).

The display of pain behavior might have unintended iatrogenic effects. There is research to show that pain behavior is a significant and independent predictor of prolonged work absence following musculoskeletal injury (Prkachin et al. 2007). The expression of pain behavior might contribute to disability directly by compromising

task performance efficiency. The expression of pain behavior might also contribute to disability indirectly by influencing others' judgments of an individual's ability to perform certain tasks. Pain behavior is one of the primary means by which observers infer someone's pain experience (Prkachin and Craig 1995; Hadjistavropoulos and Craig 2002). The observation of heightened levels of pain behavior in an injured worker might lead physicians to infer high levels of pain and, in turn, consider prescribing an extended period of sick leave. The observation of heightened levels of pain behavior might also lead an employer to consider that the employee is unable to meet his or her occupational responsibilities. In a recent study, individuals who displayed high levels of pain behavior were judged to be less likable, less dependable, and less likely to return to work (Martel et al. 2012). As such, pain behavior may not only be disruptive to activity engagement but the social response to pain behavior might also contribute to prolonged disability.

8.3.5 Catastrophizing and Fear Avoidance

The negative impact of pain catastrophizing has also been discussed within the context of Vlaeyen et al.'s fear-avoidance model (FAM) of pain and disability (Vlaeyen et al. 1995; Vlaeyen and Linton 2000; Vlaeyen and Morley 2005). According to the FAM, catastrophic thinking is the cognitive antecedent of fear, which, in turn, can lead to avoidance of activity, disuse, deconditioning, and disability (Vlaeyen and Linton 2000). The position advanced in the FA has intuitive appeal and is consistent with cognitive-behavioral models of pain and emotional distress (Beck et al. 1978; Turk et al. 1983; Lazarus and Folkman 1984). There has also been considerable cross-sectional research that has supported a relation between catastrophizing and pain-related fears (Leeuw et al. 2007). However, the sequential predictions of the FAM have not been supported by prospective research (Wideman et al. 2009; Pincus et al. 2010). In essence, the FAM predicts that relations between catastrophizing and adverse pain outcomes should be mediated by fear. The results of prospective studies suggest that catastrophizing impacts on pain outcomes, including return to work, independent of levels of pain-related fears (Wideman et al. 2009; Pincus et al. 2010).

8.4 The Relation Between Pain and Disability

Although many questions remain to be answered, research is emerging suggesting that certain individuals might be at risk for the development of chronic pain. Dysfunction of pain modulation mechanisms, involving peripheral or central processes, might place some individuals at higher risk for developing chronic pain following musculoskeletal injury. Psychological factors such as catastrophizing or fear might also have direct or indirect influences on the development of chronic pain and disability.

Although musculoskeletal pain has been shown to be an important determinant of work disability, the relation between pain severity and disability is not straightforward. Numerous investigations have addressed the role of pain severity as a determinant of work disability in individuals who have sustained musculoskeletal injuries (Waddell et al. 2003; Dionne et al. 2007). Research findings have been mixed. There are indications that pain severity immediately following musculoskeletal injury is a significant predictor of prolonged pain and return to work (Suissa 2003; Lotters and Burdorf 2006). Other investigations have reported that pain severity is not a predictor of return to work and that pain reduction does not necessarily increase the probability of return to work (Schultz et al. 2002; Vowles et al. 2004). Even when significant relations between pain severity and work disability are found, pain severity rarely accounts for more than 10–20% of the variance in duration or severity of work disability (Shaw et al. 2005; Dionne et al. 2007; Gauthier et al. 2006).

The relation between pain and disability is also brought into question by findings suggesting that interventions specifically designed to reduce

pain severity have not been shown to improve return-to-work outcomes (Von Korff and Deyo 2004; Volin et al. 2009). It has also been shown that successful work reintegration can be achieved even without the use of interventions designed to impact on pain severity (Sullivan 2003; Shaw and Feuerstein 2004; Slater et al. 2009).

It might be premature however, to discount entirely the role of pain in the evolution of work disability. It is possible that the *disability-relevant* dimensions of pain experience have not been adequately assessed in previous research. The bulk of research examining the relation between pain severity and work disability has relied on static measures of pain severity (Schultz et al. 2002; Waddell et al. 2003; Dionne et al. 2007). Static measures of pain, such as those used to assess spontaneous or condition-related pain, may not provide the best index of an individual's pain experience during physical activity, particularly the repeated nature of physical activity that is involved in the performance of occupational duties.

Pain that is experienced during repeated physical activity might be a more *disability-relevant* dimension of pain than static measures of condition-related pain. The fact that many individuals with musculoskeletal injuries return to work but are unable to maintain employment suggests that activity-related pain might increase over time, at least in a certain proportion of individuals (Franche et al. 2005; Dionne et al. 2007).

Recently, there has been growing interest in examining dynamic changes in responses to "evoked pain" in individuals with persistent pain conditions (Arendt-Nielsen et al. 1997; Price et al. 2002; Staud et al. 2007b; Weissman-Fogel et al. 2009). Evoked pain refers to pain that is experienced in response to a specific noxious stimulus (e.g., heat, cold, pressure, shock) (Price et al. 1977). Evoked pain is distinguished from "spontaneous pain," which is the term used to refer to the pain that is experienced by patients with persistent pain conditions even in the absence of specific noxious stimulation (e.g., condition-related pain) (Gottrup et al. 2006; Staud et al. 2007a).

There is increasing evidence that dynamic changes in responses to evoked pain might represent a dimension of pain experience that is distinct, both in terms of mechanisms and prognostic value, from measures of spontaneous pain (Price et al. 2002; Arendt-Nielsen et al. 2007; Weissman-Fogel et al. 2009). There are indications that individuals who experience increasing pain as a function of repeated noxious stimulation may be at greater risk for adverse pain outcomes (George et al. 2006; Weissman-Fogel et al. 2009).

Research from our laboratory has recently described a phenomenon that has been termed "repetition-induced summation of activity-related pain" (RISP) (Sullivan et al. 2009b, 2010; Ialongo-Lambin et al. 2011). In our first study on RISP, patients with chronic pain were asked to rate their pain as they lifted a series of 18 weighted canisters. A subset of participants reported increasing levels of pain over successive lifts even though the physical demands of the task remained constant (Sullivan et al. 2009b).

We subsequently replicated the RISP effect in a sample of patients with whiplash injuries (Sullivan et al. 2010). An index of RISP was computed by subtracting the mean pain ratings provided for the last three canister lifts from the mean pain ratings provided for the first three canister lifts. As can be seen in Fig. 8.2, the majority of patients (55%) showed constant levels (+ or −1 on a 0–10 severity scale) of pain across successive lifts. Approximately 30% of participants with whiplash injuries showed marked increases (>2 points on a 0–10 scale) in pain across successive lifts. Changes in pain of 2 points or greater on a 0–10 scale are considered to be clinically significant (Rowbotham 2001).

In patients with whiplash injuries, higher RISP values were observed in participants with more chronic symptoms (Sullivan et al. 2010). The index of RISP was also correlated with a measure of physical tolerance, suggesting that RISP might be a risk factor for pain-related disability in patients with whiplash injuries. Pain-related fear and pain catastrophizing have been shown to augment the RISP effect (Sullivan et al. 2009b, 2010).

Although the processes underlying RISP have yet to be clarified, peripheral mechanisms of nociception have been implicated. Repeated or sustained muscle contractions, even of relatively

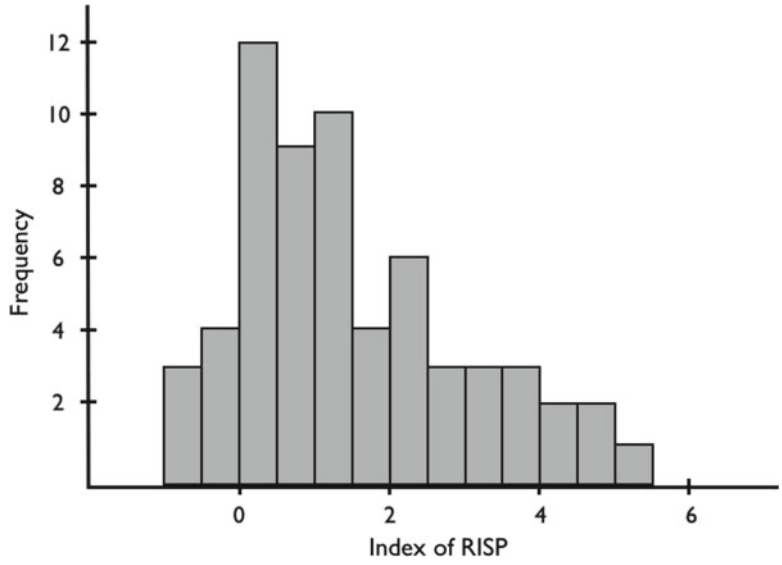

Fig. 8.2 Distribution of RISP values in a sample of individuals with whiplash injuries

low intensity, can lead to focal areas of ischemia in the muscles, which are hypothesized to have the potential to produce muscle pain (Katz et al. 2007). Although ischemia per se is not painful, when combined with a muscle contraction, ischemia hampers the washout of metabolic by-products of muscle contraction such as hydrogen ions, which in turn can stimulate bradykinin release or act directly on small- and large-diameter afferents (O'Connor and Cook 1999; Murthy et al. 2001). Progressively increasing accumulation of these chemicals in the muscle tissue could yield progressively increasing pain sensation through direct and prolonged stimulation of nociceptors.

A number of studies have reported relations between fear of pain and muscle activation alterations during movement (Lund et al. 1991; Geisser et al. 2004). It has been suggested that some individuals might respond to their pain experience with sustained co-contraction of antagonist muscle groups in order to minimize movement of painful areas of the body (Lund et al. 1991; Geisser et al. 2004). The combination of disuse of agonist muscles and sustained co-contraction has been discussed in relation to fear of pain, and it has been suggested that such muscle activation alterations might play a role in the development of chronic pain (Lund et al. 1991; O'Sullivan 2005). In previous research, the threat of painful cutaneous electrical stimulations has been shown to produce co-contraction patterns of the trunk muscles (Moseley et al. 2004; Moseley and Hodges 2005). It is well known that the increase of trunk muscle co-contraction increases the compression on the lumbar spine (Garner-Morse and Stokes 1998) and, consequently, may in turn augment stimulation of nociceptors in spinal structures (Simone et al. 1994). Greater co-contraction associated with pain-related fears might lead to irritation of musculoskeletal tissues of the spine resulting in increased pain over time.

There is increasing recognition that persistent musculoskeletal pain represents a heterogeneous population of pain conditions. Clinical researchers have called for greater attention to the specification of mechanisms that underlie subgroups of pain conditions such that treatments might be tailored to patients' needs (Max 2000). Research on RISP might reveal that a certain proportion of individuals with musculoskeletal injuries develop chronic pain and disability as a result of dysfunction of peripheral or central factors that contribute to activity-related hyperalgesia. Elucidating the mechanisms underlying RISP holds promise of providing the empirical foundation for

the development of mechanism-based approaches for the management of pain and disability following musculoskeletal injury.

Emerging research suggests that static measures of pain severity and dynamic changes in pain severity across repeated activity or noxious stimulation likely represent independent dimensions of pain experience. If future research reveals that indices of dynamic changes in pain have prognostic value for recovery trajectories following musculoskeletal injury, a case could be made for including measures of repeated evoked pain as part of comprehensive pain assessments following injury.

Clinical research suggests that a significant proportion of individuals with musculoskeletal injuries do not benefit from activity-based interventions such as physical or occupational therapy (Cassidy et al. 2007; Ask et al. 2009; Pape et al. 2009). Anecdotal accounts suggest that for some individuals, participation in activity might actually lead to a progressive worsening of pain symptoms (Ferrantelli et al. 2005). Although there has been a tendency to ascribe the failure of activity-based interventions to factors such as poor motivation or nonadherence, research on RISP suggests that for a significant proportion of individuals with musculoskeletal injuries, repeated activity might actually contribute to a worsening of symptoms.

8.5 Implications for Treatment

8.5.1 Targeting Pain Symptoms

Pain is the main symptom complaint of individuals seeking care for musculoskeletal problems (Denison et al. 2007). As such, primary care interventions for musculoskeletal problems are overwhelmingly symptom focused, taking the form of pharmacological agents or physical modalities intended to reduce pain (Negrini et al. 2001). There is a large body of clinical research showing that a wide range of pharmacological and physical interventions can yield meaningful reductions in musculoskeletal pain, at least in the short term (Waddell 2004). However, only a handful of studies have shown that symptom-focused interventions contribute to meaningful improvement in function (Peat 2008). Clinical research has yet to demonstrate that symptom-focused interventions improve the probability of successful return to work following musculoskeletal injury.

It is becoming clearer that certain analgesics interfere with recovery and rehabilitation following musculoskeletal injury. Specifically, the role of opioids in the treatment of musculoskeletal conditions has been the subject of considerable controversy (Von Korff and Deyo 2004; Breivik 2005). Some clinical researchers have advocated the early use of opioids as a strategy for preventing the transition from acute to chronic pain (Gasik and Styczynski 2008). Still, research indicating the prevention of chronic musculoskeletal pain through the use of opioids is lacking. There are however numerous investigations that have documented a relation between opioid use and return to work (Von Korff and Deyo 2004). When a relation between opioid use and return to work has been found, the results unequivocally suggest that opioid use is a risk factor for prolonged work disability (Waddell et al. 2003; Franklin et al. 2005; Volin et al. 2009).

The reduction of pain severity in patients with long-standing musculoskeletal pain might pose particular challenges. Opioids have been associated with heightened levels of depressive symptoms suggesting that, at least in some patients, opioids might contribute to a lowering of mood (Ciccone et al. 2000). The relation between opioids and depressive mood states might be one reason why opioids impact negatively on the resumption of occupational activities. Increases in depressed mood consequent to opioid use might contribute to motivational deficits, further compromising the probability of successful resumption of occupational activities.

The psychological aspects of being prescribed an opiate for a musculoskeletal problem might also play a role in augmenting disability. If patients interpret the prescription of opioids as a reflection of the severity of their condition, opiate prescriptions might be iatrogenic. Heightened appraisals of severity could lead to the development of fears

of movement or reinjury leading to a reduction in activity participation. This line of reasoning suggests that if opiates were prescribed in combination with education about the benign nature of musculoskeletal pain and the importance of work resumption, opiate prescriptions alone might not necessarily be associated with adverse recovery outcomes.

8.5.2 Targeting Pain-Related Psychosocial Risk Factors

In light of research suggesting that certain psychosocial factors might increase the risk of the development of chronic pain and disability, there has been increased interest in developing risk-factor targeted interventions. Several investigators have called for the development of interventions that specifically target pain catastrophizing and similar fear-related variables (Turner et al. 2004; Edwards et al. 2006a; Wade et al. 2010).

Research has shown that a wide variety of interventions can lead to reductions in levels of pain-related psychosocial risk factors. For example, participation in cognitive-behavioral pain management programs has been associated with reductions in pain catastrophizing, pain-related fear, and depressive symptoms (Thorn et al. 2007). Even primary care interventions, such as physiotherapy, have been shown to reduce pain-related psychosocial risk factors (Smeets et al. 2006). While numerous interventions might yield reductions in psychosocial risk factors, it remains unclear whether the reductions in psychosocial risk factors achieved through these untargeted interventions are clinically meaningful. Smeets et al. (2006) reported that interventions such as physiotherapy, problem-solving therapy, or even combined treatment yielded approximately 10% reductions in pain catastrophizing and pain-related fear. In pain research, authors have suggested that reductions in physical and emotional distress of less than 20% might not be clinically meaningful (Jensen et al. 2003).

The Progressive Goal Attainment Program (PGAP) was designed as a risk-factor targeted intervention for individuals suffering from debilitating pain conditions (Sullivan et al. 2006b). The primary objectives of the PGAP are to reduce catastrophic thinking, fear of movement, perceived injustice, and disability beliefs in order to promote reintegration into life-role activities, increase quality of life, and facilitate return to work. The intervention is typically delivered by occupational therapists, physiotherapists, or psychologists.

Since the PGAP is a risk-factor targeted intervention, clients are only considered as potential candidates for the intervention if they obtain scores in the risk range on measures of catastrophic thinking, fear of movement, or disability beliefs. In the initial weeks of the program, the focus is on the establishment of a strong therapeutic relationship and the development of a structured activity schedule. The client is provided with a client workbook that serves as the platform for activity scheduling and contains the forms for various exercises that will be used through the treatment. Activity goals are established in order to promote resumption of family, social, and occupational roles. Intervention techniques are invoked to target specific obstacles to rehabilitation progress. In the final stages of the program, the intervention focuses on activities that will facilitate reintegration into the workplace (Sullivan et al. 2006b).

PGAP has been shown to be effective in reducing catastrophic thinking, fear of movement, and disability beliefs in individuals with whiplash injuries and work-related musculoskeletal injuries (Sullivan et al. 2006b; Adams et al. 2007; Sullivan and Adams 2010b). Research has supported the view that reduction in catastrophizing might be the most significant determinant of treatment-related improvements in depressive symptoms, physical function, and return to work (Spinhoven et al. 2004; Sullivan et al. 2005b, 2006a, 2007). One study showed that PGAP reduced the prevalence of work disability by 60% at 1-year follow-up in a sample of subacute work-injured individuals (Sullivan and Adams 2010a). In the latter study, PGAP had a negligible impact on the prevention of chronic pain further supporting the view that work disability can be effectively managed without directly targeting pain symptoms.

Exposure interventions have also been advocated as risk-factor targeted interventions to prevent chronic pain and disability. The premise underlying exposure interventions is that disability can be construed as a type of phobic orientation toward activity (Vlaeyen and Linton 2000). Fear of movement is viewed as a pain-related negative emotion that leads to activity avoidance (Vlaeyen and Linton 2000). Prolonged inactivity is expected to contribute to depression and disability (Sullivan et al. 2006a). According to the FAM, reducing fear of movement is a critical component of successful rehabilitation of individuals with debilitating pain conditions (Vlaeyen and Linton 2000). Clients are typically only considered for exposure interventions if they obtain high scores on measures of fear of movement.

Exposure to feared activities involves systematic exposure or engagement in activities that individuals avoid due to fears that they might experience an exacerbation of their symptoms. Feared activities are initially identified and ranked hierarchically, from least to most feared activities. Beginning with the least feared activities, clients are systematically exposed to movements that comprise the activities that clients are currently avoiding. Clients are repeatedly exposed to specific movements until their fear of activity subsides. As clients overcome their fears associated with the least feared activities in their feared activities hierarchy, the exposure techniques are used on activities associated with higher levels of fear (Leeuw et al. 2007). Exposure interventions aimed at reducing fear of movement have been shown to be effective in reducing disability, reducing absenteeism, and facilitating return to work (Vlaeyen et al. 2001; Bailey et al. 2010) (see Chap. 20).

While movement exposure has been shown to be an effective intervention for reducing the fear of specific movements, its effects do not seem to generalize to untargeted activities (Crombez et al. 2002; Goubert et al. 2002). As such, the clinical significance of the intervention might depend on the degree to which important activities of daily living or occupational activities can be targeted.

8.6 Summary

The research reviewed in this chapter indicates that there are few physical or biomedical markers for the development of chronicity that have been identified to date. Studies have provided data suggesting that initial pain severity or indices of hyperalgesia derived from quantitative sensory testing might be associated with higher risk for chronicity (Fransen et al. 2002; Sterling et al. 2005). The manner in which initial hyperalgesia contributes to the transition to chronic pain remains unclear, but it has been suggested that initial hyperalgesia might be a marker for disruption of endogenous pain modulation mechanisms. It is also possible that initial hyperalgesia might trigger a cascade of pathophysiological processes that ultimately lead to chronicity. Alternately, initial hyperalgesia might be a marker for a subgroup of pain conditions that were destined to become chronic from the onset of injury.

The lack of clear information about the mechanisms that underlie the transition from acute injury to a chronic pain condition places important limits on the manner in which treatments can be developed to prevent chronic pain. Although early aggressive treatment with opioids has been discussed as an approach to prevent chronic pain following surgery, treatment with opioids in patients with musculoskeletal conditions has been associated with increased risk of chronicity (Katz and Seltzer 2009). At this time, there is little convincing evidence that pain-focused interventions will be effective in reducing the risk of the development of chronic pain or the duration of work disability (see Chap. 20).

Research continues to accumulate, highlighting the potential role of psychosocial factors in the development of chronic pain and disability (see Chap. 8). There is mounting evidence that psychological factors such as catastrophic thinking or fear might interfere with protective pain modulation processes and in turn increase the risk of chronicity. Although a number of intervention approaches have been shown to yield reductions in catastrophic thinking, few interventions have been specifically designed to target

catastrophic thinking as a means of reducing the risk of chronic pain and disability following injury. An unfortunate aspect of current management of musculoskeletal injury is that psychosocial interventions are typically only considered once a condition has become chronic. The development of interventions specifically designed to target neurophysiological and pain-related psychosocial risk factors holds promise of reducing the risk for chronic pain and disability following musculoskeletal injury.

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Methodological Issues in Work Disability Prevention Research

9

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Methodological issues can be encountered in work disability prevention research. The complexity of this field requires different disciplinary perspectives and methodological approaches. Methodological challenges encountered with workplaces as the setting, reluctant respondents, ethical issues and stakeholders are discussed.

9.1 Introduction

Research methodology for work disability prevention (WDP) has changed considerably over the last several decades. Much of the early work focused on vocational rehabilitation, with its origins in the need to rehabilitate returning injured soldiers from the Second World War (Schilling 1944). Early evidence was largely drawn from experience and case studies; for example, see Balme et al. (1944). Through to the 1980s, studies of workplace interventions aimed at reducing work disability largely relied upon single worksites and before–after study designs, as revealed in the review of Battie (1992). In the mid-1990s, the WDP research community turned to more rigorous epidemiologic methods than had typically been used in the past (Bombardier et al. 1994; Frank et al. 1996a, b) with a concentration of research interests in back pain and other musculoskeletal complaints that typically constitute a large proportion of work disability cases. Critical appraisals of existing literature using guidelines provided for reading and interpreting clinical journals (Department of Clinical Epidemiology and Biostatistics McMaster University 1981a, b, c) showed much of the WDP literature to be lacking in the optimal methods for studying issues of aetiology (Frank et al. 1996b), prognosis (Pulcins et al. 1994) and interventions to reduce disability (Battie 1992). The most recent literature on WDP draws upon a range of methodologies from epidemiologic studies of aetiology and prognosis to randomised trials of sophisticated integrated interventions (Lindstrom et al. 1992; Loisel et al. 1997, 2002) to studies of multiple levels of influence (Labriola et al. 2006a, b) to multi-jurisdictional studies of return to work (Anema et al. 2009) to systematic reviews synthesising evidence on return-to-work strategies (Clayton et al. 2012; Franche et al. 2005; MacEachen et al. 2006) to qualitative studies (MacEachen 2005; Eakin et al. 2003). In this chapter, focussing on the methodological challenges of WDP research, we begin by discussing the importance of methodology to the researcher. We then turn our attention to the complexity of WDP with multiple perspectives and levels of influence. This complexity suggests that different disciplinary perspectives are needed to fully

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_9,

investigate issues of WDP. We present some different models for integrating across disciplinary methods and perspectives. In the latter part of the chapter, we discuss some particular methodological challenges that arise when conducting WDP research including workplaces as a research setting, reluctant respondents, complex pathways and multiple levels of influence, ethical conduct and the complex stakeholder environment.

9.2 The Importance of Methodology to the Researcher

A researcher's methodological approach is an important part of their identity. The credibility of their research among their peers is largely judged based on the trustworthiness of the methods they use. Grant proposals submitted to funding agencies are peer reviewed and critiqued based in large part on the methodology proposed and whether it will answer the question that was posed (Canadian Institutes of Health Research 2011; National Institutes of Health (NIH) 2010). Articles reporting on research studies that are submitted to peer-reviewed journals are judged largely on the methodological rigour. Systematic review methodology typically includes quality appraisal of the different studies being reviewed to identify bias and assess the validity (quantitative studies) (Armijo-Olivo et al. 2012; Hayden et al. 2006; Higgins and Green 2011) or to identify issues of credibility (qualitative studies) (Spencer et al. 2003; CASP, Milton Keynes Primary Care Trust 2002) of individual study findings before synthesis takes place. These assessments largely focus on the methodological components of the studies. Levels of evidence in evidence-based medicine are based on a hierarchy for quantitative studies that is largely defined by methodological characteristics such as study design, measurement, confounding and precision (Centre for Evidence Based Medicine (CEBM) 2011). Hierarchies of evidence for qualitative research have been proposed based on sampling, data and theoretical concepts (Daly et al. 2007).

9.3 Complexity of Work Disability Prevention Requires Different Perspectives

WDP is a complex area as depicted in Chap. 6 of this book showing the arena of work disability depicting different elements of influence in WDP. The four sides of the pyramid depict the legislative/insurance system, the workplace system, the health-care system and the personal system, all of which play a role in WDP. Within each of these, there are multiple, graduated layers of influence from the system as a whole (jurisdictional, environmental, social and health-care system structure) down to the more detailed, person-level influences (adjudicators, occupation, health-care provider and physical elements). In the words of Albrecht et al. (1998) …*health problems emerge as expressions of parts of extremely complex interacting systems. They are the culmination of multiple variables, ranging from the genetic and physiological to the social, ecological and political acting over time and space* (p. 57).

A full appreciation and consideration of WDP require crossing many boundaries across disciplines and methods and considering all the aspects represented in the arenas of work disability. However, researchers are usually trained in one discipline often with a predominant corresponding methodological approach. Their imagination for how to conceptualise the problem can be bound by this (Lessard 2007).

Essentially, the same problem might be seen differently depending on who is looking. Take the hypothetical research problem of low back pain as a cause of work disability. Ergonomists and biomechanics might want to investigate the ergonomic or biomechanical set-up of the work environment as a source of pain, and they may try to do this within a laboratory setting where they can control the biomechanical exposures and measure muscle activity via electromyography (Balasubramanian et al. 2011; Dreischarf et al. 2011). Or, they may choose to use a participatory ergonomics approach within a workplace to identify and solve the ergonomic issues leading to low back pain (Milosavljevic et al. 2011).

Epidemiologists might approach the problem by measuring the prevalence of low back pain in different occupational groups using cross-sectional surveys (Mohseni-Bandpei et al. 2011; Kierklo et al. 2011) or may elect to study risk factors for low back pain using case–control or cohort studies and various measurement instruments (Kerr et al. 2001; Bigos et al. 1992). Economists conduct studies to evaluate the cost-effectiveness and cost-benefit of different interventions for work-related low back pain (Apeldoorn et al. 2010; Conrad and Deyo 1994; Critchley et al. 2007; Goossens and Evers 1997). Clinical scientists may use case series of patients to conduct preliminary investigations into a treatment approach and assess potential unintended outcomes (Gelalis et al. 2010; Hahne et al. 2011; Luomajoki et al. 2010; Fritz et al. 2011), or they may conduct randomised controlled trials to assess the efficacy or effectiveness of one treatment for low back pain over another (Delamarter et al. 2011; Franca et al. 2010; Kell et al. 2011; Kamioka et al. 2011). A sociologist might consider studying the lived experience of back pain to better understand the impact it has on the sufferers' lives (Walker et al. 2006). The point is that disciplinary orientation can shape what we 'see' and our methodological expertise can limit how we research a topic. Each of these approaches is valuable, but a broader vision of a problem can be limited by both discipline and method. Table 9.1 presents what is captured by each of these approaches and also gives examples of what would be missed by each of these approaches. A broader, transdisciplinary stance can help researchers to see the boundaries of their own research and to consider how it fits into a broader research environment.

9.4 Integrating Across Disciplinary Perspectives

Given the complexity of WDP, different disciplinary perspectives are required to fully understand and address the problem. Scientists from a single discipline may be able to conduct research into some limited, delineated aspect of the problem, but only by integrating across disciplines can we get at a larger picture. The Canadian Institutes of Health Research (CIHR) Strategic Training Program in Work Disability Prevention (Loisel et al. 2009) introduces the notion of transdisciplinarity to the students of the programme during their first year (see Chaps. 5 and 6 for discussions of transdisciplinarity and Chap. 28 for discussion of the WDP training programme in this book). The challenges of conducting research across disciplines are many. Albrecht et al. (1998, 2001) consider reductionism (reducing a problem to its most basic parts), holism (looking at the problem in as broad a context as possible) and discipline rigidity (the control of knowledge and power within institutions and within disciplines) as barriers to transdisciplinary thinking. Mollinga (2010) talks about disciplinary, intellectual and institutional boundaries that impede a transdisciplinary approach to complex problems—and he too notes that 'disciplinary organization is very powerful'. Discipline rigidity and disciplinary boundaries (Albrecht et al. 1998; Mollinga 2010; Lélé and Norgaard 2005; Cole et al. 2003, 2006) encompass both epistemological and methodological differences across disciplines—as Cole et al. (2006) refer to 'cultures of evidence'. We observe this first-hand each year with each new cohort of WDP students when we assign them a task to address a workplace disability problem by working together in multidisciplinary groups to come up with a research approach that would address a particular workplace health problem. Students discover that the types of research questions they might pose and the methodology they might use are not obvious to their fellow group members. What they might consider evidence is not necessarily the same as the other group members. For example, in one group, what some members saw as negotiations with a workplace to conduct research, another saw as part of the data collection.

How can researchers with different disciplinary foci come together to solve complex problems and synthesise findings from different methodological paradigms? Different models of integrating across disciplinary and methodological perspectives have been proposed. Here, we review individual approach, teamwork, boundary work and mixed methods.

Table 9.1 Common methodological approaches used by different disciplines

Disciplinary perspective	Research topics/approaches	What is captured	What is not captured (examples only to illustrate)
Biomechanical	Study the relationship between biomechanical exposures and back pain in a controlled setting	Relationship between specific controlled biomechanical loads and the experience of pain	May not translate well to exposures experienced in workplace, such as variability in load and pace of work; other factors, for example, psychosocial exposures; legislative context
Ergonomic	Participatory ergonomics approach within a workplace	The particular combination of environmental and personal issues in the given workplace with possible solutions	Multiple role strain between home and work; travelling to work; coworker relations; legislative context
Epidemiologic	Relationship between exposures and outcomes via cohort or case–control studies	Precise unbiased measure of relationship between the exposure and outcome in population under study	Individual variability in relationship; interplay between other factors on outcome under study
Economics	Cost-effectiveness of a workplace intervention to reduce back pain	The value to the company in economic terms of introducing an intervention	The impact the intervention has on the workers' cognition or on relationships with coworkers
Clinical	Randomised trial to study treatment effectiveness	Precise measure at group level of effectiveness of treatment on measured outcome such as pain	How the treatment under study is actually used in practice; factors that influence use of treatment
Phenomenological	Lived experience of back pain to understand the impact it has on the sufferers' lives	In-depth interviews with back pain sufferers about the meaning of pain in relation to their lives	How individual experience is shaped by broader structural conditions such as availability of social services, role expectations and economy of work
Sociological	Explore why workers with backpain injuries do not always return to work	Perspective of affected workers and related decision-makers who influence return-to-work conditions such as workers' compensation, health-care providers, employers and coworkers	Data are non-quantified; prevalence of issues revealed is not clear; different sample could provide different findings

Albrecht et al. (1998) describe two different ways of 'going about transdisciplinary thinking': individual and team. An individual approach involves a well-trained researcher bringing together knowledge and evidence from multiple disciplinary perspectives through analysis and integration to provide a more comprehensive understanding of a complex phenomenon or system. For instance, a study (Kunitz 1994) of disease among native populations in the New World is presented as an example of this approach (Albrecht et al. 1998). They describe the process as follows: *Using findings from single and interdisciplinary collaboration as a point of departure, the researcher transcends disciplinary boundaries by linking the disparate analyses together into a coherent framework* (p. 60).

In his analyses, Kunitz (1994) drew upon demographic, epidemiologic, historical, anthropological and sociological works to weave a picture of the health impacts of conquering European explorers on indigenous populations. However, a limitation of this approach is that most researchers do not have in-depth training across disciplines or methods and so are not able to handle diverse perspectives and methodologies in a sophisticated manner (Bryman 2006a).

A team approach is more pragmatic because it can bring together the specialised expertise of different researchers. It draws researchers with different disciplinary backgrounds to work together to build a common conceptual framework that acknowledges and accommodates complexity in a system or of a problem. A number of steps may be involved (Albrecht et al. 2001) from identifying a problem, assembling a multidisciplinary group of researchers, reviewing existing knowledge across a range of conceptualisations of the problem, designing and implementing research enquiries and finally synthesising findings and explaining the problem. For instance, in the above example of back pain and work disability, a multidisciplinary team of epidemiologists, economists and clinicians might use both qualitative and quantitative methods to explore financial, clinical and population determinants of back pain in order to determine interrelationships and possible interventions.

Despite its pragmatism, conducting research with such a multidisciplinary team can pose challenges. Massey et al. (2006) describe the research process of a multidisciplinary team effort to conduct research to understand dairy farmers' use of technology. They note the difficulties and the time it took for the research team to discuss and declare their epistemological positions prior to beginning any research decisions and the challenges of developing a mutual understanding of concepts and goals (Massey et al. 2006). Nevertheless, this discussion was seen as a necessary part of the group process. They also discussed the challenges of managing temporal differences in the various team members' intensity of involvement in the research process and keeping all team members informed and involved despite these shifts. And they note the difficulties of working in a stakeholder environment that has a greater appreciation and comfort level with one research paradigm over another—in their case with a positivist paradigm rather than constructivist.

Boundary work is a third approach to integrating across disciplinary and methodological perspectives. Mollinga (2010) proposes a consideration of 'boundaries' or barriers that hamper or prevent an integrated approach to complex problems. These include intellectual boundaries between scientists of different disciplines, boundaries between research and policy and boundaries between different organisations that might have a stake in the problem. This framework for actually doing inter- or transdisciplinary research involves three components. The first component—developing *boundary concepts*—largely involves developing common language and concepts, overcoming situations where a single term or phrase means different things to different disciplines. The second is configuring *boundary objects* such as analytic models of the complex system and/or conceptual frameworks that integrate knowledge and/or the social process of knowledge generation. The third and final is *boundary setting*, or 'getting the institutional arrangements right' both within a particular project, but also more generally at the interface between research, policy and society.

Finally, transdisciplinary work can involve bridging methods as well as disciplines. A challenge is that quantitative research is usually conducted within a positivist, empirical paradigm, while qualitative research is often carried out with a hermeneutic, interpretive paradigm, and each encompasses distinct ways of assessing quality and truth. However, the need to take a broad view when investigating complex social phenomena has opened up space for a 'pragmatic' orientation, and this is increasingly guiding researchers to bridge methodological boundaries (Bryman 2006b; Morgan 2007; Hurley 1999). The pragmatic approach, as with the transdisciplinary approach, prioritises the research question over method and discipline and can involve mixed methods. Sometimes mixed methods are used to explore very different questions within an overall project within separate sub-studies or within a single study moving back and forth between inductive and deductive approaches (Morgan 2007). As noted by Morgan (2007), moving between methods is a way to prompt thinking across disciplines: *Inductive results from a qualitative approach can serve as inputs to the deductive goals of a quantitative approach, and vice versa. This movement back and forth between different approaches to theory and data does not have to be limited to combinations of methods within a single project. A far more interesting option is to explore the potential for working back and forth between the kinds of knowledge* (p. 71).

A modest example of research bridging methods and disciplines is that of a researcher who was examining OHS risk among food service workers (Cann et al. 2008). He initially took an ergonomic, biomechanical approach. Then, as part of a transdisciplinary training programme, he was mentored by a qualitative sociologist to add an interview dimension to his study about the social dimensions to work of food service work. The results of the interviews showed a discrepancy between job role descriptions and actual work practice and strongly affected interpretation of his biomechanical measurement results. In turn, this led to theoretical development about the topic of OHS risk and who is the "expert"? Conceptually, the 'subjects' of the study who had played a passive role in the biomechanical arm of the study later in the interview study were reconceptualised as actors with their own 'expert' knowledge about the actual practices of work.

The benefits of researchers from multiple disciplines working together are apparent in many examples in the work disability literature (Ammendolia et al. 2009; Cherniack et al. 2001; Derrett et al. 2011; Sullivan et al. 2010; Väänänen et al. 2003). For example, Sullivan et al. (2010) integrated clinical, sociological and psychological views to study the psycho-emotional, social, economic, political and environmental factors impacting disability outcomes for people with spinal cord injury. To do this, they used mixed methods incorporating structured interviews and open-ended interviews using a qualitative paradigm.

9.5 Particular Challenges That Arise When Conducting WDP Research

We now turn our attention to some particular issues that can create methodological challenges for WDP researchers. Here we consider challenges that arise due to the following: (1) workplaces as a research setting, (2) reluctant respondents, (3) complex pathways and multiple levels of influence, (4) ethical conduct in research and (5) a complex stakeholder environment. We have chosen not to address methodological challenges in measurement—whether one refers to measuring work, exposures at work, pain, disability, return to work or any other relevant construct to WDP research—given that measurement issues are well covered elsewhere in this volume (see Chap. 7 for a discussion of the measurement of WDP outcomes and Chap. 15 for methodological issues related to work disability assessment instruments).

9.5.1 Workplaces as Research Setting

WDP research can be conducted in many different settings of which workplaces are but one.

But workplaces as research settings pose some particular methodological challenges, some of which are specific to quantitative research approaches, some to qualitative research approaches while others apply to both.

9.5.1.1 Workplace Environment Is Not Static

Workplaces are dynamic and have a purpose and priorities that may not easily accommodate research. They are not the ideal scientific laboratory and are not likely to remain static for observation. A common quantitative paradigm is to understand the impact of one characteristic (exposure/attribute) on some other variable, holding all else constant. Sometimes this is done in an experimental way where the researcher has some control over who is exposed or intervened with, while other studies may be conducted in a more observational way. Either way, the dynamic nature of the workplace may interfere with the ability to isolate or control an exposure of interest.

9.5.1.2 Participation

Recruiting workplaces to take part in research is a common research challenge (Cole et al. 2006; Wynne-Jones 2010; Kristensen 2005; Anderson et al. 2001). Barriers to participation include the slow timelines of research, researchers who do not understand the routines and procedures of the workplace and research topics that have no direct interest to the workplaces (Cole et al. 2006; Kristensen 2005). Changes in the workplace can also impact participation. For instance, relationships built between researchers and workplace access brokers can be disrupted if the access broker changes job during negotiations for access or before the research is completed, potentially hampering recruitment or completion of the research.

In quantitative studies where workplace is the key unit of analysis, lack of participation can be a threat to both external and internal validity of the study (Shadish et al. 2002). Threats to external validity or generalisability are an issue if the workplaces included in the study are not a good representation of the population of workplaces of interest, and so findings from the study cannot be validly generalised to that population. Selection biases in which workplaces opt to participate in the study can also threaten internal validity where biases may arise when making inferences about relationships within the study sample. Cole et al. (2006) describe several examples of poor response rates ranging from 4 to 50% across several studies recruiting multiple workplaces. A low response rate is often viewed as a warning that the recruited workplaces may not be a good representation of the population of interest. Indeed, Cole et al. (2006) suggest that in their experience, workplaces that volunteered for research or agreed to participate already had a better work environment than those that elected not to participate and are furthermore interested in improving even more.

How can one encourage participation? Many researchers have described the importance of getting senior management support for workplace-based research studies, but Kristensen (2005) emphasises the importance of having some direct benefit to the workplace for participating. Returns for investments (Anderson et al. 2001) are of interest to employers, and building some research component that addresses this for occupational health and safety and disability management investments may be one tactic to persuade participation. Stakeholder consultation including employer representatives, when setting the research agenda and selecting research questions, may make the research more relevant to workplaces and make participating more appealing. We have also found it helpful to involve system partners, such as sector-specific health and safety agencies in our own jurisdiction, who have ongoing relationships, with workplaces in the recruitment of workplaces for research (Amick et al. 2010, 2012b) although this may not overcome selection bias issues. Zohar's (1980, 2000, 2003) research was based on recruitment through trade organisations, a way to access larger numbers of similar small employers. Government workplace authorities, such as ministries or departments of labour with authority for compliance with occupational health and safety regulations, may also be able to provide sampling frames and routes of access to various workplaces (Baggs et al. 2003; Foley et al. 2009; Hogg-Johnson et al. 2011; Nelson et al. 1997; Silverstein et al. 2002).

Nevertheless, researchers must be careful not to compromise their research agenda to the point that the research questions they pose are so *safe and unthreatening* for the workplace parties that the research really does not get at the important issues of WDP. If in order to get an unbiased representative sample of workplaces, one is forced to ask only certain research questions, then that in itself creates a bias (Lessard et al. 2010).

9.5.1.3 Different Workplace Sizes and Industries

Workplaces come in different sizes from small family-run businesses to large corporations and from office settings to manufacturing plants to agricultural endeavours and beyond. With different sizes and industries come different workplace governance structures and roles meaning that the WDP issues of relevance can differ also. Methodological challenges related to workplace size and sector may come at the stage of setting a research question and at the stage of study design. The research team must clarify what question they are trying to address and whether they need to design a research study that covers issues of relevance to all workplaces, regardless of size or industry, or whether to limit their study to certain types of workplaces in order to gain a more in-depth knowledge of the relevant issues. Statistical challenges come from the instability of important outcome measures like injury and disability day rates from small workplaces, leading to overdispersion and signal-to-noise ratios that may be quite small and therefore difficult to detect. In these cases, intermediate outcomes or indicators as outlined in (Cole et al. 2003) such as, among others, exposures such as tasks (Van Eerd et al. 2009; Gerr et al. 2000; Laing et al. 2005), knowledge and beliefs (Buchbinder and Jolley 2005; Elfering et al. 2009) or symptoms (Gerr et al. 2005), workplace might be better suited for study and more appropriate for the research topic under study.

It may seem more practical and feasible to study work and health issues in medium to large size workplaces where there is some workplace infrastructure that one can exploit in the research process. Yet small workplaces are typically a large proportion of all workplaces in a jurisdiction. Excluding them removes an important portion of the labour force from consideration. Therefore, it is appropriate to tailor research design to the sample at hand. For instance, a recent systematic review (Breslin et al. 2010) of small business intervention studies identified case controls as an important and feasible area of improvement in study design. Qualitative approaches have been used to advantage in studies of small workplaces to examine unique aspects of risk exposure and work organisation that are not necessarily well addressed by current occupational health management and policy systems, which tend to be designed for large workplaces and collective bargaining (Eakin et al. 2003; Eakin and MacEachen 1998; Eakin 2010; MacEachen et al. 2010).

9.5.1.4 Characterising Workplace-Level Policies and Practices

The workplace, how it is organised and the policies and practices related to occupational health and safety and disability management, is one arena of potential influence in WDP. Challenges arise when the researcher wants to characterise or measure aspects of the workplace that might impact WDP. For instance are these things that can be captured by someone observing the workplace, by reviewing documents at the workplace or by questionnaire? If questionnaires are used, what types of questions should one ask and who at the company should be approached? Safety climate is one construct that has been suggested as a useful measure of a workplace (Zohar 1980, 2000, 2003), but the developers of the measure assert that it can only be measured by a complete census of a workplace or work group (Zohar 2000). Organisational policies and practices have been identified as predictors of return to work and return to work-role functioning (Amick et al. 2000, 2004, 2012a). In both of the cited studies, information about organisational policies and practices was collected from the injured worker leading one to question whether the relationship between organisational policies and practices and work outcomes reflected the actual organisational policies and practices or the workers' knowledge of them. There is some evidence showing only a

modest level of agreement between managers and employees on reports of organisational policies and practices (Ossmann et al. 2005). The best workplace candidate to provide information about workplace policies and practices—or indeed whether any single workplace candidate is sufficient—has yet to be determined.

One way to characterise workplace policies and practices is to examine them in action, using qualitative methodology such as interviews, focus groups or participative observation which can access a range of organisational experiences from workers to managers and, if relevant, customers. Such research can provide understanding of why some policies are implemented more forcefully than others (Eakin et al. 2009), how policies are developed and interpreted in workplaces and how they are applied (MacEachen 2005; MacEachen et al. 2012).

9.5.2 Reluctant Respondents

The unit of analysis in WDP research is often individual workers and managers across workplaces, rather than within a single workplace. In these cases, particular methodological challenges can arise when trying to recruit subjects for research or it can manifest as attrition or loss to follow-up. When subjects are to be interviewed, Adler and Adler (2003) identify challenges with access—difficulties in recruitment of subjects for participation—and issues of reluctance, subjects who agree to participate but then are reluctant to answer the questions posed.

Barriers to participation are varied and may include feelings of vulnerability, not seeing the relevance of the research, or issues of language. For workers, and in particular injured workers, feelings of vulnerability may affect their willingness to participate. They may have concerns that participation could jeopardise their employment or their workers' compensation claim. Individuals or workplaces engaged in illegal or unethical practices may also be reluctant to participate and reveal themselves to the researcher. Powerful parties, such as policymakers, may also be reluctant participants in research. They too may also feel the need to be very careful about what they say.

On the other hand, when injured workers are followed over time to assess outcomes, they may lose interest or motivation for participating once their injury has resolved. For instance, in a cohort study of injured workers with workers' compensation claims, we found that participants lost to attrition showed better levels of pain and function at their last interview before dropout and fewer days receiving compensation than those retained in the study to the end (Franche et al. 2004).

Language can also be a barrier to participation with questionnaire-based or interview-based research when study subjects do not have facility in the predominant language of their jurisdiction. And yet, lack of facility in the predominant language may be a key issue in WDP. If the researcher is familiar with the research setting, they may be able to plan for this by preparing recruitment materials in multiple languages, translating questionnaires into the most common languages of potential participants or providing interviewers fluent in different languages (Kosny et al. 2012). Methodology for cross-cultural adaptation of questionnaire instruments has been established (Beaton et al. 2000; Guillemin et al. 1993), and it has been applied to different questionnaire instruments of relevance to WDP research (Bae et al. 2001; Bumin et al. 2008; Durand et al. 2005; Gallasch et al. 2007). But these processes require adequate resources—time and money—to accomplish. Likewise, when interviewing subjects as part of a qualitative study, an interpreter could be present to translate questions and responses (Larkin et al. 2007; Kapborg and Berterö 2002), or translation of transcripts can be performed after data collection and prior to analysis (Lopez et al. 2011), but this adds to the resource requirements of the study. The methodological implications of either of these techniques have not been fully investigated, and the translation or interpretation process alone may impact the interpretation of the information (Larkin et al. 2007; Kapborg and Berterö 2002; Temple and Young 2004).

In quantitative studies, issues with participation can give rise to issues of generalisability or

external validity—that is, if the recruited subjects are not a good representation of the intended population of subjects, there will be limitations in generalising study results back to that population of interest. Internal validity—the ability to draw valid, unbiased inferences about relationships between factors—can also be threatened by selection factors in who participates or in systematic differences between those lost to attrition compared to those retained (Shadish et al. 2002). Likewise, unwillingness of participants to respond to some questions leads to issues of missing data, which can affect both external and internal validity.

In qualitative studies, the final shape of the sample is determined by the evolving needs of the enquiry. In these situations, recruitment challenges can occur when participants are difficult to access because they cannot be found, the research topic is not of interest, they are too busy or they prefer not to talk with the researcher about a sensitive topic. Strategies are used to overcome these, such as identifying for the participant ways that the study results might be relevant to them or modifying the data-gathering event to increase the confidentiality or accessibility. For instance, if participants cannot make it to a focus group, the data gathering could shift to an interview at the time and location chosen by the participant.

In some cases, the final sample is limited by the *availability* of participants and might not be the ideal sample for exploring the original issue at hand. In these situations, the final analysis can proceed, with the caveat to readers that the data and therefore the conclusions are limited. A better way to manage a limited sample is to focus on the data at hand—what novel contributions to WDP knowledge can be earned from this particular sample? This approach might shift the focus of the original research question to another line of enquiry that is better answered with the sample. For instance, a research study might seek to understand differences between managers' and workers' experiences of early return to work, and there might have been serious difficulties recruiting managers. In this case, the final analysis might focus on the variation within the worker sample about experiences of return to work, and the sample size and variation for the workers might be increased. Within an iterative data gathering and analysis design, the managerial reluctance to participate might become a part of the study focus, with questions to workers about managers' role in return to work and what contexts or situations facilitate or impede open discussion about the general topic of return to work.

9.5.3 Multiple Perspectives, Multiple Levels of Influence and Complex Pathways

We referenced the arena of work disability in Chap. 6 above to highlight the multiple levels of influence within each of the perspective in work disability research. For example, thinking about the perspective of the *workplace system*, interventions for workplace disability prevention, *one could focus on* a specific piece of equipment being used by a worker (e.g. a keyboard or chair or protective eyewear), or on how a work group works together as a team, or on the workplace organisational practices around disability management, or on the jurisdiction's laws on employment standards and occupational health and safety, and each of these interventions could have an impact on work disability in individual workers, in a working group, in a workplace as a whole or in a jurisdiction as a whole. Additional complexity occurs when facets of different levels of influence interact with one another or when paths or connections cross levels or behave in a reflexive way. And even here, the workplace is but one arena, with the health-care system, the insurance system and the personal system of the worker as others that come into play. Every study cannot take every level of influence into account, but researchers need to be aware of all that is at play and how that might contextualise one's methods and findings.

Another challenge arises when one is interested in understanding system-level influences on work disability—for instance, the set-ups of insurance systems. Quantitative studies to understand the impact of different system-level

features on work disability outcomes ideally require including several jurisdictions in the study (Anema et al. 2009).

For quantitative studies, statistical methodology that accommodates and accounts for multiple levels of influence or aggregation has undergone considerable development over the past 20 years (Hox 1994; Raudenbush and Bryk 2002), and multilevel or hierarchical models for many different types of outcome (binary, count, continuous) are readily available in most statistical software packages (Albright and Marinova 2010; Peugh and Ender 2005; Singer 1998; SAS 2008; Rabe-Hesketh and Skrondal 2005). Nevertheless, conducting a study that measures and analyses multiple levels of influence simultaneously still poses challenges to the researcher, for instance, requiring sufficient sample size at all levels of investigation to ensure sufficient power and precision and adequate control of confounding.

With the development of methods to numerically accommodate multiple levels, quantitative studies in WDP that cover or include multiple levels of influence are becoming more common (Labriola et al. 2006a, b; Jiang et al. 2010; Markham and McKee 1995; Amick et al. 2003). Many of these consider two levels of influence—the worker and the workplace. For instance, Labriola et al. (2006b) studied individual worker-level psychosocial and physical work environment factors and workplace aggregate measures of psychosocial work environment factors as predictors of RTW after sickness absences in a multilevel analysis. They found several individual-level factors predictive of RTW, but none of the factors measured at the level of the workplace were predictive. In another case, individual worker attributes and jurisdiction-specific traits were considered. After conducting a study (Webster et al. 2007) that revealed a relationship between early opioid prescriptions and delayed return to work, Webster et al. (2009) examined individual worker-level factors such as age, gender and wage and also state-level factors such as state household income inequality and number of physicians per capita to explain variation in early opioid prescriptions for injured workers with compensation claims. They found that the state-level factors were most predictive and that individual-level factors explained only a small portion of variability in prescribing patterns. Amick et al. (2003) evaluated an office ergonomics intervention where the different levels represented in the model included the intervention received (new chair with training, training only or neither), job level, the individual worker, day of week and time of day (where job tasks could change by day of week and time of day).

Likewise, statistical methods for complex causal pathways such as structural equation models have also undergone considerable development in the past 30 years (Scientific Software International 2011; Bollen 1989; Kline 2011). This class of models has developed with contributions from multiple disciplinary perspectives including path analysis models from biometrics and genetics research, the 'conceptual synthesis of latent variable and measurement models' (Bollen 1989) from psychometricians and methods of estimation and inference developed by econometricians and psychometricians (Bollen 1989). Applications using structural equation models are still most commonly seen in the social and behavioural science literatures where they are used to empirically test theories about relationships between various observed and latent variables although they are also increasingly being used in other disciplinary settings, for example, epidemiology (Der 2002; Ben-Shlomo and Kuh 2002; Amorim et al. 2010), education, and communication science, among others (Kline 2011). The very multidisciplinary nature of their development and the ability to examine complex causal pathways suggest that this class of models might be very appropriate for some of the complex and transdisciplinary research questions encountered in WDP research. Software for fitting these types of models is now readily available (Scientific Software International 2011; SAS Institute Inc 2008; StataCorp LP 2011; Muthén and Muthén 1998). Some recent studies in the work and health literature have used structural equation models to study relationships between work stress, coping and quality of life (Wu et al. 2010), work exposures to pollutants over time and space (Davis 2012), sense of coherence and work characteristics

(Feldt et al. 2010) and relationships between work characteristics and mental health (De Lange et al. 2004) as a few examples.

Qualitative research methods are well suited to examining phenomena in context. Guided by the 'sociological imagination' of Mills (1959), qualitative researchers regularly consider the ways that 'personal troubles' and 'public issues' are connected. Theoretically, there is a focus on individuals and the contexts in which they are embedded in order to understand the meaning of behaviour and the complex causal links, or processes, between context and behaviour (Grypdonck 2006; Sofaer 1999). Methodologically, this requires a careful sampling approach and an iterative, or back and forth, approach between data gathering and analysis, so that propositions about interrelationships can be investigated over the course of the study (Pope et al. 2000). Some contexts become more relevant over the course of a study. For instance, a qualitative study could begin with an examination of workers' challenging return-to-work experiences. From this, a link to entitlement decision-making processes at workers' compensation could be revealed. Investigation of entitlement decisions could then lead to the domains of compensation policy, cost and the economic climate. Altogether the investigation could identify complex processes linking individual, administrative, cost and policy contexts. Qualitative and quantitative studies generate different kinds of knowledge, and their integration is not always necessary for a particular research question (Giacomini 2001). However, the methods can inform each other in a way that sheds light on complexity. For instance, qualitative methods can identify complex processes that underlie positive results or can account for why they remain absent in a quantitative study. A qualitative understanding of process allows interventions to be designed and can explain why interventions achieved results.

9.5.4 Ethical Conduct in WDP Research

Codes of ethical conduct for research involving human subjects require researchers to respect and abide by key principals of ethics. For instance, the Canadian *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada 2010) puts forth three core principles: respect for persons (including their autonomy), concern for research subjects' welfare (including privacy) and justice (including consideration of vulnerability and imbalances of power). Maintaining these principals can pose methodological challenges in WDP research.

Recruitment procedures for research studies should be designed with these principles in mind. These procedures should ensure that research subjects are able to provide free and informed consent to participate—free of any coercion from the researcher, their employers, health-care providers or insurers. Their choice to participate—or not—must be kept confidential. Practically speaking, meeting these requirements might require some carefully designed logistics such as a two-stage recruitment process. For instance, if workers are the intended research subjects for a study, parties who routinely interact with those workers (e.g. employers, insurers, health-care providers) may first approach them and ask if they are willing to have their name and contact information provided to the researcher team. There would need to be consideration of the nature of the relationship between the intermediary and the worker, so that authority and power relations do not unduly influence the workers ability to consent or decline to research. For instance, if a worker is approached by their insurer or employer to participate in a study, he or she might feel compelled to participate even if provided with information that their participation decision is independent of benefits or employment decisions. When an appropriate intermediary is in place, then the researchers can independently work through the informed consent process with the workers. In this way, privacy is maintained for those not willing to have their names put forward, and the workers maintain their autonomy in deciding whether to participate in the research or not.

If workplace parties are engaged in the research, they may be keen to assist with the recruitment process, but their role must be limited to ensure the workers' autonomy and privacy are maintained. In one workplace-based study (Polanyi et al. 1997), members of the workplace's Joint Health and Safety Committee wanted to contact workers who had not responded to a survey to encourage their participation. The research team explained why it was important that the workplace parties not know who had or had not chosen to respond, and together they devised a follow-up for nonresponse that did not reveal information about individual participation.

For workers and in particular injured workers, their vulnerability is another consideration when making methodological choices for the research process. Power and authority dynamics exist between workers and their employers, claimants and their adjudicators, injured workers as patients and their health-care providers. They may be fearful that participation will jeopardise their employment or relationships with coworkers. Injured workers recruited through an insurance or workers' compensation system may fear that their claim might be affected by participating (or not participating) in a research study. Or they may have concerns that information they provide to the researchers could make its way back to their employer or insurer. So the researchers must take measures in how the study is conducted to ensure the confidentiality of the respondent is maintained. This can be difficult if the research is conducted in a workplace setting. Off-site locations for interviewing or completing questionnaires may better accommodate maintaining confidentiality. However, it may be impossible to ensure confidentiality if part of the research design is to observe the worker while they are doing their job or if an intervention for WDP involves the worker's own work station or work environment. In that case, the informed consent process must ensure that the worker understands what participation will entail before they agree.

Ethical challenges affecting methodological choices may also arise if one is trying to collect multiple perspectives within one work site—for example, from injured worker and from their supervisor. How does one collect information from a supervisor without revealing whether the injured worker has taken part and vice versa? In a recent study of workplace disability management processes (Busse et al. 2011), the research design included seeking information from workers on disability leave, their supervisors, the disability case manager and union representatives at the workplace. The recruitment process was designed to independently contact each of the relevant parties to invite participation and then to attach a unique case identification number to each party in order to collect the information anonymously via web-based survey, with the capacity to link information on the same case after data collection without knowing who the case was. This was a rather elaborate process, but it did protect confidentiality around choice to participate for all parties.

In qualitative research, care is taken to manage the identity of the participant, especially when others within a workplace might be able to identify a person, or if the participant has a senior position in an organisation that is readily identifiable (Anspach and Mizrachi 2006). Although rendering quotes and data anonymous can reduce the impact of data, because the readers are not informed of the uniquely rich and privileged source of the data, it is warranted because participants must be confident that their accounts cannot be used in any way that is detrimental to them. Therefore, they are provided with generic job titles and roles, such as 'workers' compensation staff' rather than vice president of a particular division, and quotes are edited (with changed sections transparent) to screen any names, places or specific activities that would reveal the identity of a participant. If relevant, the location of the research is also modified, providing only a geographic region rather than the name of a town or city. As a matter of course, pseudonyms replace actual names.

The identity of participants in qualitative research is often best protected by avoiding intermediaries altogether, but sometimes it is unavoidable as it is the only way to access participants. In these instances, 'oversampling' is necessary. That is, the intermediary is asked to provide a larger

than necessary sample, and the researchers then select a small number of participants from this sample without revealing to the participants or intermediary who else is involved in the study. During interviews, participants will often mention names and places that can compromise the identity of others. These are routinely replaced in interview transcripts by generic replacements, such as 'co-worker' or by the type of organisation being referred to.

Discretion and judgments are critical components of qualitative research, where information gathered is not standardised and revelations can yield unexpected problems, including corruption or severe emotional distress (Ferdinand et al. 2007). These events are anticipated, and procedures are put in place to manage such events. For instance, information sheets about how to find support and advice in relation to the topic at hand are provided. These protocols include decision-making processes around when to intervene, for instance, when a participant reveals suicidal thoughts (Wiles et al. 2007).

9.5.5 Interacting with Stakeholders

The variety of stakeholders in WDP research parallels the arenas of WDP and includes labour and health policymakers, compensation system and other insurers, employers, unions, health-care practitioners, workers—and in particular injured workers. This group covers a broad range of opinions and interests with different appetites and facilities for research.

Stakeholder interaction can enrich WDP research by helping to identify relevant topics that are also implementable. However, this interaction needs to proceed carefully, with the understanding that the research methods and design might be altered by stakeholder influence, when it is appropriate. However, if results are not favourable to a stakeholder, there may be pressure to modify or suppress the results. One way to manage this tension is to provide stakeholders with a period of time to consider the study results before they are made public. During this time, the researcher might offer to meet with the stakeholders to review the study, the findings and their implications. In this way, stakeholders are not caught unaware of research findings that might, for instance, attract media attention.

Earlier, we emphasised the need to balance being relevant to stakeholders to attract stakeholder involvement while still tackling issues of substance with respect to workplaces as a research setting. But researchers also need to recognise that what is relevant to stakeholders can change over time and be very much something in a moment in time. Researchers may have insights into topics of relevance that the other stakeholders do not see the importance of at the current time.

Stakeholders want definitive answers about problems or issues they are facing. On the other hand, researchers tend to be cautious about what can be declared based on any one study, often carefully wording their findings and delineating the conditions and limitations of the study. One methodological vehicle we have found useful for stakeholder interactions is the systematic review, where all available evidence on a topic or question is located, appraised and synthesised into key statements. Researchers are more confident to draw strong conclusions from a body of research work, and stakeholders get the types of evidence summary that are helpful to them. Recent advances in systematic review methodology accommodate the inclusion of a much broader range of evidence beyond the randomised controlled studies that were typically relied upon in earlier reviews. These advances benefit the WDP arena where strict application of traditional epidemiologic criteria and highly controlled studies like RCTs are neither desirable nor feasible for many of the issues that are most important. For instance, evidence from observational studies (Balshem et al. 2011; Egger et al. 2001; Furlan et al. 2008; Guyatt et al. 2011; Oxman et al. 2006; Shamliyan et al. 2010; Shrier et al. 2007; Thompson et al. 2011), qualitative studies (Barbour and Barbour 2003; Dixon-Woods et al. 2005; Greenhalgh et al. 2011; Popay et al. 1998; Ring et al. 2011; Thomas et al. 2004) and even grey literature (Coad et al. 2006; Dobbins et al. 2008; McAuley et al. 2000) are now included in

some systematic reviews. Recent systematic reviews of WDP issues have benefited from these methodological developments by appraising and synthesising a broad range of evidence (Clayton et al. 2012; Franche et al. 2005; MacEachen et al. 2006; Andersen et al. 2012; Bambra et al. 2008; Burstrom et al. 2011; Institute for Work and Health 2009).

Stakeholders and researchers often speak different languages—each with their own jargon and specialised technical language. Efforts must be made to allow effective communication. Underscoring key messages from research studies is one way to provide information about study findings to stakeholder audiences. But sometimes it is necessary to explain methodological concepts in order to get key points across. This can take time and effort, but it is well worth it to facilitate communication. The Institute for Work & Health, a research institute in Toronto, Canada, includes a column in their quarterly newsletter, At Work, called 'What researchers means by…'. Here methodological concepts are explained in language appropriate for a non-research audience. Recent examples have covered concepts such as probability (Institute for Work and Health 2010), sampling (Institute for Work and Health 2011a) and qualitative research (Institute for Work and Health 2011b). These columns are one way to introduce and educate the stakeholder community to the language, concepts and methods of the researcher.

9.6 Conclusion

The complexity of WDP presents challenges to researchers in this area, and we have briefly described some of those challenges here. The complexity of WDP motivates a transdisciplinary approach to WDP research, but working with a multidisciplinary team requires time and effort to develop a common understanding of issues, concepts and terminology. Different models of integrating across disciplinary perspectives and across methodological perspectives have been used to synthesise findings and draw out key messages.

We briefly described some research challenges particular to WDP research including the workplace as a research setting, reluctant respondents, multiple levels of influence and complex pathways, ethical conduct in research and interacting with stakeholders. This list of issues may leave the reader and hopeful researcher feeling discouraged, but with perseverance and ingenuity, and using some of the strategies suggested here, creative and relevant research in WDP can be conducted.

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Part III

Work Disability Determinants and Diagnosis

Individual-Level Psychosocial Factors and Work Disability Prevention

10

Ute Bültmann and Sandra Brouwer

Important factors to be carefully considered in work disability prevention are individual-level psychosocial factors. This chapter provides an overview of these factors and links them to theoretical models used in work disability prevention.

10.1 Definition and Overview of Individual-Level Psychosocial Factors

Individual-level psychosocial factors are important factors to measure in the prevention of work disability and the promotion of return to work (RTW). In Sects. 10.1.1 and 10.1.2, we provide a definition and an overview of individual-level (nonwork-related) psychosocial factors relevant for work disability prevention and RTW research and practice.

10.1.1 Definition of Individual-Level Psychosocial Factors

Individual-level psychosocial factors are defined as worker characteristics and concern psychological, social, and environmental factors that impact recovery and the progression of and recuperation from illness and disease (Waddell and Aylward 2010). Examples of individual-level psychosocial factors are unhelpful expectations about recovery, fears about pain or injury, distressed affect, and the workers' perception that the environment is not supportive. Psychosocial factors affect a worker psychologically or socially and may act as facilitators or barriers to a worker's rehabilitation and RTW. The primary individual-level psychosocial factors to consider in work disability prevention and RTW are summarized in Table 10.1.

It is important to note that individual-level psychosocial factors have to be distinguished from psychosocial workplace—or organizational factors (as described in detail in Chap. 11 on Workplace issues).

In the low back pain literature, psychological risk factors and social and environmental risk factors for prolonged disability and failure to RTW as a consequence of musculoskeletal symptoms are also known as "yellow flags," a term coined by Kendall et al. (1997). In occupational contexts, a distinction has been made between social/environmental risk factors, like the workers' perception that their workplace is stressful or not supportive, which were termed "blue flags." More observable characteristics of the workplace, the nature of work, and the insurance and compensation system were termed "black flags" (Nicholas et al. 2011; Main and Burton 2000). While we focus in this chapter on individual-level psychosocial factors, a certain overlap with

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_10,

Table 10.1 Individual-level psychosocial factors (see also Waddell 1998; Nicholas et al. 2011)

Attitudes and beliefs
• Attitude: positive or negative evaluation of situation, people, and activities, i.e., passive attitude to rehabilitation and unhelpful beliefs about pain
• Expectations/expectancies: expectation is what is considered the most likely to happen, e.g., expectations of poor treatment outcome and delayed return to work
• Self-efficacy: the belief that one is capable of performing in a certain manner to attain a certain set of goals
Behavior
• Fear avoidance: stems from several beliefs, i.e., pain is a sign of tissue damage and must be avoided to prevent further "harm," a belief that something is seriously wrong and that activity will make it worse; the pain must be gone before any exercise or return to work is attempted
• Coping: is the process of managing stressful circumstances
Emotional responses
• Distress: an aversive state in which a person is unable to adapt to stressors
• Anxiety: is a generalized mood that can occur without an identifiable triggering stimulus
• Depression: state of low mood and aversion to activity that can affect a person's thoughts, behavior, feelings, and physical well-being
Social support (perceived)
• Social support: feeling that one is cared for by and has assistance available from other people and that one is part of a supportive social network

work-related psychosocial factors (i.e., blue and black flags) cannot be excluded, in particular regarding attitudes and beliefs as well as perceived social support (see Chaps. 5 and 11).

10.1.2 Overview of the Literature on Individual-Level Psychosocial Factors for Work Disability and RTW

Most research to date on individual-level psychosocial factors and work disability and/or RTW has been conducted among individuals with musculoskeletal disorders. To provide an overview of the current knowledge about the role of these individual-level psychosocial factors in work disability and RTW in musculoskeletal disorders and other health conditions, relevant quantitative and qualitative reviews were selected. The reviews contained information about the current evidence base for individual-level psychosocial factors influencing work disability and/or RTW outcomes in individuals with musculoskeletal disorders/injuries, cancer, rheumatoid arthritis, mental health conditions, and cardiovascular disease (including stroke). It is important to note that the studies included in the reviews have used several individual-level psychosocial factors and just as many different instruments or tools to measure them. This observation can be explained by a lack of a common conceptual framework for these individual-level psychosocial factors. Therefore, the presented overview has to be read with caution, taking into account that comparisons of studies are often hindered due to the differences in the definition of individual-level psychosocial factors, the definition of outcome, and the study design and context. Table 10.2 provides an overview of the psychosocial factors associated with work disability and/or RTW examined for different health conditions.

10.2 Individual-Level Psychosocial Factors, Work Disability, and RTW in Musculoskeletal and Other Medical Conditions

In the past decade, many literature reviews have been published regarding (biopsychosocial) factors associated with sick leave, work disability, and RTW (e.g., Dekkers-Sanchez et al. 2008; Alexanderson and Norlund 2004), in particular among workers with musculoskeletal disorders (e.g., Laisne et al. 2012; Heitz et al. 2009; Hayden

Table 10.2 Literature reviews regarding psychosocial factors, work disability, and RTW in musculoskeletal disorders, cancer, rheumatoid arthritis, mental health, and cardiovascular disease (including stroke)

	Musculoskeletal disorders	Cancer	Rheumatoid arthritis	Mental health	Cardiovascular disease/ stroke
Attitudes and beliefs					
Attitudes and beliefs	Sullivan et al. (2005)	Tiedtke et al. (2010) Spelten et al. (2002) Feuerstein et al. (2010)	–	–	Mital (2004)
Expectations	Laisne et al. (2012) Iles et al. (2008) Sullivan et al. (2005)	Tiedtke et al. (2010) Taskila and Lindbohm (2007)	–	Cornelius (2011)	–
Self-efficacy	Laisne et al. (2012) Sullivan et al. (2005)	Spelten et al. (2002)	Allaire (2001)	–	–
Behavior					
Fear (avoidance)	Laisne et al. (2012) Iles et al. (2008)	Tiedtke et al. (2010)	–	–	Mital (2004)
Coping	Laisne et al. (2012) Hayden et al. (2009) Sullivan et al. (2005) Truchon and Fillion (2000)	de Boer and Frings-Dresen (2009) Spelten et al. (2002) Taskila and Lindbohm (2007) Tiedtke et al. (2010)	Backman (2004) De Croon (2004)	–	–
Emotional responses					
Distress	Laisne et al. (2012) Hayden et al. (2009) Iles et al. (2008) Steenstra et al. (2005) Crook et al. (2002) Truchon and Fillion (2000)	Feuerstein et al. (2010)	Backman (2004) De Croon et al. (2004)	–	–
Anxiety	Laisne et al. (2012) Iles et al. (2008)	–	–	–	–
Depression	Laisne et al. (2012) Iles et al. (2008) Steenstra et al. (2005)	Taskila and Lindbohm (2007)	De Croon (2004)	Cornelius (2011)	Mital (2004)

(continued)

Table 10.2 (continued)

	Musculoskeletal disorders	Cancer	Rheumatoid arthritis	Mental health	Cardiovascular disease/ stroke
Social support (perceived)					
Supervisor support		Amir and Brocky (2009) Feuerstein et al. (2010) Spelten et al. (2002) Taskila and Lindbohm (2007) Tiedtke et al. (2010)	Allaire (2001) Backman (2004) De Croon (2004)	Blank et al. (2008) Cornelius (2011)	Wolfenden and Grace (2009)
Coworker support	Hayden et al. (2009) (poor relations with colleagues)	Amir and Brocky (2009) de Boer and Frings-Dresen (2009) Feuerstein et al. (2010) Spelten et al. (2002) Taskila and Lindbohm (2007) Tiedtke et al. (2010)	Allaire (2001) Backman (2004) De Croon (2004)	Cornelius (2011)	–
(Family) support Social isolation	Laisne et al. (2012) Steenstra et al. (2005)	–	–	Lagerveld et al. (2010)	–

et al. 2009; Iles et al. 2008; Steenstra et al. 2005; Sullivan et al. 2005; Crook et al. 2002; Shaw et al. 2001; Truchon and Fillion 2000).

For other medical conditions, we found several relevant reviews addressing cancer (Amir and Brocky 2009; de Boer and Frings-Dresen 2009; Feuerstein et al. 2010; Spelten et al. 2002; Taskila and Lindbohm 2007; Tiedtke et al. 2010), rheumatoid arthritis (Allaire 2001; Backman 2004; de Croon et al. 2004), mental health conditions (Blank et al. 2008; Cornelius et al. 2011; Lagerveld et al. 2010), and cardiovascular disease, including stroke (Mital et al. 2004; Wolfenden and Grace 2009). In the following, we will briefly summarize the findings related to individual-level psychosocial factors for musculoskeletal disorders and other medical conditions (see Table 10.2 for overview).

10.2.1 Attitudes and Beliefs

Attitudes—In the reviews among cancer patients and cardiac event (Feuerstein et al. 2010; Spelten et al. 2002; Tiedtke et al. 2010; Mital et al. 2004), attitudes regarding work disability and RTW were mentioned. For example, work becomes less important to the women's lives after they receive a breast cancer diagnosis. A changing attitude to work is reflected by a reduced importance of work and a decrease in aspirations regarding work. Tiedtke et al. (2010) found that participants changed their perception of work. Cancer survivors felt that they valued work less than before, i.e., the relevance of work in their lives was reevaluated. These changes are negatively related to RTW (Maunsell et al. 1999). After a cardiac event, the patients' attitude toward work is an important factor for her/his RTW. If patients feel they have already worked enough during their lifetime, it is very likely that patients may not want to RTW (Mital et al. 2004). The preoperatively expressed desire to work again after surgery, in addition to an optimistic attitude with concrete plans for the future, correlated closely with RTW outcome, more than those of various clinical predictors (Boll et al. 1987).

Beliefs—The individual's beliefs about severity of the health condition were shown to be a significant predictor of RTW outcomes in musculoskeletal disorders (van der Giezen et al. 2000; Schultz et al. 2004).

Expectations, i.e., *recovery expectations*—Expectations were shown to be predictive of work participation and RTW outcomes as documented in two recent reviews on the association between biopsychosocial factors and work participation among workers with musculoskeletal disorders (Laisne et al. 2012) and in workers with non-chronic, non-specific low back pain (Iles et al. 2008). In an earlier review by Sullivan et al. (2005), low expectancies about the probability to RTW were associated with prolonged work disability (Schultz et al. 2004; Kaivanto et al. 1995; Lackner et al. 1996). Another recent review on factors associated with long-term sick leave in workers sick-listed for at least 6 weeks (Dekkers-Sanchez et al. 2008) identified the worker's negative expectation of RTW and the feeling of not being welcome back to work as being associated with long-term sick leave (Heijbel et al. 2006).

Expectations about work disability and RTW were also found in two reviews among cancer survivors (Tiedtke et al. 2010) and long-term disabled with mental health conditions (Cornelius et al. 2011). In female breast cancer survivors, Tiedtke et al. (2010) reported that women experienced recovery as a long process that might take years instead of months. Cornelius et al. (2011) found limited evidence that the absentees' expectations of a disability duration >3 months is associated with longer time to RTW in mental health conditions.

Self-efficacy—In relation to work disability and RTW, self-efficacy was only seldom addressed in the reviews on musculoskeletal disorders but has attracted increased attention in work disability prevention and RTW research in recent years. Sullivan et al. (2005) reported that lack of confidence in the ability to perform work-related activities has been associated with prolonged work disability (Schultz et al. 2004; Kaivanto et al. 1995; Lackner et al. 1996). Self-efficacy has also been examined in cancer (Spelten et al. 2002; Tiedtke et al. 2010) and

rheumatoid arthritis (Allaire 2001). Spelten et al. (2002) reported that some patients surviving cancer felt less confident about their physical ability in relation to their work or about their ability to cope with stress. Tiedtke et al. (2010) described that female breast cancer survivors felt less competent, particularly during the weeks before they returned to work, about their appearance, productivity, disappointing the employer, and job loss. After returning to work, the feeling of being less competent was experienced as if they were letting the company down; this was especially the case in smaller companies that struggled to cope with the extra workload during their absence (Maunsell et al. 2004). The review by Allaire (2001) on rheumatic diseases and work disability suggested that increasing self-confidence in ability to work improved the rate of employment.

10.2.2 Behavior

Fear avoidance (*beliefs*)—While the review by Laisne et al. (2012) reported inconclusive evidence for fear avoidance and work participation, however, moderate evidence has been reported by Iles et al. (2008) indicating that fear-avoidance beliefs are predictive of work outcome in the review. Fear avoidance was not addressed as a psychosocial factor for work disability or RTW in the included reviews on cancer, rheumatoid arthritis, mental health conditions, and cardiovascular disease.

Coping—Sullivan et al. (2005) reported that poor problem-solving abilities is associated with prolonged disability (Schultz et al. 2004; Kaivanto et al. 1995; Lackner et al. 1996). The review by Laisne et al. (2012) showed strong evidence for an association between coping and work disability outcome, but no association with work participation. For the most part, adverse or passive coping styles were predictive of a poor disability outcome. For some patients surviving the debilitating cancer treatment made them perceive themselves as stronger and more capable (Spelten et al. 2002). A Swedish intervention study by Berglund et al. (1994) was focused on improving coping skills; however, no effect on employment or sick leave duration was observed. In rheumatic diseases, work-disabled participants were found to more frequently report adverse coping styles (de Croon et al. 2004). Backman (2004) reported that higher educated patients may have better problem-solving skills which might be a preventive factor for work disability. Moreover, strategies to better manage fatigue, in and outside of the workplace, are an important part of preventing work loss in these patients (Backman 2004).

10.2.3 Emotional Responses

Distress—According to a review of systematic reviews, conducted by Hayden et al. (2009), increased psychological or psychosocial stress has been consistently reported as associated with poor outcomes in acute/subacute low back pain. Iles et al. (2008) found that distress was not predictive of failure to RTW, while Crook et al. (2002) identified psychological distress as an important prognostic factor for occupational disability following a low back injury. Feuerstein et al. (2010) reported that *distress* is one of the most prevalent symptoms in cancer survivors. In rheumatoid arthritis, work-disabled individuals were found to more frequently report emotional problems (de Croon et al. 2004).

10.2.4 Summary of the Literature Review

Several systematic reviews regarding individual-level psychosocial factors, work disability, and RTW outcomes have been conducted. It is important to note that our review of reviews is rather an overview than a rigorous meta-review of the literature and that the quality of the underlying systematic reviews varies to a large extent and has not been assessed (see article by Hayden et al. (2009) for prognostic low back pain research). While the majority of the systematic reviews pertained to musculoskeletal disorders, we also identified reviews for mental health conditions, cancer, rheumatoid arthritis, and cardiovascular disease (including stroke). In all, the most consistent finding is for individual-level psychosocial factors reflecting recovery expectations and coping, both in musculoskeletal disorders and other medical

conditions. It is interesting to note that when looking at other medical conditions, e.g., rheumatoid arthritis, most research is focused on disease or clinical factors and job characteristics. Studies addressing individual-level psychosocial factors are lacking. Dekkers-Sanchez et al. (2008) concluded in their review on factors for long-term sick leave among sick-listed workers that more research on prognostic factors, in particular nonmedical factors, is needed to develop appropriate interventions. Overall, more methodologically sound prognostic studies are needed—in different medical conditions—to investigate the role of these individual-level psychosocial factors in work disability management and the RTW process.

In the next section, we will briefly describe the predominantly used theoretical behavioral models and their application in work disability prevention and RTW research. We hope to help health-care professionals and other stakeholders to understand the mechanisms behind the individual-level psychosocial factors related to work disability and RTW.

10.3 Application of Theoretical Behavioral Models in Work Disability Prevention and RTW Research

RTW can be conceptualized as a complex human behavior change, with the employee taking the final decision to RTW (Franche and Krause 2002). Behavioral models can be used to understand the behavioral change construct and to investigate the determinants of RTW-related behavior among sick-listed workers. In the field of work disability prevention and RTW, several behavioral models have been introduced.

10.3.1 Theory of Planned Behavior Model

One of the most influential models of behavior change is the theory of planned behavior (TPB) (Ajzen 1991). The model is derived from the theory of reasoned action with an added component, i.e., perceived behavioral control. The model states that three components predict human behavior—attitudes, subjective/social norm, and perceived behavioral control—via the intention (including motivation) to perform a behavior (see Fig. 10.1). Attitude is defined as the positive and negative evaluation of the expected outcome of a certain behavior; subjective norm is defined as the belief about what others think of the behavior, as derived from the behavior and/or direct feedback of significant others; and perceived behavioral control is defined as the degree to which an individual believes that the behavior is under his or her control. Behavioral intention is considered as a mediating factor in the association between attitude, subjective norm, and perceived behavioral control on the one hand and behavior on the other hand. Perceived behavioral control is strongly related to the concept of self-efficacy, which is generally defined as confidence in being able to carry out a set of specified activities (Bandura 1977).

In the field of health promotion research, the TPB model is frequently used in the development and implementation of health promotion interventions (Hwu and Yu 2006). To date, only a few studies have applied the TPB (or the derived attitude-social influence-self-efficacy [ASE]) model in RTW research (Corbiere et al. 2011; Brouwer et al. 2009; van Oostrom et al. 2007). Brouwer et al. (2009) studied the predictive value of the three behavioral determinants (attitude, subjective norm, and self-efficacy) of the TPB model on RTW behavior. They found in a prospective, longitudinal cohort study among long-term sick-listed workers (>6 weeks sick leave) that work attitude, social support, and self-efficacy were significantly associated with a shorter time to RTW. This may provide suggestive evidence to address the behavioral determinants in the development of interventions focusing on RTW in employees on long-term sick leave.

Van Oostrom et al. (2007) developed an RTW intervention focusing on these behavioral determinants and the intention to RTW behavioral change. The authors used the ASE model (derived from the TPB model) as a theoretical framework in the development of a participatory work intervention for sick-listed employees with stress-related mental disorders. The results indicated no difference on the three behavioral determinants.

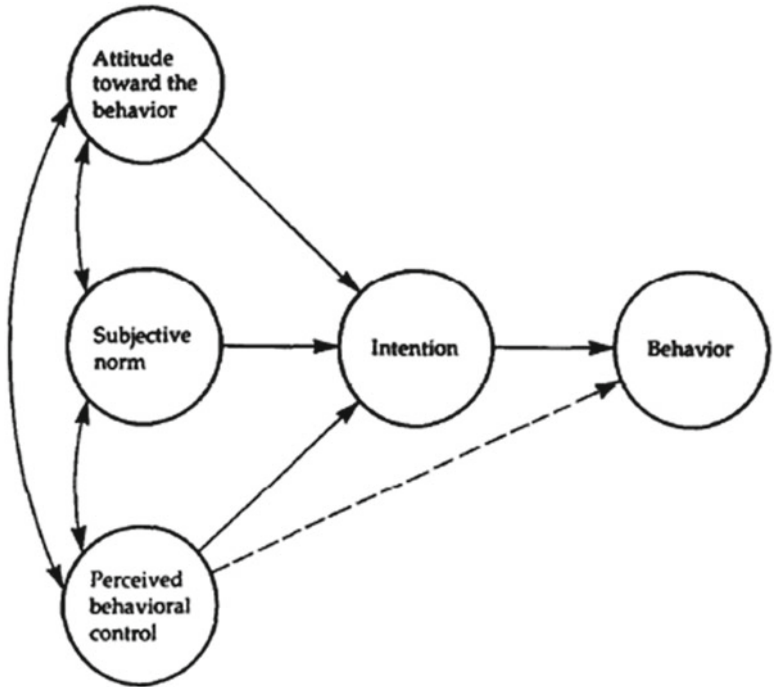

Fig. 10.1 Theory of planned behavior (Ajzen 1991)

However, they found a difference in RTW outcome between workers based on the importance of worker's intention to RTW (i.e., motivation). The authors concluded that workers without intentions to RTW despite symptoms may require a different treatment approach than employees who intend to RTW despite symptoms. The focus on RTW in the less-motivated group may be insufficient without adapting the motivation for working with symptoms. It is suggested that this group may need an (additional) intervention that aims at changing cognitions or motivation regarding RTW (e.g., cognitive behavioral interventions).

Recently, Corbiere et al. (2011) tested a conceptual model based on the TPB model to explain competitive job acquisition of people with severe mental disorders enrolled in supported employment programs. The authors examined the contribution of the TPB in a model extended by including clinical (e.g., severity of symptoms), psychosocial (e.g., self-esteem), and work-related (e.g., length of time absent from the workplace) variables as predictors of job acquisition. The authors concluded that the concepts found in the extended TPB model of work integration could be helpful for employment specialists to guide their interventions because most of the concepts are modifiable, such as perceived barriers to employment, self-esteem, and self-efficacy.

10.3.2 Phase Models of Disability and RTW

Four phase models will be presented: two phase models of disability and two phase models of RTW behavior.

10.3.2.1 Phase Models of Disability

The phase models of disability recognize the developmental character of disability: the 8-phase occupational disability model (Krause and Ragland 1994) and the three-phase model of low back pain (Frank et al. 1996).

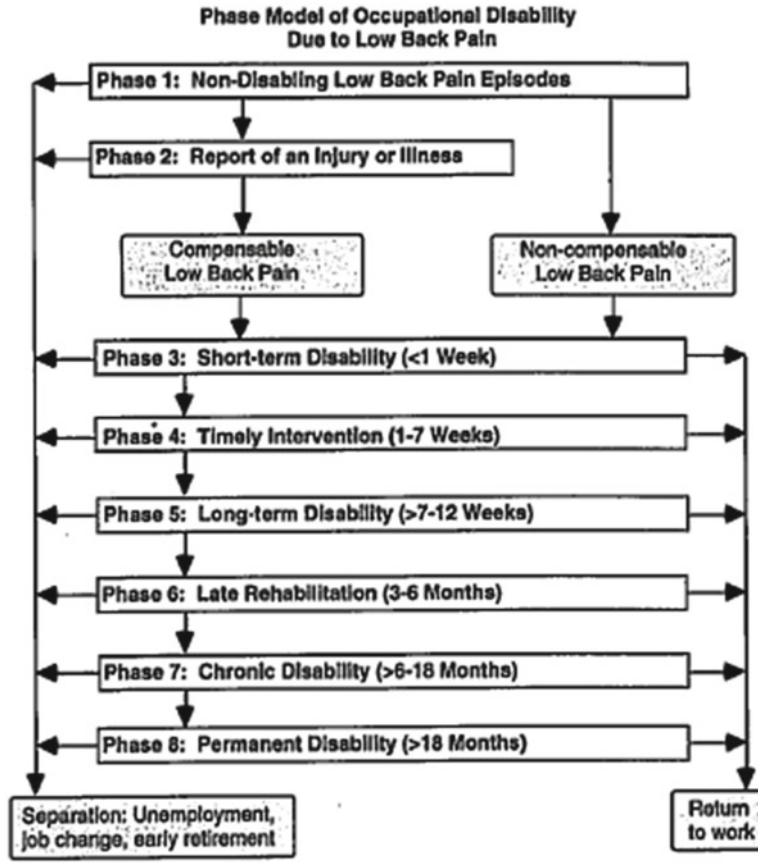

Fig. 10.2 The 8-phase model of occupational disability due to low back pain (Krause and Ragland 1994)

Both models describe temporal shifts in disability-related beliefs and behaviors, and both recognize the developmental character of disability. The 8-phase model of occupational disability (Krause and Ragland 1994) encompasses two pre-disability phases (the occurrence of symptoms and the formal report of an injury or illness) and six disability phases. The phases describe consecutive steps from the occurrence of nondisabling low back pain to the development of permanent work disability (see Fig. 10.2). This model has been developed to reflect the progression of occupational disability in low back pain other than purely biomedical classification of low back pain.

The three-phase model, Fig. 10.3, of low back pain (Frank et al. 1996) delineates three disease phases clinically defined by duration of low back pain. The phases are defined primarily by the presence and duration of work disability: the acute phase (up to 1 month off work), the subacute phase (up to 2–3 months), and the chronic phase of disability (more than 3 months). Both models emphasize the phase specificity of risk factors, i.e., that physical and injury factors are determining predictors of disability in the acute phase, whereas psychosocial factors have stronger predictive value in the subacute and chronic phases of disability (Krause et al. 2001; Dasinger et al. 2000). This statement has found extensive scientific support from other studies, that even though symptoms and diseases may originate from a health condition, the transition toward chronicity often depends on psychosocial factors (Laisne et al. 2012).

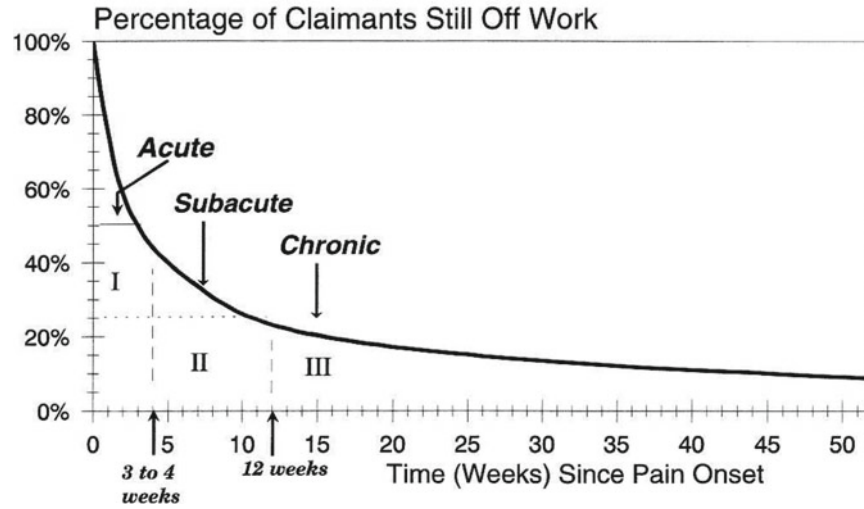

Fig. 10.3 The three-phase model of low back pain (Frank et al. 1996)

10.3.2.2 Phase Models of Return to Work

To understand the employee's decision-making and behavioral change processes regarding RTW, the individual can be conceptualized as progressing through stages of change. The readiness for change model (Prochaska and DiClemente 1992) and the readiness for return-to-work (RRTW) model (Franche and Krause 2002) are the two phase models of RTW.

The readiness for change model addresses the motivational factors contributing to and maintaining behavioral change. This model proposes that relative to a given behavior change, the readiness of individuals to change their behavior is categorized into the five stages (Prochaska and DiClemente 1992; Prochaska and DiClemente 1983): pre-contemplation (not intending to make changes), contemplation (considering a change), preparation, action (practicing new behavior), and maintenance (sustaining new behavior). Individuals will be in one of the five motivational stages, as determined by their self-efficacy, decisional balance, and change processes. The model has received empirical support relative to health behaviors, i.e., smoking cessation and substance abuse and addiction (Prochaska et al. 1994).

Franche and Krause (2002) developed the RRTW model. This model combines elements from above-described theories/models: the stages (Readiness) for change model and the phase model of occupational disability. The RRTW model allocates workers to one of the stages of change based on self-assessed readiness to resume work. The same five stages of change are distinguished: pre-contemplation, contemplation, preparation for action, action, and maintenance. Three dimensions of change determine each stage: individuals' decisional balance, self-efficacy, and change processes about RTW. Although the RRTW model has been not been validated yet, it has been demonstrated that RRTW assessments are useful to allow for an employee's individual staging of the recovery process within the broader framework of the occupational disability phases (Franche et al. 2007; O'Neill and Wolf 2010; de Rijk et al. 2009).

This RRTW model may provide more insight than the TPB model in the role and influence of behavioral determinants in a specific phase or stage of sick leave and may provide more appropriate intervention and/or management tools and measures for the RTW process of sick-listed employees.

10.4 Phase Specificity of Individual-Level Psychosocial Factors in Work Disability and Return to Work

It has been suggested (see Sect. 10.3.2) that the impact of risk factors may vary across different phases of the disablement process (short-term and long-term disabilities) (Krause and Ragland 1994; Krause et al. 2001; Dasinger et al. 2000). Truchon and Fillion (Truchon and Fillion 2000) stated that psychosocial factors may play a smaller role in acute episodes but that their impact increases with time to become major factors in chronic disability. In a recent review on biopsychosocial predictors of prognosis in musculoskeletal disorders, Laisne et al. (2012) found no strong evidence for a clear distinction between the types of predictors in the (sub)acute and chronic phases of pain and disability. The limited number of studies with subjects in the chronic phase of their condition made it impossible for these authors to establish strong levels of evidence for any psychosocial variable. In order to address the phases of disability and RTW behavior, longitudinal studies are needed that monitor all phases in the disability and RTW process—and not only examine a certain (limited) time window.

Besides that the impact of psychosocial factors on RTW outcome may differ over time, the strengths of associations between psychosocial factors and RTW behavior may also differ between health conditions. Yet, most studies addressing phase specificity are focusing on sick-listed workers with musculoskeletal disorders. The pattern of symptoms might be different for musculoskeletal conditions (which might remit within weeks), when compared to mental health conditions that might require a longer time to remit. In our study, we found significant differences in the impact of behavioral determinants as predictors for RTW behavior between somatic and mental health condition subgroups of long-term sick-listed workers (Brouwer et al. 2009). More research is needed to better understand the complex dynamics between psychosocial risk factors and work disability and RTW outcome, which may vary across different phases of the disablement process and different health conditions.

10.5 Future Perspectives on the Measurement of Psychosocial Factors and the Application of Theoretical Models in Practice

In this last section, we will address some challenges and avenues for future research and application to practice in work disability prevention and RTW. As mentioned before, several instruments to measure individual-level psychosocial factors have been developed. To date, the variety of instruments hinders a direct comparison of findings and strengthens the need for the development of a core set of individual-level psychosocial factors. Although sound instruments from a measurement properties perspective are available, the challenge is to select the factors most likely to assess the areas hypothesized to influence work disability prevention and RTW. Moreover, for several existing instruments, the measurement properties are still unknown and validation studies in different target populations are needed.

The question has also been raised as to whether the knowledge on individual-level psychosocial factors and theoretical (behavioral) models from the musculoskeletal literature can be translated to other diagnoses, such as mental health conditions and cancer. The answer is that it may be possible in some areas but not in others; more research in different diagnoses is needed to elucidate this question. As for the assessment of readiness for RTW, Franche et al. (2007) reported on the development and the initial psychometric properties of

Table 10.3 Future research considerations

• Psychosocial factors are important in the work disability/return to work process
• Time is an important factor/aspect when measuring psychosocial factors
• Take other diagnoses into consideration, and think about comorbidity
• Theoretical models have to be tested in different populations/contexts

an instrument. The authors validated the instrument by examining the concurrent validity in claimants with musculoskeletal disorders and suggested that the application of the readiness for change model to RTW is a relevant measure to work disability and RTW research. For instance, the instrument may facilitate the offer of stage-specific accommodations tailored to injured workers' needs and may be used for the evaluation of RTW interventions.

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Workplace Issues

11

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A seminal issue in workplace disability prevention is the need to carefully consider unique characteristics of work demands and the work environment. This chapter summarizes the evidence that workplace issues are a significant factor in work disability.

11.1 Historical and Theoretical Perspectives

Workplace issues are an important factor to assess in the prevention of long-term sickness absence and work disability, but workplace assessment methods have been developed from a number of stakeholder perspectives, disciplines, and theoretical orientations. Whether one is a worker encountering barriers to return to work (RTW), a practitioner making recommendations to facilitate RTW, or an employer/insurer looking to improve policies and procedures to reduce disability costs, the ability to carefully consider workplace barriers and facilitators is critical. In this section, we provide background information, both theoretical and historical, that has framed the existing knowledge base concerning workplace factors that influence disability, and the primary distinctions between these four assessment paradigms are summarized in Table 11.1.

11.1.1 The Disability Management Paradigm

One important driver of research in workplace disability has been the interest of employers, insurers, and social insurance systems to reduce costs by implementing more effective disability management strategies. Though most employers are well versed in traditional methods to eliminate safety hazards and reduce injury risks in the workplace, there has been a growing interest in reducing the impact of injuries and illnesses by tracking work absences, facilitating early RTW, and communicating more proactively with affected workers and their health-care providers. These strategies have been shown to reduce employer costs related to lost productivity, disability insurance payments, health insurance expenses, and costs of training and rehiring (Franche et al. 2005; Tompa et al. 2009), and this provides an important economic incentive for

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_11,

Table 11.1 Contrasting research paradigms that have contributed to knowledge of workplace factors impacting disability

Paradigm	Level of assessment	Key perspective	Implicit goal	Method of assessment	Sample factors
Disability management paradigm	Group level	Employer perspective	Reduce employer injury and disability costs	Review of corporate policies and practices	Modified duty program, proactive tracking, and communication
Ergonomics paradigm	Individual level	Human factors and environmental design perspective	Reduce workplace risk factors; improve worker safety and comfort	Observation, self-report of workers, instrumented measurement	Physical and psychosocial job demands; work organization
Workers' rights paradigm	Individual level	Worker perspective	Reduce stigma; increase accommodation and employer support	Worker interview	Supervisor and coworker support; perceived injustice
Occupational wellness paradigm	Group level	Societal perspective	Improve worker ability, fitness, and job satisfaction; reduce employer costs and increase wellness culture	Workforce survey	Work and family conflict; worksite health promotion; disease and symptom management

employers to improve disability management practices. For example, during the 1980s, studies in the United States showed lower rates of disability among companies with a higher degree of employee participation, greater use of conflict resolution and grievance mechanisms, early and supportive assistance to employees with chronic illness and injuries, proactive RTW programs, and greater safety diligence (Habeck et al. 1998; Tate et al. 1986). Other studies of organizational factors have focused on supervisor and coworker support, job modification efforts, and improved communication between employers and affected workers (Westmorland et al. 2005; Williams et al. 2007; Mustard et al. 2010). The disability management paradigm has focused attention on the assessment of organizational policies and practices of employers as a critical workplace issue in disability prevention.

11.1.2 The Ergonomics Paradigm

Another perspective that has influenced and informed the study of workplace factors in disability is *ergonomics*. Issues of work disability often centered on the match or mismatch between worker capabilities and physical or psychosocial work demands; thus, ergonomics has provided an important methodological framework for assessing workplace characteristics that interact with health limitations to produce disability. Of primary importance is the ability to use ergonomic principles to assess potential sources of discomfort or awkward postures that can be modified (Franche et al. 2005; Krause et al. 1998). Strenuous or physically demanding jobs may pose special challenges for workers recovering from musculoskeletal conditions, especially known risk factors such as manual materials handling, heavy physical loads, static work postures, repetition, force, cold, and vibration (Panel on Musculoskeletal Disorders and the Workplace, National Research Council 2001; Lotters and Burdorf 2006; Sim et al. 2006; van den Berg et al. 2009). There is evidence that job control, decision latitude, job stress, and other work organization factors are also important risk factors for musculoskeletal disability (Panel on Musculoskeletal Disorders and the Workplace, National Research Council 2001; Lotters and Burdorf 2006; Sim et al. 2006; van den Berg et al. 2009; Linton 2001; Bourgeois et al. 2006); thus, ergonomic evaluations should include attention to both physical and organizational aspects of the workplace. The ergonomics paradigm has focused attention on the assessment of job characteristics and functional capabilities of the worker as critical workplace issues in disability prevention.

11.1.3 The Workers' Rights Paradigm

One important sociopolitical influence behind the study of workplace factors is the recognition that individuals with physical and mental health disorders risk stigmatization, reduced opportunity, and lack of reasonable accommodation in the workplace (Braddock and Parish 2001). Thus, some research efforts have focused on reducing or preventing functional limitations through employer job modification, by providing assistive technologies, and by tailoring interventions to the needs of individual workers (Corbière et al. 2011; Roberts-Yates 2003; MacEachen et al. 2006, 2010). In the 1990s, many countries adopted specific legislation regarding disability rights (e.g., the 1990 *Americans with Disabilities Act (ADA)* in the United States and the 1995 *Disability Discrimination Act* in Britain), and in 1994, the *Standard Rules on the Equalization of Opportunities for Persons with Disabilities* was adopted by the United Nations General Assembly. These policies and legislative acts remain an important societal imperative to promote the greatest possible workplace participation by people with disabilities, and the workers' rights paradigm has focused attention on assessing possible job accommodations or assistive technologies as a critical workplace issue in disability prevention.

11.1.4 The Integrated Occupational Wellness Paradigm

One growing influence on research and practice relating to disability is the view that workplace programs, policies, and practices should result in

healthier, more productive employees if employers can simultaneously attend to issues of disease and injury prevention, health promotion, stress reduction, symptom management, and accommodations to age, family, and life stage (Cherniak et al. 2011). Many industrialized nations are experiencing a significant aging of the workforce with a greater number of chronic health conditions, and this has led some employers to embrace a more expanded view of workplace wellness beyond conventional safety and disability management practices (Anttonen and Paakkonen 2010). This new perspective is at the root of many novel occupational health and safety initiatives and integrated disability management programs. This paradigm suggests a greater interest in functional performance at work (not just absenteeism), a broader view of economic consequences (e.g., including medical costs), a prevention focus, and a concern for fitness and overall well-being, not just disease or injury (Cherniak et al. 2011). The integrated occupational wellness paradigm has focused attention on assessing worker attitudes, job characteristics, and coping strategies that enable a worker to manage transient or lingering symptoms at work.

11.2 Summary of Epidemiological Evidence

A growing number of prospective cohort studies, database analyses, organizational comparisons, and population-based surveys have evaluated the effects of workplace factors on the incidence, length, and cost of work absences due to physical and mental health conditions. Apart from workplace factors, there has been a similar level of interest in demographic variables, psychological factors, and clinical data that may also serve as important predictors of disability outcomes. It is sometimes difficult to draw a distinction between workplace and job-related psychological variables (e.g., job satisfaction). Nevertheless, we have included all observed and self-reported work-related variables in this chapter for discussion (See Chap. 10 for a more detailed discussion of psychosocial [nonwork-related] variables and their impact on disability.).

Given the large number of physical and mental health conditions that might pose functional limitations at work, it is beyond the scope of this chapter to provide an exhaustive summary of workplace issues for each medical condition separately. The conditions that have received the most study are musculoskeletal conditions, especially low back pain and upper extremity disorders, and work injuries in particular. Across medical conditions, there is a surprising level of similarity in the factors associated with disability outcomes, even between musculoskeletal and mental health disorders. In fact, some recent studies have begun to recognize workers at risk of sickness absence as a single population to be studied without stratification by medical condition (Vlasveld et al. 2012). In the following section, we provide a systematic review of the available literature summarizing workplace issues and their effects on disability.

11.2.1 Literature Review Methods

The scientific literature published between 1990 and the present was systematically searched. The primary sources of literature were from the electronic databases Medline, Cinahl, PsycINFO, Embase, and Proquest. The search strategy was developed in consultation with library and information scientists familiar with the use of electronic health databases. Each electronic database uses slightly different search terms and functions. The search strategy was developed and tested on Medline and then adapted for use with the other three databases. All databases were searched for the years 1990–2010. The Medline search strategy combined search terms focusing on (1) risk factors, (2) the workplace, and (3) work disability (including absenteeism or presenteeism). The full Medline search strategy is included as Appendix A. All citations identified by this search were entered into a bibliographic management software program, Endnote X5, and because there is overlap among the databases, duplicate entries were excluded.

All citations identified in the electronic search were screened for relevance using an a priori set of inclusionary and exclusionary criteria.

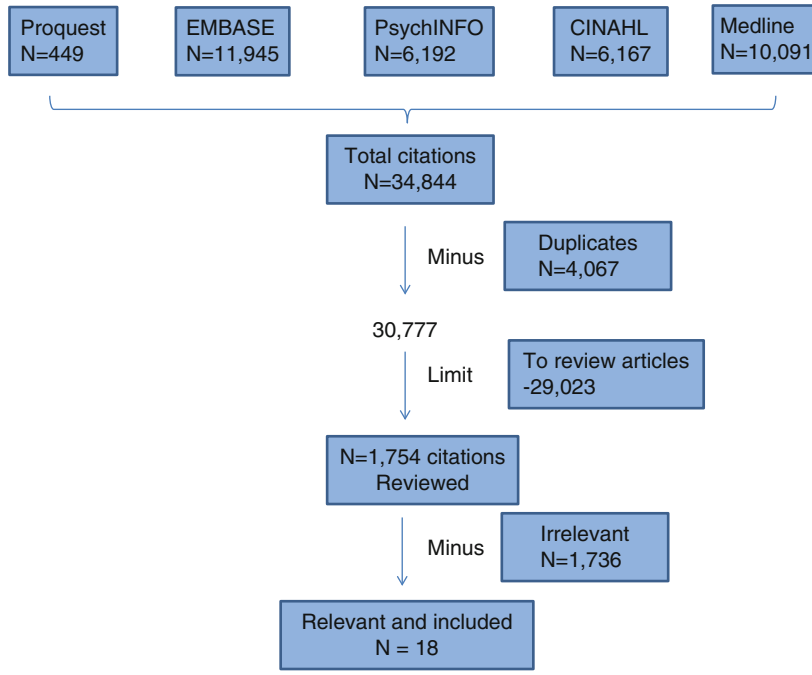

Fig. 11.1 Results of the literature search and review process

Inclusionary criteria were (1) published after 1990, (2) English language only, (3) peer-reviewed journals only, and (4) systematic and topical reviews or meta-analyses investigating the association between workplace issues and work disability, absenteeism, or presenteeism. Reviews of workplace interventions were excluded (see Chap. 21), and reviews focusing on personal and clinical factors that did not overlap with workplace concerns were also excluded. For the sake of convenience, and to align evidence across a number of medical conditions, we categorized workplace issues within four principal domains: (1) physical job demands, (2) psychosocial job demands, (3) work organization and support, and (4) worker beliefs and attitudes about their work.

A total of 34,844 citations were identified in the search of electronic databases. The results of the search are shown in Fig. 11.1. After compilation from all databases and removal of all duplicates, we were left with 30,777 citations. Limiting these to only systematic and topical reviews resulted in 1,754 citations. A title and abstract review left 77 literature review papers with potential relevance. No quality criteria were applied to the review methods employed by individual articles. A review of the 77 full-length articles led to 18 that met all inclusionary and exclusionary criteria. Four of these discussed workplace factors associated with disability after back pain (Crook et al. 2002; Hartvigsen et al. 2004; Shaw et al. 2001; Steenstra et al. 2005), two were associated with mental health issues (Blank et al. 2008; Cornelius et al. 2011), three in the general working population (Davey et al. 2009; Kuoppala et al. 2008; Allebeck and Mastekaasa 2004), two in cancer survivors (Feuerstein et al. 2010; Spelten et al. 2002), two after spinal cord injury (Lidal et al. 2007; Yasuda et al. 2002), two after stroke (Saeki 2000; Wozniak and Kittner 2002), one after heart transplant (Botsford 1995), one due to rheumatoid arthritis (Burton et al. 2006), and one due to respiratory ill health (Peters et al. 2007). Tables 11.2, 11.3, 11.4, and 11.5 show each of the factors identified in the 18 review articles by the four principal workplace domains, and the results for each of these domains are described in the following paragraphs.

Table 11.2 Evidence for job demand factors influencing work disability in 18 published reviews

		Review conclusions			
	Number of reviews	Increases disability	Decreases disability	No effect	Insufficient evidence
Physical job demands:					
Fast work pace	2	-	-	1 (50%)	1 (50%)
Self-reported high physical work	8	8 (100%)	-	-	-
Objective measure of physical work	2	1 (50%)	-	1 (50%)	-
Conflicting demands	1	-	-	1 (100%)	-
Driving for job	1	-	-	-	1 (100%)
Time pressure	1	-	-	1 (100%)	-
"Blue collar" vs. "white collar"	9	6 (67%)	-	2 (22%)	1 (11%)
Construction work (industry type)	3	1 (33%)	-	2 (67%)	-
Sitting and/or walking on the job	2	-	1 (50%)	-	1 (50%)
Awkward postures at work	1	-	-	-	1 (100%)
Job difficulty	2	-	-	1 (50%)	1 (50%)
Vibration	1	-	-	-	1 (100%)
Psychosocial job demands					
Lack of control	6	3 (50%)	-	2 (33%)	1 (17%)
Short job tenure (<2 years)	8	3 (38%)	-	3 (37%)	2 (25%)
High job stress	6	4 (66%)	-	1 (17%)	1 (17%)
High job demands	3	-	-	1	2
Attempted RTW	2	-	1 (50%)	-	1 (50%)
Distributive justice	1	-	-	-	1 (100%)
Role ambiguity	1	-	-	1 (100%)	-

Table 11.3 Evidence for work organization and support factors influencing work disability in 18 published reviews

		Review conclusions			
	Number of reviews	Increases disability	Decreases disability	No effect	Insufficient evidence
No medical benefits included in job	1	1 (100%)	-	-	-
Lack of modified (light) duty	7	4 (57%)	2 (29%)	-	1 (14%)
Social support	9	-	6 (67%)	1 (11%)	2 (22%)
Supervisor support	5	-	5 (100%)	-	-
Supervisor relational leadership	2	-	2 (100%)	-	-
Supervisor consultation with others	2	1 (50%)	-	1 (50%)	-
Supervisor communication	1	-	-	1 (100%)	-
Coworker support	3	-	3 (100%)	-	-
Influence on work conditions	1	-	-	1 (100%)	-
Job security	3	1 (33%)	-	1 (33%)	1 (34%)
Problems with colleagues	2	2 (100%)	-	-	-
Inability to take unscheduled breaks	3	1 (33%)	-	-	2 (67%)
Perceptions of poor coworker cohesion	3	2 (67%)	-	1 (33%)	-
Social isolation	2	2 (100%)	-	-	-
Large employer size	5	-	-	3 (60%)	2 (40%)
Working more than 8-h shifts	1	-	-	1 (100%)	-
Plant closures	2	1 (50%)	-	-	1 (50%)
Coaching from management	1	-	1 (100%)	-	-
Career opportunities within company	1	-	1 (100%)	-	-
Accessibility of workplace	3	-	3 (100%)	-	-
High staff turnover	1	1 (100%)	-	-	-
Overstaffing	1	1 (100%)	-	-	-
Social climate at work	1	1 (100%)	-	-	-
Vocational retraining	1	-	1 (100%)	-	-
Discretion over work hours	1	-	1 (100%)	-	-

Table 11.4 Evidence for worker beliefs and attitudes influencing work disability in 18 published reviews

		Review conclusions			
	Number of reviews	Increases disability	Decreases disability	No effect	Insufficient evidence
Job satisfaction	5	-	2 (40%)	1 (20%)	2 (40%)
Monotonous work	2	-	-	1 (50%)	1 (50%)
Emotional effort of work	1	-	-	-	1 (100%)
Negative feelings toward work	2	1 (50%)	-	-	1 (50%)
Negative feelings toward work	1	-	-	-	1 (100%)
Enthusiasm for work	1	-	-	-	1 (100%)
Enjoyment of work	1	-	-	-	1 (100%)
Low occupational pride	3	2 (67%)	-	-	1 (33%)
Trouble at work	1	1 (100%)	-	-	-
Lack of participation	2	-	-	-	2 (100%)
Lack of independence	1	-	-	-	1 (100%)
Belief that able to work	1	-	1 (100%)	-	-
Commitment to organization	1	-	1 (100%)	-	-
Intent to stay at current job/work	1	-	1 (100%)	-	-
Discrimination at work	1	-	-	1 (100%)	-

11.2.2 Physical Job Demands

Twelve variables related to physical job demands (Table 11.2) were studied in the 18 review articles. An overall assessment of high physical work demands (by self-report of the worker) was the single factor most frequently associated with increased disability. All eight reviews assessing self-reported physical work found it to be associated with increased disability (Shaw et al. 2001; Steenstra et al. 2005; Allebeck and Mastekaasa 2004; Spelten et al. 2002; Lidal et al. 2007; Yasuda et al. 2002; Saeki 2000; Burton et al. 2006). Six of the nine reviews comparing blue-collar and white-collar workers (as a proxy for high physical work demands) found blue-collar occupations to experience higher levels of work disability (Blank et al. 2008; Feuerstein et al. 2010; Spelten et al. 2002; Saeki 2000; Wozniak and Kittner 2002; Burton et al. 2006). Two reviews (Shaw et al. 2001; Steenstra et al. 2005) found no effect of blue- versus white-collar status and one reported insufficient evidence (Peters et al. 2007). Based on this evidence, it can be concluded that RTW is more difficult for those returning to more physically demanding jobs. The logical inference is that workers with more physical jobs have greater concerns about reinjury or exacerbation of pain or feel less able to make adequate job modifications, but there are no detailed studies investigating these potential explanations. Imposing physical job restrictions has been the primary method to counteract the negative effects of a highly physical job (Weir and Nielson 2001).

11.2.3 Psychosocial Job Demands

Seven variables related to psychosocial job demands (Table 11.2) were identified from the 18 review articles. Lack of job control (typically measured by a self-report questionnaire assessing decision latitude), short job tenure (typically <1 year), and high job stress (i.e., high psychological demands of work) were the most frequently examined psychosocial demands. Half of the reviews assessing lack of job control found it to be associated with increased disability (Crook et al. 2002; Allebeck and Mastekaasa 2004; Botsford 1995); however, two reviews (Hartvigsen et al. 2004; Davey et al. 2009) reported no effect of lack of job control and one reported insufficient evidence (Steenstra et al. 2005). Thus, the influence of job

Table 11.5 The evidence for workplace factors in back disability from four published reviews since 2001

	Crook et al. (2002)	Hartvigsen et al. (2004)	Shaw et al. (2001)	Steenstra et al. (2005)
Disability definition	Time to RTW, persistent disability or pain	Filing injury claim, duration of sick leave, disability pension	Duration of compensable sickness absence	Sick leave with duration of more than one day but less than six weeks
Physical job demands				
Fast work pace	-	0	-	IE
Self-reported high physical work	-	-	+	++
Objective measure of physical work	-	-	0	
Conflicting demands	-	0	-	
Driving for job	-	-	-	IE
Time pressure	-	0	-	
"Blue-collar" vs. "white-collar"	-	-	0	00
Construction work (industry type)	-	-	+	
Sitting and/or walking on the job	-	-	-	IE
Awkward postures at work	-	-	-	IE
Job difficulty	-	-	-	IE
Vibration	-	-	-	IE
Psychosocial job demands				
Lack of control	+	0	-	IE
Short job tenure (<2 years)	+	-	+	IE
High job stress	-	0	+	IE
High job demands	-	0	-	IE
Work organization and support				
Low salary	-	-	IE	0
Lack of modified (light) duty	+	-	IE	*
Social support	-	0	*	*
Supervisor support	-	-	-	*
Coworker support	-	-	-	*
Influence on work conditions	-	0	-	-
Job security	-	0	-	IE

Problems with colleagues	+	-	+	-
Inability to take unscheduled breaks	+	-	IE	IE
Worker perceptions of poor coworker cohesion	-	-	+	-
Social isolation	-	-	+	++
Large employer size	-	-	IE	00
Working more than 8-h shifts	-	-	-	00
Worker beliefs and attitudes				
Job satisfaction	*	IE	IE	00
Monotonous work	-	-	-	IE
Emotional effort of work	-	-	-	IE
Negative feelings toward work	-	IE	-	-
Enthusiasm for work	-	IE	-	-
Enjoyment of work	-	IE	-	-
Low occupational pride	-	IE	-	-
Trouble at work	-	-	+	-
Lack of participation	-	-	-	IE
Lack of independence	-	-	-	IE

Notes: Dash (-)=factor not examined in that review; IE=insufficient evidence; + indicates moderate evidence of increased disability; ++ indicates strong evidence of increased disability; * indicates moderate evidence of decreased disability; -- indicates strong evidence of decreased disability; 0=at least moderate evidence of no effect; 00=strong evidence of no effect

control on work disability may vary by setting, by occupation, or by the nature of medical conditions. Future studies might strive to understand the influence of job control at a more granular level to determine whether this is a problem with flexibility and leeway or whether this simply reflects a less supportive work environment in general. Short job tenure was assessed in eight reviews (Crook et al. 2002; Shaw et al. 2001; Steenstra et al. 2005; Davey et al. 2009; Lidal et al. 2007; Saeki 2000; Wozniak and Kittner 2002; Peters et al. 2007); three of these found an important association with increased disability (Crook et al. 2002; Shaw et al. 2001; Lidal et al. 2007), while another three found no effect (Saeki 2000; Wozniak and Kittner 2002; Peters et al. 2007). Two reviews reported insufficient evidence (Steenstra et al. 2005; Davey et al. 2009). Among cohort studies reporting more disability among new workers, this effect has been attributed to either a lack of training and experience necessary to overcome functional limitations or to a lack of supportive peer working relationships and employer investment (Shaw et al. 2009; MacKenzie et al. 2006). Four reviews found high job stress to be a predisposing factor to work disability (Shaw et al. 2001; Blank et al. 2008; Davey et al. 2009; Feuerstein et al. 2010). The Karasek demand–control model has been one of the dominant theories in occupational stress research (Jones and Bright 2001). This model suggests that workplace stress involves an interplay between the personal (psychological) demands of a job and the level of control (discretion, authority, or decision latitude) provided to the individual. In the context of work disability, both of these factors may be important, as physical and mental health disorders might reduce the capacity to endure job stress and also require necessary workplace adjustments and adaptations. Without sufficient decision latitude, the ability of workers to manage symptoms and functional limitations on the job may be greatly reduced.

11.2.4 Work Organization and Support

Eighteen review articles included a total of 25 variables related to work organization and support (Table 11.5). The most frequently assessed factor in this group was social support (Hartvigsen et al. 2004; Shaw et al. 2001; Steenstra et al. 2005; Blank et al. 2008; Allebeck and Mastekaasa 2004; Feuerstein et al. 2010; Spelten et al. 2002; Saeki 2000; Wozniak and Kittner 2002). Six of nine reviews found that social support decreased work disability (Shaw et al. 2001; Steenstra et al. 2005; Blank et al. 2008; Feuerstein et al. 2010; Spelten et al. 2002; Saeki 2000). A recent study developed a structural equation model of work disability in nurses and found that respect and social support from coworkers and supervisors was a key intermediate factor between workplace factors, including organizational support and worker health factors (Tamminga et al. 2012). This suggests that efforts to improve organizational support could be enhanced by focusing on increasing respect and support between coworkers and between supervisors and subordinates. Our findings also suggest that efforts to facilitate job modifications, increase supervisor support, supervisory leadership, and coworker support will decrease work disability.

Seven reviews reported on the association between disability and an employer offer of job modification (Crook et al. 2002; Shaw et al. 2001; Steenstra et al. 2005; Feuerstein et al. 2010; Lidal et al. 2007; Wozniak and Kittner 2002; Burton et al. 2006). Four reviews found that an employer offer of job modification decreased work disability (Crook et al. 2002; Feuerstein et al. 2010; Lidal et al. 2007; Wozniak and Kittner 2002). Two reviews found an opposite effect that providing modified duty increased work disability (Steenstra et al. 2005; Burton et al. 2006). One review found insufficient evidence for any association (Shaw et al. 2001). Though an employer offer of modified duty has been supported as an effective method to encourage early RTW for musculoskeletal disorders (Franche et al. 2005; Krause et al. 1998), it may be problematic for more chronic conditions, where a worker might find it difficult to transition back to regular duties. Large employer size was reported in five reviews (Shaw et al. 2001; Steenstra et al. 2005; Saeki 2000; Wozniak and Kittner 2002; Peters et al. 2007): three found no effect on work disability (Steenstra et al. 2005; Saeki 2000; Wozniak and

Kittner 2002) and two found insufficient evidence (Shaw et al. 2001; Peters et al. 2007). Physical accessibility of the workplace environment was included in three reviews, and all of them found greater accessibility to be associated with less work disability (Lidal et al. 2007; Yasuda et al. 2002; Saeki 2000).

11.2.5 Workplace Beliefs and Attitudes

A total of 15 variables related to workplace beliefs and attitudes (Table 11.5) were identified from the 18 review articles. The most hypothesized relationship was that a higher level of job satisfaction might increase the chances of an early RTW because the challenges of overcoming functional limitations would be offset by the intrinsic rewards of returning to a rewarding and satisfying job. The findings from two reviews supported this hypothesis (Crook et al. 2002; Davey et al. 2009); however, two reviews found insufficient evidence (Hartvigsen et al. 2004; Shaw et al. 2001) and one found no effect of job satisfaction on work disability (Steenstra et al. 2005). Other variables found predictive of increased disability in at least one review were negative feelings toward work (Spelten et al. 2002), low occupational pride (Spelten et al. 2002), and trouble at work (Shaw et al. 2001). Based on these results, we can conclude that the relationship of workplace beliefs and attitudes to work disability may be more complex than can be captured in a general assessment of job satisfaction. Future studies might focus on those aspects of job satisfaction that are most important to RTW efforts and whether improving job satisfaction might be incorporated in RTW planning goals.

11.3 Evidence of Workplace Issues by Study Population

Substantial overlap exists between the workplace factors that affect disability for a variety of health conditions; however, some workplace issues may have smaller or larger effects depending on the nature of the underlying medical problem. For example, heavy physical work may have more significant impacts for an individual with LBP than for someone recovering from an episode of depression, but there are few studies testing such condition-specific interactions in a single dataset. Topical and systematic reviews within different conditions may provide some opportunity for comparison. Tables 11.5, 11.6, 11.7, 11.8, and 11.9 show the resulting associations between workplace factors and work disability from our literature review when results are stratified by types of medical conditions.

11.3.1 Back Pain

Back pain has been the most popular area for the study of work disability. Four factors were found in at least two reviews to show moderate evidence of association with increased work disability (Table 11.5). These four factors were (1) self-reported high physical work (Allebeck and Mastekaasa 2004; Feuerstein et al. 2010), (2) less than 2 years job tenure (Davey et al. 2009; Allebeck and Mastekaasa 2004), (3) problems with colleagues (Crook et al. 2002; Shaw et al. 2001), and (4) social isolation (Shaw et al. 2001; Steenstra et al. 2005). Social support was found to be associated with decreased disability in two (Shaw et al. 2001; Steenstra et al. 2005) out of three reviews examining this factor (Hartvigsen et al. 2004; Shaw et al. 2001; Steenstra et al. 2005). One review found job satisfaction to decrease disability (Crook et al. 2002), one found no association (Steenstra et al. 2005), and two found insufficient evidence (Hartvigsen et al. 2004; Shaw et al. 2001). Overall, the evidence of workplace issues in back disability reflects a shared importance of physical, social, and organizational considerations (For more details, see Chap. 16).

11.3.2 Mental Health Problems

Mental health issues have become an increasingly important source of work disability.

Table 11.6 The evidence for workplace factors in mental health symptoms (2 published reviews)

	Published review articles	
	Blank et al. (2008)	Cornelius et al. (2011)
Work disability outcomes	Delayed RTW, long-term sickness absence, job loss	Long-term disability and RTW of sick listed individuals
Working population studied	Poor mental health	Mental health symptoms
Physical job demands		
Categorization of "blue-collar" vs. "white-collar"	+	-
Psychosocial job demands		
High job stress	+	-
Attempted RTW	*	0
Work organization and support		
Low SES	-	0
Social support	*	-
Supervisor support	*	*
Supervisor consultation with other professionals	+	0
Supervisor communication with employee	-	0
Job security	+	-
Plant closures	+	-

Notes: Dash (-) = factor not examined in that review; IE = insufficient evidence; + indicates moderate evidence of increased disability; ++ indicates strong evidence of increased disability; * indicates moderate evidence of decreased disability; -- indicates strong evidence of decreased disability; 0 = at least moderate evidence of no effect; 00 = strong evidence of no effect

Table 11.7 The evidence for workplace factors in disability of cancer survivors (2 reviews)

	Published review articles	
	Feuerstein et al. (2010)	Spelten et al. (2002)
Work disability outcome	RTW, work ability, work performance, and work retention	RTW
Working population studied	Cancer survivors	Cancer survivors
Physical job demands		
Self-reported high physical work	-	+
Blue vs. white collar	+	+
Construction work (industry type)	-	0
Psychosocial job demands		
High job stress	+	-
Work organization and support		
Lack of modified (light) duty	+	-
Social support	*	*
Coworker support	-	*
Social climate at work	+	-
Discretion over work hours	-	*
Workplace beliefs and attitudes		
Negative feelings toward work	-	+
Low occupational pride	-	+
Discrimination at work	-	0

Notes: Dash (-) = factor not examined in that review; IE = insufficient evidence; + indicates moderate evidence of increased disability; ++ indicates strong evidence of increased disability; * indicates moderate evidence of decreased disability; -- indicates strong evidence of decreased disability; 0 = at least moderate evidence of no effect; 00 = strong evidence of no effect

Table 11.8 The evidence for workplace factors in disability after spinal cord injury (2 reviews)

	Published review articles	
	Lidal et al. (2007)	Yasuda et al. (2002)
Disability definition	RTW	RTW
Working population studied	Spinal cord injury	Spinal cord injury
Physical job demands		
Self-reported high physical work	+	+
Psychosocial job demands		
Short job tenure (<2 years)	+	-
Work organization and support		
No medical benefits included in job	-	+
Lack of modified (light) duty	+	-
Worker perceptions of poor coworker cohesion	+	-
Accessibility of workplace	*	*
Vocational retraining	*	-
Workplace beliefs and attitudes		
Low occupational pride	-	+

Notes: Dash (-) = factor not examined in that review; IE = insufficient evidence; + indicates moderate evidence of increased disability; ++ indicates strong evidence of increased disability; * indicates moderate evidence of decreased disability; -- indicates strong evidence of decreased disability; 0 = at least moderate evidence of no effect; 00 = strong evidence of no effect

Table 11.9 The evidence for workplace factors in disability after stroke (2 reviews)

	Published review articles	
	Saeki (2000)	Wozniak and Kittner (2002)
Disability definition	RTW	RTW
Working population studied	Stroke	Stroke
Physical job demands		
Self-reported high physical work	+	-
Blue vs. white collar	+	+
Construction work (industry type)	-	0
Sitting and/or walking on the job	-	*
Psychosocial job demands		
Short job tenure (<2 years)	0	0
Work organization and support		
Lack of modified (light) duty	-	+
Social support	*	IE
Supervisor support	*	-
Large employer size	0	0
Accessibility of workplace	*	-

Notes: Dash (-) = factor not examined in that review; IE = insufficient evidence; + indicates moderate evidence of increased disability; ++ indicates strong evidence of increased disability; * indicates moderate evidence of decreased disability; -- indicates strong evidence of decreased disability; 0 = at least moderate evidence of no effect; 00 = strong evidence of no effect

However, our literature search found only two recent reviews (Blank et al. 2008; Cornelius et al. 2011) examining workplace factors specifically associated with work disability in this population (Table 11.6). The only factor consistently associated with work disability was supervisor support. Increased supervisor support was associated with decreased work disability in both reviews (Blank et al. 2008; Cornelius et al. 2011). Thus, assessing supervisory support may be an especially

critical element in RTW planning efforts for workers with mental health disorders. (For more details, see Chap. 17).

11.3.3 Cancer Survivors

As cancer treatments improve and there are more working age adults who are cancer survivors, researchers have begun to focus attention on the workplace issues that influence the ability of workers to resume normal work after undergoing a course of cancer treatment. Two reviews focusing on cancer survivors found that blue-collar cancer survivors were less likely to RTW than white-collar cancer survivors (Table 11.7) (Feuerstein et al. 2010; Spelten et al. 2002); however, it's unclear whether this effect is due to higher physical demands or whether other confounding factors might explain these differences (e.g., differences in job control, job satisfaction, retirement income, or disability benefits). Social support was also found to decrease the likelihood of work disability in both reviews (Feuerstein et al. 2010; Spelten et al. 2002). Based on review results, assessment of workplace issues for cancer survivors should include attention to the type of occupational setting and level of workplace social support for coping with fatigue, stigma, poor concentration, and other problems reported by working cancer survivors (Tamminga et al. 2012) (For more details, see Chap. 18, Sect. 18.3).

11.3.4 Spinal Cord Injury

Table 11.8 highlights the workplace factors associated with work disability in individuals who have suffered a spinal cord injury. Though the degree of physical impairment can vary depending on the level of injury on the spinal column, work disability outcomes have varied, even among those with very similar diagnoses and neurological deficits (Murphy and Young 2005; Young and Murphy 2009). High physical job demands were associated with increased disability in our review of the literature (Lidal et al. 2007; Yasuda et al. 2002) but also the physical accessibility of the workplace (Lidal et al. 2007; Yasuda et al. 2002). Physical accessibility is obviously an important factor if workers require a wheelchair or other assistive device to move about the workplace or to manipulate products or operate equipment. For severe injuries requiring extensive use of assistive technologies and significant changes to the workplace environment, a very detailed assessment of work setting and tasks may be necessary to identify workplace barriers that can be feasibly overcome using innovative work methods and technologies.

11.3.5 Stroke

Two reviews examined workplace factors associated with work disability after stroke (Table 11.9) (Saeki 2000; Wozniak and Kittner 2002). Blue-collar workers were found in both reviews to be less likely to RTW after a stroke (Saeki 2000; Wozniak and Kittner 2002). Short job tenure (less than 2 years) and large employer size were found in both reviews to have no effect on work disability after stroke (Saeki 2000; Wozniak and Kittner 2002). As in the case of cancer survivors, it's unclear whether the poorer disability outcomes among blue-collar stroke sufferers are due to higher physical demands or whether other confounding factors might explain these differences.

11.4 Available Methods to Assess Workplace Issues

Despite the substantial evidence that workplace issues contribute to disability outcomes, efforts to involve clinicians in identifying and addressing workplace concerns have met with some difficulty. Understanding the idiosyncratic demands and organizational context for every patient risking disability may seem a daunting task for clinicians and often outside their training, expertise, and existing practice framework. However, a number of methodologies have been studied or explored to assess workplace concerns. One method is to routinely screen

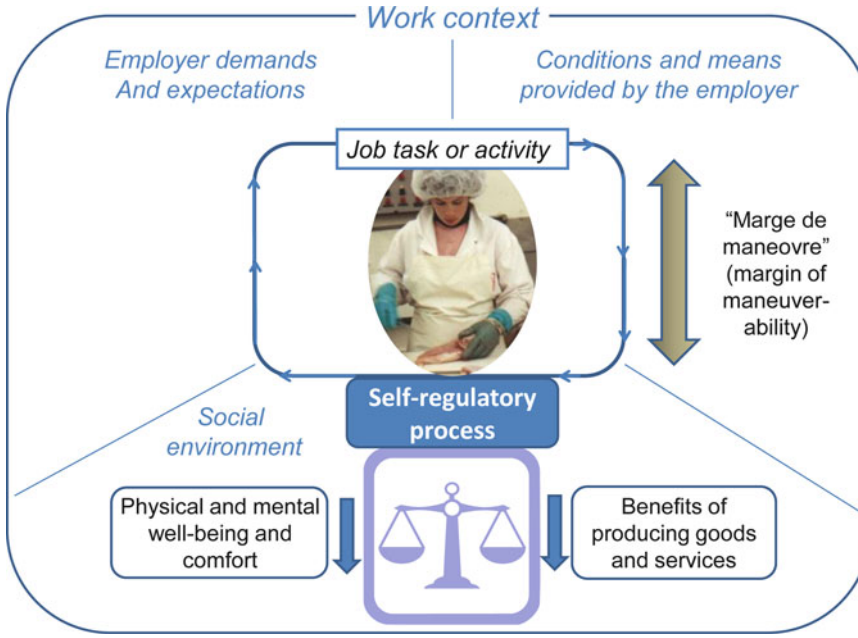

Fig. 11.2 A conceptual model describing the multiple influences of workplace issues on work disability

patients (usually by administering a brief, one-page questionnaire) to identify those patients for whom workplace concerns (or other psychosocial issues) might be significant barriers to RTW (Shaw et al. 2009, 2011; Daniels et al. 2005; Hill et al. 2010; Brouwer et al. 2011; Martus et al. 2010; Marhold et al. 2002). A second method is to give more prominence to workplace issues in patient discussions, medical history taking, ongoing treatment, and RTW planning, sometimes with the help of a semi-structured interview guide or other communication tool (Durand et al. 2002). Other assessment strategies include the use of comprehensive ergonomic evaluations (usually involving multiple assessment domains and interactions) and/or worksite meetings intended to improve workplace coordination and problem-solving efforts to facilitate RTW. Depending on the individual case characteristics, one or more of these assessment strategies may have a significant impact on job accommodation efforts and may improve the ability to achieve a safe and sustainable RTW. Chapter 15 provides more details concerning specific assessment instruments and protocols that can be used to assess workplace issues.

11.5 Integrating Evidence on Workplace Issues: A Unifying Conceptual Model

One challenge in synthesizing the evidence of workplace issues in work disability is that the findings suggest fairly complex interrelationships between worker behavior, employer practices, and the unique circumstances of the work environment that can enable affected workers to stay at work or RTW safely. Figure 11.2 provides a conceptual framework for relating the multiple workplace issues influencing disability. This model incorporates elements from the Theory of Human Occupation (Lee and Kielhofner 2010) and is based on methods of work activity analysis developed by ergonomists (Guérin et al. 2007; Vézina 2001; St-Vincent et al. 2011) and adapted by Durand and colleagues for return-to-work (Durand et al. 2011). The conceptual framework contains five principal ideas: (1) job tasks or activities involve self-regulatory and worker-centered processes, (2) job tasks vary with regard to the characteristics of the person

and her capacity to modify or control job tasks, (3) employer demands and expectations, (4) conditions and means provided by the employer, and (5) social context involving communication and mutual support and cooperation. These five principals help to explain why such a diverse array of workplace variables might factor into a worker's ability to overcome health decrements and maintain productivity. We describe each of the five ideas in more detail below and relate them to the evidence base concerning workplace issues in disability outcomes.

11.5.1 Work as a Self-Regulatory Process

Workers are in a continual process of self-regulation while carrying out job tasks, as completing work requires a constant interaction with the work environment. A worker positions his or herself in space and carries out work movements, making necessary adaptations and adjustments. Other adjustments have to be made if a coworker is absent, if it is a new product, if the tool is used, etc. Decisions about how to realize work activity strive to maintain equilibrium between the benefits of producing goods and services and the benefits of physical and mental well-being and comfort. Thus, the worker provides a critical perspective for understanding physical and organizational demands, and no assessment of workplace issues is complete without self-report information from the affected worker, his or her perception of problematic or troublesome tasks and activities, and how he or she manages to maintain this task equilibrium under different circumstances. The importance of individual-level worker assessments is reflected, for example, in reviews that have shown individual perceptions of physical demands to be better predictors of disability outcomes than more objective measurements or ratings. It also demonstrates the interest of analyzing a person's work activity to properly understand the challenge of her returning to work.

Individual differences in work habits have led to the recommendation that job modifications should be developed using participatory methods involving both workers and supervisors (for more details, we refer to Chap. 21 on workplace interventions). Work style, pacing, reach, tool use, posture, and batching are all elements of job tasks that may vary between workers performing the same job and producing the same goods and services. Self-regulatory work processes are evident among some of the variables associated with RTW outcomes, for example, self-reported job style, perceived physical demands (over objective measurements), and job control.

11.5.2 Work Tasks and Margin of Maneuver

Another aspect of work that is closely related to this self-regulatory process is the degree to which workers can vary job tasks to work more comfortably, tailor their work activities to meet unique strengths and limitations, or accommodate a pain problem or physical limitation. Terms that have been used to describe this aspect of the workplace include "marge de manoeuvre" (French), margin of maneuver, leeway, flexibility, decision latitude, and cushion (Durand et al. 2011; Hultin et al. 2010; Tveito et al. 2010). All workers take advantage of available cushion to perform job tasks comfortably, reliably, and efficiently. When the level of cushioning is not sufficient, it may no longer be possible for the worker to maintain an equilibrium, and this may have negative consequences on health or comfort, or alternately reduce productivity (Hultin et al. 2010). The concept of margin of maneuver is wide as it includes the relation between the characteristics and capacity of the person and the characteristics of the work context (including job demands, conditions and means, and social environment). A person with a physical limitation has less margin of maneuver to start with, but if the work context gives her more leeway, she might find the way to adapt the work for herself. Sometimes, her margin of maneuver can be reduced even if the employer gives her more flexibility if coworkers do not accept the person to use the unique tool that facilitates the

work or the permission to stop working sooner. In some cases, disability prevention efforts can be focused on providing workers more leeway or flexibility in the way that they perform job tasks on a temporary, if not permanent, basis. In addition to the assessment of awkward postures and heavy physical demands, assessment of workplace concerns should always include an assessment of leeway or flexibility afforded by various work tasks, and whether this level of cushioning might be increased in some way. Healthy workers who begin to report musculoskeletal symptoms, job stress, or job dissatisfaction may be signaling a lack of cushion to maintain a healthy equilibrium between productivity and health. Job redesign or alteration may help to restore this equilibrium (Durand et al. 2007, 2009). This phenomenon is evident in factors like job control, job stress, and job modification as important workplace issues impacting disability.

11.5.3 The Influence of Employer Demands and Expectations and Job Tasks or Activities

Most jobs require some level of physical activity, whether this involves the usual physical workload (e.g., awkward postures, high physical exertion, manual materials handling, repetitive motions, heavy loads, extended reach) or other aspects of work that might not be perceived as involving heavy loads (e.g., standing or sitting for prolonged periods, monotonous tasks) or involving mental loads (having to be affable with customers, time pressures). The most physical types of jobs (e.g., construction, nursing) are often associated with longer disability duration, but the mean differences between blue-collar and white-collar workers are not as large as one might expect.

Some expectations of employers, like the quality or quantity of work and production quotas as well as some conditions and means or characteristics of the social environment of the work context, can pose challenges to workers with health conditions. These include time spent training and mentoring, career advancement, overtime efforts, organizational contributions, innovation of new methods, and coworker support. Though regulatory guidelines and industry standards exist to minimize risks of injury and illness at the population level, there is a high level of variation between the strength, endurance, and fitness characteristics of individual workers. While employers may strive to match workers to jobs that meet their levels of physical fitness, work-related musculoskeletal symptoms and other negative health effects can still occur, and front-line supervisors should be well-trained to deal with these problems, both formally (e.g., encouraging injury reports and facilitating job modifications) and informally (e.g., communicating support and reassurance, clarifying job leeway) (Tremblay-Boudrault et al. 2011). This influence is evident in factors like time pressures, the inability to take scheduled breaks, and problems with colleagues as important workplace issues impacting disability.

11.5.4 The Influence of Various Conditions and Means Provided by the Employer

Given that regular work involves physical and psychosocial demands that may sometimes exceed a worker's capacities or provide insufficient margins of maneuverability, employers have various policies and practices intended to provide either a temporary or permanent remedy. An employer might establish an ad hoc safety committee to address ergonomic risk factors, provide worksite health and wellness programs to improve workforce fitness, and develop an alternate duty program to provide a continuing source of job modification opportunities. All of these efforts contribute to safety climate, wellness orientation, and operational optimism that define an individual worksite. Evidence of this influence in the work disability literature can be found in variables such as high staff turnover, lack of medical benefits, poor job security, recent

plant closures, lack of modified duty options, lack of career opportunities or mentoring, and overstaffing.

11.5.5 The Social Environment

Although a growing number of workers are lone workers (e.g., working from home, on the road, or from a remote location), most jobs involve some sort of interaction with other individuals. These individuals may be coworkers and supervisors, clients or customers, vendors or suppliers, or the public at large. Even in the case of desk jobs, extensive communication can occur by e-mail or telephone. Thus, the workplace provides a type of social environment, each with its own safety and wellness culture. In the context of a health condition or physical impairment leading to work disability, social support and encouragement from the workplace may be extremely important, especially a worker's perceptions of reassurance and support from their immediate supervisor and coworkers. Evidence of these effects in the work disability literature is supported by variables such as supervisor and coworker support, poor social climate, problems with colleagues, social isolation, and being new on the job. The evidence suggests that a worker who has spent years developing strong personal ties and close working relationships is in a much better position to negotiate help from colleagues and temporary forms of job modification.

11.5.6 Conclusion

In summary, many workplace issues have been shown to affect RTW and other disability outcomes. Study variables assessing workplace issues have covered four principal domains: physical demands, psychosocial demands, work organization and support, and worker beliefs and attitudes. Though workplace issues are fairly well studied for musculoskeletal conditions, the evidence of workplace issues for other conditions (e.g., stroke, cancer, mental disorders) is still developing. Overall, the most consistent evidence is for variables describing self-reported physical demands, job stress and control, social support, ability to modify work, workplace accessibility, and the safety and wellness culture of employer organizations.

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Public Insurance Systems: A Comparison of Cause-Based and Disability-Based Income Support Systems

12

Katherine Lippel and Freek Lötters

A comparison of cause-based and disability-based income support systems is made in this chapter.

12.1 Introduction

This chapter examines regulatory design of compensation systems in order to facilitate understanding of ways in which sociopolitical and economic contexts can colour the return-to-work process and drive behaviour of employers, workers and compensation systems. It has become increasingly clear that system effects influence the return-to-work process (Soklaridis et al. 2010), and research has shown that system design can facilitate or compromise return-to-work outcomes (Anema et al. 2009; Anema et al., Chap. 22 in this book).

The first social policies providing support for people unable to work because of illness or injury emerged in what are now OECD (Organisation for Economic Co-operation and Development) countries in the late nineteenth and early twentieth centuries. These were promoted by Bismarck in Germany to ensure a minimum safety net to breadwinners injured at work. It soon became apparent that sickness insurance was also of importance to maintain a productive workforce, and sickness insurance schemes gradually emerged, although the existence and scope of those schemes varies considerably from one country to the next. In 2011, mandatory public sickness insurance that provides wage replacement in the event of illness is either not available or very minimal in some OECD countries, like Canada, Australia and the United States, while others, like Sweden, the Netherlands, France and Italy, provide considerable coverage to the work disabled, either through a public scheme or by requiring that employers provide such coverage.

In thinking about these issues in your own jurisdiction, a certain number of parameters need to be considered. Cross-cutting considerations that are not covered in detail in this chapter include determination as to whether the existing systems are governed by public institutions or private insurance providers (European Agency for Safety and Health at Work 2010) and whether they have an impact on claimants' right to sue those responsible for their illness. Schemes that deny this right are commonly referred to as no-fault schemes.

In many countries, systems provide support to those who are actively engaged in the formal labour force, while leaving those working in the informal sector (Benach et al. 2007; Santana et al. 1997), or the self-employed, largely

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_12,

unsupported (Vosko 2010). This question is of increasing importance not only in countries like Brazil that have a large informal sector but also in OECD countries where precarious employment including self-employment is increasing. Furthermore, strong publicly mandated programmes that distinguish between the rights of temporary workers and those of the regular workforce, and the obligations of employers with regard to these categories of workers, may drive precarious employment by encouraging employers to resort to temporary workers in order to avoid obligations (Organisation for Economic Co-operation and Development 2008), thus transferring the cost of disability support for temporary workers to the public system or to the individual workers and their families.

The scope of this chapter includes public compensation systems and the legal issues that frame their implementation. Unless explicitly mandated by legislated compensation systems, we do not address the important issue of private insurance, including short- and long-term disability insurance voluntarily provided by the employer. The role of private insurers is also of great importance in the work disability prevention (WDP) paradigm; however, their role is not necessarily driven by public policy and the study of their behaviour and practices requires different methods than those used in this chapter.

The content of this chapter is based on a review of the literature on systems as well as classic legal methodology that examines laws, regulations and their application in different jurisdictions around the world. It is also informed by the expertise of the authors, who have extensive experience with disability compensation systems in a variety of countries. It is impossible to provide a comprehensive description of all compensation systems in all countries. Nor is it possible to provide complete details of any given system in an article that aims to provide an overview. We have chosen illustrations from eight OECD countries. Examples illustrating the functioning of cause-based systems are drawn from Australia, Canada, the United States and New Zealand. Examples illustrating disability insurance systems are drawn from France, Italy, Sweden and the Netherlands. For those interested in the details specific to each national programme, excellent resources are available in the European Union's Information System on Social Protection (MISSOC 2011a) and on Canadian (Association of Workers' Compensation Boards of Canada (AWCBC) 2011), American (Workers' Compensation Research Group) and Australian (Safe Work Australia 2011) systems.

The chapter is divided in two parts. We first examine cause-based systems, including workers' compensation, automobile insurance, crime victims insurance and the New Zealand no-fault accident compensation scheme. We then turn to disability insurance systems that provide coverage and support regardless of the cause of the injury or disease.

12.2 Part 1: Cause-Based Systems

Many disability insurance systems provide coverage for injury or illness only if they are attributable to a specific cause, and as a result it becomes necessary for the claimant to demonstrate causation to access benefits, including, when available, support for return to work. These systems are particularly common in Anglo-Saxon jurisdictions, although vestiges of cause-based systems still exist elsewhere.

12.2.1 Types of Cause-Based Systems

Perhaps the most universal cause-based compensation systems are those designed to compensate for injury or illness attributable to work (Ison 1998), usually known as workers' compensation systems. These systems have existed, notably, in North America and Australia since the early twentieth century and were modelled on European systems first promoted by Bismarck in the nineteenth century. Contrary to other disability insurance systems, workers' compensation systems have been the object of international law and governed by International Labour Organization (ILO) conventions since the early

twentieth century.[1] These conventions have had an influence in the development of social security/workers' compensation legislation throughout the world, as have ILO conventions on medical care and sickness benefits.[2] These international conventions circumscribe minimum levels of protection that must be complied with by countries bound by the convention, as well as determining coverage of occupational disease. The existence of these conventions has served to ensure, to a certain extent, a decent level of protection for those who are injured or who become ill at work. They have also justified maintaining adequate levels of compensation in disability insurance systems that are not based exclusively on evidence of a work injury, in those jurisdictions, like New Zealand (Campbell 1996) and the Netherlands (Pennings 2002) where work-related injury is compensated through the general disability insurance system. Here we will focus primarily on workers' compensation systems but will then examine other programmes that provide some form of disability insurance for injuries attributable to specific causes other than work. It is important to note that each system in each jurisdiction (there are 63 jurisdictions in North America alone (Block and Roberts 2000)) has its own rules and characteristics, so it is very difficult to make any general statements about workers' compensation systems in a given country, let alone in a variety of countries.

[1] ILO Convention No. C017 on Workmen's Compensation (Accidents) and C018 on Workmen's Compensation (Occupational Diseases), both adopted in 1925, have been ratified, respectively, by 71 and 60 countries, although neither the United States nor Canada has ratified these conventions. The conventions were revised by convention C121, the Employment Injury Benefits Convention, 1964, http://www.ilo.org/ilolex/english/newratframeE.htm.

[2] ILO Convention C130, Medical Care and Sickness Benefits Convention, 1969, http://www.ilo.org/ilolex/english/newratframeE.htm. Fifteen countries, including several European and Latin American countries, have ratified this convention, although neither Canada nor the United States is among them. The Canadian sickness insurance system (Employment Insurance) would not meet the exigencies of this convention, which require economic support for the sick for at least 52 weeks at a minimum of 60% of the worker's salary.

12.2.1.1 Workers' Compensation Systems

Every American state (Workers' Compensation Research Group 2011), every Australian state (Purse et al. 2007; Safe Work Australia 2011) and every Canadian province and territory (Association of Workers' Compensation Boards of Canada (AWCBC) 2011) have some form of workers' compensation legislation, and all of these systems are modelled on similar premises, although the types of medical conditions covered and the nature and level of benefits could vary from one jurisdiction to the next. In North America, these basic principles include a common underpinning, often described as 'the historic compromise': the system is funded exclusively by employers, and in exchange, employers receive protection from lawsuits that could otherwise be brought by employees on the basis of tort law. As part of that compromise, compensation is available to those who are injured or made ill at work regardless of fault (hence the designation as 'no-fault' systems). Bismarck's original nineteenth-century model was predicated on the importance of promoting social harmony between workers and their employers, at a time when political mobilisation was perceived as a potential threat to industry (Clayton 2003; Lippel 1986). In English-speaking Canada, it is the Meredith principles that are cited as the underpinnings of workers' compensation (Clayton 2003), while in French Canada, the historic origins can be traced to French legislation of the nineteenth century (Lippel 1986). The 'historic compromise' that underpins these systems has often been forgotten in the twenty-first century, but recalling this transaction is important in understanding why workers' compensation systems are often more generous than other disability insurance programmes that provide minimalist benefits to people with disabilities. It is also important when trying to understand why employers should not be perceived as the only 'clients' of workers' compensation systems, even if they finance those systems. Workers finance the systems indirectly because their historic right to full compensation for injury caused by the fault of the employer has been traded for access to a reduced level of benefits for all workers,

regardless of the circumstances in which the work-related injury occurred.

Generally benefits provided under workers' compensation schemes include access to medical care without cost and economic benefits based on pre-injury earnings. Most systems provide some form of benefits for permanent disability, while some acknowledge the importance of rehabilitation programmes and consecrate the right to return to pre-injury employment. All workers' compensation systems provide coverage for accidents and occupational diseases, although which diseases are recognised as work related varies considerably from one jurisdiction to the next, despite general ILO recommendations in this regard (International Labour Organization 2010). Occupational diseases, in particular, are known to be underreported and workers suffering from these diseases are also less likely to succeed in their claims for compensation and thus less likely to receive benefits and support in return to work (Cox and Lippel 2008; Leigh et al. 1999).

Types of injuries and illnesses covered also vary from one jurisdiction to the next. While traumatic accidents that arise out of and in the course of employment are covered in all jurisdictions, mental health problems attributable to working conditions are covered in some jurisdictions in Canada (Lippel and Sikka 2010), Australia (Guthrie et al. 2010) and the United States (Schnall et al. 2009), and not in others. Musculoskeletal disorders are among the most frequently compensated injuries in many North American jurisdictions, and while some are considered to be attributable to accidents, others are adjudicated under provisions governing occupational disease. Coverage not only can include compensation for work absence occurring at the time of the initial injury or disease but usually also covers periods of work disability attributable to recurrences or aggravation of the initial injury if it can be shown that the recurrence of disability, or the required medical intervention, is attributable to the initial work-related injury.

Importantly, benefits are based on pre-injury earnings and are designed to replace a significant proportion of those earnings. In Canada, levels of benefits vary between 75 and 90% of net wages (Association of Workers' Compensation Boards of Canada (AWCBC) 2011). In most provinces, there is a maximum insurable earning cap, so that those workers whose previous earnings exceeded that maximum suffer a higher economic loss than those whose pre-injury earnings were below the cap. In Québec, there is a minimum benefit based on 90% of minimum wage for full-time work, a policy that presumes full-time work capacity at the time of injury even if the worker was underemployed. No such minimum exists in other Canadian provinces, so that it is not uncommon for workers to receive benefits that fall far below minimum wage for full-time work. The level of benefits, and their cost for the compensation system, is a key factor in determining the cost of investment in returning the worker to the labour market: a costly claim will receive more attention than a claim based on an earning capacity presumed to equal minimum wage or less.

In all Canadian jurisdictions, the system is managed by a public institution mandated, on the one hand, to collect premiums from employers, who contribute to a mutualised compensation fund and, on the other hand, to adjudicate claims brought by workers. Historically these were workers' compensation boards, but now they have different names in each jurisdiction, like the Workers' Safety and Insurance Board, in Ontario, or WorkSafe BC in British Columbia. In many American states, employers are covered by private insurance systems, and while public workers' compensation boards exist in some states, others only rely on the private insurance industry.

Management of claims can vary a great deal depending on whether the adjudicator and the other service providers are working for a public or a private firm. Employers are key actors in workers' compensation systems as they have the right to contest workers' claims, on the one hand, and often they also have the obligation to maintain the worker's job and to bring the worker back to work, although the modalities of the return-to-work obligations vary a great deal from one jurisdiction to the next.

Workers' compensation systems will be the primary source of protection in those cases where an injury is sustained in circumstances

that could also give rise to claims under other programmes. For instance, a worker who is the victim of a violent crime at work will be compensated under workers' compensation rules, and not under a crime victims' compensation programme (Karmen 2004).

12.2.1.2 Motor Vehicle Compensation Systems

Publicly managed no-fault compensation for injury sustained in a motor vehicle accident exists in some jurisdictions in Canada (Sugarman 1998) and Australia (Clayton 2003), although the introduction of similar systems in the United States has not come to pass (Gaskins 2003; Sugarman 1998). These 'no-fault' schemes typically replace tort-based liability with access to a publicly administered fund that provides health care and rehabilitation as well as compensation for temporary and permanent disability, which will include wage replacement as well as compensation for loss of the school year for students. Predicated on the demonstration that the injury was caused by the use of an automobile, many of these systems provide benefits that are comparable or sometimes more generous than those paid out by workers' compensation schemes. Contrary to workers' compensation systems, employers are not involved in the automobile accident insurance process. They have no say in the acceptance or denial of the claim and no legally mandated role in return to work. Some employers may have return-to-work programmes applicable to all employees (Bernhard et al. 2010), and in some jurisdictions, minimum standards legislation or collective agreements in unionised workplaces may protect workers' jobs in the case of illness, but the public insurance programme for automobile injury does not require employer collaboration in the return-to-work process. Of course, if the automobile accident is a work-related injury, workers' compensation legislation will apply and associated rehabilitation and job protections will also apply. No-fault automobile insurance systems are funded through taxes on drivers' licences and automobile registrations. The Canadian no-fault systems preclude all civil litigation against the responsible party, even in cases of criminal negligence, although criminal law is unaffected by the no-fault system.

12.2.1.3 Crime Victim Compensation Systems

Public compensation systems designed to provide support for victims of crime exist in several common law jurisdictions (Karmen 2004), including Great Britain,[3] Australian states[4] and Canadian provinces. New Zealand was the first country to provide compensation for crime victims, but that programme has since been replaced by the accident compensation programme discussed later on in this chapter. The United States also provides for a crime victims compensation programme, under the auspices of the federal Victims of Crime Act (VOCA), which supports state-based initiatives, although the parameters of the programme vary from state to state.[5] Some jurisdictions provide wage-based benefits for people disabled because of a criminal act, although most crime victims' compensation systems, like the Ontario system,[6] have reduced the level of protection over the years and only provide lump sum benefits or periodic payments that are not based on pre-injury earnings rather than pensions and wage replacement. Québec still has a crime victim's compensation system that provides a wage-based pension for those who are work disabled (Lippel et al. 2000), but the other Canadian provinces only provide lump sum benefits. Support for rehabilitation and return to work are not integrated in the system.

12.2.1.4 Accident Compensation in New Zealand

Since 1974, New Zealand has a no-fault accident compensation system that provides benefits for all people injured in New Zealand as a result of

[3] http://www.direct.gov.uk/en/CrimeJusticeAndTheLaw/VictimsOfCrime/DG_177421, consulted March 6, 2012.

[4] Stakeholder flyer: http://library.nzfvc.org.nz/cgi-bin/koha/opac-detail.pl?biblionumber=3754, March 6, 2012.

[5] https://www.ncjrs.gov/ovc_archives/factsheets/cvfvca.htm consulted on March 6, 2012.

[6] Compensation for Victims of Crime Act, R.S.O. 1990, Chapter C.24.

an accident, regardless of the cause of that accident (Campbell 1996). It is included in the category of cause-based schemes because coverage depends on evidence that an accident caused the injury. A person who becomes paraplegic as a result of an accident at work has the right to the same benefits as a person who becomes paraplegic as the result of a rugby accident. However, the person whose paralysis results from a disease like multiple sclerosis is not eligible for benefits under the New Zealand scheme. Only occupational diseases are covered under the scheme.

The system is based on principles defined by Sir Owen Woodhouse (Clayton 2003). As reported by Pricewaterhouse in their review of the system (PricewaterhouseCoopers 2008), these are the Woodhouse principles on which the system is based:

1. *Community responsibility*: In the national interest and as a matter of national obligation, the community must protect all citizens (including the self-employed) and the housewives who sustain them from the burden of sudden individual losses when their ability to contribute to the general welfare by their work has been interrupted by physical incapacity.
2. *Comprehensive entitlement*: All injured persons should receive compensation from any community-financed scheme on the same uniform method of assessment, regardless of the causes which gave rise to their injuries.
3. *Complete rehabilitation*: The scheme must be deliberately organised to urge forward the physical and vocational recovery of these citizens while at the same time providing a real measure of money compensation for their losses.
4. *Real compensation*: Real compensation demands for the whole period of incapacity the provision of income-related benefits for lost income and recognition of the plain fact that any permanent bodily impairment is a loss in itself regardless of its effect on earning capacity.
5. *Administrative efficiency*: The achievement of the system will be eroded to the extent that its benefits are delayed or are inconsistently assessed, or the system itself is administered by methods that are economically wasteful.

New Zealand's Accident Compensation Commission (ACC), a public organisation, manages the compensation system and ensures access, for everyone injured as a result of an accident in New Zealand, to rehabilitation, health care and salary replacement, with some lump sum benefits in case of permanent disability. The level of benefits for salary replacement is based on 80% of pre-injury earnings, although there are other modalities that apply for those who were non-earners at the time of the accident.

New Zealand's compensation system is now financed by a variety of sources, and the system has become much more complex over the years because of these changes in financing. Compensation for injuries caused by work is financed by employers. Injuries to workers that are not caused by work are financed through the earners fund. Injuries caused by the use of an automobile are financed through petrol taxes and permits, while injuries caused to non-earners that are not attributable to car accidents are financed through the general fund paid for by taxes. While the initial Woodhouse scheme that applied until 1992 did not require determination of the cause of the injury, the current financing rules require such determinations. In 2011, New Zealand introduced experience rating whereby the premiums paid will vary depending on the costs of injury.[7] As a result, it is likely that litigation and blame laying will increase, which will increase the adversarial nature of the system.

12.2.2 Effect of System Design on Work Disability Prevention

12.2.2.1 When Cause Matters: Impact on Disability Prevention

In the cause-based systems, access to compensation depends on proof of aetiology, which can cause delay in determination of the right to support, and increase stress surrounding the compensation process (Ison 1994; Lippel 2007, 2012).

[7] Accident Compensation (Experience Rating) Regulations 2011, SR 2011/22, (2011).

Of course, it also leads to the exclusion of a large number of people with disabling injuries from the purview of economic support, which can lead to insecurity and increased presenteeism (Dew and Taupo 2009) or premature return to inappropriate work, a situation that can exacerbate the initial injury or produce new pathologies (Lippel 2010; MacEachen et al. 2010). Those excluded are also deprived of institutional support for return to work and do not benefit from any specific legal provisions protecting their job because of the cause of their injury. In some jurisdictions, like Québec, labour standards legislation protects workers' jobs in case of illness, but this is far from universal (Heymann and Earle 2010). Most jurisdictions in Canada prohibit discrimination against people with disabilities and require employers to provide suitable accommodation before ending the employment relationship, but again, these programmes do not apply universally and depend on individual complaints by the worker who has not been accommodated (Bernhard et al. 2010). Workers' compensation systems, on the other hand, are often legally mandated to provide proactive support to workers seeking to return to work, the board intervening on their behalf to facilitate the process and sanctioning employers who fail to bring workers back to work, either through experience rating penalties or through prosecution of offences under the act.

In New Zealand, the situation is better than in jurisdictions that focus on workers' compensation and other specific causes, in that the ACC provides support to all those suffering disability attributable to an accident regardless of cause, so that litigation regarding causation is reduced and support is provided rapidly. Nonetheless it is still necessary to distinguish between injury caused by accident as opposed to disability caused by disease (Dew and Taupo 2009). For this reason, there is often debate regarding musculoskeletal disorders and low back pain, as some problems may be attributable to an acute accident, while others may be attributable to wear and tear. Unlike the situation in those countries where benefits are payable for work disability regardless of cause, the New Zealand scheme, while better than the classic workers' compensation schemes in this regard, nonetheless requires medicolegal debate as to the reasons for the disability, which sometimes leads to a more adversarial system than those European systems where the cause of disability is irrelevant.

12.2.2.2 Disparities Between Benefit Levels and with Regard to Other Legal Protections

A second issue to be addressed is that of comparison between the level of benefits and the level of respect for claimants in the cause-based systems, as compared to those in other systems providing income support for the disabled in the same jurisdictions. The level of benefits available to the work disabled under the cause-based systems, notably in North America and Australia, is far higher than the social security net available to the work disabled whose disability is attributable to personal disease or any other cause not targeted by a cause-based system (Mustard et al. 2008). Stigma with regard to 'welfare' systems, based on demonstration of need and accessible only to the poorest of the poor, may be associated with 'quasi-criminal' penalties for non-compliance with return-to-work incentives, or other forms of humiliation, as noted in Australian studies examining workfare regimes (Carney and Ramia 2010; Soldatic and Chapmen 2010). Similar conclusions regarding workfare programmes associated with social welfare regimes have been reported from Great Britain (Jones et al. 2006) and the United States (Handler 2003). It is thus not surprising to find that people with disabilities in Canada or the United States, for instance, do not often rely on public disability insurance benefits, as compared to those in other countries, and that, by the same token, Americans and Canadians with disabilities are poorer than those in most other OECD countries (Organisation for Economic Co-operation and Development 2010a). This is also true in Australia (Organisation for Economic Co-operation and Development 2007). So, when reflecting on dependency of the work disabled on public insurance systems, it is important to include data on the actual income of the disabled in making international comparisons. It is easy to reduce the number of claimants in a

Table 12.1 Benefits and protections in Québec compensation systems

	Salary replacement	Permanent disability compensation	Right to rehabilitation support	Right to return to work
Work accident	90% net salary minus amount worker is capable of earning after injury Maximum annual = $41,423 Minimum = $15,394	100% permanent impairment: $48,283–96,561 depending on the age of the worker	Yes	1 or 2 years depending on size of firm. Right to resume contract for short-term contracts
Car accident	90% net salary minus amount worker is capable of earning after injury Maximum annual = $41,423 No minimum	100% permanent impairment: $219,671	Discretionary support	Cannot be fired for 26 weeks unless employer has just cause to terminate[a]
Crime	90% net salary Maximum annual = $41,423	90% net salary for life, indexed based on maximum annual = $41,423	Discretionary support	Cannot be fired for 104 weeks unless employer has just cause to terminate[b]
Personal injury at home	Québec pension plan maximum[c]: $13,836 per year	No	Nothing more than the public health system provides	Cannot be fired for 26 weeks unless employer has just cause to terminate[a]

[a]Workers in Québec cannot be fired for reasons of illness during the first 26 weeks of illness in a 12 month period, unless the employer can show just cause for terminating the contract given the consequences of the injury *Labour Standards Act*., R.S.Q. c. N-1.1, s. 79.1

[b]If the injury is caused by a crime, the worker's job is protected for 104 weeks. *Labour Standards Act*, R.S.Q. c. N-1.1, s. 79.4

[c]On the condition that the worker had made sufficient contributions to be eligible for the maximum benefits

system by either excluding them from access or providing inadequate benefits, without this reflecting in any way on the actual work ability of those who are excluded. The situation in North America is eloquent in this regard.

For return-to-work professionals, it is important to understand the type of support available to workers who are attempting to return to work after injury, as the nature and amount of support differs considerably depending on the cause of the disability, as determined by those responsible for administering the compensation systems. Depending on the cause, workers may or may not have the right to health care, retraining, income support during return-to-work programmes or subsidised employment, as can be seen by the comparison in Table 12.1, showing the hypothetical situation of four individuals disabled by paraplegia arising out of different circumstances. The benefit levels are based on legislation currently applicable in Quebec, but similar disparities exist in all cause-based systems except for the New Zealand system, which will provide similar support to everyone unless the paraplegia is attributable to a disease.

Furthermore, it is frequent to find that an individual's disability, which is multifactorial, is partially recognised by the compensation system, so that support is uneven. For example, in cause-based systems there is often emphasis on the need for specific diagnosis to ensure that the system provides support only for the disability attributable to the specific cause that is covered by the legislation. Take the example of a bricklayer who also plays drums in a band on the weekends, an activity requiring he carry his own equipment. How will eligibility be determined if he requires sick leave due to low back pain? A first debate will be necessary to determine whether his low back pain is attributable to his work as a bricklayer or to his activities as a musician, which would not be covered in North American or Australian jurisdictions. In New Zealand, it would be necessary to determine if the low back

pain was attributable to an accident or a disease. These distinctions are often medically impossible to make, but the process of determining coverage focuses on the emergence of the symptoms and often requires that the worker dwells on his symptoms in order to provide adequate explanations to the medical gatekeepers and the authorities. This can lead to interactions that can be both stigmatising and counterproductive from a work disability perspective. Furthermore, it is not uncommon in cause-based systems, for adjudicators to conclude that certain diagnoses are work related in an individual case, while others are not. For instance, in cases of bilateral upper extremity disorders, it often happens that a workers' compensation board will compensate for the consequences of injury to the worker's right arm, if that arm is more frequently solicited at work, but will refuse the claim for the left arm, if evidence as to work relatedness is insufficient (Lippel 2002). Caregivers and rehabilitation professionals are then left in the difficult position of determining the right to a rehabilitation programme and the specific needs for support for return to work without being allowed to look at the whole person in an adequate manner. Often litigation is pending with regard to the diagnosis that was denied, which means that rehabilitation for the accepted claim is ongoing at the same time as litigation is pending. Frequently this dilemma arises when workers develop secondary psychiatric conditions after suffering a physical injury; the mental health problem is ignored in determining return to work if it has not been recognised as a compensable injury (MacEachen et al. 2011). Difficulties in determining whether disability is attributable to the initial accident or to degenerative processes create similar problems in the New Zealand scheme (Dew and Taupo 2009).

Another important issue related to system design is the determination of the impact of benefits on return to work. Historically, compensation systems provided benefits based on pre-injury earnings and a medical evaluation of permanent impairment and its impact on the specific worker's employability given his or her skill set. Workers received lifetime pensions that were not reduced if the worker returned to gainful employment, as the pensions served to compensate for the impairment in the same way that the tort system provides claimants with economic compensation for loss of physical integrity. Those systems can be seen as providing positive incentives to work, in the sense that workers can make more money if they work than if they do not, a carrot approach to return to work. Reforms since the 1980s in Canada, for instance, have been based on a stick approach to encourage workers to return to work. By determining their earning ability once the injury has healed, authorities may then automatically reduce benefits when the worker is deemed capable of working, whether or not work is actually provided. Need thus drives workers to re-enter the labour market. Both models encourage return to work; however, the question is whether the incentives are positive or negative. Those systems that allow workers to attempt to return to work without jeopardising their benefits, at least for a trial period, are more favourable to return-to-work processes as they allow workers to try to return to work without immediately cutting benefits, thus encouraging workers who are afraid to lose benefits to make attempts to return to work (Organisation for Economic Co-operation and Development 2003).

12.2.2.3 The Role of System Actors: Medical Gatekeepers

Most cause-based systems rely heavily on physicians to determine eligibility for benefits, both in terms of diagnosis, treatment and determination of disability and also, in some cases, in terms of causation (Dew and Taupo 2009). Potential claimants may have trouble accessing health care because physicians do not want to deal with the compensation system (Kosny et al. 2011; Lax and Manetti 2001; Lippel 2007). Doctors play a variety of roles in the systems. Some work for the employer (Dew and Taupo 2009; Draper 2008; Guidotti 2008) or for the compensation system, while others are treating physicians who do not have particular allegiances to employers or the compensation system. Still others make their living as 'independent medical

examiners' who are active players in the medicolegal process of compensation systems, often involved in litigation (Lacerte et al. 2004; Lax et al. 2004). In some countries, social insurance systems are developing guidelines to support the medical evaluation of work disability (de Boer et al. 2009).

Understanding the specific role played by a physician in a given jurisdiction is important to our conceptualisation of the return-to-work process. Systems requiring aggressive gatekeeping by physicians, for instance, assessments for permanent work disability or work disability pension early in the course of sick leave, perform less well when it comes to return-to-work outcomes (Anema et al. 2009). This may be because the system leads to unnecessary medicalisation of the situation, forcing the physician to provide specific diagnoses and driving increased testing to ensure that the medical opinion is perceived as credible (Ison 1986a). Some studies have criticised attempts by policymakers to control or circumscribe the role of physicians by providing guidelines applicable when filling in forms for compensation systems, guidelines that have been found to oversimplify the decision-making process of physicians (Meershoek et al. 2007). Not all systems have occupational physicians, so research on the role played by those physicians in one country (Martimo et al. 2008) may be quite irrelevant to the situation of physicians in another jurisdiction.

In all jurisdictions, physicians' attitudes may contribute to the feeling of stigmatisation expressed by workers. For instance, the concept of malingering (or secondary gain syndrome), although known to be difficult to measure objectively (Macleod 2007), is specific to the discourse of physicians and serves to discredit and undermine the patient's claims and moral worthiness.

12.2.2.4 Rehabilitation and Return-to-Work Programmes

As seen in Table 12.1, huge differences in return-to-work support and programmes exist depending on the cause of the injury of the work disabled. Workers' compensation systems involve employers by definition, both because employers fund the system, and therefore are perceived as stakeholders in the compensation process, and also because the injury occurred at work, a circumstance that presents particular challenges for the return-to-work process (Ison 1986a). As Professor Ison points out in his seminal article on the therapeutic significance of compensation structures, it is not surprising that a worker injured at work is more reluctant to return to that same work than a worker injured on a ski hill. The latter may hesitate to resume skiing, but will not be perceived as a malingerer for that reticence. However, when the hesitation relates to return to paid employment, workers may well be mistakenly labelled as uncooperative, and it is important to ensure that the hazards that led to the original injury have been controlled (Sullivan et al. 2008).

Many workers' compensation systems in Australia and Canada, for instance, are highly attuned to the importance of returning injured workers to their previous employment as early as possible (Guthrie 2002; Lippel 2008; MacEachen et al. 2007a). No such incentives exist if the worker is injured during personal activities, as a result of a car accident unrelated to work, or during the course of a crime. Early return-to-work programmes exist in many workers' compensation systems in Canada, but the legally mandated programmes do not apply to workers injured in other contexts (Bernhard et al. 2010).

Employers in cause-based systems other than workers' compensation are not necessarily involved in any way in the return-to-work process, and sometimes the incentives to return to work are placed solely on the worker, whose benefits will be reduced when he or she is deemed to be able to occupy employment, even though that employment may not actually exist. The worker may well be driven to apply for means-tested social assistance when insurance benefits cease. This has been found to be the case in New Zealand (Armstrong and Laurs 2007). While the process, whereby the worker is deemed capable of occupying a specific job that may or may not exist, is problematic in the context of workers' compensation (Lippel 2010; MacEachen et al. 2007b), it is even more problematic when the system in

which this process takes place has no relationship with or control over the employer, as is the case with no-fault automobile insurance in Québec (Perreault 2011).

Occupational health and safety legislation exists in most jurisdictions and often allows workers to refuse work that is hazardous to their health. However, if the hazard exists because of the worker's pre-existing vulnerability, the legislation may not apply. Returning workers to conditions that could lead to reinjury must be done in a way that ensures their ability to refuse tasks that go beyond their capacities, if the return-to-work intervention is to be successful.

The degree of protection of employers from lawsuits varies. In Canada, it is quite rare for an employee to be able to sue either his or her own employer or any employer covered by the workers' compensation act, as the exclusive remedy provisions preventing lawsuits have a broad scope. In other jurisdictions, like some Australian states, tort-based litigation is possible for the most seriously injured. These types of variations are important to consider when analysing studies that use litigation, having a lawyer or being involved in a compensation claim (Spearing and Connelly 2011) as a variable. A broad range of very distinct realities can be represented by oversimplistic categories (Grant and Studdert 2009). While lawsuits may be rare in no-fault systems, litigation may also arise in the context of appeals, and aggressive contestation in the context of experience-rated workers' compensation systems may inadvertently exacerbate and prolong disability (Lippel 2012; Ison 1986b).

In summary, return-to-work incentives in countries where cause-based systems predominate vary according to the cause of the injury. We have discussed the explicit incentives in the cause-based systems, noting that only workers' compensation systems have a direct influence on employer behaviour by providing legal obligations to re-employ that are binding and the subject of sanction. For the other cause-based systems, incentives targeting workers are strong and failure to make an effort to return to work can lead to suspension of benefits. However neither economic nor penal sanctions target employers in the other cause-based systems. General legal provisions prohibiting discrimination against the handicapped could theoretically provide incentives to employers, as in many countries they are obliged to accommodate the disabled and can be sued if they fail to hire or fire a worker because of a disability. Nonetheless, enforcement of these obligations depends on the initiative of individual workers deprived of jobs because of their disabilities, mechanisms that do not insure effective incentives (Bernhard et al. 2010).

12.3 Part 2: Systems Providing Compensation for Disability Regardless of Cause

12.3.1 Types of Disability Insurance Systems

In this part we will discuss European jurisdictions that provide sickness and disability insurance, not only for work-related injury, but also for all forms of work disability. We will focus, in particular, on the systems in France, Italy, the Netherlands and Sweden. As we shall see, these systems have undergone significant changes in recent years, so as to place a greater degree of emphasis on claimants' residual abilities rather than focusing on disability (Organisation for Economic Co-operation and Development 2010b).

Aside from the Netherlands, which provides sickness and disability insurance regardless of the cause of the disability, the other three European countries studied have a workers' compensation system that is financed exclusively by employers (MISSOC 2011a) and also have programmes for those disabled outside of work (Organisation for Economic Co-operation and Development 2010b). While historically many of these systems were based on a compromise similar to that in existence in the jurisdictions described in Part 1, most European countries no longer prevent workers from suing their employers even if they are covered by workers' compensation, although some, like Belgium (Vogel 2011) and France (Aiuppa and Trieschmann 1998;

Thébaud-Mony 2007), only allow for lawsuits if there is evidence of inexcusable fault on the part of the employer. In that sense, workers in Europe also, at least historically, 'paid' for workers' compensation through the renunciation of their tort rights. Contrary to workers' compensation, other European social insurance programmes are funded through joint contributions of employees and employers, and participation is compulsory (International Social Security Association (ISSA) 2010; MISSOC 2011a, b).

Although the level of benefits and the procedural issues may differ between the workers' compensation systems and the sickness and disability insurance systems in the countries where this distinction is made, the contrast between the situation of the individual injured at work and the person injured in other circumstances is far less pronounced in the European jurisdictions, although causation remains an issue for the employer because of financing rules. In the Netherlands, the cause of the injury has no impact on the employer with regard to financial incentives, and the claimant receives the same benefits regardless of the cause of the disability.

Benefit levels are complex, and we will not provide details here. In the three countries where there is a distinction between work-related and non-work-related sickness absence, levels of benefits are slightly lower for non-work injuries, and employers assume the cost of benefits during waiting periods when there is a delay between onset of injury and benefits. This is the case, for instance, in Italy, where non-work-related sickness benefits start at 50% of usual income for the first few weeks, while work-related benefits are set at 60% of average daily earnings. Similar disparities exist in France and Sweden, although in Sweden the overall level of benefits is higher (non-work related based on 80% of the worker's salary, while work related may reach 100% of the worker's salary for total disability). In France, the benefits vary between 66 and 80% of pre-injury earnings. The actual periods during which a given rate of wage replacement is payable vary over time, and details as to the precise calculation of benefits are beyond the scope of this chapter. This information is available at MISSOC (2011a).

12.3.2 The Effect of System Design on Work Disability Prevention

The European systems studied raise issues that differ from those that place strong emphasis on causation. Two facets will receive more attention here: the role of system actors in return to work and the role of job protection in work reintegration. The OECD has placed considerable emphasis on the need to reduce the numbers of claimants on disability pensions in the European Union (Organisation for Economic Co-operation and Development 2003), and this is reflected in the numerous complex changes that have been brought about in recent years, particularly in Sweden and the Netherlands. Again, we shall not provide details of specific regulatory changes but rather an overview of the types of changes that have been implemented in recent years and the consequences of those changes. A more detailed description of the Dutch system is provided in Chap. 22 on Sickness and disability policy interventions.

12.3.2.1 Incentives for Return to Work

The four European countries discussed in this chapter have, in recent years, taken action to reduce the number of beneficiaries of disability insurance, targeting both employers and workers, thus shifting their emphasis from compensation to labour market reintegration (OECD 2010b). The most radical reforms were introduced in Sweden and the Netherlands.

In all systems studied, incentives targeting the worker include the determination of benefit levels that are, unless otherwise provided through collective agreements, less than equivalent to the pre-injury earnings. The adage in all four countries is 'work must pay', also an underpinning of the cause-based systems described in Part 1. For example, the recent Dutch reform makes it more attractive for workers with partial capacity to work while receiving income support. Workers with assessed earning capacity of 35–70% receive a wage supplement depending on the degree to which their residual working capacity is actually used, and at least half of the actual remaining capacity needs to be used. If they do not work

sufficiently to meet this requirement, only a flat-rate benefit is payable, which is considerably lower than the previously existing disability benefit (OECD 2010b).

Other return-to-work incentives vary between countries, and except for the Netherlands, which make no distinction based on the cause of injury, the incentives are different, depending on whether the injury is work related or not. In France, Italy and Sweden, for non-work-related injury, there is a short waiting period (between 1 and 3 days) before income replacement is payable, and in all countries studied, sickness benefits which are payable during temporary disability are limited in time, after which the permanent disability compensation schemes will apply.

The systems studied also include incentives for employers to encourage their employees to return to work (Elsler and Eeckelaert 2010; European Agency for Safety and Health at Work 2010; Parsons 2002). In Sweden, the Netherlands and Italy, employers are obliged by statute to continue to pay a significant percentage of pre-injury earnings: during the first 2 weeks in Sweden, for 180 days in Italy, and for 2 years in the Netherlands. In France, collective agreements often stipulate that the employer is liable to continue paying the difference between the salary and the amount of sickness cash benefit. The requirement that employers pay the first months and years of benefits has led to a reduction in the number of claimants of disability pensions after this initial period in the Netherlands and Sweden (Organisation for Economic Co-operation and Development 2009; Sonsbeek and Gradus 2011). This suggests that workers do not remain out of the labour market for long enough to be eligible for (temporary) disability benefits or full disability pensions, which are payable only after the years of sickness absence authorised by legislation.

In both France and Italy, there are no explicit re-employment obligations during the period of rehabilitation, whereas in the Netherlands and Sweden, there is a strong joint responsibility for employers and employees to return to work as quickly as possible (OECD 2010b).

As described in detail in Chap. 22, the Dutch Improvement Gatekeeper Act determines a process to be followed in the event of sickness absence, a process that is implemented during the first 2 years, during which the employer is responsible for wage replacement. The process provides for the development of a reintegration plan after 6–8 weeks of absence, a plan agreed upon by both employer and employee and developed with the help of an occupational physician. After 2 years of sickness absence, a social insurance physician will assess the health status, the residual work capacity of a worker and the chances of recovery. Work capacity is assessed by means of a functional limitation list. With the assessed work capacity, a labour expert will determine the possible earning capacity of the worker by means of a computer program (Claimant Assessment and Quality Control system; CBBS) (Boer and Brenninkmeijer 2004). With this program, jobs available in the labour market are selected that fit the capacity of the claimant. When the worker gets a permanent disability pension, his work capacity will be reassessed if his situation changes. A worker with a temporary disability benefit (WGA) will be reassessed if the health situation changes, at the latest after 5 years of benefits.

In Sweden, the ‘rehabilitation chain’ was recently implemented (Stahl et al. 2011). If reintegration in the worker’s regular job does not succeed within 3 months, the employer is required to seek alternative jobs within the company. After 6 months of work absence, the worker can be assessed against all alternative jobs in the labour market. Despite its name, the rehabilitation chain does not include rehabilitation measures. Instead it consists of time-driven assessments of the individual’s work ability and right to benefits. During the first 90 days of sickness absence, working capacity is assessed against the existing job, possibly with some modifications. Between the 91st and 180th days, if the old job is not an option, the worker is expected to try to find another job with the employer. Alternatively, the worker can take a leave of absence for up to 6 months to try out another job with another employer. From the 181st day, working capacity and thus the right to benefits are evaluated against all the jobs on the regular labour market (as is done in the

Netherlands) (OECD 2009). Work ability, and therefore access to benefits, is periodically reassessed, and this process may continue until the worker's retirement (MISSOC 2011a).

Although France and Italy do not put much pressure on the employer to re-employ sick-listed members of their staff, other incentives exist in those countries. In France, vocational and social rehabilitation of disabled persons is initiated by COTOREP (Commissions Techniques d'Orientation et de Reclassement professionnel) (Erhel 2008), whereas in Italy this is commissioned by INPS (sickness benefit) or INAIL (disability pension). Contrary to the situation in the Netherlands and Sweden, legislation in both France and Italy requires public and private employers to hire disabled workers in proportion to the total number of people employed (MISSOC 2011a). In Italy, this proportion is 7% of a workforce exceeding 50 workers, 2 disabled workers in a workforce of 36–50 workers and one disabled worker in a workforce of 15–35 workers. In France, for employers with more than 20 employees, it is mandatory that 6% of their workforce consists of disabled people. If this obligation is not fulfilled through direct employment, it must be compensated, either by subcontracting with sheltered workplaces or by paying a contribution to a specific fund which finances integration programmes (Erhel 2008).

12.3.2.2 Protection from Dismissal

In the four European countries studied, employers must keep positions open for those who are sick-listed, regardless of the cause of the disability. In Italy, protection from dismissal is provided for those on sick leave, and the employee's protection may be improved through collective bargaining. The ILO reports that, in case of sickness, 'suspension of the contract, with job protection, lasts for periods usually determined by collective agreements, according to the employee's seniority. The average period is about 1 year. During this time, the worker is fully paid (by the employer or by the Social Security). Beyond this period an employee is usually entitled, under collective agreements, to a further period of unpaid leave' (International Labour Organization 2011). In case of injury at the worksite, the worker maintains his/her job until full recovery is established by a medical certificate delivered by INAIL.

In France, an employer may not terminate the employment of a worker whose contract has been suspended because of an employment injury or occupational disease, unless the employer can show that the employee has engaged in serious misconduct or that it is impossible, for reasons unrelated to the injury or illness, for the contract to continue. The employer has to consult an occupational physician about the work ability of the worker on sick leave (Laflamme and Fantoni-Quinton 2009). If the worker's abilities are impaired or if he is unable to return to his previous job, the occupational physician has to propose workplace adaptations to the employer who must take these into consideration. Although the employer is not obliged to implement these adaptations, he must have good cause for rejecting them. After the transmission of the recommendation of the occupational physician, the employer has 1 month to look for an appropriate, alternative job. If this process is not successful, the worker can be dismissed on the grounds of incapacity.

In Sweden, as we have seen, an employer is obliged to reintegrate a sick-listed employee in the same job or another job in the firm or else to support them in securing more suitable work with another employer. Only when an employer can show they have tried everything reasonable to accommodate the worker in the first 6 months of sick leave may negotiations to terminate the employment contract commence, and the trade union will be involved in this process. Employers who terminate an employment contract without fulfilling the aforementioned obligations can be sued by the employee or their trade union for unfair dismissal, which may lead to a penalty equivalent to as much as 32 months' salary (OECD 2009).

The Netherlands provides the most extensive protection against dismissal for reasons of illness. Layoff on the grounds of illness is generally considered an unfair dismissal procedure and only in exceptional circumstances can an employee be fired during the first 2 years of absence for reasons of sickness. Such an exception is made when, for instance, an employee

refuses to collaborate in reintegration efforts. Dutch dismissal procedures are among the most rigid within the OECD as prior consent is required from either the Centre of Work and Income (CWI) or the court, and minimum statutory periods of notice are relatively long in case of long tenure (4 months notice), while severance payments are generous for permanent contracts (OECD 2008). Recently, several political parties have proposed more flexible dismissal protection, although this has not been enacted to date. After 2 years, the statutory sick pay period, the employer can dismiss the worker if his or her return to work has been unsuccessful. The Social Security Agency (UWV) then takes responsibility for the worker. However, it is harder for employers to dismiss workers who are not eligible for benefits for long-term disability (i.e. those workers with 35% or less loss in earning capacity). In the Netherlands 18.5% of the workforce is composed of flex workers with a contract of limited duration, perhaps because of the stringent obligations placed upon employers in the standard employment relationship. For flex workers there is limited job protection that does not go beyond the duration of the contract. However, this flexibilisation of the workforce is also a global trend, affecting 14% of employees in the EU-27 and 15.7% of those in the EA16 (Wozowczyk and Massarelli 2011).

12.3.2.3 The Role of System Actors: Medical Gatekeepers

In both France and Italy, the claims process starts with a medical certificate that includes the initial diagnosis, the corresponding degree of work disability and an estimate as to the anticipated time at which the claimant should be expected to return to work. The medical assessment that is required in order to complete the initial medical certificate is usually done by the treating physician or general practitioner. In Sweden, a sickness certificate provided by a medical doctor is the first assessment of the sick worker, and a sickness certificate is required after 7 days of sickness absence. This initial disability assessment can be seen as a medical gatekeeper role permitting access to the disability insurance system. In the Netherlands, however, no sickness certificate is needed to establish eligibility for benefits. The regular Dutch health-care system does not play an important role in occupational health issues, whereas occupational physicians are usually not involved in medical treatments (Lötters et al. 2011).

Throughout the process medical, doctors will assess the degree of disability and at the end decide on permanent disability that justifies granting of a disability pension. The rules governing disability pension for work-related injuries and diseases in France allow for a reassessment of disability any time during the first 2 years after the initial evaluation of the degree of permanent impairment is fixed. Thereafter reassessment is usually conducted at intervals of at least 1 year, and these reassessments may affect the pension. In Italy, reassessment of (work-related) disability is possible during the 4 years after the cash benefit is fixed at intervals of at least 1 year, thereafter at intervals of at least 3 years. No further review of disability is possible after 10 years. After 10 years the assessed disability pension becomes permanent (de Boer and Brenninkmeijer 2004; MISSOC 2011a).

In both France and Italy, benefits paid for temporary disability due to work-related injury or disease end with full recovery. This implies regular assessment of the medical status of the worker and his/her ability to go back to work. In France, the assessment is conducted by a general practitioner or specialist, who works for the state health insurance office (Caisse Primaire d'Assurance Maladie, CPAM). In Italy, the reassessments are conducted by a medical doctor or specialist from the INPS. The treating physician or general practitioner is rarely involved in this process of reassessment (Boer and Brenninkmeijer 2004).

12.4 Conclusion

It is impossible to do justice to the intricacies of compensation systems, even one compensation system, in a chapter of a book, yet it is hoped that this overview of a few compensation systems in North America, Oceania and Europe provides

sufficient detail for those interested in work disability to realise the importance of understanding system effects in order to succeed in WDP. Here we will identify a few messages that could contribute to more effective research and interventions.

Perhaps the most important issue to retain is that each system is different and has its own positive and negative effects on the worker and the work environment. It is thus essential to avoid assumptions about systems, even in your own jurisdiction, and to ensure a sound understanding of the way systems work when you are undertaking a study in a given jurisdiction or setting up a disability prevention practice. As a corollary, when reading scientific literature on WDP, it is important to pay attention to the jurisdiction where the study took place: interventions may be successful in the Netherlands, for instance, but totally inappropriate in North America, given the significant differences in the role of different actors and the legal protections available to workers. For example, research in Australia has shown that early return-to-work programmes in the context of workers' compensation designed on the basis of international research and policy models may be ill adapted to specific geographic locations, such as Western Australia, where jobs are physically demanding and located in remote areas. They require specific adaptation to ensure that the local realities are compatible with the disability prevention approaches retained (Ciccarelli and Dender 2010). This said, it is possible to transpose interventions from one jurisdiction to another if care is taken to ensure the appropriate adaptations are made, as necessary. For example, the Canadian 'Sherbrooke model' (Loisel et al. 2002) was successfully applied in the Netherlands (Anema et al. 2007).

A related issue is that system factors that are seen as obstacles to recovery in one jurisdiction may simply not exist in another. For instance, lawsuits against employers are all but unheard of in Canada but still exist in many Australian states. This in itself will provide a very different context for professional return-to-work interventions.

Given the huge disparities between the different systems discussed in this chapter, it is difficult to draw many overarching conclusions. A first is that those systems that provide support regardless of the cause of the disability appear to be better suited to prevent long-term disability and to permit early intervention by specialists in disability prevention. This is so because the professionals involved in the process can look after the whole person and not just the 'compensable injury' and because income support reduces stress and insecurity. It is also true that it is far less likely that the worker will be involved in litigation in those systems where the cause of the injury is irrelevant, and reducing the adversarial nature of the process has a positive impact on return to work (Lippel 2007, 2012; Roberts-Yates 2006; Soklaridis et al. 2010). It is nonetheless important to note that some appeals have a therapeutic effect and that litigation cannot be presumed to always have a negative effect on workers' health and abilities (Grant and Studdert 2009; Lippel 2007). Systems that place less emphasis on policing workers and that are less adamant about the gatekeeper role of physicians have been shown to be more successful in sustaining positive return-to-work outcomes (Anema et al. 2009). However, the role of physicians in a given system merits attention, especially with regard to their competencies in providing accurate medical certificates and supporting reintegration efforts (Söderberg and Alexanderson 2005; Stahl et al. 2011; Lötters et al. 2011). Those system characteristics that contribute to stigma of benefit claimants hinder recovery and return to work, both because of the impact on the health of the claimants and also because of the effects on the relationship between the worker and the employer (Eakin 2005; Kirsh et al. 2012; Lippel 2003, 2012; MacEachen et al. 2010; Shiels and Gabbay 2007). Systems that provide incentives to employers to contest compensation claims are more likely to contribute to adversarial relations and stigma, and this should be considered before implementing experience rating programmes (Ison 1986b), even more so in that they can lead to discrimination against people with disabilities (Harcourt et al. 2007).

Finally, a comparison of the job protections provided in the different jurisdictions studied provides some interesting examples of ways in

which workers may be encouraged to explore the job market without fear of losing their employment. Sweden, for instance, allows for a leave of absence during the period of work disability, so that the worker may try to find employment elsewhere without fear of losing his original job. Other systems in different ways may well punish a worker who attempts to re-enter the job market, by immediately suspending benefits or by allowing the employer to terminate the work contract. Systems that are flexible and that allow workers to try to return to gainful employment without immediately suspending their benefits or terminating their previous employment may well be the most supportive to workers wishing to reintegrate the labour market.

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The Role and Influence of Care Providers on Work Disability

13

Carel Hulshof and Glenn Pransky

The contribution of healthcare providers on work disability has not been consistently positive. The evidence base for a positive care providers' influence suggests a change in paradigm. More research, education, economic incentives and peer leadership are needed.

13.1 Introduction: Return to Work as Important and Valued Outcome of Health Care

Approximately half of the world's population spends at least one-third of its time in the workplace. Fair employment and decent work are important social determinants of health and a healthy workforce is an essential prerequisite for productivity and economic development (WHO and Government of the Netherlands 2011). It is now more widely recognised that for an individual person being employed is a major determinant of his or her health and well-being. Work, matched to one's knowledge and skills and undertaken in a safe, healthy and supportive environment, can reverse the harmful effects of prolonged sickness absence or long-term unemployment and promote health, well-being and prosperity (Black 2008). Good work rewards the individual with a greater sense of self-worth and has beneficial effects on social functioning. A study on quality of life in breast cancer survivors revealed that for them employment was important; working provided a sense of normalcy and helped overcome the negative effects of treatment (Ferrell et al. 1997). Also other studies showed that cancer patients consider returning to work to be important because it is regarded as a marker of complete recovery and regaining normality (Verbeek and Spelten 2007; Spelten et al. 2002).

Conversely, the absence of work, due to unemployment or due to ill health or disability, is often a threat for physical and mental health. In a social survey among member states of the European Union (1994–1998), it was found that the proportion of people in good health among those who were employed or became employed was consistently higher than among people who were not employed or left the workforce (Schuring et al. 2007). This association between health and employment may be bidirectional: unemployment may cause poor health and poor health may increase the probability of unemployment (Schuring et al. 2011).

Therefore, when their health condition permits, unemployed, sick and disabled people (particularly

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_13,

those with 'common mental health problems') should be encouraged and supported to remain in or to (re-)enter work as soon as possible (Waddell and Burton 2006). In this perspective, work disability prevention (WDP) should not only be the focus of occupational health professionals but should be a goal for all healthcare providers (HCP) (Hulshof 2009). Yet the role of the healthcare provider in relation to return to work (RTW)/WDP has not been consistently positive. In this chapter, we will explore the evidence for HCP influence on work disability outcomes, their actions when faced with work disability issues, opportunities for improvement and suggestions for future development of a positive HCP role.

13.2 Healthcare Providers' Roles and Beliefs

From recent research we know that in particular for the two most prevalent causes of sickness absence or disability in the developed countries, common mental health problems and musculoskeletal disorders, early RTW interventions have been successful. In spite of this, many patients still have difficulties in returning to work after an episode of illness (Verbeek 2006). Often patients do not get practical instructions from their treating physicians on how to cope with everyday problems. In a cohort study among cancer survivors, it was found that only half of the attending physicians had discussed RTW with their patients (Verbeek et al. 2003). Why is this? Do treating physicians and other HCP lack the knowledge or the skills, do they feel insecure on how to be involved in RTW issues, or do they perceive their role as not matching or even conflicting with WDP?

13.2.1 Care Providers' Actions in Relation to Work Disability Issues and Impact on RTW

What do we know about the influence of HCP on the duration of sickness absence or RTW? In the provision of health care to the working population, in many countries a distinction can be made between occupational health professionals and services on one hand and general HCP on the other hand. While WDP is often integrated in the activities of the occupational HCP, the lack of work focus in the provision of general health care, both in the field of primary care as in secondary clinical care, often has a negative impact on people's ability to work. This is sometimes referred to as 'the blind spot' for work (Buijs et al. 2009; Lötters et al. 2011; Hussey et al. 2010). This 'blind spot' signals a generic lost opportunity, in particular in optimising the care for patients with a chronic disease (van Weel et al. 2006).

General practitioners (GPs) play a pivotal role in WDP. They are often the first healthcare provider that employees will consult when a (new) episode of sickness absence starts. However, a comprehensive observation study of GP consultations of patients in paid work who were consulting the GP for musculoskeletal disorders showed that in only 36% of these consultations, work was discussed and that in only 12% advice on RTW was given (Weevers et al. 2009). In the U.S. healthcare system, most work-related issues are addressed by primary care practitioners. A survey among practitioners in Massachusetts about their role in evaluating work ability and managing disability showed that RTW and disability concerns came up on average in 10% of all patient encounters (Pransky et al. 2002). However, less than a quarter of the respondents had any training in this, and their assessments were largely based on patient input and observations; direct communication with employers was rare. In many countries, GPs are involved in sickness certification of sick-listed employees. Therefore, GPs sometimes do ask about a patient's work situation, but they often lack training in sickness certification. In the UK, GPs would like to maintain their role in sickness certification but felt there was scope for other health professionals to issue some sickness certificates (Wynne-Jones et al. 2010). The certification role is not without problems and often discussed as a possible source of tension between a GP's role as patient advocate and as gatekeeper to the benefit system. Role conflict is a key issue here. In a study by Hussey et al. (2004), there appeared to be deliberate

misuse of sickness certifications by GPs, possibly related to conflicts about roles and incongruities in the system. The doctor-patient relationship was perceived to conflict with the current role of GPs in sickness certification. When making decisions about certification, the GPs considered a wide variety of factors. They experienced contradictory demands from other system stakeholders and felt blamed for failing to make impossible reconciliations. In a qualitative study among patients with back pain in the UK, the perception of the participants was that GPs and other clinicians had provided little or no work-focused guidance and support and rarely communicated with employers (Coole et al. 2010). For them, when GPs restricted their activities to sickness certification, it had little added value in RTW.

Inattention to work disability issues in medical specialist care is also related to poorer outcomes with regard to RTW. This is particularly studied in sick leave due to musculoskeletal disorders. In a Dutch study among scaffolders on sick leave for at least 30 days, being treated by a medical specialist who did not have attention for work increased the risk for prolonged sickness absence four times (Heijens et al. 2003). This was confirmed in two later studies where it was also found that in workers visiting a medical specialist, RTW was clearly postponed, even when adjusted for severity of the symptoms (Steenstra et al. 2005; Lötters et al. 2011).

For the influence of physical therapists (PT) on WDP, inconsistent results are published. In a Norwegian study, previous treatment by a physiotherapist predicted a longer RTW period (Reme et al. 2009). This finding was, however, not in accordance with findings on PTs from other studies. The type of physiotherapy treatment most frequently reported was, however, more or less obsolete passive treatments such as hot packs, massage and ultrasound. In the aforementioned study by Lötters et al. (2011), consultation of a physical therapist did not influence the duration of sickness absence.

In some countries other professionals like nurse practitioners (NPs) may also be involved in sickness certification or giving work restrictions. Rupe (2010) discusses the importance of these tasks as part of the holistic care NPs provide, emphasising the importance of work and safe workplaces and help people to get their lives back to normal.

In general it can be concluded that although some promising initiatives have been taken to get WDP more in the focus of HCP, ineffective disability management, in particular by doctors, is still an obstacle for RTW (Anema et al. 2002, 2006).

13.2.2 Ignoring Available Evidence

Although evidence for effective RTW activities for many problems is still in development, for some disorders, e.g. back pain or mental health disorders, consistent evidence on effective RTW interventions is already for more than a decade available. But even on these topics, research results frequently show that this existing evidence on the management of mental health disorders or back pain is not or only partly applied by HCP. In back pain management, unnecessary diagnostic imaging tests and intensive or prolonged unnecessary treatments or waiting periods are sometimes still applied (Loisel et al. 2001). In a Canadian study among family physicians, it was shown that although various medical associations have published policy statements on physicians' roles in RTW which stress that physicians should discuss recovery times and early RTW plans with workers, recommend continuation of usual activities as much as possible and help workers and employers set up appropriate modified duties if required, only one-third of physicians stated they would say 'try to continue usual activities' to patients with occupational low back pain (Guzman et al. 2002). In a process evaluation as part of an RCT on the effectiveness of an evidence-based practice guideline for occupational physicians (OPs) on the management of work-related mental health disorders, the participating OPs used on average 50% of the recommendations of the guideline (Rebergen et al. 2010). Similar results were found in two national audits on back pain and depression prevention among occupational health departments of the NHS in the UK (Occupational Health Clinical Effectiveness

Unit 2009; Health and Work Development Unit 2010). One could argue whether the glass is half full or half empty here, but it shows anyhow that still a lot of work has to be done.

So, even when there is quality evidence for successful WDP available, care providers do not always or not yet adhere to it. Why don't HCP follow evidence-based practice guidelines? Cabana et al. (1999) conducted a systematic review of the literature to identify barriers to guideline adherence in general. The most important barriers were as follows: lack of awareness, environmental factors (e.g. lack of time), lack of agreement with the content, low self-efficacy and patient factors. With regard to WDP, some examples of these barriers can also be identified. In an exploration of physicians' recommendations for activities in chronic low back pain, physicians' recommendations for activity and work to patients with chronic back pain varied widely and frequently were restrictive (Rainville et al. 2000). These recommendations reflect personal attitudes of the physicians as well as factors related to the patients' clinical symptoms. In a focus group study on managing long-term work disability in primary care, a key finding was that many of the participants felt that their role in managing long-term work disability was limited to providing support and management of health-related issues only (Cohen et al. 2010). Furthermore, the perceived risk to their own personal safety in addressing these issues with some patients also impacted on GPs' decision-making.

Accordingly, in both research and practice of WDP, these are important issues and hurdles to discuss and overcome.

13.2.3 Lack of Communication

Asking about work and work conditions or discussing RTW with the patient is not a standard activity in the consultations of many care providers. There is abundant literature available on the fact that lack of unequivocal communication between HCP and the patient/worker, between HCP and the work environment and, last but not least, between care providers can delay or disturb an effective RTW approach. Irrespective of the differences in healthcare systems and legislation on RTW policies in various countries, poor communication of care providers may be considered as one of the Achilles heels in effective WDP. Many studies describe the limited level of communication between treating physicians, in particular GPs, and occupational health professionals like OPs or insurance physicians. Bilateral communication, if any, is often limited to exchange of medical information but seldom aiming for harmonisation or a mutual approach in the management of RTW (Anema et al. 2002, 2006). The potential for primary care to better manage work disability may even be more limited when patients move among providers and seek alternative care and work limitation prescriptions (Wasiak et al. 2008).

In a Canadian focus group study, cancer survivors reported that the effects of the disease and the treatment on work capacity were not or seldom discussed with their attending physicians (Maunsell et al. 1999). Similar experiences were reported by patients in the Netherlands (Verbeek et al. 2003). This resulted in a number of research projects, wherein some of them are still running, and the development of a multidisciplinary guidance document on 'cancer and work' (NVAB (Netherlands Society of Occupational Medicine), Coronel Instituut voor Arbeid en gezondheid, NFK, CBO 2008). Better communication about work-related issues between care providers and patients and between care providers mutually are core elements in these research projects and in the guidance document.

13.3 Interventions in the Healthcare Context to Prevent Work Disability

In various chapters of this handbook, you will find nice examples of successful RTW interventions. Several randomised controlled studies (RCTs) showed that work-related interventions were (cost-)effective in reducing long-term sickness absence in case of depression, adjustment disorders or burnout and back pain (Schene et al.

2007; van der Klink et al. 2003; Anema et al. 2007; Rebergen et al. 2009; Lambeek et al. 2010). In a review on how doctors can help their patients to RTW, Verbeek (2006) describes a number of person-directed interventions for RTW and disability in various diseases or health conditions (e.g. myocardial infarction, rheumatoid arthritis, somatisation, adjustment disorder) that have proven to be successful in RCTs. In an Australian RCT, it was shown that return to full normal activities, including work at 2 weeks, after acute myocardial infarction was possible and safe in patients who were stratified to be at low risk for future cardiac events (Kovoor et al. 2006). Also in more severe health conditions, RTW is coming more into the scope of both patients and HCP. A recently published systematic review showed for cancer patients moderate quality evidence for RTW benefits from multidisciplinary interventions compared to care as usual (de Boer et al. 2011). In many of these interventions, not only the specific care provider setting but also the more general healthcare context has been taken into account.

In a Dutch study among GPs, a protocol helping them to record risk factors for long-term sickness absence and to better cooperate with OPs leads to a better recording of risk factors and resulted in more referrals to OPs (van Dijk et al. 2008). Applying this protocol may lead to more and better cooperation between GPs and OPs. However, in another study, training GPs and OPs to collaborate did not show a positive effect on RTW of patients with low back pain, although it can be questioned if the intensity of the intervention, the training, had been high enough (Faber et al. 2005).

In the UK, Professor Dame Carol Black, National Director for Health and Work, presented in March 2008, with a stream of publicity and accompanying activities, an important report 'Working for a healthier tomorrow' to the Secretaries of State for Health and for Work and Pensions (Black 2008). This report, supported by 260 responses to a call for evidence and supplemented by six discussion events around the UK, is underpinned with commissioned reviews of the evidence of mental health and work, early intervention in sickness absence and the business case for employers to invest in health and wellness programmes for their staff. One of the core recommendations was that British GPs should change their paper-based sick notes for sick-listed patients in 'electronic fit notes' to the employee and the employer indicating what a patient still can do. The bottom line should be that it is in the benefit of their patients to go back to work. This proposal was implemented rather fast, indicating the sense of urgency. In April 2010, the UK Government replaced the sick note by the new fit note and an additional guidance document was developed. So far, doctors, mostly GPs, have largely welcomed the new fit note and often say that their practice has changed as a result (Black and Frost 2011). Of course, this still has to be confirmed by independent research.

Summarising, although there is still a lot of work to do, both in research and practice, the evidence base for a positive HCP influence on work disability outcomes is undeniably growing.

13.4 A Change in Paradigm, Evidence-Based Guidelines and Other Recommendations

Better inclusion of WDP into the work, activities and tasks of HCP is of paramount importance to go forward. What are the opportunities for improvement and suggestions for future development of a positive HCP role? In this process, different strategies and instruments are needed.

13.4.1 A Change in Paradigm

Regarding WDP, the need for a change in paradigm in the perception of care providers, both in the field of occupational health and in general health care, is articulated by an increasing number of organisations and persons. The new paradigm implies major changes in the usual healthcare perspective. Health at work should not be separated from general health and life, emphasising the role and responsibilities of care providers for all health-related aspects of personal life,

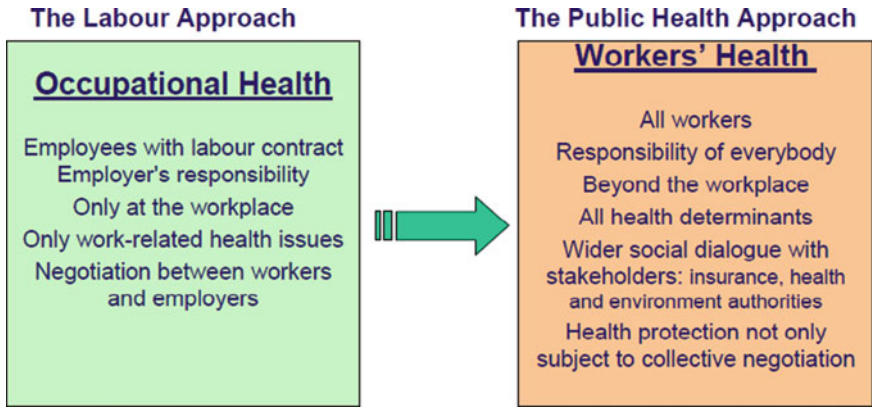

Fig. 13.1 From occupational health to workers' health (WHO 2007)

including early recognition of occupational and work-related ill health, as well as preserving and restoring working capacity of individuals. This means adopting a work rehabilitation approach that addresses the physical, cognitive and affective characteristics of the worker as well as his/her social relationships, the health care and the rehabilitation services provided and the opportunities and barriers for RTW (Loisel et al. 2001).

This change in paradigm is to a large extent also acknowledged by the WHO in its Global Plan of Action on Workers' Health, 2008–2017, adopted by the World Health Assembly in 2007 (Fig. 13.1).

Regarding work and health, international organisations like WHO and ILO have traditionally always been dealing with the negative effects of work and working conditions on human health. Much less frequently, the possible positive effects of work on health have been given attention or advocated. The change in paradigm, presented in Fig. 13.1, can also be regarded as an important step forward toward another approach in WDP (see also Chap. 5).

However, still a lot of work has to be done to change the beliefs and attitudes of HCP as we know that their conceptualisations of diseases and disability may heavily influence their recommendations and, consequently, the cognitions and beliefs of their patients. Even in 2002, after many evidence-based guidelines on the management of low back pain had already been published and disseminated, more than two-thirds of the respondents in a questionnaire survey among practising GPs and PTs reported that they would advise a patient to avoid painful movements; more than one-third believed a reduction in pain is a prerequisite for RTW, while more than 25% reported that they believe sick leave is a good treatment for back pain (Linton et al. 2002). These results were more or less confirmed in a second study among PTs and closely related disciplines (e.g. manual therapy, chiropractic) which showed that therapists with a more biomedical treatment orientation view daily activities as more harmful for the back of a low back pain patient compared with therapists with a more biopsychosocial treatment orientation (Houben et al. 2005). Morris and Watson (2011) performed a study to investigate patient and GP factors which determine sickness certification for low back pain and found that whether a sickness certificate is issued following an initial consultation for back pain was best explained by combining GP and patient factors—so both have to be considered together.

That positive results can be obtained with a change in paradigm was shown in a study by Domenech et al. (2011). They compared in PT students the effects of an educational biopsychosocial-oriented module on low back pain with a more traditional biomedical-oriented module and found that the first one changed the students' beliefs and attitudes about LBP and related disability in the favourable direction, while the

second one resulted in maladaptive beliefs and in inadequate activity restriction recommendations.

For this change in paradigm, an improved communication between workers, employers, HCP and other relevant stakeholders (e.g. insurers) may be regarded as an important prerequisite. In the context of work disability, observational studies have demonstrated that communication failures are inextricably linked with adverse disability outcomes and employers often cite poor communication with physicians as an obstacle to improved disability management. But what is and what is not appropriate and expected? In a comprehensive review on disability prevention and communication, Pransky et al. (2004) examined four prevailing models of disability management and prevention (medical model, physical rehabilitation model, job-match model and managed care model) to identify its possible strengths and weaknesses with respect to communication and how these impact disability outcomes. The medical model emphasises the physician's role to define functional limitations and job restrictions. In the physical rehabilitation model, rehabilitation professionals communicate the importance of exercise and muscle reconditioning for resuming normal work activities. The job-match model relies on the ability of employers to accurately communicate physical job requirements. The managed care model focuses on dissemination of acceptable standards for medical treatment and duration of work absence and interventions by case managers when these standards are exceeded. Despite contrary evidence for many health impairments, these models share a common assumption that medical disability outcomes are highly predictable and unaffected by either individual or contextual factors. As a result, communication in the past has often been authoritative and unidirectional, with workers and employers in a passive role. Improvements in communication and communication-based interventions may further improve disability outcomes; however, controlled trials are needed.

That poor communication plays a crucial role in a better RTW policy was also seen in a systematic review on factors associated with long-term sick leave in sick-listed employees (Dekkers-Sánchez et al. 2008). The 'perception of not being welcomed back to work' was a significant predictor of long-term sick leave. For the future, it is promising that favourable results were seen in the development of a communication skills training course for physicians performing work disability assessments (van Rijssen et al. 2011).

13.4.2 Healthcare Professionals' Consensus Statement on Health and Work

A nice example of a strategy, based on the new paradigm, is the publication of a 'healthcare professionals' consensus statement' on health and work in the UK in 2008 (Healthcare Professionals' Consensus Statement 2008). This statement, formulated more or less as a covenant, was published in relation and in addition to the aforementioned report 'Working for a healthier tomorrow' by Dame Carol Black (2008). It was formulated, signed and published by almost all relevant health professional bodies in the UK to stress the importance of helping people to acquire a job or to return to their work. It includes a statement of action:

> We, the undersigned, will work with government, other healthcare workers, the voluntary sector, employers and Trade Unions, to promote and develop ways of supporting individuals to achieve the socio-economic and health benefits of work. This pledge includes a commitment to continue to educate the healthcare community, employers and people of working age about the benefits that work can provide; and, as appropriate, to do all we can to help people enter, stay in or RTW.

Of course, in itself this is still 'only paper', but it may be a good starting point and incentive for

discussion and development of activities as the statement clearly acknowledges the joint responsibility of the healthcare sector in WDP.

13.4.3 Evidence-Based Practice Guidelines

Clinical decision-making by HCP is more and more supported by the development of evidence-based practice guidelines. Evidence-based practice guidelines can be defined as 'documents with recommendations to assist practitioners and care users, aimed at improvement of quality of care, based on a systematic review of evidence and an assessment of the benefits and harms of alternative care options, supplemented with expertise and experiences of practitioners and care users' (Kremer and Burgers 2011; Institute of Medicine 2011). In the field of occupational health, in several countries evidence-based practice guidelines on WDP have been developed. From 1999, the Netherlands Society of Occupational Medicine (NVAB) has been developing occupational health guidelines on topics like low back pain, mental health problems, upper extremity disorders, asthma/COPD, contact dermatitis, pregnancy and work and cancer and work rehabilitation (Hulshof and Frings-Dresen 2011). Management of sick leave and prevention of work disability is a central issue in these guidelines. Scientific evaluation of the NVAB guidelines on low back pain and on mental health problems in randomised controlled trials confirmed their effectiveness and cost-effectiveness with regard to shortening of sick leave and prevention of work disability (van der Klink et al. 2003; Rebergen et al. 2009; van der Weide et al. 1999).

In the United Kingdom, the NHS Plus has been developing occupational health practice guidelines on similar topics as does the American College of Occupational and Environmental Medicine (ACOEM) in the United States (Van Dijk et al. 2010).

Part of the gap between general health care and occupational or workers' health in attention for WDP may be bridged by integration of work and health issues and guidance on RTW interventions in relevant multidisciplinary clinical guidelines. In 2004, the NVAB and the Dutch Institute of Healthcare Improvement (CBO) took the initiative to develop a first guidance document for the effective integration of work-related aspects in multidisciplinary clinical practice guidelines. Later, the Netherlands Society of Insurance Physicians (NVVG) joined this initiative, and together a second version of a generic guidance document was developed, largely based on the ICF model (de Boer et al. 2008). To be eligible for funding of clinical guideline development, the Dutch Ministry of Health had included in its latest national guideline programme the introduction of work-related aspects as an obligatory requirement, stressing the importance of work and health. As a consequence of this, from 2005, more than 50 multidisciplinary guidelines have been published which all contain specific chapters or recommendations throughout the text about consequences of the disorder for work ability and about effectiveness of RTW interventions.

In the UK, a similar appeal was made to include occupational health aspects in all relevant multidisciplinary National Institute for Health and Clinical Excellence (NICE) guidelines (Hashtroudi and Paterson 2009).

Developing guidelines is one thing; making them work is another. It is often said that evidence-based medicine also needs evidence-based implementation. Therefore, implementation research may reveal the drivers and barriers for successful implementation of guidelines and other innovations and present evidence on how to accomplish successful improvement. A nice example of this is a study by Rossignol et al. (2000) who evaluated the effectiveness of a specific programme that was set up to implement clinical practice guidelines for low back pain in a large community with the multiplicity of medical and nonmedical back care providers and products. Coordination of primary health care was performed by two primary care physicians and a nurse in liaison with the treating physicians and included a complete examination, recommendations for the clinical management and support to

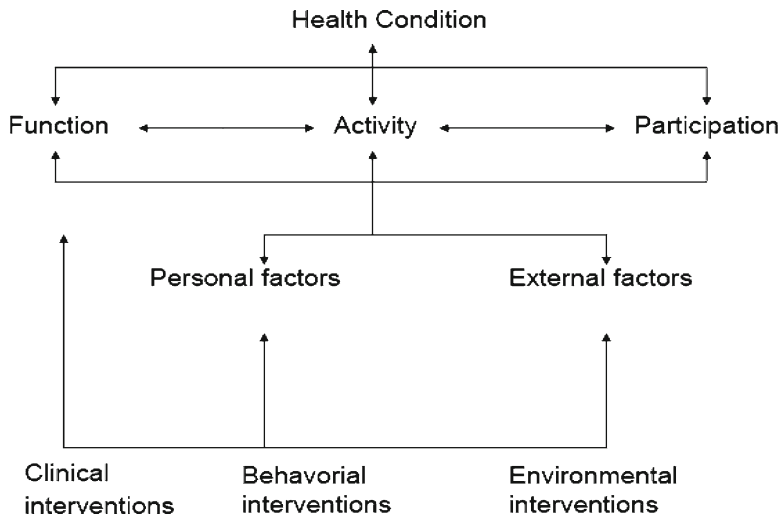

Fig. 13.2 ICF model (World Health Organization 2001) and intervention options, adapted by PBA Smits and JHAM Verbeek, Coronel Institute of Occupational Health, AMC, The Netherlands. EMUTOM project, August 2011

carry out the recommendations. The programme was successful and improved the therapeutic results for workers with primary care physicians without delaying the RTW.

13.4.4 WHO International Classification of Functioning, Disability and Health (ICF)

When discussing the problems in RTW and WDP among care providers, the WHO International Classification of Functioning, Disability and Health (ICF) provides a useful framework because it focuses on improving individuals functioning (in work and other aspects of life) and not only on disease outcomes (World Health Organization 2001). The ICF model is supported by many studies that have investigated the prognosis for RTW among patients suffering from a variety of diseases (Verbeek 2006). The attractiveness of the model is that it not only shows the interrelationships between health, disability and social functioning but that it also provides opportunities for interventions to enhance WDP (Fig. 13.2). Also in the fields of rehabilitation and physical therapy, the ICF model is advocated as a great promise to provide a synthesis of earlier models of disablement and to provide the rehabilitation disciplines with a common language with which to discuss disability and related phenomena (Jette 2006).

13.4.5 Work History

To enhance the possibilities for an effective WDP, care providers should always ask patients in the working age if they work or if they have reported sick. Possible barriers for RTW such as a lack of arrangements in the workplace or misconceptions of disability should be explored. Many care providers are, however, not familiar with asking their patients about this. A simple and structured work history could be useful for this purpose. For patients with chronic diseases, a topic list was developed that can be used by health professionals as a guideline for exploring the work-related problems of patients with a chronic disease (Detaille et al. 2003). Of course, also more attention is needed for short but adequate work history taking in the various health professional teaching programmes. International collaboration has started for teaching occupational health in undergraduate medical students (Smits et al. 2011), but still a lot of work can be done.

13.4.6 Empowering of Workers to Take Responsibility for Their Own Health and Safety

In traditional vocational rehabilitation services, often the patient or client had a rather passive role as a receiver of therapy or advice. The patient perspective, i.e. the possibilities of workers themselves to stay at work or to RTW, is less frequently studied or utilised in the past. This is, fortunately, changing. Gradually, more research is becoming available about an empowerment-oriented approach in WDP. In a systematic review, it was shown that some evidence exists that vocational rehabilitation interventions that pay attention to training of patients in requesting work accommodations and feelings of self-confidence or self-efficacy in dealing with work-related problems are effective (Varekamp et al. 2006). Health professionals are not always sufficiently aware of this. In studies on prevention of work disability among patients with rheumatoid arthritis, diabetes and hearing loss, health professionals tended to underestimate the factors that were imported from the patient's perspective (Detaille et al. 2003; Varekamp et al. 2005). Therefore, to have relevant and trustworthy guidelines on WDP issues, it is also a good policy to include one or more representatives from key affected groups (patients or workers) in guideline development groups to assist focussing on the patient's perspective and the possibilities for empowerment of individuals to stay in or RTW. HCP should more actively try to empower workers to take responsibility for their own health in relation to work and refer them to training courses or other interventions that enhance their own possibilities in WDP. Promising evidence is available in this. In case of asthma, a programme of patients' self-management resulted, in comparison to GP-supervised usual care, in a substantial and lasting reduction of asthma-related absence from work and other social daily activities (van Weel et al. 2006). Empowerment training of patients with a physical chronic disease increased self-efficacy and helped to reduce fatigue complaints (Varekamp et al. 2011). In the long term, this can lead to more job maintenance.

13.5 Conclusion

Although HCP often have a central role in the prevention and treatment of work disability, their contribution has not been consistently positive. Common problems include failure to recognise work disability as an important consideration, overfocus on biomedical issues and symptoms rather than on function, irrational cognitions about work and health, employing ineffective treatments and inability to deal with workplace and social issues. Education, economic incentives, peer leadership and support to address work disability issues can make a difference in work outcomes. A change in paradigm is suggested, based in large part on improved communication among workers, employers and HCP. The evidence base for a positive HCP' influence is growing, and in several countries, evidence-based practice guidelines are available that directly address work disability issues. Practical research on how to achieve meaningful change in healthcare provider attitudes and practices in relation to work disability is still needed. WDP should be a goal for all HCP.

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Understanding Work Disability Systems and Intervening Upstream

14

Ellen MacEachen

This chapter discusses the real impact of key policies in relation to ideals. It identifies how a focus on the logic and implementation of work disability systems can shed light on complex causal pathways between work and disability leading to improved system design.

14.1 Introduction

It is well accepted by health researchers that broad upstream determinants of health, such as societal and organizational structures and processes, have an important impact on downstream outcomes, such as individual health (Marmot 2010; Whitehead and Popay 2010; Gehlert et al. 2008). However, it can be difficult to identify causal pathways, which can be long and complex with multiple intervening factors (Braveman et al. 2011). Indeed, although models for evaluating health care systems identify structures, processes, and outcomes as three main relevant components (Loisel et al. 2001), empirical research in the field of work disability has tended to focus on relatively downstream topics, such as aspects of worker health and compensation claims. In the area of return to work, much qualitative research has dwelled on the experience of injured workers (Roberts-Yates 2003; Beardwood et al. 2005; Sager and James 2005; Haugli et al. 2011) and quantitative research on outcomes such as cost, disability duration, and worker health (Franche et al. 2005; Benavides et al. 2009). However, it is increasingly recognized in occupational health research that many current work disability problems, such as work reintegration challenges, are linked to processes and structures such as work organization, hierarchal relations, and working time arrangements (Rial-González et al. 2005). Given the increasing prominence internationally of work activation policies (OECD 2010), it is important to keep developing methods and designs to foster sustainable and appropriate work reintegration interventions following disability.

This chapter identifies ways that research on the mechanisms of work disability prevention systems can support the conceptualization of complex causal pathways between work and disability. Such research involves studies of key policies, such as early return to work, and their logic and substance, how implementation occurs, and how actual practice matches up to policy logic and ideals. The value of this focus on occupational health and safety system mechanisms is threefold. First, attention is drawn to the ways that system design can influence behavior. This can lead to informed interventions directed at improved systems and process. Second, analytic attention is brought to bear on organizational

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_14,

behavior, including the ways that social and political dynamics can influence how key stakeholders make decisions (Robertson 1998). Third, this focus helps to broaden our conceptual models of occupational health, offering the potential to synthesize research findings across structural, organizational, and individual phenomena, or a *three-dimensional image* of causes, processes, and outcomes (Torner 2011).

In this chapter, examples are provided of system mechanisms research and how these challenge the boundaries of work disability conceptualization. Following this, two detailed examples are provided of the author's studies of system mechanisms as they play a role in return-to-work problems and in the effectiveness of vocational retraining. Finally, there is a discussion about system complexity, intervention challenges, and approaches to work disability system reform.

14.2 Understanding Systems to Plan Interventions

The relevance of a focus on mechanisms becomes apparent when planning interventions. Without direct research of dynamics and processes within systems that contribute to outcomes, interventions are limited to assumptions about the likely causes of outcomes. For instance, some return-to-work interventions have focused on *best practice* approaches arrived at by literature reviews and expert consensus (Briand et al. 2008; Young et al. 2005; Cote et al. 2009). However, it can be argued that intervention research requires a broad range of evidence that goes beyond current knowledge and includes direct focus on how organizations function, social norms in workplace sectors, and complex patterns of interactions (Torner 2011).

As an example of interventions derived from limited data, return-to-work policies and interventions have focused on shortening worker time away from work, with the promise that early return to work is therapeutic and restorative for the worker. However, this inferential logic is based largely on the restricted evidence base of back pain research, cross-sectional data showing associations between disability duration and likelihood of work return, and theoretical assumptions based on ideal, harmonious workplace culture (MacEachen et al. 2007). The implementation of early return-to-work practices, as will be described below, is shaped by structural and organizational process that fall outside of this conceptual model, and real-world circumstances can produce outcomes that are not therapeutic or restorative. How can knowledge of return-to-work approaches be improved? Internationally, work disability policy is increasingly shifting from passive (benefit payment) to active (employment-oriented) work disability management (OECD 2010). A study of return to work across six countries found that sustainable return to work occurred most often when employment integration measures were supported by effective compensation measures, such as flexible disability benefits (Anema et al. 2009) (see also Chap. 22). This important association found between benefit structures and return-to-work sustainability requires direct empirical investigation of the nature of the association: how is it that benefit structure possibly makes a difference?

Intervention contexts, such as the role and impact of stakeholders who represent the various authorities in work disability management, have also been elaborated mostly through inferential logic. For instance, it is noted that friction is expected among stakeholders due to their different assumptions and paradigms (Franche et al. 2005). However, articles discussing the problems of disparate interests among work disability stakeholders often arrive at one of three expert conclusions: that stakeholders should work harder and improve communication to achieve common goals (effort focus), that stakeholders should receive training so that they are more sensitive to others' needs (knowledge focus), and that stakeholders require professional coordinating support, for instance, in the role of a return-to-work coordinator (skilled assistance focus) (Franche et al. 2005; Shaw et al. 2008; Pransky et al. 2010; Young 2012). This commonly held understanding on how to deal with the challenges of multidisciplinary stakeholder involvement in work disability prevention has resulted in some

advances in the field of implementation. However, the challenge remains that intervention recommendations are often imprecise and not practical for immediate use, many barriers exist, and many stakeholders are involved (Loisel et al. 2005). In recent years, researchers have increasingly focused on how to improve intervention implementation. Some have engaged in intervention mapping to detail changes expected by the treatment team (i.e., improvements expected in the worker) and the practical and theoretical rationale for how the intervention occurred for each worker (Briand et al. 2007). Others have developed qualitative studies of barriers and facilitators (Cote et al. 2009; Fassier et al. 2011). Often, this involves assessing process and outcomes against a conceptual model of expected process (see also Chaps. 23 and 24).

While these implementation measures yield some valuable information, they face one key problem. They are generally solutions that are being laid onto a relatively unknown (organizational, social, political, economic) environment, which can leave researchers with challenges relating to the fit between the intervention and the conditions of the setting. Take, for example, a hypothetical evidence base that shows that the duration of long-term workers' compensation claims can be lessened if case managers receive sensitivity training. Along with this, studies of injured workers have identified that a top concern is feeling misunderstood by case managers. In response, a sensitivity training intervention is launched for case managers. However, this intervention is applied with no examination of the local context of the managerial insensitivity. Is insensitivity arrived at through ill will, or ignorance, or is it due to other issues such as a heavy workload or fiscal directives? Let's say that, in this case, managers have a heavy caseload and are under pressure to reduce the number of allowed claims. This would explain why, when a case is demanding and complex, the pressured manager might simply deny the claim (achieving the goal of reduced allowed claims) or ignore some worker complaints rather than investigate (saving valuable time). Sensitivity training may have little effect on managerial behavior if it is not due to lack of managerial knowledge and instead stems from organizational process and constraints. An empirical investigation of system mechanisms could direct the intervention focus to staffing levels or clarifying criteria about claim denials. Essentially, without an understanding of the nature of the relationship between the problem and its context, an intervention can be misguided and valuable resources misused.

14.3 Occupational Health Systems Research

Much of the available research on the mechanisms of occupational health systems is qualitative inquiry. Qualitative methods are useful because they overcome some of the measurement complexities associated with researching upstream determinants of health. While these methods cannot establish the prevalence of a problem, they can explain influencing properties such as meaning, logic, social interaction, and relationships (Silverman 2001; Shortell 1999). A property such as meaning can be difficult to measure, but key to revealing the nature of relationships. Through the examination of documents (such as legal decisions, policies, government records, mission statements) and interviews, focus groups, or participant observation of key system players (for instance, system designers, implementers, users), insight can be gained about issues such as the overt versus core logic and directives of policy, financial incentives shaping behaviors of different parties, and short-term versus long-term organizational mandates.

Recent research on the mechanisms of occupational health systems has focused on the logic and goals of formal policies and procedures and how these fit with actual practice. In each case, the researchers challenge the boundaries of existing concepts thereby broadening conceptualization of links between occupational health systems, outcomes, and the range of possible interventions.

The first example is that of Stahl et al. (2010), who found that Swedish efforts to bring different authorities together to assist with the return to work of the long-term work disabled floundered,

despite being planned and coordinated. His interview and document review research identified how Swedish cooperation associations reached consensus about case management goals, but these were tempered by conflicting priorities of different public authorities. Some authorities were more oriented to return to work, while others focused on quality of life. Some were bound to short-term priorities, while others were concerned with long-term goals. Overall, the participation of the authority representatives in the cooperation associations was always limited by the filtering of issues through the principles and priorities of their home organization. This research suggests that consensus is not always achievable, pointing to the need either to better align interests among organizations or to move away from consensus ideals.

As a second example, Hohnen and Hasle's (2011) study of system mechanisms focused on occupational health and safety management systems. Their study of health and safety needs and practices in a Danish metal company showed that the rationale and goals of occupational health and safety management system at the plant were not synonymous with the goals of workers' safety and well-being. Their case study, which involved interviews and participant observation with workers and managers, examined how careful measurement and audits of safety issues such as wearing hard hats and goggles, tidiness inspections, and reporting of near-accidents created the appearance of full knowledge and control of safety risks. However, important issues occurred outside of these carefully measured issues, including some not amenable to measurement and audit, such as scope for professional judgment, psychosocial hazards, work intensity, and worker well-being. This study showed that health and safety management systems could be more effective if their focus was broadened to include work relations and production issues.

A third study illustrates an inadequate fit of occupational health and safety management systems with worker safety and well-being. Walker's (Walker 2010) ethnography of workmen at an American grain company shows how workers created informal health and safety structures when their occupational health and safety management system does not tackle the relevant risks. Although the plant held formal monthly safety meetings, they bore little relation to the safety culture as carried out by the workers. Further, the formal rules clashed with the informal means the workers had developed to protect themselves. For instance, although hard hats and safety glasses were mandated, these were resisted by workers who experienced these as increasing risk by reducing vision. Instead, workers engaged in alternative safety measures, such as not wearing wedding rings because they can crimp flesh and not using a special machine to clean parts because the machine can violently throw parts out. As well, the workers were careful about maintaining a routine so they had strong familiarity with the process and hazards. They avoided working with temporary agency staff who made mistakes due to lack of familiarity with the environment. This focus on organizational process offers several novel dimensions for interventions, in safety equipment design and managing worker inexperience.

A final example of how a focus on system mechanisms can help further knowledge about the fit between policy and practice is provided by Lippel (2003), who explored how injured workers in Quebec were scrutinized by workers' compensation authorities and employers, who each sought evidence to deny workers' entitlement to compensation benefits. Using interviews, case law, policy, and media articles, she showed how injured workers were subject to covert videotape surveillance by hired private detectives and how this organizational behavior impacted workers. While policy and media identified the issue as cheating and referred to the need for worker honesty about ability to work, the empirical data highlighted the workers' conflict between the gray zones of legitimate and illegitimate activity while recovering. For instance, if the worker is able to take out the garbage, did that mean he is inappropriately absent from work? The data detailed the detrimental effect on the worker of being targeted for surveillance and drew attention to our need to better conceptualize notions of recovery, ability, and inability.

Each of these examples shows how the study of actual organizational practice yields findings that challenge existing models, such as those of stakeholder cooperation, safety systems, and worker compliance. In the remainder of this chapter, detailed examples are provided from two of the author's studies of the mechanisms of work disability prevention systems: a workers' compensation early return-to-work system and a workers' compensation vocational rehabilitation system. In each case, the focus on system mechanisms provided an understanding of how poor worker outcomes occur. As well, a result was a broadened conceptualization of work disability, which led the way to targeted interventions for system improvement.

14.3.1 Study 1: System Role in Extended Claim Duration

The first study (conducted in Ontario 2004–2007) examined the problem of extended compensation claim duration of injured workers (MacEachen et al. 2010). Why, in the context of established return-to-work policy and processes, do some workers not return to work as expected? A total of 69 in-depth interviews were conducted with injured workers who had been on benefits for at least three months, and with providers who had firsthand experience of providing employment, health care, legal advice, and other support to injured workers with extended claims. Here, findings are detailed about system mechanisms in three contexts: workplace, health care, and workers' compensation.

In the *workplace context*, a key mechanism affecting the way work injury was managed was employer behavior that was oriented mainly to reducing the cost of experience-rated workers' compensation claims. To reduce costs, these employers returned workers to work very early with an orientation to minimize 'lost time', which was a driver of premium costs (see also Chap. 12). Because this approach was driven by costs rather than a rehabilitation orientation, it resulted in workers being returned to work but in an inactive and socially unpalatable position, as described by Sebastian (all names are pseudonyms):

> They call you next day and you have to go back. They had one fellow at work, "… he was there sitting in the chair [in the cafeteria] … The poor guy being humiliated … because they ask him to go there and spend the days in there …. He had to go there because they want to save their money … to get the …." [workers' compensation premium relief] (Sebastian, injured worker).

In other cases, an early return to work could mean an overreliance on the support of coworkers or access to lighter duties that were normally served for more senior workers, each which created a difficult social environment for the injured worker: "I didn't have the seniority at the time [for the modified work at a desk job] I was taking work away from people who thought they had earned the right to this work. So you're battling your co-workers and the whole thing was—there was a lot of bad feelings" (Janet, injured worker).

Employers also avoided officially reporting accidents and contested workers' compensation claims in order to reduce their workers' compensation costs. Since Ontario's workers' compensation system requires proof of work-relatedness of the injury, an employer could claim that a worker's injury stemmed from nonwork activities.

In all, cost to the employer was an important driver of poor workplace return-to-work practices. Return-to-work models, developed through application of principles in controlled good work conditions, presume that employers have a vested interest in maintaining healthy workplaces. However, the models do not fully consider system design, which can draw employer focus to cost, and workplace organizational dynamics, including the changing quality of employer-worker employment contracts (Papadopoulos et al. 2010). When the employer-employee relationship is poor or indifferent, an employer can focus mainly on cost avoidance, which in these return-to-work problem cases created practices detrimental to the recovery of injured workers.

In the *health care context*, bureaucratic paperwork requirements required by workers' compensation of physicians sometimes led them to avoid injured workers as patients or to quickly complete forms. In turn, this provided an inadequate knowledge base for return-to-work planning

by other parties, such as workers' compensation adjudicators, who relied on information in doctor's forms.

Consistently there's the issue of medical information: "A lot of doctors … are not crazy about spending a lot of time writing medical reports … and don't provide all the detail that would make the claim go through easily. Then there are some that are just pissed off at the Compensation Board, because … they get overruled or contradicted or not listened to which can lead them to be even less cooperative. So if you don't have good medical documentation, you're sunk, right there" (Samuel, peer helper).

Cooperation between workers' compensation and physicians about the return-to-work needs of injured workers was also impeded by burden of proof needs of adjudicators which, as described by this occupational physician, could slow down compensation decisions and contribute to illness chronicity: "So what I mean is … what is the level of burden of proof that you have to have? So it becomes very frustrating as a specialist where you're always questioned. … And you know, you have to have so many increases the complexity of what you're doing, and also it becomes very frustrating for the workers. … Same way, you know, we see that a lot, as well, with [occupational disease] claims that often they're seen by many, many specialists, all are saying it is work related, but Compensation needs a few more assessments to finally accept it, and by that time, you know, the [disease] is chronic and the person can't return to the workplace environment" (Dana, occupational health physician).

The challenge of adequate health care for injured workers was particularly acute in this study context, where there was a physician shortage and many workers had to use walk-in clinics where staff did not know them or their medical history. Each of these health care challenges contributed to workers' compensation entitlement decision-making that was based on incomplete or flawed information, and was linked to workers being placed in return-to-work situations that were inappropriate or damaging. Although some may see these health care challenges as an instance of individual practitioner violation of ethical medical codes, it can also be viewed as a systemic *gray zone* of practice between obligations to medical care and to form filling for other purposes. In any case, these problems fell outside of the line of vision of return-to-work conceptual models.

In the *workers' compensation context*, administrative procedures increased the possibility of miscommunication about workers' status and needs. Contact between adjudicators and workers occurred by letter or telephone, both forums that limited adequate communication about workers' situations and needs: "I think time with the provider [is a problem]. The [workers' compensation] providers are all time pressured …. There's good … evidence that patients … hear … very little of what you actually say to them. So … if providers had more time to sit and go through things, and … have a chance to kind of come … say a week later to … talk about it again, to answer any questions …. The Board has recognized it has communication challenges, but there's still something, I think, in not talking to [the worker] … it's always been done by voice mail, stuff like that, not actually talking to a person. I think those issues have been recognized, but I don't think they always follow through" (Lori, occupational health physician).

In some cases, these limited communication processes led to misunderstandings about workers' compliance with return to work resulting to their income benefits being cut off, which amplified workers' difficulties. In other cases, workers signed documents that they did not understand and were not in their best interest: "So I … showed her [adjudicator] the paperwork … And then she's, 'Sign here, sign here, sign here, sign this, sign this, sign this.' …Like, I'm in pain, still. So I'm signing and on my way home, I'm thinking, 'Maybe I signed something I shouldn't been signing'. … Now I don't even know if I'm still gonna get a check at the end, because I signed these papers? … I don't know how that works" (Stella, injured worker).

The communication problems resulted in delays in entitlement decisions, which caused workers stress and economic havoc: "And it doesn't matter whether the [workers' compensation] accepts the claim four months down the

road and pays all the money then. I mean if you've already incurred debts or used your credit cards or whatever … . Now you're sort of caught in a bit of a spin cycle that goes, 'Holy geez. Now … on top of the injury … . I've got to worry about … I've got no money, I've just lost my credit rating.' You know all those sorts of things" (Ben, human resources director).

This study of the mechanisms behind the problems of workers with extended workers' compensation claims drew on the firsthand experiences of a wide range of involved actors that included workers, legal representatives, human resource managers, occupational physicians and other health care providers, and workers' compensation staff. This multi-angled view of return-to-work problems revealed a variety of interacting mechanisms driving claims duration. It also identified structural characteristics of the system that contributed to claims duration, in financial incentives to employers that could prompt inappropriate return-to-work arrangements, bureaucratic interaction with health care providers that could lead to incomplete information for decision-making, and workers' compensation administrative procedures that allowed for miscommunication about worker needs and delayed claim entitlement processes. Each of these mechanisms explained how workers with seemingly minor injuries could experience hardship due to a harsh return-to-work process resulting in secondary health problems such as stress and depression that could, in turn, further exacerbate successful return to work. This consequence was identified as the "toxic dose of system problems".

In Ontario, these findings prompted some targeted system-level interventions. Injured workers with claims lasting longer than three months now have improved communication with their adjudicators, through a face-to-face meeting. Workers' compensation now takes a more active interest in how workplace return to work is carried out, with the new role of *return-to-work specialists* who visit workplaces. This investigation of system mechanisms also shows how, in the arena of work disability prevention, an intervention focus at the system level has the potential to make a positive impact on large numbers of workers.

14.3.2 Study 2: System Role in Worker Retraining Challenges

A second study focused on the mechanisms of worker retraining following a work injury. Much return-to-work research focuses on a return to the pre-injury employer. However, some workers cannot return to their former work and workers' compensation programs often offer vocational retraining to these workers to facilitate a return to the labor market. This study (conducted 2007–09) examined how vocational retraining actually functioned in Ontario (MacEachen et al. 2012a). This was a program of last resort and, at the time of the study, workers entered this program on average three years after their initial injury. It was known at the time of the study that the program had a high dropout rate and only half of workers completing the program gained employment.

The data included 71 in-depth interviews with all key players directly involved in vocational retraining: injured workers in the program, employers who had released workers to the program, workers' compensation staff, vocational case management providers, retraining educators, and legal case workers. Here we detail three main system-level issues that helped to explain vocational retraining outcomes: recovery threshold, employer costs, and communication systems.

First, workers were sent to the program when they were considered to be at a "recovery threshold". This concept in workers' compensation policy directed vocational planners to advise workers about work for which they had some residual functional ability. However, this concept did not capture the challenges of pain and chronicity that were apparent to workers and the educators who saw them daily. Educators described workers managing pain conditions with daily doses of morphine-based pain medication, which, in turn, limited their ability to learn and maintain regular attendance in a retraining program.

"Retention is one of the biggest problems we have at our Centre. We'll have clients who … take a lot of medication and come to the Centre and we teach them something and the next day they don't remember any of it" (education provider 2).

Second, the workers' compensation system was set up so that employers faced significant premium surcharges for worker absence due to injury and releasing workers to the retraining program maximized those costs. Employers therefore tried to avoid these costs, and did so in two ways, which could increase harm to the worker and cause challenges for the successful retraining. Retention of the worker until the end of the experience-rating liability window was one way that employers would avoid costs and unwelcome inspector attention: "We're just trying to keep her working … we just want to prevent … that three-year mark before we get hit" [with premium costs] (employer, FG Central).

Only when employers were in a position to avoid related insurance costs would some release the worker to the retraining program. However, by this time, the worker could be on a downward health spiral: "They placed me in the [modified job] for a year and a half. What I didn't understand at that time was the employer only had a 2 year obligation. So, they were just waiting until the end of the … obligation. … In a two hour [period] I may … put in one hour … actually doing work. The rest of the time … I was walking in the halls … and lying down. … . It probably looked to [the workers' compensation board] like I was going into work … . My quality of life was horrible… . My hair was falling out. I started to develop great big boils … just reacting to the stress and the constant pain … . Finally, my doctor and my social worker took me off work" (worker, FG Central).

A further cost avoidance strategy of employers involved directing some of the least able workers to the retraining program. A special premium relief fund for employers intended to encourage them to employ workers with preexisting health problems was instead used by employers to avoid the surcharge to their premiums associated with placing a worker in the retraining program. This incentive prompted employers to release the unhealthiest workers to the retraining program, who could least participate: "As long as they're within that three-year [experience rating] window, we'll be dinged with huge surcharges … [If] they're maxed out with trying to find work for these [work injured] people … then you start looking at who has a pre-existing condition, because …we've got cost relief [through the secondary injury enhancement fund]. … You end up … being forced into these financial decisions, and you're going to take the person who has the most pre-existing, who is actually the worst candidate to be retrained" (employer, FG Central).

A third system mechanism affecting worker retraining success was the poor setup for communication between the workers and workers' compensation about program and retraining problems. This retraining program was outsourced by workers' compensation to private providers. An atmosphere of contract insecurity led the private providers to believe that, if workers' compensation heard about problems with the retraining process, the contract would be withdrawn: "Do I feel as a service provider of [vocational retraining] services external to [workers' compensation] that I'm fairly treated? No. I have likened it to being held over a barrel. And when we say something [isn't working well] they say, 'Well, if you don't like it, we'll find somebody else to do the contract'" (LMR firm D).

When workers in the retraining program had a complaint, they were told to direct these to the contracted service providers, who then had the discretion about how and when to share these complaints and could choose to not act on them: "We've heard those complaints. … Sometimes it's the [vocational retraining] program. Sometimes it's, you know, 'They're just giving me my marks. I'm not really writing their tests …' The recourse usually is through the [outsourced private] service provider who then brings it to our attention … probably [with] a recommendation on what they feel. [Pause] … It doesn't happen very often. … . I guess … the [worker] would go … through their service provider and then to us ultimately to make a decision on whether or not we think they have a valid beef" (WSIB provider 5).

These communication structures and competitive pressures on vocational retraining service providers led to what educators called creative practices for retraining. The quality of education was compromised by workers sometimes being

retrained for goals that were not suitable for them and in a context where educators dared not speak up for fear of jeopardizing their own contractee relationships, as they were, in turn, subcontracted by the private vocational retraining service providers: "It's highly competitive … There are a lot of [education] service providers that are doing the same sorts of things that we are doing. We had a referral last week … for a concierge … Well, there are no concierge jobs in [town] … And then we're kind of in a position where we have to then go back and say, you know, 'This isn't a smart goal.' And some [vocational retraining] case managers are very offended by that, because it makes them look bad for choosing a goal that doesn't exist … We have [to train someone as] a heavy equipment operator … who can't lift more than five pounds. … So sometimes these goals are selected very poorly and … there's not a lot we can do about it. We try. And we try to be creative …" (education provider 5).

The dysfunctions of this program were recognized by all parties, including workers' compensation staff. However, each felt compelled to go along with the momentum of the program: "We've … joked among ourselves … that some workers succeed despite [the vocational retraining program] … because for workers who are really motivated … I think sometimes we even frustrate some of those workers by … making them" [participate in programs that don't meet their needs] (WSIB provider 4).

This study of a vocational retraining process shed some light on the disparity between the model's ideals and actual processes, and helped to explain how poor work reintegration outcomes develop following work injury. The study showed the ways that different system actors played a role in performance problems and how contextual conditions such as conceptualization of worker health threshold, contracted provider contract insecurity, the setup of experience-rated workers' compensation premiums, and internal communication structures each shaped the practice of vocational retraining. In Ontario, this led to interventions by workers' compensation to tackle some of these structural issues. To avoid delayed retraining program referrals, a greater emphasis is now placed on worksite visits by workers' compensation staff to prompt active return-to-work practices, and the experience-rating window was lengthened to avoid inappropriate employer retention of workers when they do not intend to reintegrate them. Contracted out services have now been brought in-house in order to improve communication sharing about worker needs. This study contributed to work disability prevention knowledge by conceptualizing the interaction between chronic pain and retraining, employer return-to-work behavior as driven by financial incentives, and challenges with subcontractor relations in work disability management.

These detailed examples of two empirical investigations of system mechanism can lead to more fully developed design for interventions. The studies elaborated links between individual worker outcomes and further upstream system design focus. That is, what are the components of the work disability system, how do they operate, and how can active work reintegration be improved?

14.4 Discussion

This chapter has detailed ways that work disability prevention research focusing on mechanisms that produce outcomes can lead to interventions that address work reintegration at an upstream system design level, thereby having the potential to make a positive impact on large numbers of workers.

A focus on processes that contribute to outcomes can help to develop occupational health system design and implementation. Too often, return-to-work problems are seen at a late stage, and the focus is on treatment at the individual worker level. What is visible at this point is the full-blown health challenge and not the determining conditions such as organizational behavior and incentives. As well, models of return to work often lack evidence about work organization and processes, resulting in implementation challenges. Although the two elaborated examples of misfit between policy and implementation are focused on Ontario, this issue is not restricted to or even necessarily particularly prominent in this

jurisdiction. Challenges with interventions, when practices do not fit the hypothesized model, have been described across nations (Nilsen et al. 2011; Parrish and Schofield 2005; Stahl et al. 2012; Wales et al. 2010).

The work disability paradigm (Loisel et al. 2001) offers an expanded view of disability that considers causes and effects at different levels, ranging from individual to organizational to societal. Further empirical research on interactions between components at different levels can improve system design and implementation. As well, in return-to-work policy design and research, there is the need to consider and integrate issues such as the changing nature of work (subcontracting, three-way employment relationships, home offices, contingent work) (Papadopoulos et al. 2010; Davis-Blake and Broschak 2009; Lippel et al. 2011; MacEachen et al. 2012b) and employment relationships, including increasingly loose loyalty ties between employers and workers (Rubery et al. 2002). These are critical contexts that affect the shape and possibility of work injury and return-to-work processes. Knowledge of environmental work conditions such as economic conditions, employment relationship norms, and worker representation is required for conceptualizing complex causal chains and for interventions. This knowledge can further understanding of both the nature of problems and the conditions for sustainable interventions.

It is in order to recognize these issues and identify where to intervene, or to understand how success was achieved, that empirical research about the nature of the relationship between process and outcome nature is required. For instance, in the vocational retraining study, the finding of poor communication about health problems between workers and the workers' compensation board could have yielded an intervention focused at training workers to speak up more effectively about their needs. However, a system-level intervention that impacted the greatest number of workers was to tackle the subcontracting arrangements that suppressed communication, and this was the route taken. Similarly, return-to-work problems related to a lack of communication and coordination are both areas where work disability researchers have called for more effort (Pransky et al. 2010). By focusing on processes that lead to outcomes, interventions are directed to organizational and economic determinants, for instance, in the extended claim duration study example, to perverse economic incentives and structures that leave health care providers rushed. Although examples provided in this chapter have been of misfit between system design and the actual implementation environment, the empirical examination of process can also identify components of successful interventions—what is it that made an intervention succeed?

An important aspect of upstream interventions is that they do not rely on individual action to protect themselves. In relation to public health, Robertson (1998) argues interventions at this level can be quite effective: "We have known for decades that the most effective prevention approaches are those that can be implemented without individuals having to take action to protect themselves. Examples are milk pasteurized before it reaches the consumer. … Why then are so many prevention programs directed at individual behavior rather than at injury and disease agents, vehicles or vectors, and environments?" (p. 54).

In this chapter, it is argued that to develop and improve programs that support injured workers to return to work, a research focus is needed of interaction between human behavior (including workers, employers, state actors) and broader environmental structures. In the studies presented, actors are theoretically conceptualized as not acting in psychological isolation. Rather, their beliefs and actions are seen as shaped by the broader structural environment (such as experience rating, or the setup of health care systems, or employment standard norms) in which they operate. This theoretical approach moves away from a focus on individual worker condition to one that investigates the circumstances that shape norms and possibilities for behavior (Bourdieu and Wacquant 1992; Foucault 2002; Emirbayer and Johnson 2008).

System-level interventions are not simple, and can be beyond the scope of researchers. They rely on the engagement of key stakeholders, often policy-makers. For this reason, a recent OECD (2010) document about sickness, disability, and work refers to the *political economy of reform*,

meaning that the interests and inclinations of a great variety of parties need to be considered. In the two detailed examples of system-level studies provided in this chapter, change was achieved at the provincial level in Canada, by engaging well-chosen key stakeholders from the very start to help focus the rationale for the study and throughout the study as members of an Advisory Committee. In this way, emerging results were well understood. More importantly, the research focus and design was sufficiently convincing that there was consensus among the different stakeholders about need for system change.

14.5 Conclusion

This chapter has identified ways that research on the mechanisms of work disability prevention systems can support the conceptualization of the complex causal pathways between work and disability. The design and implementation of work reintegration policy and programs, which are increasingly prominent internationally (OECD 2010), can be furthered by research evidence that considers the interaction of individual, organizational, and system-level components (Loisel et al. 2001). Research on how systems function in practice contributes to three-dimensional conceptualization of causes, processes, and outcomes in work disability prevention. It also offers a vision of upstream intervention possibilities that can make a difference to the lives of many workers.

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Tools for Assessing Work Disability

15

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This book chapter presents an overview of work disability assessment tools as well as criteria intended to guide users in their choice of the most appropriate instruments.

15.1 Introduction

Over the past few decades, a large body of evidence has been amassed on the assessment of work disability. Work disability encompasses work absenteeism and presenteeism originating from either traumatic or nontraumatic health problems. It is usually defined in operational terms as time off work, sick leave, reduced productivity, or working with functional limitations (Schultz et al. 2007). Based on the ICF (International Classification of Functioning, Disability and Health) framework, work disability is associated with *activity limitations*, i.e., difficulties an individual may have in executing activities (work task), and *participation restrictions*, i.e., problems experienced by an individual (worker) with involvement in life situations (work) (WHO 2001). These domains are influenced by the interaction between an individual (with a health condition) and that individual's contextual factors (i.e., environmental and personal factors) (WHO 2001). Research on work disability assessment has focused mainly on enhancing knowledge of personal and environmental factors associated with, or determining, work disability. Over the past decades, several tools have been developed for assessing specific personal factors such as pain, distress, quality of life, and disability perceptions, and others for assessing environmental factors such as organizational factors, social relations, work performance, and job characteristics. More recently, studies have also focused on developing tools for assessing the interaction between personal and environmental factors (Durand et al. 2009).

Work disability assessment tools may be classified into three main categories according to their purpose: predictive, discriminative, and evaluative (Gray et al. 2011; Kirshner and Guyatt 1985). Those tools with a *predictive purpose* are designed for the early detection of workers at risk of long-term disability in order to prevent its occurrence. It has been suggested that early detection could improve the process of treatment allocation, optimize the cost–benefit ratio, and reduce the burden of disease for society as well as for individual patients (Sattelmayer et al. 2012). Tools with a *discriminative purpose* are used to categorize patients into clusters (subgroups) to ensure better matching of interventions with patient

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_15,

needs. Targeted interventions are developed for each cluster. This subgroup/intervention approach aims to facilitate identification of those individuals likely to need additional help, in turn allowing for selection of the most appropriate interventions with optimal effect for each subgroup (Brennan et al. 2006; Childs and Cleland 2006; Fritz et al. 2003). Finally, work disability assessment tools designed for an *evaluative purpose* are used to improve understanding of patients' conditions and needs, identify workplace obstacles, determine the need for rehabilitation, set appropriate treatment goals, choose the most appropriate interventions, rule out underlying conditions that may require more extensive examination and more specific medical intervention, decide when a worker can return to work, and monitor changes/progress during the course of rehabilitation (Kendall et al. 2009; Kielhofner 2008).

This chapter provides an overview of work disability assessment instruments, and guides users in their choice of the most appropriate tools. The "flags system" is presented first, as it has great influence in both research and practice in the area of work disability assessment. Several criteria for choosing work disability assessment tools are then presented, followed by a number of instruments actually designed to assess work disability. As Chap. 3 already discusses measurement instruments for assessing presenteeism, this chapter focuses only on tools developed for workers off work due to a health problem (absenteeism). It presents some of the current tools that can be used to screen for long-term work disability or that can assess work ability and obstacles to return to work. These tools have different purposes, are of different types, and target different populations.

15.2 The Flag System

The "flags system" was among the first comprehensive assessment approaches available for the identification of risk factors for long-term disability and work loss, and for the prevention of chronic pain and disability. It included psychosocial factors that prevent patients with musculoskeletal problems from being active and working. This system was presented in a guideline for clinicians on the assessment of psychosocial yellow flags in acute low back pain patients (Kendall et al. 1997). In this guideline, physical factors (red flags) were distinguished from psychosocial factors (yellow flags) because the latter are likely to increase an individual's risk of developing prolonged pain and disability. The guideline proposes a two-stage approach involving first, the use of a questionnaire to screen patients in need of further assessment (the Örebro Musculoskeletal Pain Questionnaire, ÖMPQ), and second, the conducting of a clinical assessment of the patient's attitudes and beliefs about back pain, behaviors, compensation issues, diagnosis and treatment, emotions, family, and work (Kendall et al. 1997). More recently, the flags system has been refined by the addition of the concept of mental health problems (orange flags), perception of workplace (blue flags), and contextual factors (black flags) (Kendall et al. 2009; Nicholas et al. 2011; Shaw et al. 2009). Table 15.1 presents a short definition and examples of factors pertinent to each flag color.

The flags system provides a biopsychosocial overview of the disability problem. A guide to the flags system has been published and presents a stepped-care approach to the management of musculoskeletal disorders (Kendall et al. 2009). This guide defines three phases (initial phase, less than 2 weeks; early phase, from 2 to 12 weeks; and persistent phase, more than 12 weeks) and proposes specific intervention objectives and actions for each. Although the focus of the flags system was not primarily on work disability, it provides a good framework for multidimensional assessment, i.e., biopsychosocial evaluation of the work disability problem.

15.3 Criteria for Choosing an Assessment Tool

A myriad of tools to assess personal and environmental factors associated with work disability can be identified in the scientific literature. These tools have been categorized in a variety of ways in the literature. Shaw et al. (2009) described six

Table 15.1 Flags system (Main et al. 2008; Nicholas et al. 2011; Shaw et al. 2009)

Flag color	Definition	Examples
Red	Physical risk factors for serious pathology or disease that should lead to appropriate medical intervention	• Nerve root pain • Infection • Vertebral fracture
Orange	Significant mental health problem for which help from a mental health specialist should be sought	• Major personality disorders • Drug and/or alcohol abuse/addictions • Major depression
Yellow	Psychosocial risk factors associated with unfavorable clinical outcomes and persistent pain and disability	• Avoidance of normal activity • Catastrophizing • Distress
Blue	Individual perceptions about work characteristics and social interactions. These features of work are generally associated with higher rates of symptoms, ill-health, and work loss	• Low expectation of return to work • Belief that work is harmful • High perceived workload • Low job satisfaction
Black	System or contextual factors including relevant people, systems, and policies that can affect disability	• Financial and compensation problems • Unhelpful policies/procedures used by company • Disagreements between key players • Job involves shift work or working "unsociable hours"

types of tools for assessing risk of prolonged work disability: (1) patient questionnaires, (2) semi-structured clinical interviews, (3) worksite meeting and inspection, (4) clinician impressions, (5) objective measurements, and (6) administrative data. Such instruments and methods may also be categorized according to their purpose, and they may address individual-level or organizational-level needs, or both. They may be one-dimensional or multidimensional and either stand-alone instruments or part of a multi-method protocol. They may be disease-specific or generic instruments. Lastly, they may be designed for different types of users. Currently, the majority of tools available are designed for clinicians as the users, and only a few exist for other users, such as employers and insurers.

Several criteria have been defined for the purpose of assessing the properties of measurement tools (Fitzpatrick et al. 1998; McDowell 2006; Streiner and Norman 2008). These criteria concern measurement issues (i.e., appropriateness, reliability, validity, responsiveness, precision, and interpretability) and practical issues (i.e., acceptability and feasibility). Table 15.2 provides a short definition of each criterion (Fitzpatrick et al. 1998; McDowell 2006; Streiner and Norman 2008).

15.3.1 Appropriateness

Appropriateness refers to how well the content of the tool matches the intended purpose of the assessment. As stated in the introduction, there are several purposes for assessing work disability and these may vary greatly according to the population and the context. Currently, most tools have been developed for patients with musculoskeletal disorders (mainly low back pain) because of the high prevalence of these conditions and the substantial costs associated with prolonged work disability. However, in the past few years, prognostic evidence has also emerged for other disorders and diseases, such as mental disorders (Blank et al. 2008; Cornelius et al. 2011) and cancer (Johnsson et al. 2011; Spelten et al. 2002). Interestingly, several work disability factors, such as negative return-to-work expectations and non-supportive working environment, appear to be similar to these different diseases. Some studies have explored the adaptation of available instruments for populations other than those initially targeted (e.g., Work Disability Diagnostic Interview, WoDDI (Durand et al. 2010), Beck Depression Inventory (Corbière et al. 2011)), and others have developed instruments applicable to several populations (generic tools) (e.g., Work

Table 15.2 Criteria for choosing a tool (Fitzpatrick et al. 1998; McDowell 2006; Streiner and Norman 2008)

Type	Definition
Appropriateness	Whether the content of the tool matches the intended purpose of the assessment
Reliability	Whether measurement on different occasions, by different observers and using similar or parallel tests, produces the same results Types: 1. Stability: ensures that the same results are obtained on repeated administration of the tool (test-retest reliability) 2. Homogeneity (internal consistency): ensures that the items within the scale measure the same concept 3. Equivalence: for direct observation tools, ensures consistency or agreement between observers (interrater agreement) using the same tool or between alternate forms of a tool (parallel forms)
Validity	Whether a tool measures what it is intended to measure Types: 1. Content: ensures that the tool has enough items and adequately covers the concept under investigation 2. Criterion: ensures that the tool correlates with measures of the same concept administered at the same time (concurrent validity) or future measures of the same concept (predictive validity) 3. Construct: ensures that the tool measures or correlates with the underlying theory
Responsiveness to change	Whether a tool has the ability to measure clinically important changes over time, when change is present
Precision	Whether the tool reflects the true changes or differences
Interpretability	Whether the tool provides meaningful scores
Acceptability	Whether patients have the willingness or ability to complete a tool
Feasibility	Whether the tool requires time and resources to administer, to score, and to interpret

Role Functioning Questionnaire (Amick et al. 2000), Work Role Interview (Velozo et al. 1999), Job Content Questionnaire (Karasek et al. 1998)).

The duration of work disability may be another criterion that influences the choice of a tool. Work disability can be divided into distinct phases. Specific interventions have been suggested for each phase. For example, the flags system stepped-care approach advocates primary care management efforts such as providing patient advice/support and controlling symptoms in the initial phase (less than 2 weeks). However, if entering the persistent phase (more than 12 weeks), a multidisciplinary approach is needed (Kendall et al. 2009). Usually, there is no need for an extensive evaluation in short-term sickness absence since a high proportion of patients return to work during the first month of work disability. Thus, screening questionnaires are used more often during early phases than interview tools. By contrast, a comprehensive evaluation may be needed to assess the various factors involved in long-term work disability.

As work disability is highly context-specific, another criterion for choosing a tool concerns the context in which the tool was developed and assessed. Factors related to return to work may vary according to jurisdictional differences in compensation, in disability and unemployment insurance, and in social welfare and retirement systems (Krause et al. 2001). Hence, some work disability factors may differ from one country to the other. Generally, a tool is developed and tested for a specific population in one country, thus limiting its "generalizability" (external validity) to other study populations and different cultures (Gray et al. 2011). From a research standpoint, it would be relevant to harmonize and standardize the assessment of work disability between countries and populations. At very least, work disability assessment tools should be cross-culturally adapted using standardized methods (Beaton et al. 2000). This will allow for the comparison of studies that involve different populations and are conducted in several countries, thus

enhancing external validity. From a clinical standpoint, when choosing an instrument or method, it is important to check whether it has been tested in a comparable population (e.g., disease/disorder, age group, or culture). Also, the availability of the tool in the language of the assessor and patients is another practical criterion to consider.

15.3.2 Psychometric Properties

Psychometric properties (validity, reliability, responsiveness to change, and precision) are important aspects of an assessment tool. It is essential that tools have proper psychometric properties to ensure that they serve their intended purpose, that they can be used in different circumstances and by different persons, that the results are not obtained by chance, and that they help detect changes in a person's condition. For example, a tool that purports to assess a person's weight should correctly quantify the weight (validity), should produce similar measures if the weight has not changed between two measurement intervals (test-retest reliability), should yield similar measures if used by different raters on the same person (interrater reliability), and should indicate differences if the weight has changed over time (responsiveness to change). Work disability assessment tools should be rigorously developed on the basis of sound prognostic studies and then validated. Studies generally report the assessment tools available as having fair to good psychometric properties. However, few studies on psychometric properties have been published for most available work disability assessment tools, and some limitations can be identified in existing studies. Further research is therefore needed on the psychometric properties of these tools.

15.3.3 Interpretability

The interpretability of the scores obtained on an instrument is another criterion to consider when choosing a tool (Fitzpatrick et al. 1998). Several tools have established cutoff values to help interpret the scores obtained on a questionnaire. For example, scores on the Work Ability Index can be classified into four categories: poor (7–27 points), moderate (28–36 points), good (37–43 points), and excellent (44–49 points) (Tuomi et al. 1998). Another approach to interpreting results is to determine the minimal clinically important difference for the test, i.e., the smallest difference in score that is considered meaningful and worthwhile by a patient (Copay et al. 2007). For example, a change of two to three points (upon 24 points) on the Roland-Morris Disability Questionnaire was considered the minimal clinically important difference (Bombardier et al. 2001). Lastly, for some tools, the score can be compared with data for the general population (norms). Normative data allow for the standardization of mean scores and help to determine whether a score is above or below the average for a specific population. For example, several norms for the SF-36, a questionnaire used to measure health-related quality of life, have been published for different age groups, gender, and countries (Duran-Arenas et al. 2004; Hopman et al. 2000; Jenkinson et al. 1993).

15.3.4 Acceptability and Feasibility

Acceptability and feasibility are other important aspects to be considered when choosing a tool. How much does the tool cost to administer, score, and interpret? Is a license required to use the tool? Is training needed? How is it scored? Who will administer the tool? Is it safe to administer? How much time is needed to administer and score the tool and interpret the results? Questionnaires are usually quick to administer and useful for screening a large number of persons, and they require little skill (Kendall et al. 1997). However, they are susceptible to confounding factors and may not be applicable to everyone because of language or cultural barriers (Kendall et al. 1997). When used for evaluative purposes, questionnaires may be helpful but they alone are not sufficient (Kendall et al. 2009). Several studies have shown that subjective questionnaires on patients' perceptions may exaggerate or conceal the problem (McDowell 2006). For example,

work demands may be perceived by an injured worker as worse than they are in reality (Halpern et al. 2001). It is thus suggested that other types of assessment allowing for a triangulated approach be used to assess work disability.

Other suggested methods include interviews and observations. Semi-structured interviews allow for more in-depth multidimensional evaluation of work disability factors and for proper tailoring of interventions to patients' needs. Interviews may also allow judgments to be made about severity and can be adapted to the individual's needs (Kendall et al. 1997). On the other hand, they can be time- and resource-consuming and interviewer training may be needed. Also, they can be subject to biases and prejudices, costly, and impractical for large groups and populations (Kendall et al. 1997; Main et al. 2008). Observations allow behaviors, as well as occupational performance and functioning, to be evaluated in an artificial or a real setting. During the observation process, clinicians can also take objective measurements of job demands, for example, by measuring postures and loads (Shaw et al. 2009). Observations can be time- and resource-consuming, and both training and practice are usually needed to ensure proper use of the tool. In addition, they may be less feasible than other tools as they may require specific equipment and be more costly to administer. The choice of a tool will depend on the purpose of the assessment. Usually, the amount of time and effort needed is proportional to the amount of information needed (Kielhofner 2008). A clinician who is seeking a clear understanding of the work disability factors pertinent to a given patient in order to set up a treatment plan might use a combination of assessment tools. By contrast, an insurer wanting to know whether a patient is at risk for long-term disability might prefer to use a screening questionnaire.

15.4 Tools for Screening for Long-Term Work Disability

Several studies on the course of low back pain have shown that most patients return to work during the first month and that only a small fraction of them have prolonged disability. Also, return-to-work curves show that the longer a worker is off work, the lower the probability that he or she will return to work (Crook and Moldofsky 1994; Frank et al. 1998; Spitzer et al. 1987; Waddell 2004). However, the small fraction of workers off work on a prolonged basis accounts for a large portion of the costs related to work disability (Spitzer et al. 1987; Waddell 2004). In order to prevent prolonged work disability, it has been proposed that efforts should focus on early detection of patients at risk for long-term disability. Several screening tools have been developed for predictive purposes (Melloh et al. 2009). Screening tools are usually used in the acute phase of disability to predict a person's risk of developing a prolonged disability. Melloh et al. (2009) reviewed nine screening instruments and found that psychosocial and occupational factors were the strongest predictors of work status. Three screening questionnaires are presented in the following sections: the ÖMPQ, the Subgroup for Targeted Treatment Back (STarTBack) Screening Tool, and the Absenteeism Screening Questionnaire (ASQ).

15.4.1 Örebro Musculoskeletal Pain Questionnaire

Purpose: The ÖMPQ is an adaptation of the Acute Low Back Pain Screening Questionnaire (ALBPSQ); the ÖMPQ has 25 items (instead of 24 in the ALBPSQ) and addresses all musculoskeletal disorders (instead of only low back pain in the ALBPSQ) (Linton and Boersma 2003). The ÖMPQ is a tool developed to assist in the early identification of yellow flags in patients at risk of developing persistent work disability due to pain (Linton and Boersma 2003). This instrument was developed for use in primary and secondary care settings with patients who have acute or recurrent pain (Linton and Hallden 1998).

Conceptual basis: The ÖMPQ was developed on the basis of literature reviews in which psychological factors were found to be associated with the development of chronicity (Linton and Boersma 2003). The variables were selected from

risk factors identified in the literature (Linton and Hallden 1998). Also, several questions were taken from other existing questionnaires: the Outcome Evaluation Questionnaire, Activities of Daily Living for Patients with Chronic Pain Scale, Coping Strategies Questionnaire, Fear-Avoidance Beliefs Questionnaire, and Pain and Impairment Relationship Scale (Linton and Hallden 1998).

Description: The ÖMPQ is a self-administered questionnaire composed of 25 items, of which 21 are scored (Linton and Boersma 2003). Three items deal with sociodemographic factors (i.e., age, gender, and nationality) while the others cover days off work, anxiety and tension, depression, pain, activities of daily living associated with pain, coping, job satisfaction, fear-avoidance beliefs, and the patient's expectations regarding recovery (Sattelmayer et al. 2012). The items can be grouped into five main categories: function, pain, psychological, fear-avoidance, and miscellaneous (Gabel et al. 2011). They are scored on rating scales of 0–10. The total score can range from 2 to 210 points, with higher values signaling more psychosocial problems. Cutoff values of 105 and 112 have been proposed to indicate those "at risk" for developing persistent problems (Linton and Boersma 2003). Also, other cutoff ranges are used to indicate low risk (less than 90), medium risk (91–105), and high risk (more than 105).

Alternative forms: The original Swedish version of the ÖMPQ has been translated into several languages such as English, French, Norwegian, and Australasian (Hurley et al. 2000; Maher and Grotle 2009; Margison and French 2007). Some translated versions can be downloaded from the Web (http://www.oru.se/champ).

A short 10-item form was also developed and comprised two items for each of the constructs of the ÖMPQ: pain, fear-avoidance belief, return-to-work expectations, distress, and self-perceived function (Linton et al. 2011). This short form was found to be almost as accurate as the long version. However, since the short version contains fewer items, its clinical usefulness has been questioned (Linton et al. 2011).

Also, a modified version of the ÖMPQ was developed in order to improve some of the limitations of the original version, such as inconsistent wording, inconsistent factor structure, and the lack of a rigorous development procedure and independent validation (Gabel et al. 2011). This new version also included 25 items, was structured according to the ICF framework, added one new construct (personal construct) to the five previous ones, and changed the wording of several items and of the title. The modified ÖMPQ showed high test-retest reliability (ICC = 0.975), internal consistency (Cronbach's $\alpha = 0.84$), criterion validity (Spearman's $r = 0.97$), predictive validity (Area Under the Curve (AUC) = 0.84–0.88), and content validity (Gabel et al. 2011).

Reliability: The developers reported satisfactory test-retest reliability (0.83) of the ALBPS (Boersma and Linton 2002). Also, the Norwegian version of the ALBPSQ showed high test-retest (ICC = 0.90) and internal consistency (Cronbach's $\alpha = 0.95$) (Grotle et al. 2006).

Validity: A systematic review concerning the predictive validity of the ÖMPQ found seven publications in this regard and showed that the ÖMPQ has a moderate ability to predict long-term pain, disability, and sick leave in patients with acute or subacute spinal pain (Hockings et al. 2008). Also found was a meta-analysis of the predictive validity of the ÖMPQ and the ALBPSQ; 13 studies were included and used different cutoff values ranging from 68 to 147 (Sattelmayer et al. 2012). This meta-analysis found weak to moderate predictive value (pooled sensitivity of 0.59 and specificity of 0.77) with high heterogeneity, making it impossible to recommend a cutoff value (Sattelmayer et al. 2012).

Commentary: The ÖMPQ is one of the most widely used disability screening questionnaires. It has been tested in different cultures, is easy to administer, and is recommended as a first-level screening tool in the primary care setting (Johnston 2009). However, to date, little information can be found on its reliability. Also, its validity is moderate. Few items on the ÖMPQ are

work-related and several items are not modifiable, thus providing no obvious opportunities for intervention (Truchon et al. 2012). Also, the use of cutoff scores has been questioned and other researchers have recommended the use of a prediction model and an individual risk profile instead (Sattelmayer et al. 2012). More sensitive scoring systems need to be developed (Main et al. 2008).

15.4.2 Subgroup for Targeted Treatment Back Screening Tool

Purpose: The STarTBack Screening Tool is a screening instrument that allows for the subgrouping of patients with back pain into low-, medium-, and high-risk categories (Hill et al. 2008). It has been described as a system for triaging and targeting low back pain patients who present with modifiable physical and psychosocial prognostic indicators for persistent pain at the time of consultation with their general practitioner in primary care (Main et al. 2008).

Conceptual basis: The STarTBack was developed on the basis of a literature review of published prospective studies on primary care low back pain patients, secondary analysis of data from two previous studies (cohort study and randomized controlled trial), and input from an advisory panel of clinicians (Dunn et al. 2005; Hill et al. 2008; Main et al. 2008).

Description: The STarTBack is a self-administered questionnaire that includes a total of nine items covering eight constructs, including five psychosocial constructs (bothersomeness, catastrophizing, fear, anxiety, and depression) and three physical constructs (referred leg pain, comorbid pain, and disability) (Hill et al. 2008). One item (bothersomeness) is scored on a five-point ordinal scale (from "Not at all" to "Extremely"), and the other items are scored on a dichotomized scale ("Agree/Disagree"). A score of 0–3 on all items was determined to be low risk, a score of four or more with fewer than four of the five psychosocial items was considered medium risk, and a score of four or more on the five psychosocial items was considered high risk (Main et al. 2008).

Alternative forms: The original version was developed in English at Keele University (United Kingdom). One study on the Spanish version can be found in the literature (Gusi et al. 2011). Also, a six-item English version was developed for general practitioners (Sowden et al. 2012).

Reliability: A sample of 53 patients completed the STarTBack questionnaire twice within a 2-week period. It demonstrated good test-retest reliability (Cohen's κ=0.73 for the overall scores and 0.69 for the psychosocial subscale) and moderate internal consistency (Cronbach's α=0.79 for the overall scores and 0.74 for the psychosocial subscale) (Hill et al. 2008). Agreement between clinical experts using the tool was good for low-risk patients but poor for high-risk patients (Hill et al. 2006).

Validity: Validity was tested on a sample of 131 patients. Discriminant validity was found to be acceptable to excellent with the AUC of the overall scores ranging from 0.74 to 0.92 (Hill et al. 2008). Factor analysis confirmed that the psychosocial subscale formed a single dimension and that no floor or ceiling effects were present (Hill et al. 2008). The external and predictive validity were tested on a sample of 500 patients, and sensitivity of 80.1% and specificity of 65.4% were obtained for the total sample (Hill et al. 2008). The concurrent validity of the STarTBack was tested with 244 nonspecific low back pain patients (Hill et al. 2010). The STarTBack scores correlated well with the ÖMPQ scores (r=0.80) and discriminated for reference standards (but the ÖMPQ was better at discriminating patients' baseline pain intensity, while the STarTBack was better at discriminating baseline bothersomeness and referred leg pain) (Hill et al. 2010).

Commentary: The STarTBack is short, easy to both use and score, and focuses on modifiable factors.

However, it lacks focus on the actual work environments and perceptions of work. As several studies have shown that long-term sick leave is more closely associated with work conditions than with individual characteristics (Marhold et al. 2002), the fact that the STarTBack does not include work-related factors may limit its use with work disability patients. Using the STarTBack, targeted treatments for patients allocated to each subgroup have been developed and are currently being tested for effectiveness (Foster et al. 2010; Hay et al. 2008).

15.4.3 Absenteeism Screening Questionnaire

Purpose: The ASQ is a long-term disability screening questionnaire for low back pain aimed at determining a person's probability of being absent from work for more than 6 months (Truchon et al. 2012). The ASQ was developed for workers with subacute low back pain.

Conceptual basis: The ASQ is based on a 67-item theory-driven and validated questionnaire. This questionnaire was developed on the basis of a literature review concerning predictive variables of long-term disability related to low back pain and on the Biopsychosocial Stress Process model (Truchon et al. 2012).

Description: The ASQ is a self-administered questionnaire that includes 22 items divided into four dimensions: (1) work and pain (four items), (2) return-to-work expectations (one item), (3) professional and demographic characteristics (three items), and (4) work concerns (14 items). Several scales are used, including dichotomous and six-point ordinal scales.

Alternative forms: The original version was developed in Canadian French. It has been translated into English (Truchon et al. 2012).

Reliability: Two-week test-retest reliability showed a moderate to high correlation between first and second administration ($r=0.52–0.84$). The 67-item ASQ was found to have moderate to good internal consistency (Cronbach's $\alpha=0.62–0.94$) (Truchon et al. 2012).

Validity: Assessment of the construct validity of the 67-item version led to the merging of two subsections on organizational risk factors and return to work since exploratory factor analysis found that these subsections were associated with the same factor (Truchon et al. 2012). Acceptable discriminative validity was found (AUC=0.73) (Truchon et al. 2012).

Commentary: The ASP is a recent screening instrument developed for workers with subacute back pain. Compared with other screening tools that include mainly personal factors, the ASQ focuses more on work-related factors, including psychosocial organizational risk factors. Only one study on the psychometric properties of the full 67-item French version can be found. No study has yet been published on the 22-item version or on the English version.

15.5 Tools for Assessing Work Ability

Work ability is defined as the "match between physical, mental, social, environmental and organizational demands of a person's work and his or her capacity to meet these demands" (Fadyl et al. 2010). The assessment of work ability can have several purposes: clinical (e.g., to identify needs and provide appropriate interventions), managerial (e.g., to perform preemployment and post-offer screening), and insurance/legal (e.g., to make reimbursement and return-to-work decisions) (Fadyl et al. 2010; King et al. 1998). Several tools have been developed for assessing work ability in workers still at work (presenteeism) and in those off work (absenteeism). The following sections present one category of tools (Functional Capacity Evaluations, FCEs), followed by a specific instrument (the Assessment of Work Performance, AWP).

15.5.1 Functional Capacity Evaluations

Purpose: Developed since the 1970s, the FCE is one of the best-known and most widely used categories of tools in current practice. FCEs were initially developed for preplacement purposes. In vocational rehabilitation, FCEs attempt to objectively measure the physical capacity of a person who has sustained a musculoskeletal injury to perform a series of work tasks safely (Kraus 1997). As proposed by Demers (1992), FCEs are primarily used to (a) identify how much work patients can do, (b) provide guidance to employers in developing modified jobs, (c) assist in the disability determination process, (d) obtain baseline data for development of a treatment for work hardening/reconditioning, and (e) evaluate the effectiveness of this treatment.

Conceptual basis: Three main assessment approaches can be found (Isernhagen 1992; Nicholls et al. 2011):

1. Psychophysical approach: The maximum functional capacity is determined by the patient. The patient selects the appropriate weights on different tests based on his or her perception of pain, effort, anxiety, and physiological stress. Hence, subjective maximum performance depends not only on physical but also on psychosocial factors.
2. Kinesiophysical (biomechanical) approach: The maximum functional capacity is determined by observation of physical efforts. The evaluator assesses several signs such as body mechanics, movement patterns, facial expressions, and changes in movement velocity to assist in determining the appropriate weight for each activity.
3. Physiological approach: The maximum functional capacity is based on physiological signs such as heart rate.

Description: FCEs are described as a "systematic, comprehensive, objective series of dynamic tests designed to measure an individual's ability or performance in work-related tasks" (Nicholls et al. 2011). Many standardized FCEs have been developed and are commercially available. Some FCEs were developed on the basis of the 20 physical demands outlined in the Dictionary of Occupational Titles (DOT) (US Department of Labor, & Employment and Training Administration 1991), and others in relation to specific work tasks (such as lifting). Among the most studied FCEs based on the DOT are the Isernhagen Work Systems FCE, the California Functional Capacity Protocol (Cal-FCP), and the Physical Work Performance Evaluation (PWPE). The FCEs concerning specific tasks often studied are the BTE Work Simulator, EPIC Lift Capacity Test, Valpar Component Work Samples, and Progressive Isoinertial Lifting Evaluation (PILE) (Innes 2006; Innes and Straker 1999a, b; King et al. 1998). Data may be collected using several methods, such as record reviews, interviews, self-administered questionnaires, and physical, functional, and physiological measurements (King et al. 1998). Several physical dimensions, such as lifting, pushing/pulling, carrying, balance, dexterity, posture tolerance, and mobility, can be assessed. FCEs are administered by trained evaluators and can take anywhere from a few hours to a few days to administer.

Reliability: Several reviews on the psychometric properties of FCEs can be found in the scientific literature (Gouttebarge et al. 2004; Gross 2004; Innes 2006; Innes and Straker 1999a, b; King et al. 1998). Only some FCEs have been extensively studied, while others have been the subject of very little or no study (Innes 2006). In general, moderate to excellent levels of test-retest and interrater reliability (Innes 2006; Innes and Straker 1999a) have been demonstrated for the FCEs studied.

Validity: Compared to reliability, fewer studies on the validity of FCEs can be found in the literature. A review of 28 FCEs found limited evidence of validity for most tools, with poor to good validity found for those studied, while no tool demonstrated moderate to good validity in all areas (Innes and Straker 1999b). Also, negligible to moderate correlations can be found with other measures, demonstrating that FCEs assess different constructs (Innes 2006). To date, their predictive validity has rarely been investigated and contradictory results have been found between FCEs (Innes 2006).

Commentary: Although developed several decades ago, until today, few studies can be found on the reliability and validity of FCEs. FCEs are usually time-consuming and require specialized equipment, licensing, and specific training (Gross 2004). Several authors argue that FCEs cannot properly assess workers' ability to safely return to work because they fail to simulate the real work environment and psychosocial factors (Gross and Battié 2005; Pransky and Dempsey 2004; Smith et al. 1986). Most FCEs are carried out in clinical settings and do not take into account factors other than physical requirements. Also, although a wide selection of FCEs are commercially available, a survey conducted of Australian health professionals who use FCEs showed that they do not usually use standardized FCEs or that they use only part of an FCE and adapt the tool to their clients' needs and job requirements (James and Mackenzie 2009). It has been suggested that the length and complexity of FCEs should be reduced by matching them with specific job demands and including only items shown to be related to return to work (Innes 2006). Moreover, FCEs involve evaluating a person's capacities at a given moment in time and making recommendations regarding their compatibility with the job demands. This superimposition of capacities and work demands does not take into account the variations in the person's health or condition, the work demands, or the interaction between both (Durand et al. 2011) (see also Chap. 7).

15.5.2 Assessment of Work Performance

Purpose: The AWP assesses an individual's observable working skills (Sandqvist et al. 2006). At the end of the assessment, the clinician is able to ascertain whether a person performs a work activity efficiently and appropriately (Sandqvist et al. 2006).

Conceptual basis: The AWP was developed on the basis of the Model of Human Occupation (MOHO) framework (Sandqvist et al. 2006). The MOHO framework seeks to explain how occupation is motivated, patterned, and performed. Within the MOHO framework, humans are conceptualized as being made up of three interrelated components: volition (i.e., motivation for occupation), habituation (i.e., process by which occupation is organized into routine), and performance capacity (i.e., physical and mental abilities). These components are influenced by an environmental context (physical and sociocultural context) (Kielhofner 2008).

Description: The AWP is an observational tool and includes a total of 14 skills rated on a four-point ordinal scale (ranging from "Deficient performance" to "Competent performance"). These skills are categorized in three main domains: motor skills (five items), process skills (five items), and communication and interaction skills (four items) (Sandqvist et al. 2006). This is a generic instrument and is not designed for a specific disease, context, or task. It is recommended that the AWP ideally be used in a real-life work situation but it can also be used in an artificial environment.

Alternative forms: The original version was developed in Sweden (version 1.1). The AWP has been translated into English and Dutch.

Reliability: No study on the reliability of the AWP can be found. However, in a construct validity study, the author indicated that one assessor tended to rate clients higher on the AWP than did the other five assessors (Sandqvist et al. 2009).

Validity: One study showed satisfactory content validity and utility (Sandqvist et al. 2008). This study consisted of a survey of 67 AWP users. In general, respondents thought that the AWP covered all aspects of observable working skills, that the definitions of the items were clear and comprehensible, and that the assessment manual offered enough guidance (Sandqvist et al. 2008). Another study involving 364 patients with various work-related problems found good construct validity (Sandqvist et al. 2009). The items were found to be well clustered in the three domains

and appropriately differentiated from each other. Two dimensions were found: one on motor skills and one combining process and communication/interaction skills. Also, the findings showed that the instrument is sensitive, that it discriminates between patients, and that results are unaffected by the patients' gender (Sandqvist et al. 2009).

Commentary: The AWP is a fairly recent observational instrument for assessing work ability. Its strengths lie in its generic nature, its comprehensive conceptual basis, and its availability in several languages. To date, only papers on the AWP's validity can be found in the literature. Studies are needed on its reliability. Also, although assessment in the real work environment is increasingly advocated, some barriers can be found. The AWP developers showed in their survey that it was used mostly in clinical settings because of the difficulty for evaluators to observe a client for an extended period of time in a workplace setting (Sandqvist et al. 2008). Also, another barrier mentioned concerned the difficulty of using the AWP when tasks are too simple or limited (Sandqvist et al. 2008).

15.6 Tools for Assessing Obstacles to Return to Work

Over the past decades, several return-to-work programs have been developed and assessed (Franche et al. 2005; Hlobil et al. 2005; Meijer et al. 2005). These programs aim to facilitate the return to work of employees who have experienced a work-related injury or illness and are absent from work, to minimize the consequences of prolonged work disability and to provide a safe and timely transition back to work. Several assessment tools have been developed to help clinicians involved in vocational rehabilitation to identify the factors that impede a worker's return to work. Five instruments are presented in the following sections: the Obstacles to Return-to-Work Questionnaire (ORTWQ), Worker Role Interview (WRI), Return-to-Work Self-Efficacy (RTWSE) Questionnaire, Dialogue About Ability Related to Work (DOA), and WoDDI. It is worth noting that overlaps between work ability and obstacles to return-to-work instruments can be found; instruments on obstacles to return to work may also assess work ability.

15.6.1 Obstacles to Return-to-Work Questionnaire

Purpose: The ORTWQ assesses barriers to return to work for patients with musculoskeletal disorders in the chronic phase of disability.

Conceptual basis: The ORTWQ was developed on the basis of the results of epidemiological studies on psychosocial and physical risk factors for pain and disability in the workplace (Marhold et al. 2002).

Description: The ORTWQ is a self-administered questionnaire that includes 55 items grouped into three parts and nine dimensions: Part 1—depression and pain intensity; Part 2—difficulties at work return, physical workload and harmfulness, social support at work, worry due to sick leave, work satisfaction, family situation and support; and Part 3—perceived prognosis of work return (Marhold et al. 2002). Some items in Part 1 and in Part 3 were taken from the ÖMPQ. Items are rated on seven-point scales. The total score can range from 0 to 330.

Alternative forms: The original version of the ORTWQ was developed in Sweden. It was translated into English by two independent translators (Marhold et al. 2002).

Reliability: Reliability was studied with 30 patients evaluated twice at a one-week interval (Marhold et al. 2002). High correlation ($r=0.77$–0.91) was obtained for test-retest reliability. Regarding internal consistency, results were low to moderate for Part 2 (Cronbach's $\alpha=0.52$–0.83), and moderate for Part 1 (Cronbach's $\alpha=0.75$ and 0.81) and Part 3 (Cronbach's $\alpha=0.72$).

Validity: One validity study involved 154 patients on sick leave due to musculoskeletal disorders

(Marhold et al. 2002). Moderate but significant correlations with other constructs (depression, distress, catastrophizing, and pain) were obtained. The ORTWQ helped predict sick leave 9 months after the questionnaire had been filled in; it correctly classified 79% of the patients. Various cutoff scores on prediction prognosis were tested. For example, using a cutoff score of 160, the ORTWQ would correctly identify 82% of patients with a good prognosis and 59% with a poorer prognosis (Marhold et al. 2002).

Commentary: The ORTWQ is one of the widely known and most often recommended self-report questionnaires developed for the assessment of return-to-work obstacles in patients with chronic musculoskeletal disorders. This questionnaire covers many blue flags and has adequate psychometric properties (Gray et al. 2011). Due to its length, it is considered less clinically feasible for acute cases and is recommended for use in secondary healthcare settings to assess multiple occupational issues (Gray et al. 2011; Grimmer-Somers et al. 2009).

15.6.2 Worker Role Interview

Purpose: The WRI is a semi-structured interview designed to identify a client's perception of psychosocial and environmental factors influencing the ability to return to work after sickness or injury (Velozo et al. 1999).

Conceptual basis: The WRI was developed on the basis of the MOHO framework.

Description: The latest version of the WRI (version 10.0) includes 16 items (previous versions had 17 items) and is used as an initial rehabilitation assessment process for injured workers or workers with a long-term disability and poor/limited work history. The items reflect six concepts: personal causation, values, interests, roles, habits, and perceptions of the environment (Velozo et al. 1999). The items are rated on a four-point scale indicating how they impact return to work (ranging from "Strongly interferes with returning to work" to "Strongly supports returning to work"). The "Not applicable" option is also available. Higher scores mean a greater psychosocial ability to return to work (thus few barriers to returning to work). A manual and training tape provide guidelines and examples to assist with rating.

Alternative forms: The original version was developed in English at the University of Illinois in Chicago in 1991. The latest version, version 10.0, of the WRI comes in three formats (MOHO Clearinghouse 2011b): (1) for workers with recent injuries/disabilities, (2) for clients with chronic disabilities, and (3) for long-standing illness or disability. For this latter version, it is recommended that the WRI be used in combination with the Occupational Circumstances Assessment Interview and Rating Scale (OCAIRS) interview (the OCAIRS assesses a patient's occupational adaptation (Lai et al. 1999)). The WRI has been translated into several languages (MOHO Clearinghouse 2011a). Studies on the Swedish, Icelandic, and German versions can be found in the scientific literature (Asmundsdottir 2004; Fenger and Kramer 2007; Haglund et al. 1997; Koller et al. 2011).

Reliability: Interrater reliability was tested in a study involving 30 adults receiving rehabilitation due to an upper extremity injury. The intra-class coefficient (ICC) ranged from 0.46 to 0.92, with a total value of 0.81 (Biernacki 1993). Higher ICCs were obtained for test-retest reliability (from 0.86 to 0.94) (Biernacki 1993). A study on the German version obtained a high interrater reliability (ICC = 0.90, from 0.86 to 0.94) (Koller et al. 2011).

Validity: This instrument was tested with different populations (e.g., musculoskeletal disorders and psychiatric disorders) and in different cultures. It was found to provide a valid assessment across culture, language, age, and diagnosis (Forsyth et al. 2006; Haglund et al. 1997). Studies on the construct validity of the WRI showed that all the items formed a one-dimensional construct, with the exception of a few items that measure

the client's perception of the environment (Fenger and Kramer 2007; Haglund et al. 1997; Koller et al. 2011; Velozo et al. 1999). The predictive validity regarding return to work was studied using the original version of the WRI, and no variable in the predictive model was found to be significant (Velozo et al. 1999). However, another study involving the Swedish version found the WRI to be useful in predicting return to work (Ekbladh et al. 2004).

Commentary: The WRI is a generic instrument; it can be applied across diagnostic groups and in different work contexts. It has been translated into several languages and studied in different cultures. In general, the WRI has good psychometric properties and requires minimal training for those familiar with the MOHO framework. It was designed to complement existing work capacity evaluations focusing on psychosocial and environmental factors that influence return to work (Fisher 1999).

15.6.3 Return-to-Work Self-Efficacy Questionnaire

Purpose: The RTWSE Questionnaire assesses workers' beliefs about their current ability to resume normal job responsibilities following pain onset. It assesses an individual's concerns about returning to work and self-perceived problem-solving abilities. The RTWSE can be used across a wide range of jobs and employer types (Shaw et al. 2011).

Conceptual basis: The original version was developed on the basis of a qualitative study of back-injured workers. It focused on the return-to-work challenges perceived by the injured workers and described their concerns and expectations about the resumption of normal work while recovering from low back pain (Shaw et al. 2011). Also, the adapted version was based on the Readiness for Return-to-Work Model, which focuses on the interpersonal and systemic aspects of work disability, and combines elements from existing theories: the Readiness for Change Model and the Phase Model of Occupational Disability (Brouwer et al. 2011).

Description: The RTWSE is a self-administered questionnaire. The original version comprised 28 items and was developed for workers with low back pain. The development of this questionnaire was based on three main conceptual domains: (1) managing pain, (2) obtaining help, and (3) meeting job demands (Shaw et al. 2011). The respondents' level of confidence about overcoming a number of return-to-work barriers was reported on a scale ranging from 0 to10. A total score is computed as an average of the scores on all items (Shaw et al. 2011).

Alternative forms: The original 28-item version was developed in English at the Liberty Mutual Center for Disability Research (USA). A 19-item version was developed after sensitivity analysis (Shaw et al. 2011). Another 10-item version was developed for a Canadian study, which used eight of the items from the original version and added other items based on the Readiness for Return-to-Work Model (Brouwer et al. 2011). This 10-item version uses a five-point scale (ranging from "Not at all certain" to "Completely certain").

Reliability: A study involving 399 patients with acute low back pain showed moderate test-retest reliability (from 0.51 to 0.70), a finding which the authors attributed to the fact that self-efficacy beliefs were still evolving in the first week (Shaw et al. 2011). Also, this study showed good internal consistency of the three scales (Cronbach's α=0.98, 0.92, and 0.81) (Shaw et al. 2011). In another study on the 10-item version involving 632 workers with back and upper extremity musculoskeletal disorders, satisfactory consistency was found for the three subscales (Cronbach's α ranging from 0.66 to 0.93) (Brouwer et al. 2011).

Validity: The RTWSE score helped predict sickness absence and persistent work limitation at the 3-month follow-up (Shaw et al. 2011). Self-efficacy was found to correlate negatively with concurrent measures of pain

intensity, functional limitation, physical demands of work, activity avoidance, and pain catastrophizing (Shaw et al. 2011). Also, results from the principal components analysis showed a three-factor solution, but with different labeling of the conceptual domains: meeting job demands, modifying job tasks, and communicating needs to others (Shaw et al. 2011). In the study on the 10-item version, factor analysis supported three domains (obtaining help from supervisor, coping with pain, and obtaining help from coworkers) (Brouwer et al. 2011). Moderate intercorrelation between subscales ($r = 0.33–0.52$) was obtained (Brouwer et al. 2011). Regarding construct validity, this study found significant correlations between the RTWSE pain subscale and other constructs, but coworker and supervisor subscales showed some inconsistency in relation to other constructs (Brouwer et al. 2011).

Commentary: Compared with other self-administered questionnaires on yellow flags, the RTWSE focused more on work-related constructs (Brouwer et al. 2011). In general, the RTWSE showed acceptable psychometric properties. Over the past few years, self-efficacy has been shown to have important impact on return to work. Indeed, poor expectations for recovery have been shown to be one of the main factors influencing the return to work of an injured worker, and several studies emphasize the role of self-efficacy in the return-to-work process (Franche and Krause 2002; Heijbel et al. 2006).

15.6.4 Dialogue About Ability Related to Work

Purpose: The DOA (also called Dialogue About Working Ability) is used to determine the factors that impact a patient's work ability (Norrby and Linddahl 2006). The assessment is done by both the patient and the therapist and is followed by a dialogue on goal setting and treatment planning. The DOA was developed for patients with long-term disability due to psychiatric and psychosocial problems.

Conceptual basis: The DOA was developed on the basis of the MOHO framework. It focuses on the patient's own active participation in the rehabilitation process (Norrby and Linddahl 2006).

Description: The DOA is divided into two sections with 34 items each: client self-assessment and professional assessment focusing on the individual's ability to perform work-related activities. The DOA is divided into five dimensions: (1) personal causation, values, and interest (nine items), (2) roles and habits (eight items), (3) physical ability (four items), (4) organizational and problem-solving ability (six items), and (5) communication and interaction ability (seven items). The assessment is followed by a dialogue to distinguish goals for the return-to-work process based on the client's own preferences. The items are scored on a five-point Likert scale (ranging from "Low level" to "High level"). The scores obtained by the patients and by the therapist are presented in a graphic summary that allows for dialogue on the differences and similarities between the two assessments and goal setting for the return-to-work process.

Alternative form: The original version of this questionnaire was developed in Sweden. An English version can be purchased on the website of the Swedish Association of Occupational Therapists.

Reliability: A study involving 34 patients and 14 raters tested the interrater and test-retest reliability (Norrby and Linddahl 2006). In general, retest results showed acceptable correlations (ranging from fair to excellent; 0.430–0.931). Interrater reliability was high, with the percent agreement ranging from 75 to 100% (Norrby and Linddahl 2006).

Validity: The construct validity of the DOA was determined using the Rasch measurement model in a study involving 126 patients and 21 therapists (Linddahl et al. 2003). Results indicated that the items were well separated and generally worked together in the five dimensions to measure work ability. Five items did not fit the expectation model and were revised (Linddahl et al. 2003).

Commentary: The DOA is an instrument based on the MOHO framework and one of the rare instruments developed for patients with work disability due to psychiatric and psychosocial problems. The DOA combines self-reported and observation methods. The psychometric properties of this instrument are good in general. The use of this instrument is consistent with the client-centered approach, which is based on the establishment of an interaction between clinician and patient and on the patient's active role in his or her rehabilitation process (Falardeau and Durand 2002).

15.6.5 Work Disability Diagnostic Interview

Purpose: The WoDDI is an interview guide designed to help clinicians detect the most important work disability factors in subacute and chronic patients with work-related musculoskeletal disorders (Durand et al. 2002).

Conceptual basis: This instrument was developed on the basis of the Handicap Creation Process framework proposed by the Quebec Committee on the International Classification of Impairment, Disability and Handicap (Fougeyrollas 1991). In this framework, the concept of handicap is defined as a disruption in the accomplishment of a person's life habits, taking into account personal and environmental factors. Life habits are defined as habits that ensure the survival and development of a person in society throughout his or her life, such as the ability to perform the social role of a worker.

Description: The WoDDI is a semi-structured interview guide. The WoDDI for musculoskeletal disorders includes open-ended questions on 62 personal, workplace, and insurance-related factors. It is divided into ten sections: (1) history of the present disease/disorder, (2) pain syndrome, (3) prior and current health condition, (4) physical examination, (5) lifestyle habits, (6) sociofamilial background, (7) financial situation, (8) work environment, (9) worker's perceptions and expectations, and (10) results analysis and recommendations. The pain syndrome and physical examination sections are used to rule out specific conditions (red flags) requiring specific medical treatment. Self-administered questionnaires are also suggested in order to confirm clinical impressions. The factors identified are weighted according to their perceived importance in explaining the work disability, and are then classified as modifiable (e.g., pain, fears, or employer barriers to return to work) or unmodifiable (e.g., age or legal aspects). This allows for the development of a rehabilitation plan that specifically addresses the main work disability factors. The WoDDI is administered by trained clinicians and requires around 3 h to administer.

Alternative forms: The WoDDI for work-related musculoskeletal disorders was originally developed in Canadian French in 1997. A second version was developed in 2001 by a panel of experts and on the basis of an updated literature review (Durand et al. 2002). A third version was developed in 2007 to clarify certain factors. This latter version was transculturally adapted in Portuguese for a Brazilian population (Mininel 2010).

Since 2010, a modified version of this instrument has been available for common mental disorders (Durand et al. 2010). It includes 47 factors influencing work disability and return to work. In this version, a five-point ordinal scale (ranging from "Highly unlikely" to "Highly likely") was added to assess the extent to which each factor influences the individual's long-term absence. At the end of this rating process, the clinician extracts the main factors that stand out for their high ratings, prioritizes them by focusing on modifiable factors, and makes clinical recommendations. This version was transculturally adapted for an English Canadian population.

Reliability: Not reported.

Validity: The content validity of the WoDDI was established on the basis of a critical review of the

literature on prognostic factors and of meetings with experts aimed at identifying scientific and empirical factors that influence work disability (Durand et al. 2002, 2010). The WoDDI was pretested by trained clinicians, who administered it to workers on sick leave. Changes were made to the instrument in light of this process to render it easier to understand and use (Durand et al. 2002, 2010). A correlational study involving 222 workers with musculoskeletal disorders who were participating in a vocational rehabilitation program tested the predictive nature of the factors identified in the WoDDI regarding return to work. A general predictor model of nine factors was developed from the factors identified using the WoDDI (Marois and Durand 2009). This model was found to accurately predict the work status of 77% of the participants. This study found that screening for predictive factors and obstacles at the time of admission to a work rehabilitation program for individuals with a long-term work disability allows for more specifically tailored and effective intervention. Early detection of factors influencing long-term absence and return to work makes it possible not only to target the complex cases but also to identify the intervention targets, and lastly, to minimize the impact of the long-term absence risk factors (Marois and Durand 2009).

Commentary: The WoDDI is a comprehensive instrument designed to help clinicians identify factors impeding a return to work and develop a rehabilitation plan. This instrument focuses on personal and environmental factors influencing work disability, as well as on the mutual interaction between these factors. It covers red (orange, in the common mental disorders version), yellow, and blue flags. The WoDDI was developed on the basis of a conceptual framework currently used by practitioners in Quebec, was translated into other languages, and can be used for both common mental disorders and musculoskeletal disorders. However, the process of administering this instrument is resource- and time-consuming. Also, no sound studies on its psychometric properties have yet been published. This instrument is used for secondary and tertiary work disability prevention.

15.7 Conclusion

This book chapter has presented a non-exhaustive list of ten tools developed in the field of work disability, with emphasis on those focusing on work ability and return to work for workers absent from work due to a health problem. Several of these tools include personal and environmental factors. Some have acceptable psychometric properties, but others lack studies on their properties. The tools differ in terms of their purpose, type, conceptual basis, time required to administer, and target population. Table 15.3 summarizes some of the characteristics of the tools described in this book chapter.

Work disability is a complex phenomenon involving several factors and various stakeholders (i.e., workers, clinicians, insurers, employers). Because of the complexity of work disability, it is important to include a range of measures addressing personal and environmental factors. The most appropriate tools for the purpose at hand must be chosen from among the many available. These choices should be based on several measurement and practical criteria (Table 15.2). Some users may decide to combine several tools assessing specific concepts, while others may prefer to use multidimensional tools. Also, a triangulated approach using a combination of several methods is advocated when an in-depth understanding of work disability factors is required.

At present, there is no one perfect tool available that encompasses the full complexity of work disability, takes the numerous stakeholders' perspectives into account, and covers all the phases of disability. Research in the past decades has led to important advances in the understanding of work disability factors and how to assess them. Several tools have been developed and could be used in current practice. Yet further research is needed in this field to refine the concepts and establish clear guidelines on work disability assessment. There is also a need to identify which concepts should be assessed, as well as when and in what context. In addition, as part of a complete work disability assessment, it is important to consider the

Table 15.3 Comparison of a selection of work disability assessment tools

Tool	Type	Number of items	Administered by	Target population	Time required to administer	Studies on reliability	Studies on validity
Screening							
ÖMPQ	Quest.	25 or 10	Self	MSD	10 min	✓	✓
STarTBack	Quest.	9 or 6	Self	LBP	5 min	✓	✓
ASQ	Quest.	22	Self	MSD	10 min	✓	✓
Work ability							
FCE (category)	Quest., obs., interview, objective measures	–	Clinician	MSD	Few hours to few days	✓	✓
AWP	Obs.	14	Clinician	Generic	Few hours to weeks	–	✓
Return-to-work obstacles							
ORTWQ	Quest.	55	Self	MSD	30 min	✓	✓
WRI	Interview	16	Clinician	Generic	30–60 min	✓	✓
RTWSE	Quest.	28, 19, or 10	Self	MSD	10 min	✓	✓
DOA	Obs. and quest.	34	Self and clinician	Psychiatric/ psychosocial problems	30–60 min	✓	✓
WoDDI	Interview and quest.	62 or 47	Self and clinician	MSD, CMD	2–3 h	–	✓

Type (Quest. = questionnaire, Obs. = observation); population (MSD = musculoskeletal disorders, LBP = low back pain, CMD = common mental disorders)

interaction between the person and his or her work environment. To date, few tools exist for assessing this interaction. Furthermore, prognostic evidence includes modifiable and unmodifiable factors. More studies on modifiable factors are needed to better inform clinicians and other stakeholders about how to identify and treat them (Krause et al. 2001; Main et al. 2008). Also, more research should explore multifactorial generic tools applicable to several work disability populations and that are psychometrically sound and phase-specific. Moreover, tools applicable to several stakeholders may help to foster concerted action and promote greater intervention success. Lastly, researchers could benefit from implementation studies that provide more evidence on the best way to put evidence-based tools into practice.

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Part IV

Work Disability Issues on Specific Disorders

Predicting Return to Work for Workers with Low-Back Pain

16

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This chapter reports on factors that best predict disability outcomes for workers with occupational low-back pain (LBP) when evaluated early in the course of a work disability. Recommendations and implications for practice are tabled.

16.1 Introduction

Low-back pain (LBP) is the second most common cause of work absenteeism in industrialised countries (Andersson 1999). Most injured workers usually return to work (RTW) in a timely manner; however, some disability episodes are prolonged and disproportionately costly. The percentage of patients with acute LBP whose situation becomes chronic ranges from 2% to 33% (Hoogendoorn et al. 2000), and delays in RTW result in high compensation and treatment costs in all parts of the industrialised world (Frymoyer and Cats-Baril 1991; Maniadakis and Gray 2000; Lambeek et al. 2011; Dionne et al. 2007). Up to 90% of these costs are associated with loss of productivity (Lambeek et al. 2011). Given these facts, there is a genuine need for effective RTW programmes.

When a worker is unable to work due to a low-back injury, many parties want to know how long it will take before the injured person is able to resume employment. The worker wants to know because being off work can seem endless and lead to insecurity and anxiety. The employer wants to know if the organisation or business should make alternate work arrangements should the injured worker be off for an extended period of time. Workers' compensation case managers want to know so that they can guide intervention decisions for early and safe RTW. Other parties that are interested in RTW include medical examiners, policymakers, clinicians, and workplace disability prevention and return-to-work practitioners.

Identifying workers who are disabled due to LBP and at risk for prolonged recovery is a good idea. This knowledge would help the workplace and other agencies to target interventions that could benefit those workers.

In this chapter, we investigated the idea of predicting RTW for workers with LBP, via a systematic review. The objective of this study was to assess the evidence on factors from different domains (World Health Organization

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_16,

2001) that predict the duration of sick leave in workers in the beginning of a LBP-related sick leave episode.

As the chapter unfolds, we explain how our review was done, what studies were included in the review and the key findings. We report on factors that best predict disability outcomes for injured workers with LBP when evaluated early in the course of a work disability. The final component of this chapter tells the story of the knowledge transfer workshop where we discussed the review with practitioners. Recommendations and implications for practice are tabled and considered in the final section of the chapter.

In our systematic review, an update of our 2005 review (Steenstra et al. 2005b), we encountered numerous studies that looked at prognostic factors associated with time until RTW. Interpretation of the body of studies on prognostic factors for delayed RTW is challenging due to the sheer volume of publications and the different research design used for each study. However, with the results of our systematic review on early prognostic factors, we have a good starting point that can be used to build a prediction rule to identify the at-risk workers (Steyerberg 2009; Heymans et al. 2009).

Prediction rules go beyond the goals of the prognostic studies we have seen so far in this field. They aim to inform the field, in a direct way, by providing tools that are valid and reliable in patients seen early in the course of a work-disabling episode of LBP. From other fields where this approach seems less novel, evidence shows that prediction rules do a better job at forecasting outcomes than clinical judgement (Meehl 1954; Grove et al. 2000; Grove and Lloyd 2006). A number of prediction rules have been developed to tailor intervention in the treatment of LBP. Some of them are well validated and their impact has been examined (Apeldoorn et al. 2011; Fritz et al. 2005). It is not clear how well prediction rules do when RTW is the outcome of interest. Although prediction rules in the field of work disability prevention have seldom been validated (McGinn et al. 2000), they nevertheless hold promise.

16.2 How Was the Systematic Review Done?

First, we identified the studies that looked at prognostic factors associated with time until RTW for workers with LBP; these were identified by three reviewers working in pairs. The search strategies included three broad categories: prognosis, LBP and RTW terms, and terms on LBP advocated by the Furlan et al. (2009). We covered studies published in the time frame from January 1966 to April 2011. Next, we made sure that the studies met the following eligibility criteria:

- Observational, longitudinal cohort studies enrolling subjects with LBP and sick leave with a duration of more than 1 day, but less than 6 weeks.
- Studies that examined the relationship between at least one prognostic factor and RTW.
- Studies where the outcome was measured in absolute terms (differences in number of days between groups), relative terms (relative risks, odd ratios or hazard ratios), survival curve or duration of sick leave.

Next, we assessed the methodological quality of the studies that were considered for inclusion. The available evidence for each prognostic factor was then assessed as being at one of three levels of evidence (Hoogendoorn et al. 2000):

- Strong evidence: consistent findings in more than one high-quality study.
- Moderate evidence: consistent findings in one high-quality study and one or more lower-quality studies, or in more than one lower-quality study.
- Insufficient evidence: only one study available or inconsistent findings in more than one study.

16.3 Studies Included in the Systematic Review

The initial search was fruitful. It yielded 4,449 citations. After a screening of all titles and abstracts, 140 papers were selected for full

Table 16.1 Characteristics of studies included in our systematic review

References	Country	*N*	Percent with RTW (%)	Quality score
Abenhaim and Suissa (1987)	Canada	1,720	96.4	14
Alexopoulos et al. (2008)	Greece	119	>97.5	15
Andersson et al. (1983)	Sweden	940	>90	8
Baldwin et al. (2007)	USA	Not reported	Not reported	12
Burdorf et al. (1998)	NLD	50	>90	7
Dasinger Dasinger et al. (2000)	USA	433	Unclear	14
Du Bois and Donceel (2008)	Belgium	186	69.9	12
Du Bois et al. (2009)	Belgium	346	79.6	16
Franklin Franklin et al. (2008)	USA	1,843	>80	15
Fransen et al. (2002)	NZL	854	76.1	12
Fulton-Kehoe et al. (2008)	USA	1,885	>80	14
Gluck and Oleinick (1998)	USA	8,628	Not reported	7
Goertz (1990)	USA	207	>98	9
Hagen and Thune (1998)	NOR	89.190	Not reported	9
Heymans et al. (2006)	NLD	299	96	16
Heymans et al. (2009)	NLD	628	Not reported	14
Kapoor et al. (2006)	USA	300	Not reported	8
Krause et al. (2001)	USA	433	Not reported	14
Lotters and Burdorf (2006)	NLD	253	>90	13
Nordin et al. (1996)	USA	162	Not reported	11
Pransky et al. (2006)	USA	494	68	10
Prkachin et al. (2007)	CAN	148	64	9
Schultz et al. (2004)	CAN	111	64	12
Schultz et al. (2005)	CAN	111	64	9
Steenstra et al. (2005a)	NLD	615	>95	15
Turner et al. (2006)	USA	1,068	81.6	15
Turner et al. (2008)	USA	1,885	81.6	15
van Doorn (1995)	NLD	1.119	>70	14
van der Weide et al. (1999)	NLD	116	Approximately 90	15
Webster et al. (2007)	USA	8,443	90.2	6

text review, including those where title and abstract did not provide sufficient details to assess eligibility. Thirty papers from 25 different studies met all of our inclusion criteria (Table 16.1). Eleven were articles captured in our earlier review, and 19 were published after our initial review. The updated search strategy did not identify any studies that should have been considered in our previous review. Three papers (Gatchel et al. 1995a, b; Butterfield et al. 1998) that were selected in the previous review were excluded due to stricter eligibility criteria.

16.4 Key Findings: Four Factors with Strong Evidence

There were a number of factors that were supported as prognostic for RTW in LBP by strong evidence. This means that there were multiple high-quality studies that agreed on the significance of a particular prognostic factor, and no conflicting results from other studies. Patient's recovery expectations, health-care provider type, patient-reported level of disability and the presence of radiating pain were supported by strong evidence. We discuss each of the four below.

16.4.1 Recovery Expectations

The factor that was supported by the most evidence was 'recovery expectations' (Heymans et al. 2006, 2009; Du Bois and Donceel 2008; Du Bois et al. 2009; Kapoor et al. 2006; Lotters and Burdorf 2006; Schultz et al. 2004, 2005; Steenstra et al. 2005a; Turner et al. 2006, 2008). Recovery expectations mean that the worker predicts how long he or she thinks it will take before RTW is possible and/or how likely he/she thinks that he/she will be returning to work. Worker expectations of RTW or of a quicker recovery are strong indicators for RTW that could be suitable for use in screening or the assessment of workers, for instance, at the 4-week point post-injury.

Recovery expectations might be influenced by a number of factors. Turner et al. (2008) reported that patients' expectations might be determined by injury severity, functional status, having a hectic job, receiving an offer for job accommodation, number of pain sites, previous injury and type of health-care provider.

This has practical application. Asking injured workers about their recovery expectations could identify those at high risk. Then those individuals could be further questioned as to what specific issues affect their recovery expectations, some of which may be modifiable.

16.4.2 Health-Care Provider Type

This factor was supported by strong evidence (Steenstra et al. 2005a; Turner et al. 2008; van der Weide et al. 1999) as well. In other words, there was an association between which type of health-care provider the worker attended following a low-back injury and time to RTW. Specifically, there was evidence that said seeking care from a chiropractor results in shorter time on disability benefits.

This finding is in agreement with evidence of the effectiveness of manipulation for acute and sub-acute LBP (Assendelft et al. 2004). However, some caution is warranted. Referral bias might play a role, by which we mean that more severe injuries may be preferentially referred to health-care providers other than chiropractors. Evidence for a causal relationship is better established through randomised controlled trials.

16.4.3 Disability and Pain Intensity

Workers' 'self-reports of disability' (Heymans et al. 2006, 2009; Baldwin et al. 2007; Du Bois et al. 2009; Fransen et al. 2002; Lotters and Burdorf 2006; Nordin et al. 1996; Steenstra et al. 2005a; Turner et al. 2008; van der Weide et al. 1999) and 'pain intensity' (Heymans et al. 2006, 2009; Baldwin et al. 2007; Burdorf et al. 1998; Du Bois and Donceel 2008; Du Bois et al. 2009; Franklin et al. 2008; Fransen et al. 2002; Goertz 1990; Lotters and Burdorf 2006; Nordin et al. 1996; Prkachin et al. 2007; Schultz et al. 2004; Turner et al. 2008; van der Weide et al. 1999) are often correlated, but asking both questions seems to improve prediction of prognosis. This means that a worker should be asked both about functional limitations and about pain intensity at the start of work disability. Both can be easily measured in several ways with well-validated questionnaires. In Ontario, the Workplace Safety and Insurance Board (WSIB) uses the Roland Morris Disability Questionnaire and a 10-point Visual Analogue Scale (VAS) pain rating scale to monitor baseline values and progress at the end of treatment within their programmes of care for LBP.

16.4.4 Radiating Pain

Radiating pain—that is, pain that extends away from the low back, usually into the legs—is often used as a surrogate proxy for neurological involvement and reported as a measure of injury severity (Baldwin et al. 2007; Du Bois and Donceel 2008; Franklin et al. 2008; Fransen et al. 2002; Fulton-Kehoe et al. 2008; Goertz 1990; Nordin et al. 1996; Prkachin et al. 2007; Turner et al. 2008; van Doorn 1995; Abenhaim et al. 1995). This factor was supported by strong evidence to predict delays in RTW. In patient assessments, neurological findings are often considered to be a 'red flag' that warrants further clinical investigation. Since this fact has become more commonly known, some recent studies excluded patients

with neurological complications associated with radiating pain. Therefore, this factor was often not included in the more recent high-quality studies.

16.5 Workplace Factors Predictive of Return to Work

Unfortunately, workplace factors are not considered in prognostic studies as often as one might expect given the amount of research concluding that RTW is a multifactorial problem. There has been a shift away from a biomedical to a biopsychosocial model in current literature (Loisel et al. 2001). However, the measurement of workplace-related factors in formal studies is clearly lagging. Often, measures are used from general work and health research (Karasek et al. 1998) that might not be valid for workers off work. However, there are a few work-related factors, supported by strong evidence, shown to be predictive for RTW. In this next section, we will discuss those workplace factors supported by the best evidence: physical demands, accommodation and modified duties, and job satisfaction.

16.5.1 Physical Demands

Physical demands at the workplace have been shown to be predictive of RTW (Du Bois et al. 2009; Turner et al. 2008)—in other words, those workers with more physically demanding work were slower to resume employment after a low-back injury. Physical demands of the workplace are often derived from the coding of occupations (Herbert et al. 1996). These codes may, at first, seem crude, but they have shown to be predictive more often than self-reported measures where the worker is asked about physical demands of the job. Studies that used self-reported measures only provide moderate evidence for an effect of physical demands on RTW. Some studies in our review (Fransen et al. 2002; Nordin et al. 1996) found an effect of what seemed extreme differences in physical demands that were present in the study population, for instance, when comparing rail maintenance workers to office workers in one company (Nordin et al. 1996). However, most studies did not find an effect of self-reported physical demands (Heymans et al. 2006, 2009; Alexopoulos et al. 2008; Dasinger et al. 2000; Du Bois et al. 2009; Franklin et al. 2008; Fulton-Kehoe et al. 2008; Krause et al. 2001; Lotters and Burdorf 2006; Pransky et al. 2006; Schultz et al. 2004; Turner et al. 2008). These findings suggest that physical demands classified through occupational codes and self-report of physical demands are not interchangeable. This may be because a workers' perception of the physical demands of the job is biased by getting injured at work.

16.5.2 Accommodation and Modified Duties

Workplace accommodation may help address physical workplace demands as a barrier to resuming employment after a low-back injury. If so, the offer of modified duties or workplace accommodation could improve RTW outcomes. This factor was reported in a number of ways: Two high-quality studies (Fransen et al. 2002; Fulton-Kehoe et al. 2008; Turner et al. 2008) found the factor to be predictive for faster RTW, one lower-quality study reported a significant effect (Goertz 1990) and one lower-quality study found a non-significant effect of the availability of modified duties (Pransky et al. 2006).

Interestingly, goodwill goes a long way: The *offer* of alternate duty was more prognostic than whether or not alternate duty was actually implemented (Turner et al. 2008). In some jobs modified duties are more difficult to implement, and in that case unavailability of modified duties could also be considered as a characteristic of the job and not so much as unwillingness to provide modified duties (Fransen et al. 2002).

16.5.3 Job Satisfaction

There is strong evidence that a simple job satisfaction measure is predictive for RTW following a low-back injury (Baldwin et al. 2007; Fransen et al. 2002; Heymans et al. 2006; Krause et al. 2001; Nordin et al. 1996; Turner et al. 2008; van der Weide et al. 1999). Job satisfaction is probably

determined by other factors at work, but it is nevertheless a strong indicator that can be used in screening or assessing at the very start of the work disability process.

16.6 Factors That Do Not Predict Return to Work

Some factors showed no predictive ability for RTW. There was strong evidence that there was no association between lifestyle factors (Alexopoulos et al. 2008; Burdorf et al. 1998; Du Bois et al. 2009; Franklin et al. 2008; Fransen et al. 2002; Heymans et al. 2006; Turner et al. 2008; van der Weide et al. 1999) or pain catastrophising and RTW. Pain catastrophising was profiled in two high-quality studies, and no significant effect was found among workers with acute low-back injuries. However, it might play a role at a later stage in the work disability process (see also Chap. 8).

16.7 Factors with Mixed Evidence

A number of factors showed moderate or mixed evidence for predicting RTW. It was difficult to summarise the evidence of workplace psychosocial factors and their relationship to RTW, due to a lack of consensus on how this construct was measured among researchers. Similarly, there was moderate evidence that having a prior claim is associated with a delay in RTW (Alexopoulos et al. 2008; Fransen et al. 2002; Pransky et al. 2006; Steenstra et al. 2005a; Turner et al. 2006), the evidence on this factor was mixed. The North American studies in our review reported a delay in RTW among employees with prior disability claims (Pransky et al. 2006; Turner et al. 2006), whereas non-North American studies did not (Alexopoulos et al. 2008; Fransen et al. 2002; Steenstra et al. 2005a).

Surprisingly, there was moderate evidence that depression does not play a major role as a prognostic factor in the first phase of work disability (Du Bois et al. 2009; Fransen et al. 2002; Fulton-Kehoe et al. 2008). Depression could, however, become important at a later stage of the work disability process, when the worker is away from work for a longer period of time.

Likewise, the results of clinical examination (Baldwin et al. 2007; Du Bois et al. 2009; Nordin et al. 1996; Prkachin et al. 2007) were not prognostic for time away from work, although some of these studies excluded red flag issues that would have been evaluated during clinical examination.

Also interestingly, age and sex were two categories for which insufficient evidence was identified. This was surprising since in our previous review, these items were identified as prognostic. Recent high-quality studies (Alexopoulos et al. 2008; Du Bois et al. 2009; Steenstra et al. 2005a; Turner et al. 2008) did not report a relationship for age and sex with RTW. Age and sex are often added as confounders to statistical models without providing actual effect estimates—oftentimes because age is deemed not modifiable. This limits our understanding of the strength of association with RTW when compared to studies where they are reported as significant.

In a working population that is ageing, reporting the effect of age might provide valuable information when devising interventions to improve RTW and stay at work outcomes in this growing segment of the population. Reporting the effect of age in RTW could be a first step in disentangling the mechanisms at play in older age groups.

'Fear-avoidance beliefs' were not shown to be prognostic for RTW following a low-back injury (Alexopoulos et al. 2008; Fransen et al. 2002; Gluck and Oleinick 1998; Krause et al. 2001; van Doorn 1995; van der Weide et al. 1999). This may be due to the content of the questionnaire primarily used in this field (Waddell et al. 1993). The commonly used fear-avoidance beliefs questionnaire (Waddell et al. 1993) could be less valid in a population where back pain is work related or at least work relevant (Inrig et al. 2012) because some of the items relate to fears about re-injury on the job which

might be quite valid rather than fear-avoidance related.

One factor that has recently been of great interest to researchers is the association between use of pain medication in general and opioids in particular on RTW. However, this area has not yet been examined in a sufficient number of high-quality studies (Du Bois et al. 2009; Franklin et al. 2008; Pransky et al. 2006; Webster et al. 2007) to draw conclusions.

16.8 Knowledge Transfer Workshop: Discussing the Results with Practitioners

We wanted to get this information, the findings of our systematic review, into the hands of practitioners to make the findings applicable, to provide context for the identified factors and to improve the RTW process for injured workers with LBP. So we organised a workshop for the organisation that provided the grant for this study in Winnipeg, Manitoba, in 2011 to discuss the results of our review. The workshop was attended by 34 professionals who were active in work disability prevention. Participants were divided into seven groups to discuss the review. The workshop had four components:

1. An overview of our study (design and methods).
2. A discussion of prognostic factors, according to the knowledge and experience of the practitioners involved.
3. Information on the strength of the evidence for all factors identified in the review.
4. An exercise using cue cards to evaluate the relevance of the most important constructs found in the evidence synthesis.

The workshop involved much dialogue and discussion; the researchers heard from the practitioners. Each of these practitioner groups discussed the importance of each prognostic factor and determined relevance based on the clinical practice and experience of the groups' members. The table below illustrates the agreement between research and practice (see Table 16.2).

Table 16.2 Agreement between research and practice

Important according to practitioners	Evidence from review
Psychosocial	Insufficient evidence
Fear-avoidance beliefs	Insufficient evidence
Work relatedness of back pain	Insufficient evidence
Kinesiophobia	Insufficient evidence
Depression	Moderate evidence for NO effect
Treatment related: content	Moderate evidence
Workplace psychosocial	Moderate evidence
Claim-related factors	Moderate evidence
Workplace modified duties	Strong evidence
Pain	Strong evidence

No consensus (number of groups endorsing the factor/total number of groups): recovery expectations (5/7), radiating pain (4/7), disability (4/7), workplace physical factors (6/7), provider (6/7)

16.9 Results of the Knowledge Transfer Workshop

The workshop revealed a number of discrepancies between the results of our systematic review and clinician's impressions. Although we made it clear to participants that we limited our review to those workers in the early phase of work disability/sick leave, some of the discrepancies noted between the clinicians' views and the evidence may be influenced by their clinical experience with patients at a later stage in the disability process.

Many of the factors raised by the practitioners were psychological. The shift from a biomedical model to a biopsychosocial model (Engel 1977) appears to have occurred with a strong emphasis on psychological factors. However, from our review, it seems that some of these factors should still be considered in conjunction with some of the biomedical factors. The psychosocial factors that were mentioned lacked evidence.

Another key distinction was revealed in the workshop: Participants (practitioners) considered workplace factors, such as supervisor or co-worker support and work-life interference, to be psychosocial factors. This may be important. At the workshop, we were only able to present preliminary findings. The final results on job satisfaction were not presented, and yet they could be considered as a workplace psychosocial factor.

There was no consensus among workshop participants on some of the factors supported by strong evidence: Recovery expectations was endorsed by five out of seven groups, radiating pain and disability by four of the seven groups and workplace physical factors and health-care provider by six of the seven groups.

We asked participants what they thought should be the next steps for research. The recommendation was to further translate the results into practical tools. Participants wanted research and information that could be applied in practice.

16.10 Discussion: Applicability and Recommendations

The findings of our systematic review can be used to develop an approach for identifying at-risk workers with LBP or, more specifically, those workers in the early stages of work disability from LBP at high risk for poor RTW outcomes. Practitioners could prioritise and allocate resources based on this new information. The factors identified in this review could be used to screen those workers at high risk of long-term or permanent disability. From these findings a screening tool could be developed, although such a tool would require validation to obtain reliable risk estimates.

How, exactly, would this be done? The steps as summarised by McGinn et al. (2000) could be followed. Such a tool should be based on prior knowledge (as summarised in this review). It should be derived in a dataset, and it should be validated. Thorough validation procedures are available (Steyerberg 2009). A first step would be internal validation within the same dataset. However, external validation in a new dataset and/or other setting is preferred. The screening tool should then be evaluated for its effectiveness on improvement of care for those off work due to LBP (McGinn et al. 2000).

Other studies and reviews may lead the way, as well. A recent systematic review on prediction rules for the physiotherapeutic management of LBP concluded that most of the identified 23 studies described the derivation of a rule and none investigated the impact phase of development (Haskins et al. 2011). Stanton et al. (2010) found 18 studies on 15 separate rules for a variety musculoskeletal complaints and found only one study that looked at the impact of the rule in practice (Flynn et al. 2002). Stanton et al. confirmed that more evidence is needed to implement prediction rules in practice on a large scale. For the work disability prevention setting evidence for the effectiveness of the application of a prediction rule is definitely lacking.

The prediction rule that was included in our review was by Heymans et al. (2009). The variables examined for the rule were chosen based on our previous review and clinicians' input. This study used validation techniques to increase generalisability to other populations (Steyerberg et al. 2001). External validation however is still preferred when the original study is small (Bleeker et al. 2003). The prediction rule for LBP as developed by Dionne and colleagues (Dionne et al. 2005, 2006) has been validated in multiple settings. It is however not clear whether RTW had already occurred in the workers studied by Dionne, and so these papers did not meet the eligibility criteria for our review. For both prediction rules (Steyerberg 2009; Flynn et al. 2002; Steyerberg et al. 2001), it is not yet clear if their use would improve outcomes for injured workers.

Practicing physicians have considered subgroups of patients that may be more or less responsive to clinical intervention (Kent and Keating 2004, 2005), and studies have supported the impression of differential response to certain therapies based on patient characteristics (Boersma and Linton 2005, 2006; Shaw et al. 2007) or course of disease (Dunn et al. 2006). Identifying clusters or subgroups of patients is an interesting way to determine whether interventions can be more closely tailored to individual workers' conditions (Shaw et al. 2006). A few studies of LBP have suggested that subgroup-based intervention can improve outcomes (Flynn et al. 2002; Haldorsen et al. 2002; Haldorsen 2003; Childs et al. 2004; Brennan et al. 2006). Shaw et al. have proposed an approach to match intervention strategies to potentially modifiable disability-related risk factors detected early in the course of a

significant LBP episode, theoretically when risk factors may be most amenable to modification (Shaw et al. 2006). Their approach is based on a review of reviews of prognostic factors in LBP. The impact of implementing this approach in practice, however, has not been tested.

Another approach is to formally test for subgroup effects in randomised controlled intervention studies to determine effectiveness of interventions for subgroups of patients (Steenstra et al. 2009). Subgroup analysis is often done poorly (Sun et al. 2011) and should adhere to published criteria (Sun et al. 2010). Both of these approaches might be useful as complementary to the prediction rule approach to identify appropriate interventions for workers at high risk for work disability.

The effectiveness of applying a prediction rule is dependent on the quality of the rule and the availability of effective interventions suitable for those identified to be at high risk. The recently published randomised controlled study on the impact of the STarT Back tool shows that using a simple, nine-item tool and referral to appropriate interventions based on risk stratification can lead to significant improvements in care compared to usual physiotherapy care(Hill et al. 2011). The population in this study was mixed with regards to work status. Results on RTW and work productivity were not available when we were writing this chapter, but are considered in the study design (Hay et al. 2008). Although this approach shows to be an improvement to usual care in England, Koes in his commentary states that there is still room for improvement (Koes 2011), since differences might be statistically significant but still relatively small in absolute size.

16.11 Conclusions and Implications for Practice

In this chapter, we walked through the process of our systematic review and looked at key findings in terms of prediction factors for RTW from acute LBP. The main known prognostic factors for RTW were:

- Patient's recovery expectations.
- Content of care.
- Disability and pain rating.
- Radiating pain.

As well, workplace factors such as physical demands, work accommodation and job satisfaction were prognostic factors for RTW.

As noted, the findings from this systematic review will be of interest to all those who play a role in RTW—in particular, policymakers, clinicians, workers' compensation case managers and medical examiners, and workplace disability prevention and return-to-work practitioners. The findings can be used to inform decision-making in practice.

Applying this new knowledge in practice should be executed in a structured way. The effectiveness of choosing interventions for workers with LBP based on prognostic information for RTW needs to be established, and therefore applying this approach should be done with care.

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17 Mental Health Problems and Mental Disorders: Linked Determinants to Work Participation and Work Functioning

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Understanding the relationship between mental health and work conditions. Specific determinants of mental health problems in the workplace and significant work reintegration factors of workers with mental disorders are discussed.

17.1 Introduction

Organizational, economic, and technical changes in our societies have important repercussions on employees' mental health. The consequences of these types of changes in the workplace represent a burden not only to people but also to economies. In several countries, the costs related to health care and loss of work productivity due to mental health problems and mental disorders exceed several billion dollars annually (OECD 2010). Presenteeism in the face of mental health problems (e.g., depressive and anxiety symptoms) is a significant burden for the organization, while disability claims have doubled in the last decade for employees with common mental disorders (i.e., adjustment disorder, anxiety, and depression disorders), accounting for 30% of disability claims (OECD 2009). Furthermore, approximately 50% of employees who are absent from work because of common mental disorders will take several days, or even months, off or will never return to work (Stephens and Joubert 2001). Though many people with severe mental disorders (e.g., schizophrenia and bipolar disorder) are ready and available to integrate into the competitive workplace, 70–80% of these workers continue to be unemployed (Corbière and Lecomte 2009).

Distinctions made in the literature concerning mental health conditions and the work situations in which they occur have led to the terms "mental health problem," "common mental disorder," and "severe mental disorder" being used to differentiate a person's symptomatology and their ability to function at work. While the term "mental health problem" means any deviation from the state of mental or psychological well-being, the terms "illness" and "disorder" refer to clinically recognized diseases, and they suggest that significant distress or dysfunction, or a tangible risk of undesirable or harmful outcomes, exists (Government of Canada 2006). While mental

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_17,

health problems can have a negative impact on job performance (e.g., presenteeism) and cause pain for individuals and their families, they do not necessarily lead to the development of mental illness (World Health Organization 2005). According to Nieuwenhuijsen et al. (2003), the majority of workers who are absent from work due to a "common mental disorder" can be grouped into three categories: adjustment disorders, mood disorders (including major depression), and anxiety disorders (Shiels et al. 2004; van der Klink et al. 2003). It remains difficult to precisely establish the incidence and prevalence of these three mental disorders in a working population (St-Arnaud et al. 2011); however, they are most common in the labor force and have a higher prevalence compared to a severe mental disorder such as schizophrenia, which has a prevalence of approximately 1% in the general population. The Ontario Ministry of Health (Ministry of Health and Long-Term Care 1999) and other international institutions (e.g., National Institute of Mental Health) define "severe mental disorders" using three tangible indicators: (1) the inabilities or difficulties that interfere or limit the person's functioning in one or more areas of life activity; (2) the expected duration refers to the problem identified either through facts or subjective experience suggesting a persistence of health problems over time (e.g., frequency and intensity of use of psychiatric services); and (3) the predominant diagnoses are schizophrenia, schizoaffective disorders, bipolar disorders, and major depression. Other psychiatric diagnoses, such as personality disorders and severe concurrent diagnoses (psychiatric diagnosis with substance abuse), are also included in the term "severe mental disorder." In using the term "severe mental disorder," it is important to consider not only the psychiatric diagnosis and severity of symptoms but also the functioning of the person in his or her social and work environment (Corbière and Durand 2011).

Even though preventive interventions for employees with mental health problems, return-to-work programs for employees absent from work due to common mental disorders, and supported employment programs for people with severe mental disorders are available, these programs still encounter difficulties in returning to and/or maintaining jobs in these groups of people. The relationship of these mental health problems and severe mental disorders as they are associated to a work situation is represented as a continuum in Fig. 17.1. For example, people with common mental disorders are likely to be absent from their organization and can be in the process of return to work, while people with severe mental disorders are often unemployed or on long-term disability and can be in the process of work reintegration. The parallel of mental health with work conditions during the process of work participation and work functioning is not strictly defined: people with mental health problems may be absent from the workplace, and people with mental disorders may try to stay at work (e.g., presenteeism).

We think that understanding the nuances in the relationship between mental health and work conditions, as well as the more common parallel relationships shown in Fig. 17.1, will help us to better understand the specialized literature. To illustrate this, the four objectives of this chapter are (1) to demonstrate the economic burden of mental health problems and mental disorders in the workplace, particularly relating to presenteeism, work absences, and long-term disability; (2) to present the determinants of mental health problems of employees in the workplace; (3) to present the significant return-to-work factors for people with common mental disorders; and (4) to present the significant work integration factors for people with severe mental disorders. For the last three objectives, we will support the linked determinants of work participation with theories, when possible, to better explain the combination of factors affecting the work outcomes of different populations. At the ends of these sections, we will present services/programs or interventions designed to facilitate the work participation of people with mental health problems or mental disorders. Finally, we will discuss similarities in the factors affecting work participation of people with mental health problems or mental disorders as well as future avenues of research.

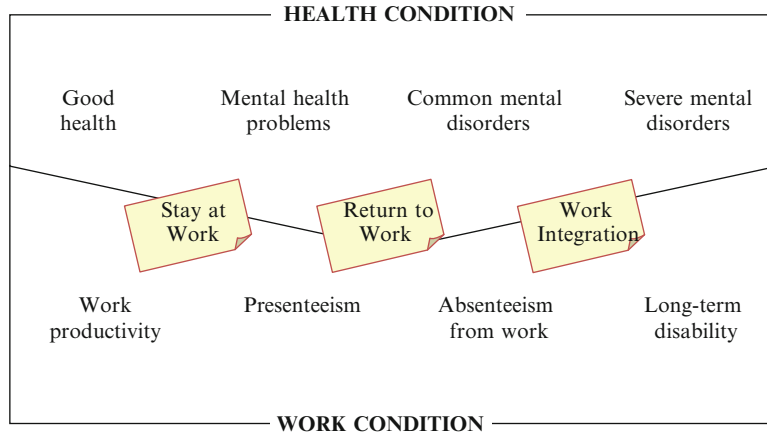

Fig. 17.1 Mental health conditions associated to work participation and work functioning (adapted from Corbière and Durand 2011). *Note*: *Colored stamps* represent the three different types of individuals' work participation and work functioning

17.2 Economic Burden of Mental Health Problems and Mental Disorders in the Workplace

One of the most significant costs to society related to mental health problems and mental disorders is the lost productivity of their working population. Estimates suggest annual productivity losses total in the billions worldwide (Greenberg et al. 2003; Lim et al. 2008; Hilton et al. 2010). Decreased work productivity in the work force has been reported as reduced production by workers remaining at work, work absences, and long-term disability.

17.2.1 Presenteeism

One source of decreased work productivity losses is presenteeism. Presenteeism has been defined as being present at work but unable to work to full capacity. Studies from around the globe indicate that presenteeism is responsible for a significant cost burden related to mental health problems and mental disorders (Dewa and Lin 2000; Kessler et al. 2003; Lim et al. 2000; Sanderson and Andrews 2006; Holden et al. 2011). A higher prevalence of presenteeism among Korean workers with depressive feelings has resulted in this group being 7.4% less productive (Lee 2010). During a 2-week period, it has been estimated that US workers lose an average of 4 h/week due to depression-related presenteeism; this translates into $36 billion USD (Stewart et al. 2003). Other studies suggest annual presenteeism losses to be $24.5 billion (USD) for major depressive disorder and $7.6 million (USD) for bipolar disorder (Kessler et al. 2006).

A number of factors could account for presenteeism, including the ways in which mental health problems and mental disorders decrease productivity at work. A Canadian study showed that they can interfere with a worker's social participation, understanding and communicating, and day-to-day functioning (Wang et al. 2006). A US study found that depression limited the performance of physical jobs at an average of 20% of the time and limited mental interpersonal demands 35% of the time, on average (Lerner and Henke 2008). Individuals with more severe depression had more job performance deficits than those with moderate or mild depression, and individuals with dysthymia had fewer job performance deficits than patients with major depression (Lerner and Henke 2008). In addition, Lerner et al. (2004) observed that workers with depression experienced more impairment with time management.

17.2.2 Work Absences

Workplace productivity costs due to mental disorder-related absences are substantial. Work absences take two primary forms: One form is sporadic absence, such as sick days taken for a cold, and the second form is absence associated with prolonged leaves from work, such as those covered by disability benefits. Below we will discuss recent findings on sporadic absence and its significance.

Population-based surveys of workers estimated that the annual average depression-related absenteeism productivity loss is about 1 h/week/worker; this is equivalent to $8.3 billion USD (Stewart et al. 2003). Kessler et al. (2006) observed fewer days of work lost. Their estimates also indicated that workers with major depressive disorders experienced average annual work absences of 8.7 days; this totals about $24.48 billion (USD) or a total of 150.5 million days lost. In addition, $5.97 billion (USD) or a total of 40.7 million days are lost each year due to work absences related to bipolar disorder (Kessler et al. 2006).

Studies from The Netherlands and the USA have reported that the number of absences related to depression is greater than those for many chronic medical conditions (Druss et al. 2001; Grzywacz and Ettner 2000; Buist-Bouwman et al. 2005). A multinational European study compared to people with physical conditions with those with mental disorders and observed that on average more days during which they cannot carry out their usual activities (Alonso et al. 2011). Using data from one US firm, Druss et al. (2000) observed that workers experienced an annual average of almost 10 sick days for depression compared to 7 days for diabetes, heart problems, and back problems, and 3 days for all other problems. Using population-based data from The Netherlands, Buist-Bouwman et al. (2005) found that chronic back problems were associated with 25 additional work loss days compared to 29 additional work loss days associated with mood disorders and 18 days with anxiety disorders.

There is also increasing evidence that when they occur together, mental and chronic physical disorders further increase work loss. A Dutch study found that the likelihood of experiencing a common mental disorder (especially a mood or anxiety disorder) increases significantly when someone has a chronic physical disorder (Buist-Bouwman et al. 2005). Studies from North America and The Netherlands indicated that workers with comorbid mental and chronic physical disorders experience a greater number of sick days than those who do not have comorbid conditions (Buist-Bouwman et al. 2005; Druss et al. 2000; Dewa et al. 2007; Braden et al. 2008). Canadian workers with both mental and chronic physical disorders are almost four times as likely to experience an absence day compared to a worker who has neither (Dewa et al. 2007). Buist-Bouwman et al. (2005) reported significant increases in work loss days for Dutch workers experiencing comorbid anxiety and mood disorders with chronic back problems or hypertension compared to either type of condition alone. US workers with chronic pain disorders (e.g., migraine/chronic headache, arthritis, back problems) and a common mental disorder were more likely to have missed at least one work day in the past month (Braden et al. 2008). Holden et al. (2011) observed increased absenteeism among Australian workers with comorbid psychological distress and either an injury, cancer, or arthritis.

17.2.3 Long-Term Disability

In contrast to short-term work absences, long-term disability can be defined as a leave from work that requires a lengthy absence. Disability leave can take the form of either short-term or long-term disability leaves. In general, these are absences requiring a worker to file an insurance claim to receive income replacement benefits, often called disability benefits (i.e., short-term or long-term disability). These benefits may be either publicly or privately sponsored. Because these benefits are a form of insurance, they are defined by the insurance policy. As a result, there are no universal definitions for this type of disability. Eligibility criteria and length of coverage differ from one disability insurance plan to another.

Despite the caveats, in the early 1990s, insurers (governments and employers) began to become aware of the rise in mental and nervous disorder disability claims. The Health Insurance Association of America (HIAA) (1995) reported that between 1989 and 1994, disability claims doubled. The HIAA (1995) also found respondent companies spent between $360 and $540 million on disability claims related to this group of disorders. Over half of short-term mental or nervous disorder disability claims among North American workers are attributed to major depression (Health Insurance Association of America [HIAA] 1995; Conti and Burton 1994; Dewa et al. 2002). In Canada, mental illness-related short- and long-term disability accounts for up to a third of claims and about 70% of the total costs, translating into $15–33 billion annually (Dewa et al. 2002). For some Canadian companies, mental disorders account for 30–40% of all short-term disability claims (Sairanen et al. 2011).

About 76% of workers in Canada return to their jobs at the end of a short-term disability episode, while approximately 8% go on to receive long-term disability benefits (Dewa et al. 2002). Although a smaller proportion of workers receive long-term disability, a long-term disability episode in Canada can cost almost four times as much as a short-term disability episode (Sairanen et al. 2011; Dewa et al. 2010). There have been reports that annually, Canadian long-term disability episodes have increased by 0.5–1.0% and account for as much as 30% of total claims (Sairanen et al. 2011).

Compared to other types of disability leaves, US studies indicate that those related to major depression are generally longer than leaves for other types of disorders such as rheumatoid arthritis, heart disease, and diabetes (Druss et al. 2000; Conti and Burton 1994; Adler et al. 2006; Burton and Conti 1998). Canadian studies report that disability leaves related primarily to common and severe mental disorders can be double that for physical disorders (Dewa et al. 2010). As a result, compared to disability leaves for physical disorders, the average disability episode for mental/behavioral disorders can be double the cost per episode (Dewa et al. 2010).

17.3 Determinants of Mental Health Problems of Employees in the Workplace

Psychosocial risk factors refer to adverse psychosocial characteristics unfavorable to the health and well-being of an individual (Cox and Rial-Gonzalez 2005; Theorell and Hasselhorn 2005; Kompier 2005). These characteristics can be work and non-work related. Many studies have demonstrated that exposure to adverse psychosocial factors at work (e.g., high job demands) determines the individual's stress response (e.g., changes in pulse) and the related physical and psychological symptoms (e.g., musculoskeletal [MSD] disorders, burnout) (see reviews: Bonde 2008; Nieuwenhuijsen et al. 2010; Stansfeld and Candy 2006). These symptoms are, in turn, predictors of withdrawal behaviors from an organization (Table 17.1).

To define and assess the relationship between potential psychosocial risk factors and health

Table 17.1 Work and health: relationship between psychosocial risk factors, health, and withdrawal behaviors

Exposure to adverse work conditions	→	Stress response	→	Symptoms	→	Withdrawal behaviors
Psychosocial risk factors Work Non-work Personal		*Objective indicators*, e.g., changes in hormones, blood pressure, and pulse		*Mental health problems*, e.g., depression, burnout, psychological distress, anxiety *Physical health problems*, e.g., cardiovascular diseases, musculoskeletal disorders, cancer		The most studied outcomes Absenteeism Retirement Turnover No return to work No job maintenance

problems, particularly mental health problems, we suggest a multifactorial classification integrating both work- and non-work-related psychosocial factors (Stansfeld 2002; Marchand and Durand 2011).

First, *work-related psychosocial risk factors* refer to the characteristics of the design, organization, and management of work, as well as to its social context. These factors include all organizational characteristics and interpersonal relationships in the workplace that constitute potential risks for the deterioration of physical and mental health conditions (Stansfeld and Candy 2006; Cox et al. 2000; Gilbert-Ouimet et al. 2011; EU-OSHA-European Agency for Safety and Health at Work 2007; Vézina et al. 2004). Work-related psychosocial risk factors consist of four levels: content of work, context of work, individual, and interpersonal. The first two levels refer to the sets of "stressful characteristics of work" (Cox et al. 2000). The content level specifically consists of objective job characteristics. For example, several studies have shown that repetitive tasks, unclearly defined roles, and intensified workload can negatively affect an individual's mental health condition (e.g., Nieuwenhuijsen et al. 2010; Karasek 1979; Kompier 2006). The context level includes characteristics of the organization. For example, many studies have demonstrated that an organizational culture characterized by discrimination, unfair treatment of workers by supervisors, or job insecurity can determine an individual's stress reaction that leads them to quit the organization (Kivimaki et al. 2003; Siegrist 1996). Individual characteristics at work, such as little latitude allowed for employees' decisions, little decision authority, and low skill discretion, have been identified as significant determinants of mental health problems (Stansfeld and Candy 2006; Karasek 1979). Interpersonal factors concern the fundamental social roles and relationships at work. For instance, a lack of social support from coworkers and from supervisors, and isolation at work were all found to increase psychological strain at work and, thus, depression (Bonde 2008; Karasek 1979; Netterstrom et al. 2008) (about organizational variables, see also Chap. 11) (Table 11.2).

Second, *non-work-related psychosocial risk factors* are classified into three levels, including the family situation, participation in social networks, and the individual's community exchanges (Marchand and Durand 2011). Several studies showed that poor quality of life outside of work (e.g., work-family conflict, lack of partner support, poor social contacts) can determine mental health problems such as psychological distress (Marchand et al. 2005; Beauregard et al. 2011). Table 17.2 also shows a third domain, referring to *personal characteristics*—i.e., sociodemographic, psychological, and behavioral characteristics. In the literature, these factors are generally studied as indirect determinants of mental health problems. For example, as control variables, gender (women), age (young people), personality traits (having poor coping strategies), low educational level, poor physical status, and unhealthy behaviors (e.g., overweight, tobacco use) may modulate the impact of work- and non-work-related psychosocial risk factors on mental health problems (Stansfeld 2002; Marchand et al. 2005).

The multilevel classification integrating both work- and non-work-related psychosocial factors described in this chapter derives from the two main theoretical models used to explain the relationship between work and mental health: (1) the *job demand-control* (JD-C) model (Karasek 1979), extended by the JD-C-support model (Johnson et al. 1989), and (2) the *effort--reward imbalance* (ERI) model (Siegrist 1996). The basic assumption of the JD-C and ERI models is that psychosocial risk factors (job demands and effort) lead to job strain when job resources are lacking (low control, low social support, and low reward). In the JD-C model, control and social support buffer the impact of job demands on job strain (Karasek 1979). In the ERI model, rewards are offered that may minimize the unfavorable effects of effort (Siegrist 1996). Though the JD-C and ERI models are the most influential job stress models (Bakker and Demerouti 2007), they do not exhaustively explain the relationship between psychosocial factors at work and mental health status (Bakker and Demerouti 2007). Thus, the *job demands-resources* (JD-R) model

Table 17.2 Psychosocial risk factors: a multifactorial classification

Psychosocial risk factors		
Domain	Levels	Factors (examples)
Work	Content	• Lack of task variety • High psychological/physical job demands • High workload/overwork • Inappropriate work schedules
	Context	• Job insecurity • Poor organizational justice • Organizational stress intervention • Lack of health and safety policy
	Individual	• Low control • Low skill utilization • Low decision authority
	Interpersonal	• Lack of social support (coworkers, supervisor) • Poor teamwork • Efforts/rewards imbalance • Lack of recognition
Non-work	Family	• Marital status (single) • High parental responsibilities • Work-family imbalance
	Social network	• Lack of participation in social networks • Lack of social support (friends)
	Community	• Poor economic situation • Difficult to access daycare
Personal	Sociodemographic	• Age (young) • Gender (female) • Low educational level
	Psychological and behavioral characteristics	• Personality traits (negative affectivity) • Poor coping strategies • Unhealthy lifestyle habits (tobacco use) • Lack of physical activity • Stressful life events (divorce)

(Demerouti et al. 2001) will be introduced to further explain the determinants of mental health problems at work. The JD-R model (Demerouti et al. 2001) classifies a wide range of psychosocial risk factors into two general categories: job demands (JD) and job resources (JR) (Schaufeli et al. 2002).

The JD-R model can also detect the complex reality of working conditions for different occupations. The central assumption of this model is that JD and JR imply two different underlying processes that play a role in the development of employees' well-being. First, a *health impairment process* in which high JD (physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological effort or skills) exhausts employees' mental and physical resources, leading to general health problems, repetitive strain, and injury (Bakker and Demerouti 2007; Demerouti et al. 2001; Leiter 1993; Bakker et al. 2003b). Second, a *motivational process* in which JR (physical, psychological, social, or organizational aspects of the job that drive employees to achieve work goals) has intrinsic and extrinsic motivational potential, fostering employees' growth, learning, and development (Bakker and Demerouti 2007; Demerouti et al. 2001; Schaufeli and Bakker 2004) (Fig. 17.2).

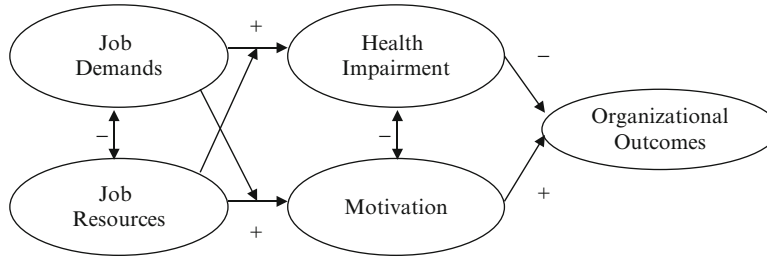

Fig. 17.2 The Job Demands-Resources model (adapted from Bakker and Demerouti 2007)

Empirical evidence showed that JD was directly responsible for job strain, including burnout,[1] lack of energy, and development of health problems, and indirectly responsible for sickness absence duration. Job Resources were directly related to motivation, including work engagement[2] and organizational commitment, and indirectly related to absenteeism (Bakker et al. 2003a) and turnover intention (e.g., Bakker and Demerouti 2007; Bakker et al. 2003a, b; Schaufeli and Bakker 2004). Moreover, JD and JR have been found to be interactive, with JR buffering the impact of JD on job strain (Bakker et al. 2003c). From a practical point of view, organizations must enhance JR (e.g., social support) and/or decrease JD (e.g., workload) in order to lead to a low level of job strain. Bakker et al. (2010) have recently demonstrated that JR (skill utilization, learning opportunities, autonomy, colleagues' support, leader's support, performance feedback, participation in decision making, career opportunities) may maintain work engagement under conditions of high JD (i.e., workload, emotional demands). This additive effect arises because under demanding work conditions, the need for challenge translates JR into task enjoyment and work engagement (Demerouti and Bakker 2011). In sum, changes regarding JD and JR levels lead to promote the performance and health of employees.

Based on the theories described above, three common interventions for workplace prevention and stress management (primary, secondary and tertiary) and three levels of application based on different targets (individual, group or organization) have been described in the literature (e.g., Cooper and Cartwright 1997; Cottrell 2001; Dollard and Winefield 1996; Kompier et al. 1998; Murphy 1988; Wilson et al. 1996). *Primary intervention* occurs in the absence of symptoms in order to reduce the incidence of stressors and to maintain an individual's good health. This can be achieved by, for example, assessing psychosocial risk factors, monitoring the organizational and human resource management, and/or investing in life-long training (e.g., Kompier 2006; Golembiewski et al. 1987; Jones et al. 1988). *Secondary intervention* occurs after the emergence of the first symptoms in order to reduce the prevalence of the disease. Preventive programs, such as one-to-one peer counseling or self-help groups, were found to be good practices for treating critical events promptly (e.g., Lindquist and Cooper 1999), and have helped workers to develop the psychological skills to control stressful situations (Karimi and Alipour 2011). *Tertiary intervention* also occurs after the emergence of symptoms but focuses on employee assistance. Counseling the employee to power self-awareness, reestablishing confidence between the people involved, and restoring the normal work and health conditions are, for example, good practices to reduce the consequences of the stressful conditions.

The *individual level* of application refers to the employee's mental and physical health. Preventive programs focusing on employee mental health are very rare and are usually performed by "Employee Assistance Programs." At this level, work-family conflict management, development of professional

[1] *Burnout* is defined as a three-dimensional syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment (Maslach et al. 2001).

[2] *Work engagement* is defined as a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption (Schaufeli et al. 2002).

skills, time management, and role clarification seem to be the most successful primary and secondary interventions to reduce potential stressors at work (Cottrell 2001). The *group level* involves the employee's coworkers, supervisors, family, and non-work social network. It has been well demonstrated that working in a self-managed team, receiving social support from coworkers and supervisor, and receiving performance feedback are among the most significant practices for preventing mental health problems at work (Bourbonnais et al. 1999). The *organizational level* consists of the company's formal and informal policies, rules, standards, and workplace accommodations (Corbière et al. 2009). Five main factors have been identified as the key mechanisms for successful preventive interventions to reduce psychosocial risk factors and promote employees' health at work (Vézina et al. 2004; Vézina and St-Arnaud 2011): (1) support from senior management and involvement of all hierarchical levels, (2) employee participation in discussions of problems and efforts to develop solutions, (3) prior identification of worker populations at risk based on validated theoretical models or related events, (4) rigorous implementation of necessary changes in targeted worker populations, and (5) evaluation and management of the process and changes in the workplace (Vézina et al. 2004; Kompier et al. 1998; European Agency for Safety and Health at Work 2002). It is important to note that even if preventive interventions at the individual level have a lower risk and cost associated with their implementation than those at an organizational level (Murphy and Sauter 2004), intervening at the organizational level has been more effective (Kompier and Kristensen 2001).

17.4 Significant Factors Impacting Return to Work for People with Common Mental Disorders

At least three systematic literature reviews have recently been conducted on the factors impacting return to work/work disability for people with common mental disorders (Lagerveld et al. 2010; Blank et al. 2008; Cornelius et al. 2011). Blank et al. (2008) conducted a systematic review of the factors predicting return to work or risk of job loss for employees with common mental disorders and concluded that this type of prediction was multifactorial in nature. The significant factors were categorized as work factors (e.g., high job stressor), social status (e.g., older employees and low education), health risk behaviors (e.g., being drug dependent), and medical factors (e.g., severity of symptoms). Due to the limitations of the 14 studies retained in this systematic review (e.g., diverse work outcomes and definitions of mental disorders), the authors could not clearly identify the most significant (or evidence-based) factors affecting return to work for people with common mental disorders.

Two years later, Cornelius et al. (2011) presented results from a systematic review including seven studies. In contrast to Blank et al. (2008), they included studies with a prospective or longitudinal design only and did not consider the duration of prior sickness absence. More precisely, their inclusion criteria for participants included being on sick leave from 2 to more than 90 days due to common mental disorders (claiming disability benefits or receiving disability pension at baseline). In their systematic review, they divided 17 potential predictors (modifiable or not) into three categories: (1) health-related factors (e.g., stress-related), (2) personal factors (e.g., age), and (3) external factors (e.g., supervisor communication with employee). For health-related factors, limited evidence was observed only for the association of stress-related factors and depression/anxiety disorder with longer durations of disability. For personal factors, strong evidence was shown for age; for example, older workers (>50 years old) had a higher risk for continuing disability and a longer time to return to work. For other variables included in this category (e.g., gender, sole breadwinner, history of previous sickness absence, socioeconomic status), limited evidence was found for their effect on work outcomes. For external factors, only limited evidence was found for any of the variables (e.g., continuity of occupational care, supervisory communication with workers having mental disorders, supervisors' consultation with other professionals) to have a specific effect on work outcomes. In the end, Cornelius et al. (2011) concluded that age

(>50 years old) was the only significant predictor of disability and return to work for people with common mental disorders. These results suggest limitations since age is not a modifiable variable allowing health professionals to intervene. To overcome these limitations, Cornelius et al. (2011) suggested developing age-specific interventions to facilitate the return to work. No further information was given to specify how this type of intervention should be designed.

In parallel, Lagerveld et al. (2010) also conducted a systematic review of employees with common mental disorders to identify predictors of work participation (e.g., sick-leave duration) and work functioning (e.g., work limitations) to provide evidence for the development of specific interventions related to these two work outcomes. They defined work participation (WP) *as the capability and/or opportunity to participate in the work force*, *fulfilling one worker's role*, and work functioning (WF) *as the productivity or performance of employees that participate*, *at least partly*, *in work*, *and is the result of a relationship between an individual's health resources and the expectations and structural conditions that operates within social settings such as the workplace* (Lagerveld et al. 2010; Anema et al. 2006). The main difference between these two work outcomes is for WP to indicate taking on the role of worker while WF reflects the functioning of employees in the workplace. From the 30 studies selected in this systematic review, the authors observed that 5 studies addressed WP and WF together, 14 studies included only WP, and 6 included only WF. The authors divided the variables into three categories: (1) personal factors (e.g., age, education, self-esteem), (2) work-related factors (e.g., type of occupation, supervisor contacts), and (3) disorder-related factors (e.g., severity of symptoms, duration of depression). For personal factors, only 2 variables (out of 15) had moderate evidence for a negative relationship with work participation: age (older) and history of sick leave (longer leave). Other variables from this category had limited evidence (e.g., low self-esteem) or were inconclusive (e.g., alcoholism/substance abuse) for predicting WP and/or WF. For work-related factors, limited evidence was found for three variables (out of 9) to predict WP: level of functioning at work, contact with supervisor, and supervisor contacting other professionals besides occupational physicians. For disorder-related factors, strong evidence was found for one variable to predict WP; moderate evidence was found for four variables to predict both outcomes, WP and WF; and evidence was limited or inconclusive for the remaining variables. Strong evidence was found between duration of depression and WP, where longer duration was associated with work disability. Moderate evidence was most often found for severity of symptoms, type of disorders, comorbidity (physical and mental), and clinical improvement to predict both outcomes: WP (e.g., short- or long-term disability) and WF (e.g., mental-interpersonal demands, time management demands). The strongest level of evidence for all factors, regardless of the category, was related to the duration of depression and WP. To reduce the duration of episodes of mood disorders, the authors suggested several strategies: (1) to improve the knowledge of health professionals in recognizing depression to avoid delays in consultation and treatment, (2) to facilitate access to treatment either by appropriate psychiatric care or through workplace channels, and (3) to increase general awareness or literacy about depression and other mental health problems. In this systematic review of the literature, the authors focused on modifiable factors (e.g., self-esteem, supervisor contacts) even if they presented only limited evidence.

To understand the importance of considering modifiable factors from diverse stakeholders (e.g., attitudes and behaviors of people with common mental disorders, supervisors and return-to-work coordinators) in a work disability paradigm (Loisel et al. 2001), we will concentrate on three key studies. First, in a longitudinal cohort study, Brouwer et al. (2009) suggested using the Theory of Planned Behavior (Ajzen 1991, 1996) to explain the return to work of employees on sick leave. This theory has already been applied to different contexts of health behaviors (Hwu and Yu 2006) and vocational domains (van Ryn and Vinokur 1992). Brouwer et al. (2010) also showed that several concepts—work attitude, social

support, and willingness to expend effort to complete the behavior (return to work)—were significant factors affecting time to return to work of people on sick leave due to physical or mental symptoms. Even though this study is important for better understanding the influence of different factors on work participation, disorder-related factors and external factors were not included. In the second key study Nieuwenhuijsen et al. (2004) filled the gap by assessing three factors using a standardized telephone interview: (a) communicating with the employee, (b) promoting a gradual return to work, and (c) consulting with professionals such as human resource (HR) managers and psychologists when dealing with mental disorders (depression vs. other mental disorders). Survival analysis (Cox's regression) of the results demonstrated that better communication between supervisor and employee was associated with favorable full return-to-work rates in nondepressed employees. Third, van Oostrom et al. (2008, 2009) added that the worker-supervisor relationship could be facilitated by a return-to-work coordinator arranging meetings with stakeholders both separately and together to identify return-to-work barriers (e.g., mental workload) and suggest a plan of action (e.g., participatory workplace intervention).

Based on the results of these three key studies, we hypothesize that evaluating modifiable factors (attitudes and intentions towards return to work, communication with the supervisor, and the return-to-work coordinator) together can improve the work participation and work functioning of employees with common mental disorders. In this way, the Loisel et al.'s work disability paradigm (Loisel et al. 2001) helps by considering the key actors stemming from four pillars or systems (legal, organizational, insurance, and personal) to identify each one's role in the work participation of people with disability due to MSD or mental disorders (Loisel et al. 2001; Franche et al. 2005; Marois 2007; Waddell et al. 2003).

Return-to-work interventions dedicated to people with common mental disorders have often been inspired by interventions offered to people with MSD disorders (Goldner et al. 2004) (see Chap. 20). In this vein, Briand et al. (2006, 2007) transferred knowledge and methods from MSD to common mental disorders. This knowledge transfer was possible since a strong association had been identified in the literature between chronic pain and psychosocial and cognitive factors and, more specifically, between chronic pain and depression (Williams et al. 2004; Fishbain et al. 1997; Gatchel et al. 1995; Gatchel 2004; Rush et al. 2000; Dersh et al. 2002). Corbière and Shen (2006) systematically reviewed the literature on psychological return-to-work interventions for people with common mental disorders and/or physical injuries. Of the 14 studies retained in their review, only 2 were classified as work-related common mental disorders (adjustment disorders), with the remaining 12 studies focusing on mental health problems associated with physical injuries. Results from these studies reinforced the difficulty in finding interventions with the aim of helping employees with common mental disorders to return to work. Despite the heterogeneity of approaches or the type of components chosen, the most popular psychological intervention (nearly two thirds of the 14 studies) remained cognitive behavioral therapy (CBT). Cognitive behavioral interventions were usually more effective than the control treatment or condition. However, the type of CBT used in these studies varied in both length and content, which ranged from improving coping skills to developing problem-solving strategies. Briand et al. (2007, 2008) also noted that challenges existed with interventions for people with common mental disorders. Examples included the lack of stakeholder involvement (e.g., employer, insurer) in the return-to-work process (more often only a medical follow-up is offered to this population) or the lack of work accommodation arranged for the specific needs of people with common mental disorders (e.g., time flexibility). Yet, in Nieuwenhuijsen et al.'s (2008) review, in which the main objective was to evaluate the effectiveness of interventions to reduce work disability of employees with depression (all studies were randomized controlled trials), the results showed that no work-directed interventions were found. Systematic reviews of the work participation or

work disability literature emphasized the need to intervene with people directly and also with the organization (e.g., communication with the supervisor). Furthermore, Nieuwenhuijsen et al. (2008) reported that no evidence existed for or against the effectiveness of psychological interventions to reduce work disability of employees with depression. It seems that psychological interventions alone (individual focused ones) are not sufficient in order to maximize the return to work of people with depression.

To conclude, Pomaki et al. (2010) summarized the best practices (based on a systematic review of the literature, including stakeholder input) for return-to-work/stay-at-work interventions for people with common mental disorders. The five principles can be arranged over three levels of intervention (organizational, individual, and disability management practices interventions): (1) Clear, detailed, and well-communicated organizational workplace mental health policy supports the return to work/stay at work; (2) return-to-work coordination (with a trained return-to-work coordinator) and structured, planned, close communication between different stakeholders (e.g., employers, unions, worker, health professionals) are required to optimize return to work and stay at work; (3) application of systematic, structured, and coordinated return-to-work practices (e.g., guidelines for occupational physicians) improves return-to-work outcomes; (4) work accommodations (e.g., reduction of work demands) are an integral part of the return-to-work process and the context of their implementation determines their effectiveness. It is noteworthy that these work accommodations should be feasible for the employer and need to be reassessed regularly regarding their usefulness for the employee (Durand, submitted); (5) facilitating access to evidence-based treatment (based on CBT interventions) reduces work absence. These principles must be considered carefully, and the next step will be to identify significant specific components of return-to-work interventions to facilitate the continuum of work participation and work functioning for people with common mental disorders (Durand and Briand 2011).

17.5 Significant Factors of the Work Integration of People with Severe Mental Disorders

In their literature review, Cook and Razzano (2000) found that people with schizophrenia spectrum disorders obtained fewer remunerative jobs than people with other psychiatric diagnoses (e.g., major depression). Wewiorski and Fabian (2004) carried out a meta-analysis studying the association between psychiatric diagnosis, individual characteristics (gender, race, and age), and employment outcomes and, conversely, found that these characteristics had only modest effects on work outcomes, particularly with respect to job acquisition in the regular labor market. Other studies have demonstrated that sociodemographic and clinical variables such as age, gender, civil status, ethnic group, level of education, age of first hospitalization, and drug abuse could not distinguish individuals with severe mental illness who obtained employment from those who did not (Becker and Drake 2004; Drake et al. 1998). Several authors have pointed out that the socioeconomic factors *work history* or *length of absence from work* significantly predict obtaining employment and are correlated to achieving employment goals (Fabian et al. 1993; Midgley 1990; Xie et al. 1997; Corbière et al. 2005).

In addition, other authors recommend that the indirect benefits inherent to disabilities also be studied because they may influence or restrict an individual's decision to obtain competitive employment in the regular labor market by acting as a disincentive to return to work (Latimer et al. 2006; Resnick et al. 2003). Yet, the OECD (2010) suggested limiting these disincentives to facilitate work participation for people with long-term disability, particularly by revisiting pension disabilities to transform disability into ability.

Other significant predictors for obtaining a job consist of characteristics typically lacking for many individuals suffering from severe mental disorders, such as appropriate social support (Lewis 1990). Alverson et al. (2006) highlighted that the more people with severe mental disorders are satisfied with their social and intimate

relationships, the less they are motivated to seek work. More straightforward results might arise if, for instance, the impact of social encouragement on work integration was evaluated, rather than the larger concept of perceived social support (Corbiere et al. 2011).

Albeit and Luzzo (1999) observed that the work-related barriers an individual perceives can strongly influence their behavior, self-efficacy, and overall work integration process (i.e., getting competitive employment), even when that perception is not based on factual information. For instance, Johannesen et al. (2007) noted that the more barriers to employment perceived by people with severe mental disorders registered in supported employment, the less likely they were to attain vocational success. In this vein, Regenold et al. (1999) demonstrated that people who possessed a certain sense of self-efficacy in their job search were more likely to attain their employment goal, and Bassett et al. (2001) stressed the importance of self-esteem and a person's confidence in their ability to make decisions for achieving vocational goals. A lack of these characteristics may result in deeply held beliefs that a person is incapable of getting employment or is too unstable or fragile to work (Lysaker et al. 2005). Indeed, people who anticipated negative attitudes from others or who had negative expectations demonstrated poor self-efficacy and poor performance at getting employment (Fabian 2000).

In line with previously mentioned results, some authors have found that the longer the unemployment, the greater the perception of barriers to employment and the greater the erosion of self-efficacy and self-esteem (Banks 1995; Eden and Aviram 1993). Other researchers (Midgley 1990; Xie et al. 1997; Anthony and Jansen 1984; Catty et al. 2008) have shown that work history or past work experience was the most significant predictor of obtaining employment, regardless of whether a person was registered in a vocational program or not (Campbell et al. 2010). Corbière et al. (2005) added that both the use of job search strategies and previous work experience provided better understanding about how competitive employment was obtained. Behavioral actions are also essential when predicting getting competitive employment. In fact, *active seekers* who look for a job on their own, seek help from their assigned counselors, express a desire to work, and, consequently, use more job search strategies are more likely to obtain a job compared to *passive seekers*, who present with a lack of intrinsic motivation (Alverson et al. 2006; Mueser et al. 2001).

Thus, how do the variables described above fit with the significant variables recognized in the literature? How do they contribute to work integration? As suggested by Fabian (2000), social cognitive theories are relevant to better understand work outcomes related to mental health for individuals with severe mental disorders. More recently, Corbière, Zaniboni, Lecomte et al. (2011) suggested adapting the theory of planned behavior (Ajzen 1991, 1996) and self-efficacy theory (Bandura 1977a, b) to the work integration of people with severe mental disorders. In other words, the centrality of work in life (attitudes), social encouragement to obtain employment (subjective norm), career search efficacy (self-efficacy), and perceived barriers to employment (internal and external obstacles) can predict the intention to obtain employment (in this case, intention means people who are looking for employment). Taken together, these variables predict the use of job search strategies, which influence the ultimate goal: obtaining employment. In addition, since relevant and significant variables have already been observed in the literature, past work experience (the length of absence from the workplace), social support, self-esteem, and severity of symptoms are included in the model, linked directly to other determinants of the Theory of Planned Behavior and indirectly to work outcomes. Based on data collected in Canada, the explained variance of the behaviors (use of job search strategies) was 26%, and the explained variance of getting employment was only 8%. One of the limits of this study was that other important personal variables, such as cognitive and social interaction deficits, were not assessed. Some studies have ascertained a link between cognitive deficits and poor community functioning, including work outcomes in

individuals with severe mental illness (McGurk and Meltzer 2000; McGurk and Mueser 2003; McGurk et al. 2003). In their recent review, Tsang et al. (2010) highlighted the continuous refinement of cognitive functioning (e.g., executive functioning, attention and work memory, verbal memory) in studies with people with severe mental disorders looking for employment. Results from their review indicated that cognitive functioning was a significant and stable predictor of work outcomes. Individuals with severe mental illness have been reported as frequently demonstrating specific deficits in social skills (Kopelowicz et al. 2006), which could translate into having difficulties relating to coworkers, building a social network, interacting with others, or responding to feedback from supervisors (Mueser et al. 2005). These modest results, obtained in Corbière, Zaniboni, Lecomte et al.'s study (2011), open the door to other significant variables, particularly environmental variables, to explain the work integration of people with severe mental disorders. Stigma is one of the most important variables in the literature (Corbière et al. 2002; Krupa et al. 2009; Stuart 2004, 2006) along with the type of employment program engaged to find employment or the competencies of counselors in helping their clients find employment (Corbière and Lecomte 2009; Krupa et al. 2009; Stuart 2004, 2006; Ravaud et al. 1995).

Corbière and Lecomte's (2009) review of vocational programs dedicated to people with severe mental disorders, distinguished the programs according to their philosophy: Train-Place or Place-then-Train programs (Corrigan 2001). Train-Place vocational programs (e.g., sheltered workshop) aim to help people with severe mental disorders develop specific skills; Train-Place is a step-by-step process allowing people to reintegrate into the workplace. Conversely, Place-then-Train programs place the person in a real work situation prior to offering them specific training. Training is offered as needed (if there is disclosure of the mental disorder in the workplace) to help the person quickly achieve their vocational goals. Supported employment (SE) programs have been recognized as following the philosophy Place-then-Train (Corbière and Lecomte 2009). Several forms of SE programs exist, including the well-established Individual Placement and Support (IPS) model (Corbière and Lecomte 2009; Crowther et al. 2001; Roush 2009) which is considered to be the SE standard (Bond et al. 2008, 2001). Supported employment programs are recognized in several countries as evidence-based practices to help people with severe mental disorders integrate into the regular labor market (Latimer et al. 2006; Crowther et al. 2001; Burns et al. 2007; Cook et al. 2005; Corrigan and Wassel 2008; Corrigan et al. 2008; Wong et al. 2008). The principles/components of the IPS model of SE programs (Corrigan et al. 2008; Bond 2004; Drake et al. 1999; Drake 1998) are the following: (a) Eligibility is based on consumer choice and zero exclusion philosophy; (b) SE is integrated with mental health treatment; (c) attention is focused on consumer preferences; (d) competitive employment is the goal; (e) the job search is rapid from the start; (f) follow-along supports are continuous and time-unlimited (Bond 2004; Drake et al. 1999; Drake 1998); and (g) benefits counseling is systematically offered, and informs the clients about social security and other financial concerns. A recent review of 11 randomized controlled trials of IPS programs indicated that almost 60% of the participants with severe mental illness were successful at obtaining competitive employment (Bond and Drake 2008) compared to 25%, on average, for control groups. However, when randomized controlled trial results were considered separately, we noted work outcome variations from 27 to 78%. The study authors also tried to identify evidence-based components or ingredients in SE programs. For example, in their study including a literature review of the salient ingredients of SE programs, Corbière and Lanctôt (2011) observed that counselors' or employment specialists' competencies, along with the philosophy of the SE program, or supported by the partnership with key actors of the organization (employers, supervisors), were crucial in explaining work integration for people with severe mental disorders. These salient components included employment specialists' competencies related to (a) the working alliance, (b) the recovery philosophy, (c) support, and (d) disclosure and work accommodation.

17.6 Conclusion

In this chapter, we first defined mental health conditions and work situations as observed in the specialized literature, noting the economic and human burden. Second, we identified factors related to the development of mental health problems in the workplace and factors associated with the return to work and work integration for people with common and severe mental disorders. These different work situations and health conditions are often segregated in the literature, while work participation and work functioning should form a continuum (Corbière and Durand 2011; Lagerveld et al. 2010). Future studies of mental health conditions linked to the workplace should include different work outcomes to represent this continuum and should consider the different stakeholders involved in work participation/work functioning (employers, unions, supervisors, insurer, health professionals, employees with a mental condition, etc.).

Even though systematic reviews of the literature have uncovered relevant information with moderate or strong evidence in the area of work participation and work functioning for people with a mental condition, little information is available about the return-to-work process. The return to work does not occur at the end of a complete health recovery, but through a continuous process where health is rebuilt gradually through the work activity itself (St-Arnaud et al. 2011). It would be preferable if literature reviews allowed us to better understand the direct or indirect influences on work outcomes, supported by a theoretical framework.

In the last decade, more sophisticated methods and statistical analyses such as path analyses and structural equation modeling have been used to test the direct and indirect relationships between variables to predict work outcomes, supported by a theoretical framework. Authors have also stressed the importance of modifiable variables (e.g., self-efficacy, self-esteem) to produce more efficient interventions. This new methodology in our domain and theory is useful not only for preventing mental health problems in the workplace but also for improving our understanding of the return to work or work integration of people with mental disorders. The use of different theories such as the JD-C-support model (Karasek 1979; Johnson et al. 1989), the ERI model (Siegrist 1996), the JD-R model (Demerouti et al. 2001), the self-efficacy theory (Bandura 1977, 1997), and the theory of planned behavior (Ajzen 1991, 1996) improves our understanding of work participation and work functioning of people with a mental condition. Moreover, these theories could be embedded in larger theories such as the work disability paradigm (Loisel et al. 2001) in which several systems are identified (legal, insurance, organizational, and personal), as well as the work participation theory in which different work situations (work (re)integration, return to work, maintain employment) of people with a mental condition are considered (Corbière and Durand 2011).

Special attention must also be paid to the levels at which the interventions occur. Researchers and health professionals must consider the individual, the group/community, and the organization as intertwined "actors," all playing an active role in determining the quality of work conditions and associated health conditions. Thus, an "integrated multifactorial approach" involving work- and non-work-related factors should be considered when assessing psychosocial factors at work and detecting the resources for coping with these problems (see JD-R model, Demerouti et al. 2001; Cooper and Cartwright 1997; Cottrell 2001; Kompier and Cooper 1999). In order of relevance, primary and secondary interventions should be priorities because they reduce the need for tertiary interventions (Corbière et al. 2009). Moreover, an "integrated multilevel approach" involving individual, group, and organization levels should be considered in future studies for preventing mental health problems at work, maintaining/improving employees' mental health and organization's productivity, and reducing costs to society (e.g., Vézina et al. 2004; Corbière et al. 2009). Several authors have stressed the importance of more rigorous assessment of intervention implementation to better understand the underlying reasons for excluding components/

ingredients that are recognized in the literature as evidence-based components (Marshall et al. 2008; Swain et al. 2010; Rapp et al. 2010; Rinaldi et al. 2010; Corbière 2012). To accomplish this, many authors have suggested strategies to overcome the barriers to implementation such as using fidelity scales to assess the implementation of the intervention, solid leadership, health professional's and/or return-to-work coordinator's attitudes, and specific and applied training for health professionals and/or counselors (Marshall et al. 2008; Swain et al. 2010; Rapp et al. 2010; Rinaldi et al. 2010; Loisel and Corbière 2011; Tjulin et al. 2009).

Finally, authors stress the importance of considering at the same level, individual and organizational variables and interventions as well as the various stakeholders (i.e., employer, supervisor, return-to-work coordinator, union, employee/person with a mental disorder) involved in the return to work or work integration of people with mental disorders (see also Chap. 25 on stakeholders' perspectives). Further research is warranted on processes and implementation issues encountered in the work disability domain.

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Cancer Survivorship

18

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The views, opinions, and analyses contained in this section are those of the author and should not be interpreted as representing the official views or policies, either expressed or implied, of the Uniformed Services University of the Health Sciences or the Department of Defense.

18.1 Introduction

Who is a cancer survivor? The term cancer survivor was originally defined as any individual diagnosed with cancer at any period before, during, or after treatment (Ganz 2009). For the purposes of this chapter the focus will be primarily on the individual diagnosed with cancer who has completed primary cancer treatment (surgery, radiation, or chemotherapy) (Feuerstein et al. 2007a). This chapter will first provide a brief overview of the epidemiology of cancer survivors and work and the long-term or late effects of cancer and treatment exposures. These long-term and late effects provide many challenges that can impact various work outcomes. We also provide a brief comparison of well-established models of musculoskeletal pain and work, and models recently developed in cancer and work. The cancer and work models have evolved from the existing literature on cancer and work and models from research on work-related musculoskeletal disorders and work disability. Interventions designed to improve return to work will also be considered. Future areas that may help improve the range of work outcomes for cancer survivors who experience problems related to work will also be discussed.

18.2 Epidemiology

12.7 million cases of incident cancer were reported worldwide in 2008 (Ferlay et al. 2010). Increasing numbers of both newly diagnosed cases and survivors have contributed to a growing cancer survivor population (Mariotto et al. 2011). For example, the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program monitors cancer incidence, survival, and prevalence in the United States (Howlader et al. 2011).

Work can be important for many cancer survivors. Working during treatment, returning to work or, for many, the ability to remain at work once back at work represents a return to health while providing often needed income and social

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_18,

support outside of their family and friends (Ferrell and Hassey Dow 1997; Rasmussen and Elverdam 2008; Steiner et al. 2008). Work may also be a necessity to ensure financial security and healthcare insurance (Steiner et al. 2008; Amir et al. 2011; Main et al. 2005). Although many cancer survivors are able to continue working or return to work following treatment and experience no difficulties, a proportion of cancer survivors report problems related to employment (Syse et al. 2008; Munir et al. 2009; Moran et al. 2011).

18.3 Employment

Several studies have demonstrated a relationship between unemployment rates and a history of cancer (Syse et al. 2008; Moran et al. 2011; Park et al. 2008; Kirchoff et al. 2010; de Boer et al. 2006). A meta-analysis of mixed cancer types reported that cancer survivors overall were almost 1.4 times (95% CI = 1.21–1.55) more likely to be unemployed than individuals in a healthy control group and had a threefold greater risk for unemployment due to disability than controls (de Boer et al. 2009). Even years after diagnosis and treatment, a history of cancer can still have adverse effects on employment. Another meta-analysis reported that adult survivors of mixed childhood cancers were 1.85 times (95% CI = 1.27–2.69) more likely to be unemployed than healthy controls with the highest rates of unemployment in central nervous system and brain tumor survivors but no significant differences for childhood blood or bone cancer (de Boer et al. 2006). Interestingly, the country of residence was significantly correlated with the unemployment risk for adult survivors of childhood cancer such that US survivors were at a threefold higher risk than healthy controls but there was no such difference for European survivors (de Boer et al. 2006). A retrospective study compared adult survivors of mixed childhood cancers 5 years or more post-diagnosis with their non-cancer siblings and reported that survivors are two times more likely to be unemployed than their siblings (Kirchoff et al. 2010).

18.4 Working Through Treatment

Although the primary focus of this chapter is on cancer survivors post-primary treatment there is some research on the rates of those diagnosed with cancer who are undergoing active treatment for cancer yet working throughout treatment (Munir et al. 2009). A survey of cancer survivors with varying types of malignancies post-diagnosis and posttreatment (Pryce et al. 2007) reported that 30% of their sample continued working through treatment. They found that survivors who continued working through treatment were more likely to describe having flexible work arrangements and having disclosed their cancer diagnosis to their colleagues (Pryce et al. 2007). However, difficulties managing fatigue was also significantly correlated with those survivors who continued to work through treatment (Pryce et al. 2007).

18.5 Work Ability

Work ability is defined as the ability of employees to fulfill their job responsibilities with respect to their physical and mental health (Munir et al. 2009). However, work ability consists of more than individual factors and includes contributions of the work environment as well as unique societal contexts and expectations (Lindbohm et al. 2012). Various clinical factors such as site, stage, treatment type, number of comorbidities, and symptom burden are related to levels of work ability in cancer survivors. A review (Munir et al. 2009) found that lower levels of work ability are associated with most types of cancer as compared to controls or those with other chronic conditions such as heart disease, lung disease, stroke, arthritis, major depression, or panic disorder (Munir et al. 2009; de Boer et al. 2008, 2009). The authors also reported that the correlation between certain cancer types and lower work ability varied based on study design and work ability measure (Munir et al. 2009). Confidence in one's ability to work or self-efficacy is also a factor that predicts task function (Munir et al. 2009, 2010;

Stajkovic and Luthan 1998) as well as the likelihood of return to work and work retention (Denison et al. 2004; Brouwer et al. 2011). Efforts to understand the role of positive expectations related to work outcomes among cancer survivors represents an important area to pursue given its well-documented role in musculoskeletal disorders and work (Denison et al. 2004; Brouwer et al. 2011).

18.6 Work Retention

Once back at work some cancer survivors report difficulties remaining in the workplace. A population-based study of mixed cancer survivors 1- to 5 years post-diagnosis found that 41% of men and 39% of women discontinued working during cancer treatment but most returned to work within the first year (Short et al. 2005). This study also found that 9% of survivors who continued working throughout treatment reported quitting within 4 years due to cancer-related reasons. However, for survivors who returned to work within the first year, 11% reported quitting within 3 years for reasons related to cancer (Short et al. 2005). A cross-sectional study of stage I–III breast cancer survivors 1- to 4 years post-diagnosis reported that while 5.5% of the sample stopped working altogether and 25% returned to work following treatment, 69% of the sample continued to work through treatment (Mahar et al. 2008). While some cancer survivors are prompted by the diagnosis to reevaluate priorities, difficulties at work may facilitate the decision to leave the workplace (Syse et al. 2008; Moran et al. 2011; Park et al. 2008). Research is warranted on the exact mechanisms that can help explain the processes involved in this work loss for those who desire or need to work (Moran et al. 2011).

18.7 Common Symptoms of Cancer Survivorship

Many employers and cancer survivors are not fully aware of the problems that can occur as a result of cancer and its treatment. A number of symptoms, many of them not present prior to treatment, are reported. These symptoms can pose a significant challenge for the cancer survivor and are referred to as symptom burden. Symptom burden is defined as long-term and late effects of cancer and/or anticancer treatment (Shi et al. 2011). Symptom burden can impact employment and can persist for years following diagnosis and treatment. A 2011 study (Shi et al. 2011) identified mixed cancer survivors who were experiencing either high or low symptom burden and observed that those cancer survivors with higher symptom burden were 1.6 times more likely to have lower income and 1.27 times more likely to be unemployed as compared to those survivors with lower symptom burden (Shi et al. 2011). Of the cancer survivors in this study, 92% reported symptom burden at 1-year post-diagnosis (Shi et al. 2011). Additionally, comorbid conditions (unspecified) experienced by cancer survivors can potentiate the effects of the symptom burden (Shi et al. 2011; Mao et al. 2007).

Symptoms reported by cancer survivors include pain (Oberst et al. 2010), fatigue (Steiner et al. 2008; Bower et al. 2007), impairment in physical function (Oberst et al. 2010), impairment in cognitive function (Oberst et al. 2010; Boykoff et al. 2009), depressive-like symptoms (Tighe et al. 2011), anxiety (Tighe et al. 2011), and fear of recurrence (Simard and Savard 2009; Kim et al. 2012). These symptoms can interact with one another limiting physical, cognitive, and emotional function, which can result in work disability (Oberst et al. 2010). Although both physical and mental fatigue are reported post-cancer, physical fatigue in particular is often cited as a cancer survivor's most prominent and debilitating symptom (Steiner et al. 2008; Bower et al. 2007; Harrington et al. 2010; Lavigne et al. 2008). While this fatigue tends to improve, it can remain elevated over time. Despite the reduction in fatigue, it is associated with lower work productivity, higher absence rates from work, or need for reduction in total work hours (Lavigne et al. 2008; Spelten et al. 2003; Steiner et al. 2010). Psychologically, depression and anxiety can be sequelae of cancer and cancer treatment (Tighe et al. 2011). Faced with mortality, uncertainty,

family stressors, and financial and occupational burden, many cancer survivors report feelings of anxiousness, nervousness, worry, sadness, being overwhelmed, hopelessness, helplessness, and isolation (Tighe et al. 2011). In concert with generalized anxiety and depression, fear of recurrence is another emotional concern of the majority of cancer survivors (Simard and Savard 2009; Kim et al. 2012; Taylor et al. 2011). As there usually is no definitive "cure" for many types of cancers and treatment exposures of radiation and chemo-toxic agents can increase the probability of new cancers and/or recurrence, the fear of recurrence or presence of new primary tumor is a real and constant threat (Simard and Savard 2009). For some, this possibility adds to the stress on overtaxed emotional and physical resources, which can further complicate a survivor's recovery and return to a sense of normalcy (Taylor et al. 2011).

Cancer survivors also report posttreatment difficulties with cognitive functioning (Boykoff et al. 2009; Janelsins et al. 2011; Shilling et al. 2005; Wefel et al. 2011; Calvio et al. 2009). These cognitive limitations can be a significant work-related problem since cognitive abilities such as attention, working memory, and concentration are required in many types of work (Lysaght et al. 2008). In an online survey of mixed cancer survivors (91% breast cancer), 62% of respondents indicated they had experienced work changes related to decreased cognitive functioning (Hurrican Voices Breast Cancer Foundation 2007). Some of these changes were characterized as needing to be retrained on work tasks that were once familiar (e.g., data analysis, learning new things, concentrating on work tasks, and performing integrative cognitive operations) (Oberst et al. 2010). Although cognitive problems in cancer survivors are often subtle, they can vary in severity (Shilling et al. 2005; Schagen et al. 2006; Wefel et al. 2004), be exacerbated by other cancer survivor symptoms such as fatigue and depression (Munir et al. 2011), and may not manifest until several months posttreatment (Wefel et al. 2010).

Some breast cancer survivors have indicated that cognitive problems are their most problematic posttreatment symptom (Boykoff et al. 2009). Studies examining cognitive changes in breast cancer survivors have reported impairments associated with attention, learning, executive functioning, and/or concentration (Shilling et al. 2005; Schagen et al. 2006; Wefel et al. 2004). A study of post-surgery (pre-adjuvant therapy) testicular cancer survivors (Wefel et al. 2011) indicated that cognitive problems can also detrimentally impact physical functioning (e.g., fine motor function). The most frequent cognitive problems observed in the sample were impairments in learning and memory, executive function, and both upper extremity and fine motor dexterity (Wefel et al. 2011).

18.8 Factors Related to Work

In the context of work, presence of the symptoms described in the previous section can be disruptive to an individual attempting to resume some level of premorbid function (Steiner et al. 2008; de Boer et al. 2011). Cancer survivors as a whole are typically in poorer physical and psychological health than their work colleagues without a cancer diagnosis (de Boer et al. 2011; Taskila et al. 2007). A cancer survivor's return to full occupational function is also dependent on the workplace environment (Steiner et al. 2008). Supervisor and peer attitudes, physical job demands, organizational policies and procedures regarding long-term illness, and physical and psychological limitations of the survivor can interact to determine a cancer survivor's ultimate work outcome (Feuerstein et al. 2010). Pain and fatigue often interact with the physical demands of a job and force a cancer survivor to reduce his or her responsibilities, switch job roles, or cut back on the number of hours worked, resulting in reduced output and often reduced income as well (Taskila et al. 2007).

Psychological factors can also be partially responsible for a cancer survivor's difficulty performing at their pre-cancer levels in the work place. Depression, anxiety, and cognitive challenges can serve to diminish a survivor's ability to concentrate, multitask, think critically, react,

and perform other cognitive operations needed to function in their position (Munir et al. 2010; Spelten et al. 2002). This sense of decreased mental ability can fuel the cycle of frustration regarding physical and psychological capacities; additionally, supervisors and coworkers need to account for reduced work output, which may ultimately contribute to a cancer survivor's decision to cut back on work hours, quit work, or be fired from their job (Park et al. 2008; Munir et al. 2010; Spelten et al. 2002; Yarker et al. 2010; Feuerstein et al. 2007b; Torp et al. 2011). It has been argued that the impact of various symptoms (e.g., cognitive limitations) on function (i.e., ability to multitask at work) is the consequence of reduced self-efficacy on the part of the cancer survivor which can contribute to further reductions in ability to perform certain functions. While an individual's self-efficacy does impact actual function and there are several approaches to improve self-efficacy related to work tasks (Stajkovic and Luthan 1998), it is important to realize there are factors outside the person that can interact with individual factors to impact various work outcomes (Feuerstein et al. 2010; Mehnert 2011).

18.9 Stakeholder Roles

Several stakeholders are involved in the return to work or work retention process such as healthcare providers, employers, and policy-makers (Loisel et al. 2005; Nilsson et al. 2011). Stakeholder knowledge and attitudes are important factors in return to work outcomes (Pryce et al. 2007; Spelten et al. 2002; Yarker et al. 2010; Lindbohm et al. 2011; Bouknight et al. 2006; Amir et al. 2010; Tiedtke et al. 2012); however, relevant cancer survivorship research is often not disseminated to various stakeholders outside the academic or scientific communities and may neglect considering the interactive roles of individual cancer survivors, healthcare providers, and employers (Steiner et al. 2010). As with any chronic illness, implementing research evidence to improve return to work can be challenging because of the varying objectives and perspectives of diverse levels of stakeholders (Tiedtke et al. 2012); however, this research needs to consider those who are important in implementation. The ability for these stakeholders to honestly communicate effectively among each other is also a challenge (Yarker et al. 2010; Loisel et al. 2005; Bains et al. 2012). Interventions can and should be targeted at the individual worker, the employer, the healthcare provider, and the policy maker. Approaches that incorporate multiple workplace stakeholders and their varying perspectives are more likely to improve work outcomes (Loisel et al. 2005; Dobrow et al. 2006). In order to devise such intervention strategies, it is important to understand the experiences of each stakeholder.

18.10 Healthcare Providers

Healthcare providers can and many do play an important role in both educating cancer survivors about the course and potential symptoms experienced in survivorship, and are often sought out for additional advice regarding a survivor's decision to continue working or return to work following treatment (Pryce et al. 2007; Bains et al. 2012). A study of cancer survivorship and work (Pryce et al. 2007) reported that posttreatment return to work in a sample of mixed cancer survivors was correlated with receiving work-related advice from a healthcare provider. However, survivors often report receiving little guidance from healthcare providers regarding work-related concerns (Lindbohm et al. 2011; Bains et al. 2012). Recent research indicates that healthcare providers may not feel comfortable with the limited knowledge they have regarding survivorship. One study examining work-related guidance offered by healthcare providers to individual colorectal cancer survivors reported that the guidance provided varied and was not systematic (Bains et al. 2012). Healthcare providers in this study reported a reliance on experiences with previous patients to inform their work-related recommendations, citing absence of evidence-based guidelines and lack of knowledge about the experiences of survivorship and work (Bains et al. 2012).

18.11 Employer Knowledge and Attitudes

Poor employer support or accommodation negatively predicts return to work (Spelten et al. 2002) or remaining at work at the same job (Lindbohm et al. 2011). Although some studies have indicated that cancer survivors experience supportive employers (Bouknight et al. 2006), the effects of this support may be limited to the initial return to work phase (Yarker et al. 2010). A qualitative study of mixed cancer survivors indicated two distinct phases of return to work (Yarker et al. 2010). The *initial phase* was characterized by contact and support from occupational health, lack of communication with supervisors during leave, supervisors being unaware of what support should be offered to a cancer survivor, and empathy and support from work colleagues (Yarker et al. 2010). In contrast, the *post-return to work phase* was characterized by the survivor experiencing the delayed effects of cancer and anticancer treatments on their work, a reduced amount of follow-up and support from their employer, and a considerable decline of the previous empathy and support they had received during the initial phase (Yarker et al. 2010). Regarding the *post-return to work phase*, employers and colleagues may be unaware of the changes experienced by cancer survivors at work or of the long-term nature of symptom burden and living with cancer and its treatment sequelae. Therefore, employers, supervisors, and coworkers need support and training regarding how best to help cancer survivors in the workplace while still meeting their other objectives (Yarker et al. 2010; Richardson et al. 2011). While this training and subsequent support appears to represent a relatively low cost/high yield approach, we need evidence of the long-term cost-effectiveness of such an intervention. It is important to recall that while many cancer survivors do return to work, 3–4 years of work post-diagnosis or treatment represents a high risk time for departure from the workplace. More detailed analyses of this time period can help determine whether the work termination is voluntary or the consequence of factors that might be preventable.

18.12 Discrimination

Although cancer survivors are a protected class under many state and federal laws in the UnitedStates (Hoffman 2005), cancer survivors who continue working or return to work report biased treatment in the workplace. A study of disputes in the workplace (Feuerstein et al. 2007b) examined claims within the Americans with Disabilities Act (ADA) and found that cancer survivors experienced higher rates of workplace discrimination claims than individuals with other impairments (e.g., behavioral health problems, cardiovascular, orthopedic). Cancer survivors were more likely to file claims related to termination, lay off, terms of work, pay, benefits, and demotion (Feuerstein et al. 2007b). Also, those cancer survivors with comorbid illnesses were more likely to file claims related to problematic relationships at work than any other impairment group (Feuerstein et al. 2007b). This finding, coupled with data that indicate higher levels of symptom burden in survivors with comorbidities (Shi et al. 2011; Mao et al. 2007), is of particular interest in that it can help direct research and intervention development efforts toward a better understanding of these relationships and evidence-based efforts to prevent and manage work-related problems in this subgroup of employees. An independent study using the same ADA data looked at adjudicated claims and reported that complaints involving claims related to cancer were more often decided in favor of the claimant than any other impairment-related claims (McKenna et al. 2007) suggesting cancer survivor-related claims are more likely to have more supporting evidence than other types of impairments in the workplace. In this context, it is interesting to note that breast cancer survivors were less likely to return to work at 12 months post-diagnosis if they perceived differential treatment by their employer due to their illness (Bouknight et al. 2006).

18.13 Work Disability and Musculoskeletal Illness: Lessons from the Past

While evolving at a rapid rate, research and practice related to return to work in cancer survivors is a relatively new pursuit. In contrast, the area of work disability and musculoskeletal disorders research and practice has been the topic of extensive research for many years (Feuerstein 1991). Musculoskeletal disorders are one of the most prominent and costly causes of disability in the United States (Yelin 2003; Lubeck 2003; Baldwin 2004) and other industrialized countries (Baldwin 2004; Oh et al. 2011; Coyte et al. 1998).

Can we generalize principles, techniques, and theoretical models from musculoskeletal disorders and disability to cancer survivorship and work? Let's consider a paper centered on models of work disability related to musculoskeletal disorders (Schultz et al. 2007). This paper concluded that biomedical, psychosocial, forensic, ecological/case management, economic, and biopsychosocial models represent the broad categories within which most research and practice fall. The authors also concluded that the distinctions between models are vague as there is much conceptual overlap. They also concluded that return to work and work disability research has been moving toward a biopsychosocial perspective particularly over the last few decades. Research has indicated that the exclusive role of physical impairment or an exclusive medical explanation of functional loss can only explain a modest amount of variance in return to work and other work outcomes. Psychosocial and societal determinants are often more influential in mediating individual's decisions and outcomes concerning employment and work disability (Schultz et al. 2007). They highlight that biopsychosocial models also include systems-level factors as well as micro-level determinants such as individual biobehavioral, psychological, and social factors and therefore may prove more useful in the understanding and management of work disability in musculoskeletal disorders. The broad area of work disability research and practice has generated a greater understanding of the mechanisms of work disability over the past 2 decades and work outcomes are better managed (Shaw et al. 2011; Costa-Black et al. 2011; Wickizer et al. 2011). However, achieving positive work outcomes in the long term remains a challenge for musculoskeletal disorders (van Oostrom et al. 2009).

This problem may in part be a result of diverse stakeholder interests related to this work problem and the workers compensation systems that typically manage work-related injuries and illnesses and other economic systems that are charged with the compensation of the work disabled that need to be considered as well. These systems, whether work related or nonwork related in terms of causation, tend to be adversarial in nature with many conflicting stakeholder perspectives. Often the various organizations or agencies in a government do not communicate with each other or among other stakeholders involved in the disability process. Approaches to facilitate an integration of these diverse stakeholders represents an area that needs to be further developed and studied.

18.14 Models of Cancer and Return to Work

Taking guidance from various models of work disability (Schultz et al. 2007), research has focused on many factors that may play a role in work disability among cancer survivors (Munir et al. 2009; Short et al. 2008). A review of the literature on work outcomes in cancer survivors (Feuerstein et al. 2010) resulted in part in the development of a conceptual model (Fig. 18.1) of cancer survivors and work. This model considered the various correlates of a cancer survivor's return to work, work ability, retention and work disability (Feuerstein et al. 2010). A subsequent study (Mehnert 2011) also generated a model of work and cancer (Fig. 18.2) based upon a review of many of the same studies.

Both models are multivariate in nature. The models generally include many of the same variables. The model illustrated in Fig. 18.1 focuses

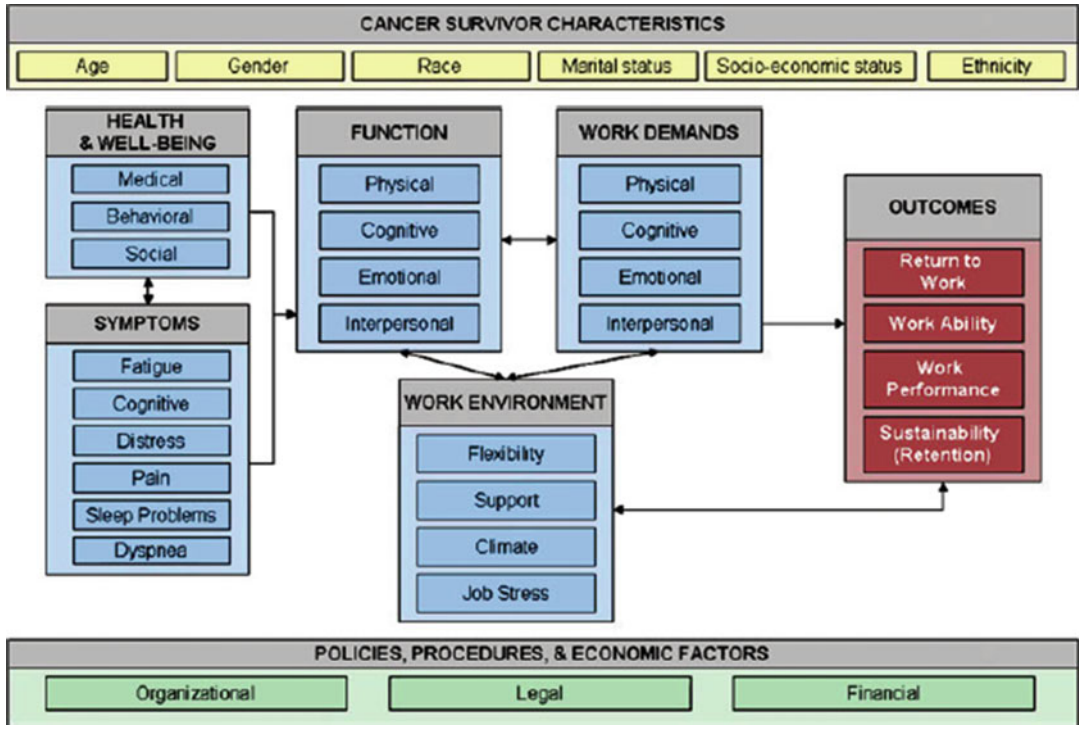

Fig. 18.1 From Feuerstein et al. (2010). Permission granted

exclusively on work outcomes while the model in Fig. 18.2 covers many outcomes including work-related, psychosocial, and economic. These are all important outcomes; however, a major difference between the two models was that the model in Fig. 18.2 provided a very comprehensive list of psychosocial and economic outcomes while many of these were placed as potential mediators in Fig. 18.1. The model in Fig. 18.1 was focused on a more limited set of work outcomes. There were other differences as well and both models present a comprehensive look at cancer and work; however, detailed comparison is outside the scope of this chapter. Suffice it to say there are many similarities from two distinct research groups in two countries reviewing much of the same data. It is hoped that both models help stimulate research and greater understanding of cancer survivors at work and lead to more effective approaches for primary and secondary prevention of work disability among this group.

18.15 Interventions

As previous sections of the chapter have highlighted, while work-related problems are not an inevitable sequelae of cancer and its treatment they can impact the long-term work trajectories of cancer survivors interested in returning to and/or remaining at work for years following diagnosis and treatment. Data continue to emerge that indicate as cancer survivors live longer both long-term and late health effects are noted. These long-term and late effects can impact work outcomes from both the cancer survivor's and employer's perspectives. Given the episodic and/or chronic nature of various symptoms, they can tax the coping abilities of employees and employers and economic demands of various healthcare and compensation systems. Some cancer survivors who originally returned to work following diagnosis and or treatment eventually decide to

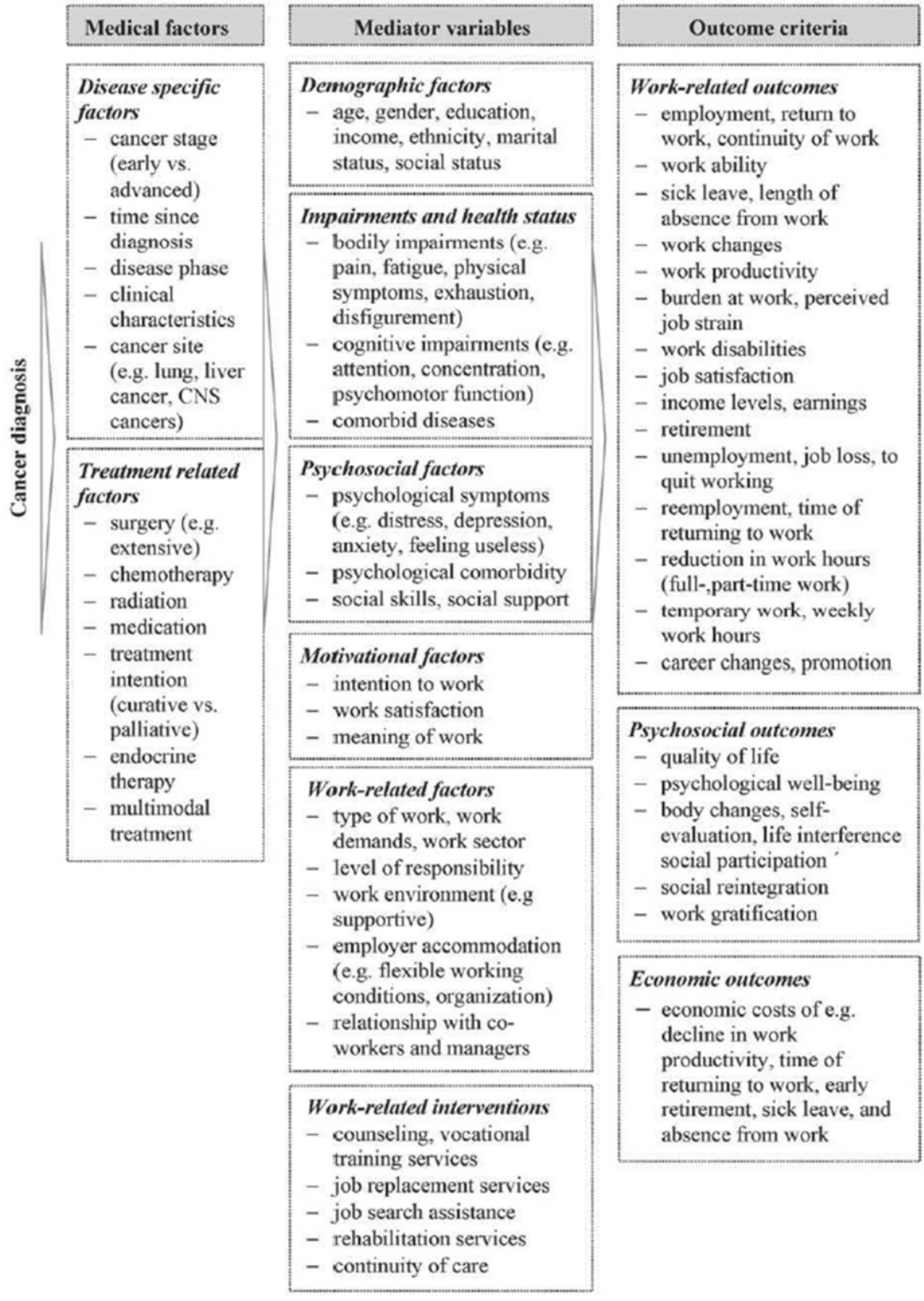

Fig. 18.2 From Mehnert (2011). Permission granted

discontinue working. This loss of work can have adverse effects on the survivor, family, workplace, and economy. Primary and secondary prevention of work disability in cancer survivors who desire to remain in the work force represents an important research and practice challenge.

Despite differences in administrative systems created to manage work-related and nonwork-related illnesses (workers compensation and no workers compensation), both musculoskeletal disorders and cancer have been related to changes in return to work, work ability, and work productivity. There are differences in specific types of symptoms between these two problems but as previously noted they share many factors that can impact work. Meta-analyses of randomized controlled trials of various interventions for the work-related musculoskeletal disorders may in turn inform approaches to cancer survivors and work. Despite over 2 decades of research, the effects of these various interventions on return to work are modest at best. For example, a Cochrane review on physical conditioning on sickness absence for acute low back pain found no effect even when adding a workplace component (Schaafsma et al. 2011). In contrast, for chronic low back pain there was a small effect on sickness absence. No further improvement was observed when cognitive behavioral treatment is added. While cognitive behavioral treatment can be effective in the management of chronic low back pain (van Hooff et al. 2012) and some short-term challenges post-cancer treatment (Osborn et al. 2006), when it comes to return to work there is no improvement in outcome (Schaafsma et al. 2011). Positive changes for long periods of time as it relates to work are difficult to achieve and often require the skills and involvement of many (de Boer et al. 2011).

The development of interventions for cancer survivors and work is very modest in comparison to musculoskeletal disorders; however, a recent Cochrane review addressing interventions to facilitate return to work among cancer survivors does provide the most up to date information available on this work outcome (de Boer et al. 2011). Findings from one study (de Boer et al. 2009) indicate that when considering return to work (rate, number of days on sick leave) psychological/group education and medical function conserving approaches (e.g., chemoradiation, adjuvant endocrine) had no improvement over usual care or in the case of medical conserving approaches in contrast to nonmedical conserving approaches. The effect size of randomized controlled trials using a "physical approach" (e.g., exercise) on return to work could not even be computed at this point because of a small numbers of cases. The intervention with moderate quality evidence for return to work was a multidisciplinary (physical, psychological, vocational) intervention. While the medical conserving conclusions were based on a total of 695 cases, the other estimates of effects sizes were based on very small groups (ranging from 21 to 170). These findings are very preliminary.

18.16 Future

Qualitative studies indicate cancer survivors desire more information regarding return to work (Main et al. 2005; Yarker et al. 2010; Amir et al. 2008) and providing such information does improve return to work outcome (Verbeek et al. 2003). Research on fatigue as a risk factor for return to work (Verbeek et al. 2003) indicates the importance of other factors such as symptom burden that many survivors experience and can impact other dimensions of work in addition to return to work. The work our group completed that indicates work productivity is related to fatigue, cognitive limitations and depressive symptoms 3–4 years following diagnosis and/or posttreatment (Feuerstein et al. 2007a) also indicates that cancer survivors may require more than information and support, especially to remain at work.

As this chapter illustrates, many factors are related to various work outcomes. It is not only important to target a specific work outcome but also to consider the multivariate nature of the factors that can be related to the outcome in order to impact such outcomes. It is important to remember that not all cancer survivors are seeking to return to or remain at work but for those

for which work is a primary quality of life aspect, we need to provide the optimal degree of assistance ranging from communication and simple education to multiple discipline involvement. In order for this to become a reality, careful evaluation of the many factors that can impact work in cancer survivors needs to be considered. Specific interventions for mitigating these factors can follow. Research educating stakeholders and involving them in the development and evaluation of innovative time and cost-efficient approaches (education, accommodation, support, direct mitigation of symptom burden, changes in physical and psychosocial aspects of the work environment, aligning work demands and work capacities and policy change) either independently or in various combinations represent a logical next step.

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Specific Disorder-Linked Determinants: Traumatic Brain Injury

19

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Traumatic brain injury can result in persistent cognitive, psychosocial, and physical impairments. Multidisciplinary rehabilitation programs and innovative assistive technologies may improve employment outcomes.

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19.1 Overview: Specific Context and Issues of Traumatic Brain Injury in Adults

19.1.1 Definition and Classification of Traumatic Brain Injury

Traumatic brain injury (TBI) is an insult to the brain caused by an external physical force that may produce a diminished or altered state of consciousness, which results in an impairment of cognitive abilities or physical functioning (Brain Injury Association of America 2011). It can also result in the disturbance of behavioral or emotional functioning. These impairments may be temporary or permanent and can cause partial or total functional disability and/or psychosocial maladjustment (Brain Injury Association of America 2011). Clinical severity ranges from mild, moderate, or severe depending primarily on the assessment of mental status as measured by the Glasgow Coma Scale (GCS), duration of loss consciousness (LOC), and duration of posttraumatic amnesia (PTA) (see Table 19.1) (Carroll et al. 2004a; Corrigan et al. 2010).

19.1.2 Epidemiology of Traumatic Brain Injury

TBI is a significant clinical and public health problem throughout the world (Thurman et al. 1999). It contributes to premature death, disability,

P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_19,

Table 19.1 Severity of TBI

	TBI severity		
Measure	Mild	Moderate	Severe
GCS	13–15	9–12	3–8
LOC	<30 min	30 min–24 h	>24 h
PTA	0–1 day	1–7 days	>7 days

and unfavorable medical, social, and financial consequences for the injured persons, their families, and society (Leibson et al. 2011). The incidence of TBI is substantially increasing and is partly due to an increase in the number of motor vehicles and their growing use (Maas et al. 2008). According to a systematic review of brain injury in Europe, the total fatality and hospitalized incidence rate is 235/100,000 people/year (Tagliaferri et al. 2006). Recent data show that approximately 1.7 million people sustain a TBI annually in the USA (Centers for Disease Control and Prevention 2010). The leading causes of TBI in the USA are falls (35.2%), motor vehicle-/traffic-related events (17.3%), struck by/against events (16.5%), and assaults (10%) (Centers for Disease Control and Prevention 2010). Falls are the leading cause of TBI in the USA and cause half of the TBIs among children aged 0–14 years and 61% of all TBIs among adults aged 65 years and older (Centers for Disease Control and Prevention 2010). Among all age groups, traffic-related incidents are the second leading cause of TBI and result in the largest percentage of TBI-related deaths (31.8%) (Centers for Disease Control and Prevention 2010). Traffic collisions are the leading cause of TBI for those aged 15–24 years (Adekoya et al. 2002). Falls are also the leading cause of TBI in Canada, accounting for 41.6% of TBIs in the province of Ontario (Colantonio et al. 2010). In general, it has been reported that males are twice as likely as females to incur TBI, presumably because they are more commonly engaged in risk-taking behavior (Corrigan et al. 2010).

The WHO Collaborating Centre Task Force on Mild Traumatic Brain Injury (MTBI) found that MTBI represents between 70 and 90% of all treated TBI, and the incidence is likely in excess of 600 per 100,000 (Cassidy et al. 2004a). The incidence of TBI is difficult to determine because mild cases are commonly undocumented and inconsistently diagnosed (Ryu et al. 2009).

19.2 Specific Disability Determinants

Impairments stemming from TBI can generally be classified into three groups: cognitive, psychological, and physical (Khan et al. 2003a; Gamboa et al. 2006). Cognitive problems include impairments in memory, attention, concentration, judgment, language, and organization. Psychological problems include anxiety, depression, impulsivity, and posttraumatic stress disorder. Physical problems can consist of motor impairments (e.g., balance and coordination), sensory impairments (e.g., touch, hearing, vision, taste, and smell), and painful conditions. For example, posttraumatic headache is the most common sequel after TBI (Gladstone 2009). Musculoskeletal complaints may also confer a significant source of pain and disability in long-term TBI survivors (Brown et al. 2011). These potential impairments can lead to a significant reduction in productivity (e.g., employment). In the year 2000 in the USA, productivity losses were estimated to be $51.2 billion for all treated hospitalized and nonhospitalized TBI cases (Corrigan et al. 2010; Corso et al. 2006).

19.2.1 Vocational Evaluation and Prognostic Factors

A best evidence review was recently conducted in order to develop a clinical practice guideline which makes explicit the processes (see Fig. 19.1) and factors (see Table 19.2) essential to vocational evaluation (Stergiou-Kita et al. 2011).

The findings from this review indicate that the factors most strongly associated with successful employment following TBI are younger age, higher pre-injury education, better post-injury neuropsychological/cognitive status, better post-injury psychosocial status, better post-injury functional status and a higher level of

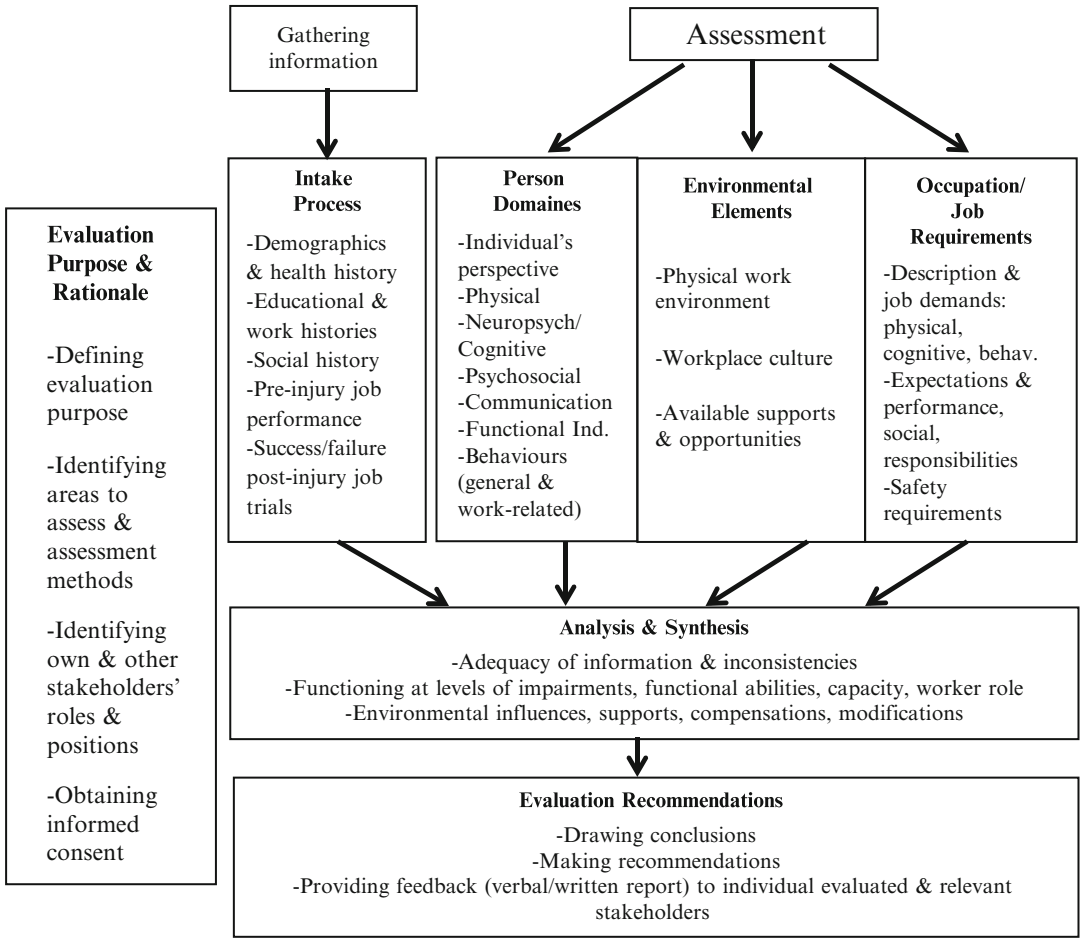

Fig. 19.1 Evidence-based framework for vocational evaluation following TBI (With kind permission from Springer Science + Business Media: Journal of Occupational Rehabilitation, An Integrated Review of the Processes and Factors Relevant to Vocational Evaluation following Traumatic Brain Injury, volume 21, 2011, p. 382, Stergiou-Kita M, Dawson DR, and Rappolt SG, Figure 1)

Table 19.2 Key prognostic factors identified as relevant to vocational rehabilitation (Stergiou-Kita et al. 2011)

Pre-injury personal factors	*Post-injury personal factors*
• Age • Gender • Marital status • Race • Educational level • Psychological status (e.g., substance abuse, record of arrests)	• Physical status • Neuropsychological and general cognitive status • Psychosocial status (e.g., depression, anxiety, posttraumatic stress) • Functional status and functional abilities (at admission and discharge) • Self-reported status (e.g., subjective complaints, self-assessment)
Injury-related personal factors	*Occupational factors*
• Injury severity • Type/mechanism of injury/CT scan results • Concurrent symptoms (e.g., nausea and vomiting, pain) • Acute impairments and patterns of recovery • Length of stay	• Pre- and post-injury occupational category/complexity
	Environmental factors
	• Economic factors • Workplace supports • Social and instrumental supports

independence, better pre-injury occupation/work history, and more environmental and workplace supports.

19.2.2 Age

The majority of findings suggest that survivors who are older, particularly over 40 years of age, are less likely to return to competitive employment after TBI (Stergiou-Kita et al. 2011). One study showed a tendency for individuals in the improved employment group to be younger than individuals in the stable unemployment group (Ownsworth et al. 2006). This study consisted of 50 individuals with an acquired brain injury (66% with TBI). Most of the TBI cases were caused by a traffic incident and were more severe injuries as determined by the GCS and PTA. Individuals in the improved employment group were not employed at baseline but became employed and worked for at least 6 months during the 12-month study period. Individuals in the stable unemployment group were either not performing any work duties or working in voluntary or unpaid positions at baseline and at the 12-month follow-up.

19.2.3 Pre-Injury Education

Trends in a large body of research suggest that individuals who have attained a higher education level are more likely to return to work following a TBI (Stergiou-Kita et al. 2011). For example, educational level was associated with a return to productive activity (RTPA) in a prospective study of 105 patients with 1-year follow-up (Wagner et al. 2002). RTPA was defined as return to pre-injury comparable work, full-time school, or homemaking. Most of the sample had mild to moderate injuries as determined by the GCS and most (84%) were employed full-time pre-injury. Results indicated that in those who had some college education ($n = 27$), 24 (89%) returned to productive activity. On the other hand, of the participants who completed grades 9–12 ($n = 28$), only 14 (50%) returned to productive activity.

19.2.4 Post-Injury Neuropsychological/Cognitive Status

There is evidence to support the value of neuropsychological and cognitive status testing in predicting vocational success; however, the optimal time for testing remains unclear (e.g., 1 month vs. 1 or more years post-injury) (Stergiou-Kita et al. 2011). For instance, poorer scores on neuropsychological/cognitive assessment (e.g., Stroop Word Reading, Stroop Interference, and Trails B minus A tests) were correlated with failure to return to productive employment or school post-TBI (Dawson et al. 2007). This study involved 46 participants who were followed up 4 years post-injury. More than half of the sample had MTBI as defined by the GCS. Return to productivity was defined as returning to work and/or school. In the MTBI group, better performance on the Stroop Interference test was correlated with return to productivity ($r = 0.45$, $p = 0.03$). Similarly in the moderate/severe TBI group, better performance on the Stroop Word Reading test was correlated with return to productivity ($r = 0.49$, $p = 0.02$).

19.2.5 Post-Injury Psychosocial Status

Evidence exists to support a relationship between post-injury psychosocial status and vocational outcomes (Stergiou-Kita et al. 2011). Psychosocial status refers to (a) an individual's level of psychological adjustment and the identification of behavioral or emotional problems (e.g., anxiety, depression) that could interfere with gaining and/or maintaining employment post-TBI and (b) an individual's social adaptive skills and competency (e.g., ability to behave in a socially appropriate manner, exhibit impulse control, and ability to develop positive relationships with work peers) (Stergiou-Kita et al. 2011). Depression ($r = 0.55$, $p < 0.0001$) and the use of maladaptive coping behaviors ($r = 0.53$, $p = 0.0003$) were correlated to productivity status in the study described above by Dawson et al. (2007). Participants that returned to productivity reported less depression, had greater feelings of control over their lives, used fewer maladaptive coping strategies, and had higher scores on the Personal Meaning Index (PMI) than those who did not return to productivity.

19.2.6 Post-Injury Functional Status and Level of Independence

There is continued strong support for a relationship between functional status at discharge and future employment outcomes (Stergiou-Kita et al. 2011). One-year follow-up data for 1,341 individuals revealed that those who scored more than the 75th percentile on the Functional Independence Measure (FIM) were 3.3 times more likely to return to work when compared to individuals scoring at the 25th percentile (Walker et al. 2006). Participants in this study were admitted to an acute care hospital within 24 h of injury and had mixed severities of TBI (27% mild, 18% moderate, and 54% severe). More than half (55%) held skilled positions such as technicians, sales, and service occupations before the injury. Manual laborers (e.g., machine operators, equipment cleaners) made up 30% of the sample, and professional/managerial positions comprised 15% of the sample.

19.2.7 Pre-Injury Occupation/Work History

Evidence suggests that those more likely to be employed post-injury are individuals who were employed pre-injury with stable work histories (Stergiou-Kita et al. 2011). The type of pre-injury occupation may also play a significant role in vocational success (Stergiou-Kita et al. 2011). For example, in the study described above by Walker et al. (2006), individuals (with mixed TBI severity) holding professional/managerial positions were three times more likely to return to work than those in the manual laborer occupational category. RTW was defined in this study as competitive employment in any occupation at 1 year post-injury, either full-time or part-time. Most of the individuals who returned to work did so in the same pre-injury occupational category. Furthermore, an inception cohort of MTBI participants assessed within 1 month of injury and at follow-up 6–9 months after injury revealed that subjects were significantly more likely to return to work if their jobs were in the more independent/greater decision-making latitude category (Ruffolo et al. 1999). These participants were involved in traffic collisions and were all working prior to injury in paid or unpaid employment (e.g., student, volunteer).

19.2.7.1 Environmental and Workplace Supports

Workplace supports include the availability of supervision at the workplace and identification of individual(s) able to provide ongoing assessment of performance; accommodations of work activities, workstation modifications, and adaptive aids/devices; availability of part-time work and potential for slow reintegration into the workplace; and allowances for increased time to complete tasks and/or use of compensatory strategies (Stergiou-Kita et al. 2011). There is evidence that these types of supports are associated with positive employment outcomes (Stergiou-Kita et al. 2011). For example, a prospective study examined the effect of work environments on RTW for persons with mainly moderate to severe TBI ($n = 37$) (West 1995). The causes of their injury were mixed (e.g., traffic collision, gunshot wound, and assault). Participants were a mean of 11.8 years post-injury (SD 10.4) and 69% had been employed prior to injury. They were placed into supported employment and were assessed using the Vocational Integration Index (VII), an instrument for rating the opportunities for integration and the extent to which an employee benefits from those opportunities. The results indicated that those who retained their jobs for 6 months ($n = 19$) had been rated significantly higher on total scores for the VII. Participants were employed in entry-level unskilled or semiskilled positions, including clerical, custodial, food services, and warehouse positions. The authors concluded that job retention outcomes were better for individuals who were placed in positions offering fringe benefits, opportunities for raises and advancement, formal and informal support, and opportunities for socialization with other employees. Such environments will promote the sense of belonging that many individuals with brain injuries want and need to succeed in the workforce (West 1995).

19.3 Specific Return to Work Issues

19.3.1 Return to Work Rates

Estimated rates of RTW vary widely due to the heterogeneity of populations studied and RTW definitions (e.g., paid employment vs. volunteer or part-time work). A recent systematic review of persons with mild to severe TBI found that approximately 40% returned to work within 2 years post-injury (van Velzen et al. 2009). This was based on 276 subjects from three studies, although their occupations were not reported (Kreutzer et al. 2003; Ponsford et al. 1999; Huebner et al. 2003).

In a follow-up study of 434 adults with TBI of various severities, half of all patients were able to RTW completely 1 year after injury, with one in four patients only partially employed or employed at a lower level job (see Table 19.3) (Benedictus et al. 2010). Despite returning to work, these patients still encountered problems in the physical (40%), cognitive (62%), behavioral (55%), and social domains (49%). One in three of them encountered cognitive or behavioral problems, even though they resumed vocational activities on a previous level. With increasing severity of injury, the frequency of problems increased in each of these domains. Even those with mild TBI experienced cognitive (43%) and behavioral problems (33%). The domains that were significant predictors of RTW were cognitive (OR 10.55, CI 5.99–18.67), behavioral (OR 2.65, CI 1.63–4.29), and physical (OR 2.76, CI 1.60–4.78). The cognitive domain was predictive for RTW in those with moderate and severe TBI, and both the cognitive and behavioral domains were predictive for RTW in those with MTBI. Cognitive problems included executive functioning, flexibility, attention, and speed of information processing.

19.3.2 Rehabilitation

Rehabilitation is often managed by a specialized interdisciplinary team of professionals, including a general practitioner, a rehabilitation medicine physician and nurse, allied health professionals (e.g., occupational therapist, physiotherapist, chiropractor, speech pathologist, and social worker), neuropsychologist, clinical psychologist, vocational rehabilitation services and counselors, and other medical specialties (e.g., neurosurgery and orthopedic surgery). In addition, the patient, his/her employer, family, and other caregivers form an integral part of this team (Khan et al. 2003a). A recent systematic review reported on the promising effects of various multidisciplinary programs that can enhance community integration (e.g., return to work) for TBI patients (Kim and Colantonio 2010).

19.3.3 Multidisciplinary Rehabilitation Programs

19.3.3.1 Moderate to Severe TBI

Rehabilitation of moderate to severe injuries generally consists of two phases (Khan et al. 2003a). The first is inpatient management, which is required for those with more severe acute physical, cognitive, and/or behavioral deficits. It includes PTA monitoring, pain management, pharmacological management, retraining of ADLs, cognitive and behavioral therapies, assistive technology (e.g., memory and gait aids), environmental

Table 19.3 RTW for the total population and different categories of severity of TBI

RTW category	All patients ($n=434$)	Mild TBI ($n=208$)	Moderate TBI ($n=70$)	Severe TBI ($n=156$)
Complete resumption of work	50	72	43	23
Part-time	24	22	30	24
Lower level	13	4	17	21
Not working	14	2	10	32

Note: Values are percentages (Reprinted from Archives of Physical Medicine and Rehabilitation, volume 91, Benedictus MR, Spikman JM, and van der Naalt J, Cognitive and Behavioral Impairment in Traumatic Brain Injury Related to Outcome and Return to Work, p. 1438, 2010, with permission from Elsevier)

amenities (e.g., installation of ramps, bathroom alterations), and family education and counseling. The second phase is community rehabilitation (e.g., vocational rehabilitation), which follows discharge from an inpatient setting when the patient is medically stable.

The effectiveness of an intensive cognitive rehabilitation program (ICRP) was investigated and compared with a standard neurorehabilitation program (SRP) in a controlled intervention trial of patients who were mostly engaged in full-time, competitive employment before their injury (Cicerone et al. 2004). The ICRP is a highly structured and integrated program lasting 16 weeks and is provided to small groups of five to eight participants at a time. It consists of individual and group cognitive remediation that focused on increasing awareness and developing compensations for cognitive deficits, small-group treatment for communication skills, individual and/or group psychotherapy, family support, therapeutic work trials, and placement to facilitate educational or vocational readiness. The core treatment program occurred 4 days per week and 5 h per day.

Cognitive group treatment focused on executive functioning (e.g., planning, problem solving, adapting to unexpected situations), metacognitive functioning (e.g., self-monitoring, cognitive self-appraisal, affect regulation), and interpersonal group processes (e.g., giving and receiving feedback, achieving consensual agreement). After each group session, participants received 1 h of individual cognitive remediation directed toward their specific needs and relevant to their daily functioning. Group treatment of communication and interpersonal skills incorporated role-playing in various scenarios. Videotaped feedback was given in order to review each participant's communication style and intent and social and interpersonal interactions. In addition, 1 day a week of the core ICRP program was dedicated to participation in individually designed therapeutic work trials within the hospital or community under the supervision of a vocational therapist. These provided participants with an opportunity to identify their deficits, practice compensatory strategies, and improve their interpersonal communication skills in a realistic environment. Family participation was scheduled in order to reinforce the use of compensatory strategies in the home and community.

The SRP was delivered within the same setting, but the delivery of treatment was less intensive and structured. It consisted mainly of physical, occupational, speech, and neuropsychological therapies depending on the patients' needs. Participants could also receive recreational therapy, vocational interventions, and psychological counseling. Both the SRP and ICRP groups received 4 months of treatment. The results of the study revealed that while both groups showed significant improvement in community integration, ICRP participants were over twice as likely to show benefit than participants receiving standard rehabilitation (OR 2.41, 95% CI 0.8–7.2). When both treatments were compared in a randomized controlled trial, 47% (16/34) of ICRP participants were engaged in community-based employment compared with 21% (7/34) of SRP participants at the 6-month follow-up ($p = 0.02$) (Cicerone et al. 2008).

19.3.3.2 Mild TBI

For persons with MTBI, the evidence supports educational interventions that also promote the return to usual activity as soon as possible (Borg et al. 2004; Comper et al. 2005). In a randomized trial of 111 adults, one study compared an education-oriented *single-session* (SS) treatment for MTBI to a more extensive assessment, education, and *treatment-as-needed* (TAN) intervention (Paniak et al. 1998). Participants in the SS group met with the principal investigator and discussed any concerns they had about their injury. They were given an education brochure to read and had a chance to discuss it with the investigator. The goal of the SS treatment was to legitimize the participants' post-MTBI experience and not brush aside their concerns, educate them about common complaints after MTBI, provide them with suggestions about how to cope with common problems (e.g., by encouraging rest as needed and gradual reintegration into activities), and to provide reassurance of a good outcome. Participants were told that any further concerns should be addressed by their family physician.

Participants in the TAN group received the same treatment as those in the SS group but also

had a 3- to 4-h neuropsychological and personality assessment, consultation with a physical therapist who specialized in postconcussion problems (e.g., dizziness), a feedback session on the psychological test results, and treatment as needed for MTBI complaints. This additional treatment included added psychological and physical therapy interventions for MTBI complaints and access to the rehabilitation hospital's multidisciplinary brain injury treatment program. At the 3-month follow-up, the mean number of days before return to full-time pre-injury vocational activity did not significantly differ between the SS group ($M = 27.6$, SD = 38.8) and the TAN group ($M = 29.8$, SD = 40.4).

Of these 111 adults, 1-year follow-up data were obtained for 105 participants (Paniak et al. 2000). Similarly, no group differences in vocational outcome were evident at 1 year post-injury. In addition, improvements seen in both groups after 3 months were maintained at 12 months. The results of these two studies indicate that a brief educational intervention given soon after MTBI (within 3 weeks) appears to be as helpful as more intensive treatment for most MTBI patients for at least 1 year post-injury. Nevertheless, some patients may require ongoing support to deal with ongoing postconcussion syndrome and other psychosocial issues.

19.3.3.3 Strategies for Work Production After MTBI

For those with persistent cognitive dysfunctions after MTBI, traditional medical tests may not identify mild deficits in executive functioning, which can significantly impact occupational performance (Hartmann 2010). A recent case study described the successful use of compensatory strategies with assistive technology (AT) for a 32-year-old male paralegal who sustained a MTBI (Hartmann 2010). The executive functioning difficulties reported by this patient included problems with short-term memory, sustainable focus for reading and taking notes, and sequential organization. A work analysis was completed by an occupational therapist and included a collaborative interview with the patient and supervisor. This process included an analysis of work activities, a review of work performance both pre- and post-injury, observation of work activities, and discussion of strategies and technology to improve executive functioning challenges. During intervention planning, the patient's reported goals, needs, and environmental contexts (i.e., legal office) were all considered.

The intervention process continued over five, 1-h sessions, using a matching process. This comprised choosing technological tools that matched the needs of the patient in his particular environment. The tools had to be simple and portable and could interface with existing technology and had to have operating instructions that were easy to use. The intervention process consisted of a demonstration of each AT tool, trials of the tools, and practice using each tool in actual work activities in each of the areas of concern. The criteria for the final tool selection were client-selected, met occupation-based goals, compatible with currently used technology, socially acceptable by the patient, and circumvented the reported executive dysfunctions. Examples of some of the tools chosen included text to speech software for reading and a digital pen with a voice recorder for note taking. After the intervention and 1 month of AT usage, a work analysis with the technology yielded significant improvement in work production. This single case illustrates the potential of the appropriate, patient-centered use of AT to circumvent executive functioning challenges and improve work production and self-esteem, as well as reduce irritability and anxiety over job security. Further studies are warranted.

19.3.4 Vocational Rehabilitation

In a quantitative synthesis of outcome studies, it has been suggested that individuals who receive vocational rehabilitation (VR) have quicker RTW rates than those who do not (Kendall et al. 2006). While numerous literature reviews in the past decade have examined various types of VR approaches, it remains unclear which are the most effective and/or best for whom (Babineau 1998; Chesnut et al. 1999; Fadyl and McPherson 2009; Holzberg 2001; Wehman et al. 2005; Yasuda

et al. 2001). This is due to a lack of high-quality evidence as well as an absence of studies comparing the different approaches (Fadyl and McPherson 2009; Cullen et al. 2007). A recent evidence-based review of the literature for rehabilitation of moderate to severe acquired brain injury (ABI) was conducted by the Evidence-Based Review of Moderate to Severe Acquired Brain Injury (ERABI) Research Group (2011). Weak evidence was found for the following: after VR, more than half of subjects become gainfully employed or full-time students; individuals with the most significant cognitive impairments benefit the most from vocational services; and individuals with severe head injury benefit from supported employment services.

A recent systematic review was conducted to identify the most common VR interventions and to evaluate their effectiveness (Fadyl and McPherson 2009). Three common models were identified: the *program-based vocational rehabilitation model*, the *supported employment model*, and the *case coordination model*. The program-based vocational rehabilitation model contains three sequential modules: (1) intensive individualized work skills rehabilitation and interventions within a structured program environment (20 weeks), (2) guided work trials (3–9 months), and (3) assisted placement with transitional job support, including follow-up (ongoing). This approach has various key strengths. It offers work skills training to build confidence and competence before entering a work environment. It also offers an opportunity to achieve independence in the workplace while transitional support is still offered. Limitations to this approach also exist. There is very little follow-up regarding employment sustainability. As is the case with the other two models, success of the model very much depends on the individual staff, as well as the provision of services in each area.

The supported employment model is an intensive intervention mainly provided to those who experience a greater degree of disability, such that they are unlikely to manage working without it. There are four main elements to this approach. The first involves quick job placement (based on abilities, limitations, interests, and work environment) with minimal preemployment training. The next two elements involve individualized worksite training and one-on-one coaching until job competence is reached. Lastly, the job coach monitors long-term performance and provides long-term support. The main difference between this model and the other two is that this intervention is delivered entirely on the job site and is not time-limited. Thus, the key strengths of this approach are that there is no limitation on the level or length of support and the support is highly individualized to the job and the worker. The ERABI Research Group concluded that there is weak to moderate evidence that supported employment improves the level of competitive employment outcomes particularly for ABI survivors who are older, have more education, have no prior work experience, or have suffered more severe injuries.

The case coordination model comprises of a holistic approach whereby VR is part of an overall rehabilitation program that is individualized according to specific needs. A case coordinator assesses service needs, refers individuals accordingly (e.g., for vocational counseling, preemployment training, assisted job placement, and worksite support), and monitors progress. A key strength is the flexibility and coordination of VR with other medical and non-VR services that could reduce the risk of fragmented care for people with disabilities. Another key strength is that this model focuses on early intervention that may shorten the time it takes to return to work after injury. Of all three models, this approach was found to have the strongest employment outcome evidence (Fadyl and McPherson 2009). There is, however, no evidence of the cost-effectiveness of these approaches for workers with TBI.

The Acquired Brain Injury Knowledge Uptake Strategy (ABIKUS) Guideline Development Group provided guidelines regarding vocational rehabilitation following moderate to severe ABI (ABIKUS Guideline Development Group 2007). The first guideline states that patients seeking a return to employment, education, or training following brain injury should be assessed by a

professional or team trained in vocational needs. Assessment should include (a) evaluation of their individual vocational and/or educational needs; (b) identification of difficulties which are likely to limit the prospects of a successful return and appropriate intervention to minimize them; (c) direct liaison with employers (including occupational health services) or education providers to discuss needs and the appropriate action in advance of any return; (d) evaluation of environmental factors, workplace, and psychosocial aspects including social environment and work culture; and (e) verbal and written advice about their return, including arrangements for review and follow-up. The second guideline states that clinicians involved in brain injury rehabilitation should consider the patient's vocational needs and put them in touch with the relevant agencies as part of their routine planning and refer where appropriate to a specialist vocational rehabilitation program. The third guideline states that in setting up placement into a long-term job, monitoring should be provided for at least 6 months or longer to respond to any emergent difficulties, with a follow-up thereafter to establish the long-term viability of the placement.

19.4 Specific Research Issues

More research is needed regarding compensation-related issues. For instance, disagreement and a lack of communication between the injured worker and the insurer can deter the pursuit of employment or RTW following an injury (Gary et al. 2010). In other cases, it is possible that for those not employed prior to their injury, receiving some type of disability payment may be an improvement in financial stability and an incentive to remain on disability benefits. Furthermore, if an injured person is receiving sufficient insurance payments, they may not wish to return to a job they are unsatisfied with. In other cases, there are some injured persons who could RTW in some capacity, but opt not to. This may occur in the event that workers feel they have poor employment prospects for the future and that they might be better off receiving disability payments. In a population-based study of MTBI after traffic collisions, Cassidy et al. (2004b) found that insurance legislation had a profound effect on recovery, with claim closure occurring much faster in the absence of payments for pain and suffering (i.e., comparing tort to no-fault insurance systems). These findings have important implications for RTW after road-traffic injuries.

Further research is needed to determine the specific and optimal timing, duration, and intensity of VR services required for each patient (Cullen et al. 2007) and to explore the long-term impact of VR on different types of employment after all severities of TBI (Fadyl and McPherson 2009). In addition, the training for rehabilitation professionals regarding assistive technologies should be expanded, (Gamble et al. 2006) and innovative technology-driven research is needed so that informed triage for TBI survivors can be provided (Hartmann 2010).

It is clear that rehabilitation following TBI is complex and a challenge to study. Several factors lead to difficulties in interpreting the evidence we have presented, including small sample sizes, heterogeneous patient groups, complex interventions involving iterative stages, and different environmental settings. Furthermore, the timescale over which rehabilitation may have its effects (i.e., often months or years) is usually longer than funded research projects (Turner-Stokes 2008).

19.5 Conclusion

Prognosis and RTW after TBI varies and may depend on injury severity, location, and a multitude of other factors. Despite most injuries being classified as mild, the resulting residual disability can be significant and is not always apparent through casual observation. Adults with MTBI can experience subtle cognitive deficits and postconcussion symptoms such as headaches, difficulty with attention and memory, irritability, sleeping difficulties, and challenges with interpersonal relationships and work (Carroll et al. 2004b; Ponsford et al. 2000). The evidence indicates good recovery for most adults; however, 10–15% remain symptomatic in the longer term with persisting postconcussion syndrome (O'Connor et al. 2005).

Persons with moderate and severe TBI show a wide range of possible outcomes that can be difficult to predict. Nevertheless, many patients with a bleak early prognosis may still successfully integrate into the community (Kim and Colantonio 2010) and return to competitive employment (Khan et al. 2003b). Deficits and resulting disabilities can depend on specific brain damage and may require different approaches to rehabilitation and management.

Standardized vocational evaluations involving all stakeholders should be completed for TBI survivors who are experiencing difficulty with RTW. Factors such as age; education; cognitive, psychosocial, and functional status; work history; and environmental supports have been found to be important RTW determinants. Multidisciplinary programs should focus on these factors, make use of assistive technologies such as innovative software and memory aids, and, above all, tailor interventions to the specific needs and preferences of the individual. In order to better inform practice and policy, further research is needed to determine long-term prognosis, RTW determinants, and effective vocational rehabilitation for all severities of TBI in different occupational categories.

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Part V

Effective Work Disability Prevention Interventions

Clinical Interventions to Reduce Work Disability in Workers with Musculoskeletal Disorders or Mental Health Problems

20

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An overview of clinical interventions for musculoskeletal disorders and mental health problems, which aim to reduce work disability, is presented. Recommendations are given for future research and occupational healthcare practice.

20.1 Introduction

Clinical interventions usually aim to improve the health status of an individual by restoring impairments and body functions, either mentally or physically. This in turn may result in positive outcomes for activities and participation. In general though, the main focus of many physicians and other healthcare providers is to improve the patient's clinical condition rather than encouraging activity, participation, and return to work. Although this seems obvious at first sight, there are, especially in chronic conditions, good reasons to integrate the stimulation of activity, participation, and return to work into clinical treatment protocols. For many chronic conditions, for example, musculoskeletal or mental disorders, there are indications that targeting at (physical) activity and return to work has positive health implications (Strohle 2009; Wiles et al. 2007; Lotters et al. 2005) and reduces the burden of costs and productivity losses related to work disability (Council for Disability Awareness 2011; The Health and Safety Executive 2010; Lambeek et al. 2011). Musculoskeletal and mental health disorders are major reasons for work absenteeism and more permanent disability for work in Western countries. In the USA, around 30% of long-term disability claims were due to musculoskeletal disorders and around 7% due to mental disorders in 2010 and 2011 (Council for Disability Awareness 2011). In the Netherlands, these disorders are also leading causes for disability claims although mental health problems (38%) exceed musculoskeletal disorders (28%) in being associated with absence from work and permanent disability (RIVM 2011). In Sweden, the contribution of psychiatric diagnoses responsible for sickness absence over 60 days increased from 14% in the early 1990s to 23% in 2000 (Hensing and Wahlström 2004). Further, in

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_20,

a survey of workers in the UK in 2009 and 2010, musculoskeletal disorders, stress, anxiety, and depression were the most commonly reported illness types which they thought were work related (The Health and Safety Executive 2010).

In this chapter an overview will be presented of clinical interventions for musculoskeletal disorders and mental health problems, which aim to reduce work disability. This research synthesis is limited to musculoskeletal and mental disorders since these clinical conditions are major reasons for work disability though (parts of) the interventions described might be applied to other disorders as well. We refrained from considering purely medical interventions not aimed at improving work ability per se, such as surgery or pharmacological interventions (although in some of the studies presented here, pharmacological treatment was included as a control condition). To collect the available evidence, a literature search was conducted using the databases PubMed, Embase, and PsycINFO and the personal files of the authors. At first, systematic reviews were searched for and in case of older systematic reviews (published before 2007) also additionally relevant randomized controlled trials (RCTs) were sought to cover the period since the publication of the last systematic review. In order to be included, both systematic reviews and RCTs need to describe the effects of clinical interventions for either musculoskeletal or mental disorders on work disability, return to work, or similar outcomes. The content and effects of interventions as described in the systematic reviews and original publications have been summarized, described, and critically discussed. Recommendations will be given for future research and occupational healthcare practice.

20.2 Setting

The interventions described take place in various phases of the disability and in various settings, but the focus will be on preventive interventions in the sense of secondary prevention. Also, various caregivers can be involved. Primary prevention is about intervening before the onset of the disease and is mostly offered by the employer to groups of employees. Primary prevention however falls beyond the scope of this chapter. In case of secondary prevention (i.e., clinical intervention after the onset of the disease or aimed at employees "at risk" for work disability), the interventions might be offered by four types of providers (depending on legislation): (1) occupational health agencies linked to the organization, which might include physicians, psychologists, and nurses; (2) individual occupational physicians; or (3) specific agencies that offer preventive programs for workers in general. Additionally, (4) rehabilitation centers, social insurance offices, and psychiatric institutes might offer prevention of work disability. Particularly, in rehabilitation centers return-to-work support is offered by multidisciplinary teams (Desiron et al. 2011). However, the organization of occupational health care and the disciplines involved in the prevention programs most likely vary from country to country.

20.3 Musculoskeletal Disorders

Low back pain is the most common musculoskeletal disorder affecting workers (Rossignol et al. 2009). Other somewhat less prevalent conditions are *neck/shoulder disorders* and/or *upper extremity disorders*. Although widespread pain in general is also studied, we will limit ourselves to low back, neck/shoulder, and upper extremity pain since these conditions are among the most important reasons for work disability (Staal et al. 2007; Bongers et al. 2006). Most of these disorders are nonspecific in nature, which means there is no clear pathophysiological substrate explaining their etiology or occurrence. Moreover, both risk and prognostic factors described in the literature are combinations of work-related and nonwork-related physical, ergonomic, individual, and psychosocial factors.

As a consequence, clinical interventions for the prevention of work disability of musculoskeletal disorders are often multifactorial and may consist of different intervention components. These components generally are patient education,

physical exercises, behavioral treatments, ergonomic measures, and different sets of combinations of these components (Staal et al. 2002). We refrain from depicting ergonomic interventions since they are considered as nonclinical and covered in other chapters (see Chaps. 11 and 21).

Patient education for patients with low back pain can be defined as any advice or information (verbal, written, or audiovisual) given by a healthcare professional in order to improve their understanding of their own back problems and what they should do about them (Engers et al. 2008).

The underlying concepts of physical exercise interventions such as commonly applied in occupational healthcare practice vary from physical fitness enhancing or work conditioning interventions to more psychologically oriented interventions, or combinations of these two approaches. Physical exercise programs normally seek to stimulate physical fitness and/or functional capacity (Shaw et al. 2006) to improve work endurance, whereas psychologically oriented exercise interventions aim at behavior change and fear reduction rather than enhancing physical fitness (Lindstrom et al. 1992; Staal et al. 2004; Fordyce 1976). Physical exercises can be performed under supervision or alone, but in a clinical context it is usually done under supervision. In general, there is an increasing amount of literature on the effects of physical exercises for musculoskeletal disorders and in particular low back pain. The problem in weighing the evidence of physical exercise interventions is that they encompass a broad range of interventions with variations in schools, setting, type of exercises, intensity, frequency, and duration which limits their comparability across studies (Helmhout et al. 2008). Moreover, physical exercise interventions have sometimes been combined with other types of interventions such as manual therapy, ergonomic measures, education, and/or cognitive behavioral treatments which cause problems in disentangling their effects in the evaluation of intervention studies (Staal et al. 2002). In this chapter we will present the results of physical exercise intervention studies that are especially relevant from an occupational healthcare perspective. This means that they are commonly applied in an occupational healthcare setting and/or have work disability or return to work as their main outcome. Of course, there are other—for example, specific physiotherapeutic—intervention studies for low back pain, which may also have work disability or return to work as outcome, besides pain and self-reported disability. One can think of studies on, for example, specific stabilization exercises, McKenzie exercises, and general aerobic and strengthening exercises (Hayden et al. 2005). Usually, they are not typical for an occupational setting nor have work disability or return to work as their most important outcome. Therefore, we excluded studies describing such interventions from this literature synthesis. Physical exercise offered to disabled workers is often referred to as work conditioning, work hardening, functional restoration, and physical conditioning programs. What they do have in common generally is job task analysis, simulation of physical job demands during exercise sessions, and exercise sessions in the workplace environment (Staal et al. 2012). In many cases these interventions have a high intensity with exercise sessions 3–5 days per week eventually combined with other treatments (Staal et al. 2012). The original so-called functional restoration approach introduced by Mayer and Gatchel (1988) in the USA suggests that physical training has beneficial effects on the range of motion of joints, cartilage nutrition, cardiovascular fitness and coordination, and muscle atrophy (Mayer and Gatchel 1988). These physical effects would improve work endurance, reduce work disability, and facilitate return to work (Staal et al. 2012; Mayer and Gatchel 1988). Moreover, the program also contains cognitive behavioral therapy (CBT), patient and family education and counseling, and functional goal setting. The importance of psychosocial factors is certainly recognized also in this approach and back pain and disability are viewed as biopsychosocial phenomena (Mayer and Gatchel 1988).

Fordyce (1976) introduced the operant conditioning psychological approach in the treatment of chronic pain (Fordyce 1976). According to the operant conditioning theory, overt behavior that accompanies pain (e.g., complaining, medical consumption, and being absent from work)

should be understood as types of behavior, the future occurrence of which might be influenced by the consequences of that behavior. Essential features of the operant conditioning approach are positive reinforcement of healthy behavior, withdrawal of attention towards "pain behavior" (i.e., behavior that accompanies the pain), and time-contingent vs. pain-contingent management (Fordyce 1976). The main message to be communicated by the caregivers who are involved in providing the treatment is "pain does hurt, but that does not mean it harms" (Staal et al. 2004). Physical exercise and operant conditioning are combined in the so-called graded activity intervention, which is regarded both as a physical and behavioral intervention (Hayden et al. 2005; Macedo et al. 2010). Physical exercise and physical activity are considered to be incompatible with pain behavior and the stimulation of exercise behavior may therefore lead to a decrease of competing pain behaviors. During the graded activity intervention, exercise quota are gradually increased towards preset goals and are not subject to change according changes in pain or symptoms (Staal et al. 2004). Besides operant treatments, behavioral therapies for low back pain may consist of cognitive (dealing with thoughts, feelings, and beliefs) or respondent treatments (reduces muscle tension by relaxation techniques or biofeedback) (Henschke et al. 2010).

This chapter presents an overview of the interventions described in the literature and the evidence base that supports their use in clinical practice. Subsequently, we describe patient education, physical exercise interventions, and behavioral treatments for first low back pain and then neck and/or upper extremity disorders.

20.3.1 Low Back Pain

A substantial amount of research has been done on the effects of patient education as a treatment for low back pain patients (Engers et al. 2008). Most of the studies were carried out in primary care and some of them were also relevant for occupational health care. Two RCTs of high methodological quality found significant effects on return to work in favor of education when compared to usual care. Both studies were from Norway, examined an individual 2.5 h educational session, and were conducted in workers with subacute low back pain (Hagen et al. 2000; Indahl et al. 1995).

Compared to patient education, more research has been done on the effects of physical exercises. Over the last years, several systematic reviews have been conducted on physical exercise interventions for reducing work disability (Bell and Burnett 2009; Oesch et al. 2010; Schaafsma et al. 2011). The Cochrane review by Schaafsma et al. (2011) included 23 RCTs on physical conditioning programs for acute, subacute, and chronic low back pain. The RCTs varied in the intensity of the exercise interventions, comparison groups, whether or not an operant conditioning approach was used, workplace visits, and/or co-interventions were added, and various other characteristics. In this systematic review, no effects were found for acute and subacute low back pain. For chronic back pain (>3 months duration), however, pooled results of five studies showed a small significant effect on absence from work at 1-year follow-up (standardized mean difference −0.18, 95% CI −0.37 to 0.00) compared to usual care. Moreover, a meta-regression analysis did not identify any factor related to study design, intervention, and population characteristics that could explain the variation in outcomes (Schaafsma et al. 2011). Another systematic review limited the search to RCTs only including non-acute low back pain populations, which was defined as workers with symptoms lasting at least 4 weeks (Oesch et al. 2010). They found 17 RCTs comparing exercise to usual care, which were included in a meta-analysis. Overall, significant effects on work disability were found at the longer term (odds ratio = 0.66, 95% CI 0.48–0.92) but not at the short or intermediate term. They also performed a meta-regression analysis but none of the study or intervention characteristics explained the variation in outcome (Oesch et al. 2010).

Although the graded activity approach was originally developed for chronic pain populations, it has also been used in a number of other studies, among which several studies on disabled workers with low back pain (Macedo et al. 2010).

Lindström and coworkers were the first who studied the effects of such a physical exercise intervention for low back pain in an occupational healthcare setting (Lindstrom et al. 1992). They found a significant reduction of the number of days of absence from work in their study at the Volvo factories in Sweden (Lindstrom et al. 1992). The study by Lindström et al. (1992) was more or less replicated by Staal et al. (2004) in a population of Dutch Airline workers. The results were similar, while significant reductions in the length of staying off work were found in favor of graded activity (Staal et al. 2004). Since then, several studies have been conducted on the effects of graded activity interventions for low back pain (Macedo et al. 2010) and a number of them were carried out in an occupational healthcare setting (Heymans et al. 2006; Lambeek et al. 2010a, 2010b; Steenstra et al. 2006). Heymans et al. (2006) and Lambeek et al. (2010a, 2010b) found positive effects of graded activity on return to work (Heymans et al. 2006; Lambeek et al. 2010a, 2010b). In the study by Lambeek et al. (2010a, 2010b), graded activity was combined with participatory ergonomics in a population of workers long-term (5–6 months) sick listed due to chronic low back pain (>3 months) contrary to the study by Heymans et al. which studied graded activity as a sole intervention in workers sick listed (2–6 weeks) with subacute low back pain (Heymans et al. 2006; Lambeek et al. 2010a, 2010b). In fact, Lambeek et al. studied the effects of a multidisciplinary intervention, which integrated clinical and occupational care. The study by Steenstra et al. (2006) found no effects of graded activity in workers sick listed due to subacute low back pain. According to the authors, the level of implementation in this study was low and the intervention was only administered in workers who failed to respond to participatory ergonomics (Steenstra et al. 2006).

The effects of behavioral treatments have been studied extensively. Most research on the effects of behavioral treatments for low back pain is limited to the chronic stage of low back pain (>3 months duration). A Cochrane systematic review identified 30 RCTs studying behavioral treatments in chronic low back pain (Henschke et al. 2010). Generally, no clear effects on pain or functional status were found. Contrary to the graded activity trials described above, only very few trials had outcomes collected related to work disability or return to work and no positive effects have been reported (Henschke et al. 2010).

The results of the studies on patient education, physical exercise interventions, and behavioral treatments still leave many questions unanswered. Nevertheless, based on research findings, we can cautiously postulate that there is some evidence in favor of intense patient education and physical exercise intervention and that they may be useful therapies to reduce work disability in chronic low back pain.

20.3.2 Neck and Upper Extremity Disorders

Although nonspecific neck, shoulder, and upper extremity pain can be considered as distinct disorders with localized symptoms, they often occur simultaneously. Neck pain often radiates into the shoulder or just as shoulder pain even in the more distal parts of the upper extremity (Staal et al. 2007). Given this variation in symptoms, it has been hard for researchers to come up with clear and solid classifications of nonspecific neck, shoulder, and/or upper extremity disorders (Staal et al. 2007; Huisstede et al. 2007; Van Eerd et al. 2003). Symptoms of arm, neck, and shoulders commonly encompass a range of symptoms and disorders, which may include besides pain in some cases even swelling, stiffness, numbness, tingling, clumsiness, loss of coordination, loss of strength, skin discoloration, and temperature differences (Staal et al. 2007). The occurrence and persistence of these symptoms and disorders are affected by exposure to physical activities and postures at work but also, and maybe even more importantly, by work-related psychosocial and demographic factors such as high job demands, lack of coworker support, and higher age (Bongers et al. 2006; Eltayeb et al. 2011). Moreover, upper extremity pain is more prevalent in women than in men (Bongers et al. 2006; Eltayeb et al. 2011). Upper extremity and in particular forearm pain

have been associated with an increased use of computers during work time in many jobs over the last decades (Eltayeb et al. 2011). Management of these disorders in the workplace often include (timely) adaptations of work and workplace alongside clinical interventions (Staal et al. 2007). Clinical interventions for neck, shoulder, and upper extremity pain mostly consist of physiotherapeutic interventions containing different therapeutic modalities (Staal et al. 2007; Verhagen et al. 2007).

A substantial amount of research has been done in workers with neck and/or upper extremity pain. A Cochrane review on the effects of ergonomic and physiotherapeutic interventions for workers with neck and/or upper extremity pain included 13 RCTs comparing physical exercises to other interventions (Verhagen et al. 2007). Since the publication of this Cochrane review, several other relevant RCTs have been published on the effects of physical exercises in workers with neck and/or upper extremity pain. Altogether, five methodologically sound RCTs have been conducted comparing exercise to a no-treatment comparison group (Sjogren et al. 2005; Viljanen et al. 2003; Waling et al. 2000; Ylinen et al. 2005) or to general health counseling (Andersen et al. 2008). Four of them were positive with regard to pain reduction at the short and longer term (Sjogren et al. 2005; Waling et al. 2000; Ylinen et al. 2005; Andersen et al. 2008). Three of the RCTs also compared strength training to general fitness exercises and to endurance training (Sjogren et al. 2005; Waling et al. 2000; Ylinen et al. 2005). There were no clear differences between these exercise modalities although at the short term there seemed to be a tendency in favor of strengthening exercises. One additional RCT compared strength training combined with stretching exercises to endurance training combined with stretching exercises and to stretching exercise only (Ylinen et al. 2010). The results of this study were also in favor of strength training (Ylinen et al. 2010). Despite several effects found for several subjective outcomes, no effects were found for physical exercises on the prevention of work disability. Although the studies described above were carried out in populations of workers, this important outcome was often ignored.

In conclusion it can be stated that physical exercise, in particular strength training, may improve pain in workers with neck and/or upper extremity pain. Although the studies described above were carried out in populations of workers, very few studies used outcomes related to work disability. Of the studies described above, only one had work disability as outcome measure but no effects of physical exercises on these outcomes were found (Viljanen et al. 2003).

20.3.3 Conclusions Musculoskeletal Disorders

The most common musculoskeletal disorders affecting workers is low back pain with other little less prevalent conditions as neck/shoulder disorders and/or upper extremity disorders. For low back pain, there are indications that targeting at (physical) activity and return to work has positive health implications and may reduce the burden of costs and productivity losses related to work disability. Most research in an occupational setting targeted at secondary prevention and has been done in the field of patient education, physical exercise interventions, and behavioral treatments for low back pain and neck and/or upper extremity disorders. For patient education some effects on return to work were reported in low back pain. Physical exercise interventions are not successful for acute low back pain (<4 weeks), but in subacute and chronic low back pain, physical exercise interventions generally seem effective in reducing work disability. For physical exercise interventions administered according to operant conditioning principles (i.e., graded activity), positive effects on work disability have been reported and to a lesser extent also on pain and functional status. For other behavioral treatments (both cognitive and respondent treatment), no effects on work disability were found. A promising intervention is multidisciplinary integrated care that consists of the integration of clinical and occupational health care and was found highly effective for preventing work disability in workers with chronic low back pain (Lambeek et al. 2011) (see Chaps. 21 and 23).

Positive effects have also been found for physical exercises in workers with neck and/or upper extremity disorders. The exercises reduce pain symptoms and there is some weak evidence that strength exercises should be preferred above other types of exercises. Surprisingly, most RCTs carried out in worker populations however ignored work disability outcomes.

Overall, studies show some evidence in workers with subacute and chronic low back pain of patient education and physical exercises on work disability reduction and in workers with neck and/or upper extremity disorders on pain reduction. However, the need for further high-quality research of interventions to reduce work disability is apparent.

20.4 Mental Health Problems

There is a confusing variety regarding the definition and diagnostic criteria used for mental health problems in relation to work (Hensing and Wahlström 2004; van der Klink and van Dijk 2003). In studies on mental health problems in relation to work, the following conditions are most often included (see also Chap. 17).

Adjustment disorders are regarded as the mental health problems most commonly seen by occupational physicians (van der Klink and van Dijk 2003). Adjustment disorder is a diagnosis from the Diagnostic and Statistical Manual of mental disorders (DSM), the leading classification system for mental disorders. Its essential feature is "a psychological response to an identifiable stressor or stressors that result in the development of clinically significant emotional or behavioural symptoms" (DSM-IV-TR, p. 679) (APA 2000).

In occupational health practice, the following terms are used to express some kind of adjustment disorder or *stress-related disorder. Neurasthenia* is from the ICD-10 but not included in the DSM-IV. It is characterized by chronic fatigue, weakness, and physiological problems. *Nervous breakdown or surmenage* (in French) is used to indicate an exaggerated response to psychological stress in everyday life. It is expressed by distress symptoms and dysfunctional behavior. *Work-related stress* might refer to the stressor, process, or stress response. It is usually used for workers that still work but feel fatigued, irritable, and have problems concentrating. *Burnout* refers to emotional exhaustion combined with distant feelings or cynicism in relationship with others (called "depersonalization") and/or reduced feelings of personal accomplishment (van der Klink and van Dijk 2003).

Mood disorders include disorders that have a disturbance in mood as the predominant feature. Mood disorders are one of the leading causes of work disability (RIVM 2011). They include the *depressive disorders* and the *bipolar disorders.* Depressive disorders are characterized by depressive mood or loss of interest and at least four other symptoms such as reduction of appetite, insomnia, agitation, and decreased energy during at least 2 weeks. Depressive disorders are different from bipolar disorders because they lack a history of the manic, mixed, or hypomanic episodes that are so characteristic for bipolar disorders (which are also characterized by depressive symptoms) (DSM-IV-TR) (APA 2000).

Anxiety disorders include among others *acute stress disorders* that are characterized by symptoms of increased arousal and avoidance of stimuli associated with the stress. *Panic disorders* are characterized by recurrent unexpected panic attacks about which there is persistent concern. *Post-traumatic stress disorders* (*PTSDs*) are characterized by the reexperiencing of an extremely traumatic event accompanied by symptoms of increased arousal and avoidance of stimuli associated with the event. *Generalized anxiety disorders* are characterized by at least 6 months of persistent and excessive anxiety and worry (DSM-IV-TR). *Obsessive-compulsive disorder* (*OCD*) refers to a condition with recurrent, severe obsessions (persistent ideas, thoughts, impulses, or images that are experienced as alien and not within ones control) or compulsions (repetitive behaviors such as hand washing), that is, they are time consuming and/or cause marked distress (DSM-IV-TR) (APA 2000).

Disturbed eating patterns or substance abuse such as alcohol may be symptoms of a mental disorder but may also be a disorder on its own (i.e., eating disorders such as anorexia nervosa and bulimia nervosa or substance-related disorders such as substance dependence and substance misuse (DSM-IV-TR)) (APA 2000).

The remaining psychiatric disorders include severe mental disorders such as schizophrenia and other psychotic disorders and somatoform disorders, factitious disorders, dissociative disorders, sexual and gender identity disorders, sleep disorders, impulse-control disorders, and personality disorders (DSM-IV-TR) (APA 2000).

Different interventions for mental health disorders in workers have been studied. We follow the categorization suggested by van der Klink et al. (2001) and Furlan et al. (2011) (Furlan et al. 2011; van der Klink et al. 2001).

1. Psychotherapeutic interventions. These interventions often include a type of *cognitive therapy* or cognitive restructuring aimed at changing cognitions that elicit mental health problems. Cognitive therapy aims to remove systematic biases in thinking and thus helping clients to modify their assumptions and irrational cognitions that maintain maladaptive behaviors and emotions. In the therapy, client's beliefs are regarded as testable hypotheses to be examined through behavioral experiments jointly agreed upon by client and therapist (Engler 2003). CBT aims at changing cognitions, decreasing avoidance behavior, and increasing new behavior (van der Klink and van Dijk 2003). CBT consists of three core elements: (1) altering antecedent cognitive reappraisals, (2) preventing emotional avoidance, and (3) facilitating action tendencies not associated with the emotion that is deregulated (Barlow et al. 2004). *Exposure* in vivo is a common behavioral component of CBT for different anxiety disorders. By being exposed to anxiety-provoking work situations, workers learn gradually to deal with them. *Mental imagery exposure* is also an aspect of CBT that aims at cognitive restructuring and can be used to prepare for a real-life confrontation with anxiety-provoking situations (Noordik et al. 2010). Graded activity that has been described in the musculoskeletal disorders section is a specific form of *behavioral therapy* that includes physical exercise. Graded activity uses the technique of time contingency, which implies that activities are built up according to a time schedule rather than the course of the symptoms (van der Klink and van Dijk 2003). Graded activity builds upon two pillars: (1) the behavior and operant learning theories (i.e., reinforcing positive behavior and ignoring pain behavior) and (2) cognitive principles (i.e., providing insight in the negative consequences of pain behavior and modifying irrational cognitions). Cognitive therapy exclusively builds upon the cognitive behavioral theories aiming at changing behavior by changing the patient's thoughts and values (Engler 2003). Another psychotherapeutic approach is *problem-solving therapy* (*PST*) aimed at solving daily problems, which are perceived as real threats to the patients (Mynors-Wallis 2001). Additionally, *stress inoculation training* is described in the work-related literature (van der Klink and van Dijk 2003). It is designed to improve resistance to stress by improving coping skills. Three stages are distinguished: education, skill acquisition, and application of coping skills (van der Klink and van Dijk 2003; Meichenbaum 1996). *Stress management* refers to combinations of varying and various interventions aimed at dealing better with stress.
2. Enhanced psychiatric care involves outpatient psychiatric treatment enhanced by occupational therapy. This type of intervention is usually delivered by psychiatrists and occupational therapists (Furlan et al. 2011).
3. Enhanced primary care involves physicians and nurses working in the primary care centers or managed care organizations. The main components of this type of interventions are education for physicians and nurses about guideline-concordant care and reinforcement to adhere to these guidelines (Furlan et al. 2011).
4. Enhanced care by occupational physician. This type of interventions is aimed at establishing a more active role for the occupational

physician in the management of sickness absence and work disability and in the prevention of repeated sickness absence and disability for work (Furlan et al. 2011).

5. Exercise/promoting a healthy lifestyle. This usually consists of different types of physical exercises (e.g., improving muscle strength, aerobics, jogging, running, cycling, and swimming) in a hospital setting or in a supervised setting (Furlan et al. 2011; Schaufeli and Enzmann 1998). Physical exercise can be a good antidote to stress. People with mental disorders can be referred to this type.
6. Relaxation (Furlan et al. 2011; Schaufeli and Enzmann 1998). People with mental health disorders such as stress or burnout are very often unable to relax, which enhances feelings of stress and exhaustion. Many stress programs include some type of relaxation training. Relaxation is known to have both physiological and psychological effects. Four well-known relaxation methods are progressive muscle relaxation, deep breathing, meditation, and biofeedback (Schaufeli and Enzmann 1998). Other interventions aimed at relaxation studied are music therapy, massage (Cooke et al. 2007), and Qigong, a Chinese practice of breathing, movement, and awareness (Stenlund et al. 2009).
7. Multidisciplinary care (Desiron et al. 2011) and integrated care management (Furlan et al. 2011). Furlan is referring to interventions conducted at the organizational or healthcare system level. These types of interventions are aimed at appropriate diagnosis, adherence to treatment, adequate follow-up, and ensuring collaboration among all professionals involved in the treatment.
8. Work-related stress reduction. Finally, Furlan et al. (2011) describe how supervisors can list work stressors and make plans to reduce these (Furlan et al. 2011).

Even though the latter two interventions are not purely clinical, they use principles of the clinical interventions, such as CBT. Another category of interventions is worksite interventions that are not aimed at individuals but at work modifications. These are not the focus of this chapter, even though—as will be explained later—some interventions include work-directed interventions in their approach to reduce work disability due to mental disorders.

9. Pharmacologic therapy (such as lithium, second-generation antidepressants). In the case of preventing work disability resulting from mental disorders, pharmacologic therapy is usually not the only clinical intervention, but it is used as additional therapy.

In the overview below, we will present the results of mental health intervention studies. The outcome measures of the studies had to be one of the following: presenteeism, absenteeism, or (prevention of) work disability. We did not include studies or reviews in which the mental health problem was studied as a comorbidity of another disorder (e.g., MS, cardiovascular diseases); interventions for musculoskeletal disorders or fibromyalgia were the focus of study; the interventions were not tested among employees or people with paid work; pharmaceutical treatment was the sole type of intervention; and interventions that merely focused at changing or adjusting the workplace. We did include some studies though that combined an individual with a workplace intervention.

20.4.1 Interventions: General Evidence

Generally, we found very few systematic reviews. We collected 352 references in a systematic search for systematic reviews on clinical interventions in relation to mental health disorders in Embase, PubMed, and PsycINFO but found only four reviews that met our criteria addressing stress, anxiety disorders, depression, and severe mental disorders, respectively (Noordik et al. 2010; Edwards and Burnard 2003; Marshall et al. 2001; Nieuwenhuijsen et al. 2008). Another three reviews were added from our own files addressing depression (Furlan et al. 2011) and stress (van der Klink et al. 2001; Richardson and Rothstein 2008).

These reviews concluded that there is only weak evidence for the effectiveness of interventions

for reducing work disability in people with mental disorders. This contradicts the positive conclusions of earlier narrative reviews on the subject (van der Klink and van Dijk 2003; Jones et al. 2003; Simon et al. 2001). In a systematic review on *depression*, it was concluded that "there is insufficient quality of evidence to determine which interventions are effective and yield value to manage depression in the workplace" (Furlan et al. 2011). Nieuwenhuijsen et al. (2008) also concluded in relation to depression that there is no evidence of an effect of medication alone, enhanced primary care, psychological interventions, or the combination of those with medication on sickness absence in depressed workers (Nieuwenhuijsen et al. 2008). Edwards and colleagues concluded already in 2003 that although a great deal is known about the sources of *stress at work* among nurses and its impact, a translation of these results into practice is lacking (Edwards and Burnard 2003). Thus, there seems to be a lack of studies with regard to the impact of interventions that attempt to moderate, minimize, or eliminate some of these stressors.

Some reviews found some evidence of clinical interventions for anxiety disorders, severe mental disorders, and stress and burnout. Noordik et al. (2010) found for *anxiety disorders* that for OCD, exposure in vivo containing interventions yield better work-related outcomes compared to medication alone (SSRIs) and relaxation but not better compared to response prevention (i.e., subjects confronting their fears and discontinuing their escape response). The results on anxiety outcomes were similar. For PTSD, exposure in vivo containing interventions can yield better work-related and anxiety-related outcomes compared to a waiting list but not better compared to mental imagery exposure. In sum, exposure in vivo as part of an anxiety treatment can reduce work-related adverse outcomes in workers with OCD and PTSD better than various other anxiety treatments or a waiting list (Noordik et al. 2010). Armond (1998) showed in a narrative review the positive effects of pharmaceutical treatment (lithium maintenance therapy under strict supervision of specialists) on employment of people with bipolar disorders (disorder with manic, mixed manic/depressive, or mixed hypomanic/depressive episodes) (Armond 1998). Patients were able to stabilize or even improve employment status, due to a reduction in hospital admissions among other things. Richardson and Rothstein (2008) found in their meta-analysis of 36 experimental studies on secondary stress management interventions (aimed at employees at risk for work disability) in various occupational settings that CBT interventions consistently produce larger effects on stress-related disorders, burnout, and anxiety disorders than other intervention types such as relaxation, multimodal interventions, or alternative interventions (Richardson and Rothstein 2008). For the specific group of severe mental disorders such as schizophrenia, who were not working at the onset of the study, no evidence was found for the effectiveness of clinical interventions (Marshall et al. 2001). Supported employment (support and training on the job) though was effective when compared to prevocational training (preparing for the job). There was also no evidence that prevocational training was more effective than standard community care (Marshall et al. 2001). This review shows that even in severe mental illness, interventions can effectively reduce work disability. This seems in particular to be the result of the work-related element in the intervention, although one characteristic of supported employment is that it is preceded by some degree of medical/treatment optimization and there is often at least minimal adherence support. Two additional reviews (Bond et al. 2008; Drake et al. 1999) also show that the individual placement and support (IPS) model of supported employment is effective for people with severe mental illness when it comes to finding and maintaining competitive employment. IPS appears to be more effective, for instance, than rehabilitative day programs or more traditional stepwise approaches to vocational rehabilitation. Burns et al. (2009) found in a large RCT that working in itself and supported employment has beneficial effects for a specific group of patients with severe mental illnesses (such as schizophrenia). These beneficial effects are, for instance, a better global functioning, fewer symptoms, less social disability, and greater

job tenure (Burns et al. 2009). Bond et al. (2008) conclude that IPS/SE is one of the most robust interventions available for people with severe mental illness or psychiatric disabilities (Bond et al. 2008).

20.4.2 Specific Interventions for Specific Disorders

It seems that, particularly in studies on clinical interventions for mental disorders among employees, the methodological quality of the studies is not sufficient to establish convincing evidence. Also, reviews seem to try to combine too many different populations, disorders, and interventions. Therefore, it is worthwhile to look more closely at individual trials and also include the more recent ones in this overview.

Several recent RCTs focused on secondary prevention of *depression* or depressive symptoms by a range of *stress management* interventions. Wang et al. (2007) showed that a telephone outreach in combination with care management and optional psychotherapy significantly reduced depressive symptoms and increased work retention, productivity, and number of hours worked (as compared to usual care) (Wang et al. 2007). Lexis et al. (2011) showed in an RCT with 138 employees at risk for work disability that early intervention based on CBT and training in problem-solving skills was effective in reducing severe depression and preventing long-term sickness absence for employees who had mild depressive complaints and were at risk for sickness absence at the onset of the study (Lexis et al. 2011).

Also evidence is found for *stress management interventions* to reduce sickness absence or stress symptoms. Willert et al. (2011) found in an RCT with 102 participants who were at risk for going on sick leave or returning from a period of sick leave that a stress management intervention significantly reduced self-reported sickness absenteeism (but not sickness absenteeism based on register data) (Willert et al. 2011). Duijts et al. (2008) studied the effects of a (secondary) preventive coaching intervention for employees at risk for sickness absence due to psychosocial health complaints. This intervention was delivered on an individual basis and had a positive effect on the general well-being of the employees (i.e., psychological distress, burnout, need for recovery, and life satisfaction), but not on sickness absence (in comparison with care as usual) (Duijts et al. 2008).

Cooke et al. (2007) tested the effect of aromatherapy massage combined with music therapy on stress and anxiety levels of emergency nurses (in two seasons: summer and winter). This study was designed as one group pretest–posttest quasi-experiment. The results showed that aromatherapy massage with music significantly reduced anxiety for both seasonal periods. Anxiety before the massage intervention—which was offered both in winter and summer—was significantly higher in winter than summer. No differences in sick leave and workload were found (Cooke et al. 2007).

These positive findings regarding stress management in relation to stress symptoms and to a somewhat lesser extent sickness absence are in line with older reviews on stress management that conclude that stress management interventions are effective in reducing the negative aspects of stress (van der Klink and van Dijk 2003). In an older meta-analysis, it was concluded that cognitive behavioral interventions combined or not with relaxation appeared to be the most effective (van der Klink et al. 2001).

Regarding secondary or tertiary interventions, also evidence for effective interventions of *CBT* for *depressive disorders* is found. Hollinghurst et al. (2010) showed that an online CBT intervention delivered by a therapist in real time is cost-effective in comparison with care as usual in primary care for patients with depression (Hollinghurst et al. 2010). Patients in the control group reported more time off work than patients in the CBT group. Bee et al. (2010) also showed that telephone-delivered CBT was effective for depressed workers (as compared to usual care, outcomes were severity of symptoms and sickness absence and work productivity). Effect sizes are small though (Bee et al. 2010).

Evidence for *other interventions* for *depression* or *depressive symptoms* (such as exercise

and a multimodal intervention) is inconsistent. Krogh et al. (2009) compared the effects of three types of physical training (i.e., aerobics, muscle strength, and relaxation) among a group of patient with unipolar depression who had been referred by their psychiatrist or GP. They found that only muscle strength training significantly reduced days of sickness absence, but they found no effect on symptom severity. The other types of physical exercise were not effective (Krogh et al. 2009). Vlasveld et al. (2012) tested the effect of a multimodal intervention (as compared to care as usual) in a group of employees with major depressive disorder and tested the effect on RTW and symptom severity. The intervention consisted of a transmural collaborative care model, including problem-solving treatment (PST), a workplace intervention, antidepressant medication, and manual-guided self-help. They found a positive short-term effect of the intervention (after 3 months) but in the long term the effect on severity of depression disappeared. Subgroup analyses indicated that the intervention was effective in the long term only for employees with moderate depression (Vlasveld et al. 2012).

Regarding the effects of *CBT* for people with *anxiety disorders* or *stress-related disorders,* we found rather positive effects, although results are not completely consistent and sample sizes of the studies are often small. In the above-mentioned study of Bee et al. (2010), it was found that telephone-delivered CBT had a positive effect on severity of anxiety (and work productivity) as well (Bee et al. 2010). Uegaki et al. (2010) performed an economic evaluation, which aimed to test whether a general practitioner-based minimal intervention for workers with stress-related sick leave (MISS) was cost-effective as compared to usual care. They could not find any effect in a heterogeneous patient population (Uegaki et al. 2010). Bakker et al. (2010) tested the effectiveness of this intervention on return to work and they could not detect a significant effect of MISS (Bakker et al. 2010).

Stenlund et al. (2009) performed an RCT in which they compared two interventions for a group of employees who were absent from work due to burnout. Intervention 1 was a rehabilitation program consisting of cognitively oriented behavioral rehabilitation (CBR) and Qigong; intervention 2 was a rehabilitation program with Qigong only. Outcome measures were burnout and sickness absence. The authors found that both programs had a positive effect on the outcomes, there were no differences between the groups (Stenlund et al. 2009). De Vente et al. (2008) conducted an RCT to evaluate the effects of a CBT-based stress management training (either individually or group based) as compared to care as usual on sickness absence in a group of employees who were absent from work due to work-related stress. In general they could not find any effects: there were no differences between the three treatment conditions. Only for the employees with minor depressive complaints, individual CBT was more effective than care as usual as regards severity of complaints but not with regard to sickness absence (de Vente et al. 2008). Duffy et al. (2007) tested the effect of immediate cognitive therapy of PTST in the context of terrorism in Northern Ireland. They found that immediate therapy reduced PTST and depression and improved occupational and social functioning, including work-related disability, as compared to a group of patient who received similar treatment but only after 12 weeks on a waiting list (Duffy et al. 2007).

We also found several studies that combined clinical/individual treatment with some kind of *workplace intervention*, mainly for employees with *stress-related disorders* (such as distress and burnout). Results of these studies are mixed. Blonk et al. (2006) compared the effectiveness of CBT with the effectiveness of a combined intervention (brief CBT combined with individual focused and workplace interventions) on psychological complaints (i.e., burnout, anxiety, and depression) among self-employed people on sick leave (Blonk et al. 2006). They found that the combined intervention was far more effective on both partial and full return to work. Full return to work occurred 200 days earlier in the combined intervention group than in the CBT group or the control group (Blonk et al. 2006). Van Oostrom et al. (2010) evaluated the cost-effectiveness of a workplace intervention (including CBT by the

OP according to the guideline) for employees with distress who had been sick listed for 2–8 weeks (van Oostrom et al. 2010). They could not find any effects of this intervention on lasting return to work, QALYs, and costs. A subgroup analysis showed that the intervention was effective on workers with a positive intention to RTW while still having health complaints. In fact, a cost–benefit analysis showed that this workplace intervention was more expensive than usual care but did not yield any additional benefits except for the mentioned subgroup in which it was highly cost-effective from the company perspective. Care as usual was delivered by the occupational physician in accordance with the guidelines of the Dutch Association for Occupational Physicians. Employees in the intervention group received the usual care as well but were additionally referred to a return-to-work-coordinator who identified and removed obstacles for return to work in consultation with the employee and his/her supervisor (van Oostrom et al. 2010). For more detailed information, we refer also to Chap. 21 Workplace Interventions.

Karlson et al. (2010) found in a clinical trial among employees diagnosed with burnout and on long-term sick leave that their workplace-oriented intervention had a positive effect on long-term return to work. This intervention was aimed at improving the match between the job and the employee by enhanced and improved communication between the employee and his/her supervisor (Karlson et al. 2010). This was based on the consideration that one specific contributing factor to long sick leave may be insufficient contact between the employee and the supervisor. The intervention was called a convergence dialogue meeting (CDM). The purpose of the CDM was to initiate a dialogue between employee and the supervisor to find solutions to facilitate return to work. The CDM was carried out at the workplace, with two team members who had examined the employee. The CDM started with the team members' summary of the perspectives of the patient and the supervisor, highlighting their agreements and disagreements on the causes for the sick leave and on necessary changes for facilitating return to work. The main focus was on solutions and suggested changes, that is, striving for converging perspectives and goals between supervisor and employee. Rebergen et al. (2009) evaluated the effectiveness of guideline-based care (GBC) among workers with mental health problems on sickness absence on return to work. The GBC promotes counseling by the occupational physician in order to facilitate return to work. They could not find a general effect of this intervention, but found small effects in the subgroup of employees with minor stress-related disorders (Rebergen et al. 2009).

Finally, changes in clinical systems, such as occupational medical services, can be viewed as a clinical intervention (also see Furlan et al. (2011) who describe this type of interventions aimed at the healthcare system level as integrated care management or multidisciplinary care). Bernacki and Tsai (2003) describe 10 years of experience an Integrated Workers' Compensation Claims Management System that allowed safety professionals, adjusters, and selected medical and nursing providers to collaborate in a process of preventing accidents and expeditiously assessing, treating, and returning individuals to productive work (Bernacki and Tsai 2003). They showed that the organization of clinical services around work disability prevention as a priority is highly effective. The hallmarks of this program involve patient advocacy and customer service, steerage of injured employees to a small network of physicians, close follow-up, and the continuous dialogue between parties regarding claims management. The frequency of lost time and medical claims rate decreased tremendously, just as the number of temporary/total days paid per 100 insured total workers' compensation expenses including all medical, indemnity, and administrative costs decreased as well (Bernacki and Tsai 2003). These data suggest that workers' compensation costs can be reduced over a multiyear period by using a small network of clinically skilled healthcare providers who address an individual worker's psychological as well as physical needs and where communication between all parties (e.g., medical care providers, supervisors, and injured employees) is constantly maintained.

20.4.3 Conclusions Mental Health Problems

Generally, there is a lack of good quality research on clinical interventions aimed at the prevention of work disability resulting from mental health problems among employees, and this limits our conclusions. There seem to be indications for positive effects of CBT interventions in employees with stress and burnout. Also for depression, positive findings have been found (Hollinghurst et al. 2010; Bee et al. 2010). Generally, there is strong evidence for the effectiveness of CBT in studies not primarily focusing on employees (Butler et al. 2006; Cuijpers et al. 2008; Stewart and Chambless 2009). These effects seem superior to other forms of psychotherapy, even 6 months or 1 year after discontinuation (Tolin 2010). It might be that there is yet too little research to conclude that CBT is effective to reduce work disability in mental disorders.

The conclusion that it is possible to reduce work disability in case of mental disorders seems warranted, however, although more and better-focused studies are certainly necessary to find out what specific intervention is most fruitful in what condition. Further, there are indications that including the workplace and a focus on work is important (van der Klink and van Dijk 2003). Employees with mental disorders generally experience stigma because of having (had) a mental disorder (Proudfoot et al. 2009; Saraceno et al. 2009). This might imply a barrier to (re)integrate in the workplace additional to the usual barriers of symptoms, time lag, etc. Interventions that include workplace involvement and changes might therefore be particularly successful. However, few interventions included work-related components.

Another reason why it is difficult to draw conclusions is the large variation in interventions included in one review but also across the more recent RCTs. This situation led us also to include not only clinical interventions in a strict sense. The variation is even larger than reported here: not only work-directed interventions are not described, also alternatives which are not clinical or work directed such as peer support groups (Peterson et al. 2008) are possible. In general, mostly studies with (some) positive results regarding the intervention are found which may be a sign of publication bias.

In line with the findings regarding stress and burnout, a guideline has been developed for adjustment disorders based on mainly cognitive behavioral principles and stress management components. Aspects are "stress inoculation training" and graded activity, and the aim of these guidelines is to enhance the problem-solving capacity of patients in relation to the work environment (van der Klink and van Dijk 2003). An RCT that was based on these guidelines and put into practice by instructing occupational physicians demonstrated a shortening of sick leave duration (van der Klink et al. 2003). A more intensive treatment of the disorder itself might be necessary in cases of severe mental disorders (van der Klink et al. 2003).

20.5 General Conclusion

There is to some extent more and better evidence regarding the effectiveness of clinical interventions for musculoskeletal disorders than for mental disorders in preventing work disability. With respect to physical exercise, beneficial effects were reported on work disability and absence from work for subacute and chronic low back pain patients and on pain symptoms in neck and/or upper extremity disorders. The interventions for musculoskeletal and mental conditions most frequently studied (and published) are alternative forms of cognitive behavioral treatment, with an emphasis on behavior for musculoskeletal disorders and on cognitive therapy for mental health problems and disorders. For musculoskeletal disorders, these treatments, also called graded activity interventions, seem to be effective in subacute and chronic low back pain patients in reducing sick leave days and work disability. For mental health problems, there are indications for positive effects of these treatments—also called cognitive behavioral treatments—in employees with stress and burnout or depression. However, strong conclusions regarding the most effective treatments are hampered by the large variety in interventions

and patient populations as well as for the subgroup of musculoskeletal and mental disorders. This means that more and better-aimed studies are necessary to find out what specific interventions are most effective in what specific patient condition. This also means that there are indications that the influence of the workplace and the focus on work are underestimated in the content of current interventions for musculoskeletal and mental disorders. Van Balen et al. (2010) found in their review of Dutch general practice guidelines that there are few references to work-related aspects, which was reflected in the few studies with work-related outcomes. Low back pain and to a lesser extent depression and anxiety disorders were however exceptions to this rule (van Balen et al. 2010). They concluded that in primary care, more attention should be paid to the relationship between work and disease. Even though, more research is necessary.

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Workplace Interventions

21

Sandra H. van Oostrom and Cécile R.L. Boot

This chapter presents the current scientific knowledge about the effectiveness of workplace interventions implemented to facilitate return to work and some of the challenges linked to their implementation.

21.1 Introduction

This chapter presents a synthesis of knowledge on the effectiveness of interventions directed at the work situation: workplace interventions aiming a long-lasting return to work (RTW) for sick-listed workers. The definition of a workplace intervention and its objectives are described, and the participatory process is introduced as an approach for workplace interventions. Examples of changes at the workplace and in the work organization are provided to illustrate types of work adaptations that can be implemented at the workplace, and finally the effectiveness of workplace interventions is described. Before presenting these key points about workplace interventions, a case illustration is presented in Fig. 21.1. The case highlights the issue of the usefulness of workplace interventions in a challenging situation in which the health condition and disability status are highly influenced by the individual's workload and work demands.

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21.2 Rational for Developing Workplace Interventions

Timely RTW is of great benefit for both the injured workers and their employers. The longer a worker is unable to work, the higher is the probability that he/she will not RTW at all. Both personal and work factors interfere with this process. At the personal level, low self-motivation and low self-efficacy to go back to work make it harder to initiate the RTW process, especially when problems at work are related to the reason for sick leave (Briand et al. 2007; Labriola et al. 2007). At the workplace level, coworkers take over the tasks of the worker on sick leave, work piles up, or another worker is hired to take over the tasks.

The influence of personal and workplace factors on activity and participation levels has been recognized by the World Health Organization's International Classification of Functioning, Disability and Health (ICF) (World Health Organization 2001). If the cause of work disability is associated with workplace factors, then a return to an unchanged workplace (with or without appropriate treatment for the disorder) may

P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_21,

Sheila, 42 years old, married with two children, is one of the most experienced and motivated workers at a financial department. She has been working at the department since 1999. Her main task is the processing of invoices into the computer. Because of her experience and knowledge of the department, colleagues frequently ask her for advice and she helps them with their tasks.

Since February 2007, resulting from a restructuring within the company, time pressure has increased for everyone, and there was a huge increase in the number of invoices. Even though the pile of invoices lying on Sheila's desk waiting to be processed was increasing, she did not ask her colleagues to assist her. Requests for her advice still continued and despite the high work pressure Sheila continued to help her colleagues although with less enthusiasm and often as quick and as minimal as possible. During the last months she got headaches by the end of the morning more often, go teasily frustrated and irritated when colleagues did not understand her. By the end of the day Sheila was very tired but she had sleep problems during the night, lost her motivation to undertake sport and social activities after work, had frequent arguments with her husband and was easily annoyed by her children. After a long-lasting period of increased workload, Sheila was no longer able to carry out her work, and she took sick leave in August 2007. Her occupational physician diagnosed her complaints to be an adjustment disorder. She felt exhausted all day, suffered from sleeplessness and concentration problems. During the first three weeks of sick leave Sheila slept a lot by day because of her tiredness and she consulted her occupational physician. During the first consultation of the occupational physician, Sheila was reassured, discussed her complaints and got more insight into the causes of her breakdown. The occupational physician informed her about the normal course of adjustment disorders and sick leave and advised an active approach to solve her problems. Although she felt somewhat better during the second consultation, she still reported concentration problems and felt tired. Sheila was now even more distressed since she had not been able to perform any tasks at home or usual activities with her children during the last two weeks. Together with the occupational physician she prepared a schedule to start performing the necessary tasks of daily living, such as children's care and housekeeping. A next session was planned in about one week and Sheila gave permission to contact her supervisor to propose a workplace intervention using the participatory approach.

Fig. 21.1 Case illustration—an example of the need for a workplace intervention

not be successful and may even lead to recurrences of sick leave with longer duration (Adler et al. 2006; Sanderson and Andrews 2006). Personal and workplace factors may turn out to be barriers to RTW. For instance, concentration problems hampering accurate execution of calculations (cognitive work demand) or a height of the desk that is too low (workplace design) may exacerbate pain sensation. Therefore, it is important to identify and reduce potential barriers due to work demands in order to increase the chances for a successful RTW (Nordqvist et al. 2003; Schultz et al. 2007; Young et al. 2005).

21.3 Definition of a Workplace Intervention

For the purpose of this chapter, workplace interventions are defined as interventions focusing on changes in the workplace and equipment design, or in the work organization (including working relationships), or in the job situation, or in the environmental conditions. They can also be the actions taken for proper occupational (case) management with the active participation of the worker and the employer (Anema 2004; Franche et al. 2005). Active participation is defined as face-to-face conversations about RTW issues between the worker and the employer (or at least involving these two workplace actors).

The definition of "workplace interventions" proposed has been inspired by the International Ergonomic Association's definition (Stapleton 2000) and the Waddell and colleagues' definition of occupational interventions (Waddell and Burton 2001). Workplace and equipment design include changes in the workplace furniture, tools, or materials needed to perform the work tasks. Changes in work organization include, for instance, changes in work schedules or tasks, training in task performance, and communication processes between coworkers. Changes in the job situation refer to the financial and contractual arrangements to facilitate RTW; changes in the work environment concern noise, lighting, vibration, etc.

In summary, workplace interventions include all interventions that are closely linked to the

workplace (work focused) including either work adaptations or involvement of stakeholders from the work environment. This implies that all worker-focused interventions directed to an increase in the work capacity of workers, without changes to the workplace itself or without participation of workplace players in the RTW process, are not within the scope of this chapter (see Chap. 20).

21.4 An Example of the Participatory Approach

Several approaches for selecting the changes to be implemented in the workplace exist. The participatory approach is the most well known in the field of work disability prevention. A particular advantage of this participatory approach is that different stakeholders are active participants throughout the whole process of development and implementation of the changes, which may increase the possibility of a more sustainable and successful RTW (Loisel et al. 1994; Anema et al. 2003).

Participatory interventions are relatively new in the field of RTW research but are well known in the primary prevention of work-related musculoskeletal disorders (de Jong and Vink 2002). Often, the recommendations obtained by this type of intervention are about the necessary changes to working methods; however, this change is rather difficult. Sometimes workers do not perceive changes as a necessity, and they are often expensive. Sometimes workers refuse to adopt new working methods, or it is difficult to find the most appropriate improvement(s) aimed at a reduction of musculoskeletal load and an increase in efficiency in work (de Jong and Vink 2002). The idea behind a participatory approach is that participation of workers may help to overcome these implementation difficulties (Noro 1999). This step-by-step approach usually requires the involvement of a group of workers, supervisors, and a facilitator (i.e., a RTW coordinator) in order to arrive at a consensus about the best solutions for workplace problems. This group-based participatory approach was adopted by Anema and colleagues with the purpose of uncovering RTW issues for an individual worker and for designing workplace interventions accordingly (Anema et al. 2003).

In this adaptation, individual participatory workplace interventions comprised of six phases as follows: organizational preparation, an inventory of barriers for RTW, thinking of solutions, preparing the implementation, implementing solutions, and evaluation/control.

In the first phase of the participatory approach, several meetings between a RTW coordinator (=case manager), the sick-listed worker, and the supervisor were planned. At that phase other stakeholders including human resource personnel and the occupational physician are informed about the process by the RTW coordinator who also must collect information about who is the person or department responsible for adjustments in the workplace. The second phase comprises two meetings between the RTW coordinator, the worker, and the supervisor. These meetings are intended to identify barriers for RTW. In the first meeting, the worker completes an overview of his or her tasks at work and identifies obstacles for RTW in a structured interview with the RTW coordinator. They rank the obstacles according to their priority, which is determined on the basis of their frequency and perceived importance. In the second meeting, the supervisor identifies obstacles for RTW from his or her perspective. Table 21.1 shows an example of a matrix including the overview of tasks, obstacles for RTW, and the priority ranking, filled in by the RTW coordinator during the first and second meetings, based on the case of Sheila presented in Fig. 21.1. Few barriers at the workplace were identified in the two meetings by Sheila and her supervisor Tom: a high workload due to the pile of invoices, concentration demands during the processing of invoices on the computer, assistance to colleagues taking time away from her main tasks, and her own difficulty in delegating tasks to others while chairing in the weekly meetings. The high workload due to the pile of invoices occurred continuously; thus, the frequency was rated with the maximum number of stars (four) and this problem was also rated with high importance as an obstacle

Table 21.1 Matrix: examples of identified obstacles for RTW and priority settings

Main tasks	Activities	Obstacle	Frequency	Importance	Priority
Processing of invoices	Arranging invoices	High workload due to pile of invoices	****	***	1
	Putting invoices into the computer	Concentration problems (too much invoices, very accurate work)	***	***	3
	Archiving invoices				
Helping colleagues with difficult invoices	Giving advice to colleagues	Time consuming, less time for own work	***	***	2
Organizing weekly meetings about distribution of work	Preparing meetings				
	Chairing meetings	Difficulties with delegation of tasks	*	*	4

Name of worker: Sheila
Name of supervisor: Tom
Name of RTW coordinator: Helen
Frequency: report if a certain task occurs frequently or not:
* = Only once in a while (for instance, once a week or month)
** = On a regular basis (for instance, a few times a week, sometimes once a day)
*** = Often (more times a day)
**** = Always (every hour of the day)
Importance: report the importance of every obstacle:
* = Somewhat important
** = Important
*** = Very important

for RTW (three stars). Difficulties with delegation of task during the weekly meetings occurred once a week and were rated as a somewhat important obstacle. Based on the frequency and the importance, the four barriers were ranked with high workload as the first priority and the difficulties with delegation of tasks as the fourth priority (Table 21.1).

In the third phase a third meeting with both the worker and the supervisor takes place. The worker, the supervisor, and the RTW coordinator are jointly involved in a group session to brainstorm solutions. They rank the solutions according to priority, based on feasibility, solving capability, and short-term applicability of the suggested solutions. Table 21.2 shows the matrix of solutions for returning to work and priority setting filled in by the RTW coordinator during the third meeting. The brainstorm session in the case of Sheila resulted in three solutions for the high workload for processing the invoices. Sheila's job description should be revised in order to clarify her work responsibilities, some extra meetings with Tom about planning her tasks were recommended, and some colleagues should assist in processing the invoices to distribute the workload over all workers in the department. Based on the criteria for solving capability and the usefulness for decreasing the barrier for a RTW, the last solution regarding the assistance of colleagues with processing the invoices got the highest priority. After the priority ratings, a plan for RTW was formulated in the fourth phase, and the implementation of work adaptations was planned. The matrix used for this fourth phase is shown in Table 21.3. This matrix summarizes all actions that followed from the chosen solutions, for example, scheduling extra meetings and contacting a company social worker to plan training. Furthermore, the matrix specifies the person responsible (Sheila or Tom in this case) and the period of time to implement the solution. The fifth phase was directed to the implementation of work adaptations at the workplace, and if needed a visit for instructions regarding work adaptations was conducted by the RTW coordinator.

In the final phase (sixth phase), the plan for RTW is evaluated by phone and information regarding the actual implementation of solutions and improvements is collected from the worker and supervisor. Follow-up or case management after the implementation of the workplace intervention is discussed with the worker and supervisor.

Table 21.2 Matrix for solutions for RTW and priority setting

		Assessment of criteria			
Obstacle	Solution	1	2	3	Priority
High workload	Job description for clarity about Sheila's responsibilities	++	+++	+	3
	Extra meetings with Tom about planning	+++	+++	+	2
	Spread of workload over workers in department	+/−	+	+++	1
Difficulties with delegation of tasks	Training in delegation of tasks	+++	++	+++	1
	Feedback from Tom after the weekly meetings	++	+++	+	2

Criteria:
1: Solution exists and can be realized in the short term
2: Solution is inexpensive and can be purchased in this framework
3: Solution helps in eliminating/decreasing obstacle for RTW
Meaning of plus and minus signs:
−=A negative score on this criterion (cannot be realized, expensive, does not decrease obstacle for RTW)
+=Positive score on this criterion (may vary from + to +++)
+/−=has both positive and negative aspects
Criterion has both positive and negative aspects

Table 21.3 Matrix for planning implementation of solutions at the workplace

Obstacle	Solution	Action	Person responsible	When	Done
High workload	Clarity about Sheila's responsibilities	Write job description	Tom	10-10-2007	dd-mm-yyyy
	2 daily meetings (5 min) about planning	Schedule appointment in the morning and afternoon	Sheila, Tom	From start RTW	dd-mm-yyyy
	Spread of workload over workers in department	Consideration of new schedules for next year	Tom	November 2007	dd-mm-yyyy
Difficulties with delegation of tasks	Training in delegation of tasks	Contact with company social worker to plan training	Sheila	This week	dd-mm-yyyy
	Feedback from Tom after the weekly meetings	Schedule 15 min meeting between Sheila and Tom after each weekly meeting	Tom	From start RTW	dd-mm-yyyy

Several stakeholders may be involved in an individual participatory workplace intervention, at least the sick-listed worker, his or her supervisor, and a RTW coordinator or case manager who guides the process. Involvement of coworkers, a representative of the union, or the insurer is also possible. A RTW coordinator should be trained to guide the process of implementation of a workplace intervention (Shaw et al. 2008). A health professional with expertise on the various health problems experienced by the worker is preferred by workers and supervisors (van Oostrom et al. 2007); however, this type of expertise may not be essential to guide a process that takes place in a workplace intervention. Communication and problem-solving skills might be more important than expertise in health care. Studies show different professionals in the role of RTW coordinator: ergonomists, occupational hygienist, occupational nurses, occupational physicians, company social workers, return-to-work experts, or insurance agents (van Oostrom et al. 2009a).

Due to large differences in legislation and compensation systems between countries, the roles of stakeholders differ and the most appropriate professional to guide a participatory approach may vary. Because of these differences, there is no standard list of recommended stakeholders that should be involved in workplace interventions. Within each jurisdiction,

key stakeholders should be identified in order to implement changes in the workplace.

21.4.1 Types of Work Adjustments

Workplace interventions often result in the implementation of work adjustments at the level of the workstation and at the level of work organization. The participatory approach is an approach used to identify and implement these work adjustments. The following subsessions briefly present some examples of changes at the workplace or in the work organization.

21.4.1.1 Workplace Design and Equipment

Interventions for workplace design and equipment are usually directed to the prevention of accidents and injuries and they include the design of ergonomic chairs, new computer devices, and lifting aids. However, several studies have proposed that changes in workplace design and equipment should be implemented at the workplace for RTW purpose (Loisel et al. 1994; Anema et al. 2003; Lambeek et al. 2009; van Oostrom et al. 2009b). For example, in a study about workplace interventions with workers with chronic low back pain, 21% of the RTW solutions were related to equipment design and 6% to workplace design (Lambeek et al. 2009). Examples of the proposed solutions were obtaining a hand-free telephone in order to improve incorrect postures during phone conversations, the provision of a desk lamp to prevent painful eyes because of insufficient light at the workplace, and the use of lifting resources to avoid low back pain. About 36% of the solutions for workers with subacute low back pain are categorized into workplace and equipment design. These solutions have been mostly implemented in the short term, that is, within 3 months (Anema et al. 2003). The proportion of solutions regarding workplace layout or equipment design was much higher in another study among workers with subacute low back pain, namely, 56% (Loisel et al. 1994).

21.4.1.2 Work Organization

Interventions at the work organization level comprise a broad category of solutions. It includes changes in job schedule or tasks, training directed to improve task performance, and also changes in the structure of the social dynamics in the workplace. These interventions are more directed to the prevention of psychosocial strains imposed by the organizational structure and also to facilitate the RTW. At that level changes in the work organization—such as job rotation and task breaks, promotion of communication activities like regular meetings with supervisor and collecting more feedback from supervisor, and training related to time management and skills training—are essential (van Oostrom et al. 2009b). Interventions directed to work organization and workers' training have been frequently applied for workers with low back pain (Anema et al. 2003; Lambeek et al. 2009).

21.5 Effectiveness of Workplace Interventions

A Cochrane systematic review on workplace interventions was published in 2009 (van Oostrom et al. 2009a) and it has been updated for this handbook to include publications up until March 2011. The objective of this review was to determine the effectiveness of workplace interventions in preventing long-term work disability among sick-listed workers, when compared to usual care. All randomized controlled trials (RCTs) concerning workplace interventions aimed at preventing work disability by means of job accommodation or involvement of at least the worker and the employer, as key stakeholders in the RTW process, were described and a meta-analysis was performed. Outcome measures included were time until RTW, cumulative duration of sickness absence, functional status, pain, symptoms, and general health.

The Cochrane review identified six studies evaluating the effectiveness of workplace interventions from European countries, North America, and Canada which met inclusion criteria. Inclusion criteria for the studies in this review were very

strict; only RCTs of workplace interventions aimed at RTW for workers where sickness absence was reported as a continuous outcome were included in the review. The updated literature search (March 2011) revealed three additional publications of European effectiveness studies on workplace interventions (Bultmann et al. 2009; Lambeek et al. 2010; van Oostrom et al. 2010).

21.5.1 Study Populations

The characteristics of the nine studies are presented in Table 21.4. Four studies concerned workers with back pain (Lambeek et al. 2010; Anema et al. 2007; Loisel et al. 1997; Verbeek et al. 2002), one included workers with work-related upper extremity disorders (Feuerstein et al. 2003), two included musculoskeletal disorders in general (Bultmann et al. 2009; Arnetz et al. 2003), and two included mental health problems (van Oostrom et al. 2010; Blonk et al. 2006). The duration of work disability varied largely in the studies; six out of the nine studies focused on sickness absence shorter than 3 months (Bultmann et al. 2009; van Oostrom et al. 2010; Anema et al. 2007; Loisel et al. 1997; Verbeek et al. 2002; Blonk et al. 2006), while two studies included only workers sick listed for more than 3 months (Lambeek et al. 2010; Feuerstein et al. 2003), and this was unclear for the study of Arnetz (Arnetz et al. 2003). One study included self-employed workers only (Blonk et al. 2006). In total seven out of the nine studies concern workers with musculoskeletal disorders; therefore, subgroup analyses for musculoskeletal disorders only are described.

21.5.2 Risk of Bias of Studies

Assessment of risk of bias is an important step in conducting a systematic review and meta-analysis. High-quality studies increase confidence that the effects found are a consequence of the intervention and not due to a suboptimal study design or bias. Ten quality criteria were assessed: adequate sequence generation for randomization, allocation concealment, blinding of outcome assessor, dropout rate described and acceptable, intention-to-treat analysis performed, free of selective reporting, similar prognostic factors at baseline, co-interventions avoided or similar, compliance acceptable, and timing of the outcome assessment comparable. Studies with more than 5 points on the risk of bias assessment have a low risk of bias. The risk of bias scores of the nine studies is shown in Table 21.5. Only one out of the nine studies scored less than 5 points. It should be remembered that blinding of participants and care providers for the allocation of interventions is often included in the assessment of risk of bias. This is easily arranged in RCTs studying effectiveness of drug medications. Because of the nature of workplace interventions, it is almost impossible to blind participants and care providers, and all of the nine studies studied did not meet the criteria of blinding.

21.5.3 Content of Workplace Interventions

The identified workplace interventions were all directed to RTW of a sick-listed worker but varied largely in their content. Table 21.6 presents information about the content of all workplace interventions. Changes to the workplace and equipment were implemented in all studies, changes of work design and organizations in eight out of nine studies, changes to working conditions in two studies only, and changes in work environment in six studies. Case management with the worker and employer (supervisor) occurred in seven studies. The number of contacts between the worker, the supervisor, and the RTW coordinator during the workplace intervention was often not clear from the publications, but for studies providing this information, it ranged from one to six contacts. Face-to-face contact took place in all studies, mostly at the workplace and in one study at the occupational health service (Verbeek et al. 2002). Table 21.7 presents the different stakeholders involved in the workplace interventions. The worker, the supervisor or employer, and a professional in occupational health were always involved

Table 21.4 Characteristics of the studies on the effectiveness of workplace interventions

Study	Country	Participants	Intervention	Usual care	Outcomes	Duration of follow-up
Anema et al. (2003, 2007), Steenstra et al. (2003)	The Netherlands	196 Sick-listed workers with low back pain	Work site assessment and work adjustments based on methods used in participatory ergonomics	Dutch occupational guideline on low back pain	Time until lasting RTW, time until first RTW, cumulative duration of absence, functional status, pain	12 months
Arnetz et al. (2003)	Sweden	137 Workers with diagnosed first or recurrent musculoskeletal disorders	Early workplace intervention, adaptation at work, all stakeholders meet at the workplace, ergonomic assessment	Non-standardized treatment: 8-week RTW plan	Cumulative duration of sickness absence	12 months
Blonk et al. (2006)	The Netherlands	122 Workers with adjustment disorders	Brief cognitive behavioral therapy and advice from labor expert directed to lower the workload and job demands and increase the decision latitude	Two brief sessions with general practitioner to check legitimacy of the work disability benefit	Time until first RTW, symptoms	360 days sickness absence, 10 months symptoms
Bultmann et al. (2009)	Denmark	119 Workers on sick leave for 4–12 weeks due to musculoskeletal disorders	Coordinated and tailored work rehabilitation, work disability screening by interdisciplinary team followed by the collaborative development of a RTW plan	Conventional case managements provided by the municipality	Cumulative sickness absence hours, pain, functional disability	12 months
Feuerstein et al. (2003), Shaw et al. (2001)	United States	123 Work-related upper extremity disorder claimants and sick listed for more than 90 days	Quality medical case management, case management plan, work site ergonomic assessment	Usual case management limited to monitoring of the claims process and surveillance of medical treatment	Time until first RTW, functional status, general health status, symptoms	12 months sickness absence, 16-month self-reported outcomes

Lambeek et al. (2007, 2009, 2010)	The Netherlands	134 Adults aged 18–65 sick listed for at least 12 weeks owing to low back pain	Integrated care, workplace intervention based on participatory ergonomics, and a graded activity program based on cognitive behavioral principles	Usual treatment from medical specialist, occupational physician, general practitioner, and/or allied health professionals	Time until lasting RTW, cumulative duration of absence, functional status, pain	12 months
Loisel et al. (1994, 1997, 2002)	Canada	104 Workers with thoracic or lumbar back pain incurred at work, sick listed between 4 weeks and 3 months	Participatory ergonomics evaluation including work site assessment	Treatment from attending physician	Time until first RTW, functional status, pain	12 months
van Oostrom et al. (2008, 2009b, 2010)	The Netherlands	145 Employees with distress, sick listed for 2–8 weeks	Participatory workplace intervention, with the sick-listed employee and supervisor, aimed at reducing obstacles for RTW	Dutch occupational guideline on mental health problems	Time until lasting RTW, cumulative duration of absence, symptoms	12 months
Verbeek et al. (2002), van der Weide et al. (1999)	The Netherlands	120 Workers on sick leave with low back pain for at least 10 days	Occupational physician guideline for low back pain consisting of interventions aimed at removing barriers for return to normal work and advice about modifying the work demands	Medical treatment by general practitioner	Time until first RTW, recurrences, functional status, general health perception, pain	12 months

Table 21.5 Risk of bias scores in the nine studies

	Adequate sequence generation	Allocation concealment	Blinding	Free of selective reporting	Intention-to-treat analysis performed	Co-interventions avoided or similar	Compliance acceptable	Timing of outcome assessments comparable in all groups	Groups similar at baseline regarding important prognostic factors?	Dropout rate described and acceptable?
Anema et al. (2007)	+	+	+	+	+	–	?	+	+	+
Arnetz et al. (2003)	+	–	+	+	+	?	?	+	+	?
Blonk et al. (2006)	+	–	+	+	–	–	?	+	–	?
Bultmann et al. (2009)	+	–	+	+	+	?	?	+	+	+
Feuerstein et al. (2003)	+	?	+	–	–	+	?	+	+	+
Lambeek et al. (2010)	+	+	+	+	+	?	?	+	+	+
Loisel et al. (1997)	?	+	+	+	–	+	?	+	+	+
van Oostrom et al. (2010)	+	+	+	+	+	?	+	+	–	+
Verbeek et al. (2002)	+	+	+	+	+	–	?	+	+	+

+ indicates that the study fits the specific quality criterion, – indicates that the study does not fit the specific quality criterion, ? indicates that it is unclear whether the study fits the specific quality criterion

Table 21.6 Content of the workplace interventions in the nine studies

	Characteristics of the workplace interventions							
	Changes in workplace design or equipment	Changes in work design and organization including working relationships	Changes in working conditions	Changes to the work environment	Case management with worker and employer	Number of meetings	Face-to-face contact	Meeting at the workplace
Anema et al. (2007)	+	+	–	+	+	3	+	+
Arnetz et al. (2003)	+	+	–	–	+	1	+	+
Blonk et al. (2006)	+	+	+	–	–	5–6	+	+
Bultmann et al. (2009)	+	+	–	+	+	2	+	?
Feuerstein et al. (2003)	+		–	+	+	4–5	+	+
Lambeek et al. (2010)	+	+	–	+	+	3	+	+
Loisel et al. (1997)	+	+	+	+	+	?	+	+
van Oostrom et al. (2010)	+	+	–	+	+	3	+	+
Verbeek et al. (2002)	+	+	–	–	–	3	+	–

+ indicates that the study fits the specific intervention characteristic, ? indicates that it is unclear whether the study fits the specific intervention characteristic, – indicates no data

Table 21.7 Stakeholders involved in the workplace interventions in the nine studies

	Stakeholders involved in the workplace interventions						
	Worker	Employer/ supervisor	Occupational physician	Occupational nurse	Ergonomist	Representative of union	Representative of insurer
Anema et al. (2007)	+	+	–	+	+	–	–
Arnetz et al. (2003)	+	+	–	–	+	–	+
Blonk et al. (2006)	+	Self-employed	–	–	–	–	+
Bultmann et al. (2009)	+	+	+	+	–	–	–
Feuerstein et al. (2003)	+	+	–	+	–	–	–
Lambeek et al. (2010)	+	+	+	+	–	–	–
Loisel et al. (1997)	+	+	+	–	+	+	–
van Oostrom et al. (2010)	+	+	–	+	–	–	–
Verbeek et al. (2002)	+	+	+	–	–	–	–

+ indicates that the specific stakeholder participated in the workplace intervention, – indicates nonparticipation

in the interventions, except for one study on adjustment disorders where no supervisor was involved (Blonk et al. 2006). Insurer representatives were involved in two studies (Arnetz et al. 2003; Blonk et al. 2006) and union representatives in one study (Loisel et al. 1997).

21.5.4 Outcomes of the Workplace Intervention Studies

The outcomes varied in nine effectiveness studies of workplace interventions. Roughly there are few categories of outcomes that were evaluated: duration of sickness absence or time until RTW, total days of sickness absence, functional status, symptoms, pain, and general health. Not all sickness absence periods are alike in terms of their consequences and a differentiation between short-term and long-term sickness absence is needed (Uegaki et al. 2007). Use of dichotomous outcomes such as work status results in a loss of information because there is no information on the exact duration of work disability and the episodic nature of work disability is neglected. This is especially important when an intervention is focused on RTW. Therefore, for the purpose of this overview, dichotomous sickness absence outcome measures were not included. For the outcome time until RTW, the durability of a RTW may differ. A RTW of 1 day, which means that a worker returned to work and after 1 day there is a new episode of sick leave, can be distinguished from a sustainable RTW. The definition of a sustainable RTW is usually related to national social security legislation systems. For example, in the Netherlands this means a full RTW for a minimum of 4 weeks without recurrences of sick leave. The sickness absence and RTW outcomes will be discussed in the next paragraphs followed by a short summary of the other outcomes.

21.5.4.1 Effects of Workplace Interventions on Time Until Sustainable RTW

Time until a full and sustainable RTW has been evaluated in three Dutch studies (Lambeek et al. 2010; van Oostrom et al. 2010; Anema et al. 2007). Two studies on low back pain found a reduction of the time until first RTW in favor of the workplace intervention, whereas a study on workers with stress-related health problems found no reduction of the time until first RTW. Anema et al. studied the effectiveness of a workplace intervention for workers who are sick listed for a maximum of 6 weeks with low back pain and found that the median time from the first day of sick leave until RTW was 77 days in the workplace intervention group and 104 days in the usual care group. Time until sustainable RTW significantly favored the workers who participated in the workplace intervention with a hazard ratio of 1.7 (95% CI 1.2–2.4) (Anema et al. 2007). The interpretation of a hazard ratio is not as straightforward as other statistical ratios (e.g., relative risks). A hazard ratio of 1.7 in favor of the workplace intervention suggests that the chances that a worker will return to his work more frequently and quicker than a worker in the usual care condition and, more specific, a worker who has not yet achieved a sustainable RTW by a certain time are 1.7 times more likely to RTW at the next point in time compared with a worker in the usual care condition. Lambeek et al. reported for workers with chronic low back pain a median duration of sick leave (after randomization) of 88 days in the integrated care group (including a workplace intervention) and 208 days in the usual care group (Lambeek et al. 2010). The hazard ratio was 1.9 (95% CI 1.2–2.8).

For sick-listed workers with distress, no favorable results were found in the main analysis, and the median duration of sick leave after randomization was 96 days in the workplace intervention group and 104 days in the usual care group. A hazard ratio of 1.0 (95% CI 0.7–1.4) indicated no effect of the workplace intervention on sustainable RTW (van Oostrom et al. 2010). However, an additional subgroup analysis showed that the workplace intervention significantly reduced the time until sustainable RTW for workers who at baseline intended to RTW despite symptoms. These workers can be classified as the most motivated to RTW since their thoughts and cognitions already assist working despite their symptoms. For these highly motivated workers, a hazard

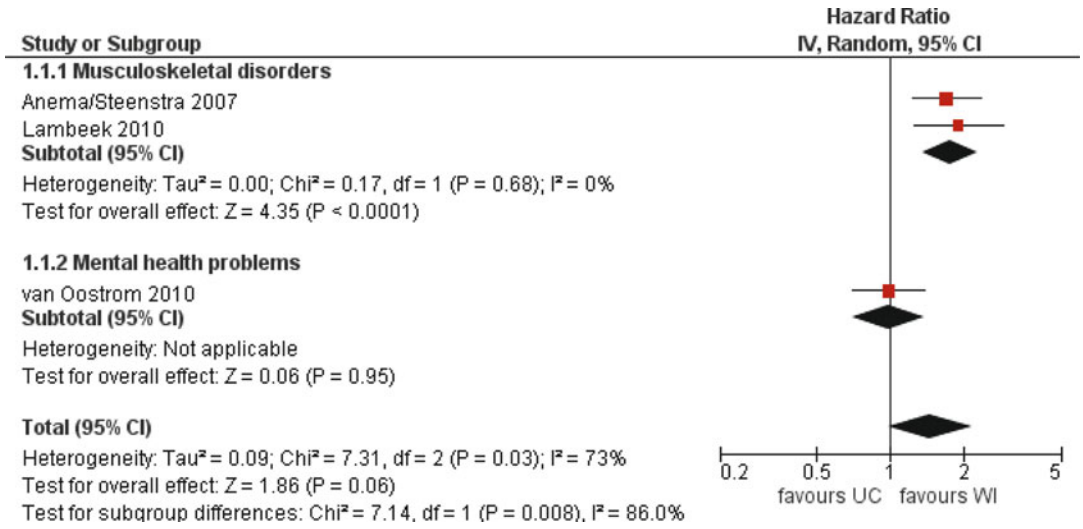

Fig. 21.2 Forest plot for the outcome time until sustainable RTW

ratio of 2.1 (95% CI 1.2–3.5) was found. Workers who beforehand intended to RTW despite symptoms showed a sustainable RTW after 55 days in the workplace intervention group and after 120 days in the usual care group. No such effect of the intervention was found for workers without intentions to RTW despite symptoms at baseline (hazard ratio 0.8, 95% CI 0.5–1.3). Since these last results were based on a subgroup analysis, they should be repeated in another study to confirm these findings.

Figure 21.2 presents a forest plot of three studies pooled together on the outcome time until full and sustainable RTW.[1] By pooling studies on a particular outcome, a forest plot presents the overall effect of workplace interventions for that outcome. The forest plot of time until sustainable RTW shows that workplace interventions were no more effective than usual care, with a pooled hazard ratio of 1.5 (95% CI 1.0–2.2). A subgroup analysis on the studies on musculoskeletal disorders showed results that favor the workplace intervention with a pooled hazard ratio of 1.8 (95% CI 1.4–2.3).

21.5.4.2 Effects of Workplace Interventions on Time Until First RTW

We identified five studies reporting on the outcome time until first RTW. Three studies found a reduction of the time until first RTW in favor of the workplace intervention (Anema et al. 2007; Loisel et al. 1997; Blonk et al. 2006), and the other two studies did not show a significant difference (Verbeek et al. 2002; Feuerstein et al. 2003).

Workers with low back pain achieved a first RTW in 70 days after the workplace intervention and in 99 days after usual care (Anema et al. 2007). In line with the results for the outcome sustainable RTW, a hazard ratio of 1.7 (95% CI 1.2–2.3) was found. Another study on workers with low back pain also showed that workers who participated in a workplace intervention returned 64 days earlier to their work than workers who received usual care, with a hazard ratio of 1.91

[1] A forest plot displays effect estimates and confidence intervals for both individual studies and meta-analyses. Each study is represented by a block at the point estimate of intervention effect with a horizontal line extending either side of the block. The area of the block indicates the weight assigned to that study in the meta-analysis, while the horizontal line depicts the 95% confidence interval. The confidence interval depicts the range of intervention effects compatible with the study's result and indicates whether each was individually statistically significant. Studies with larger weight (larger size of block and usually those with narrower confidence intervals) dominate the calculation of the pooled result.

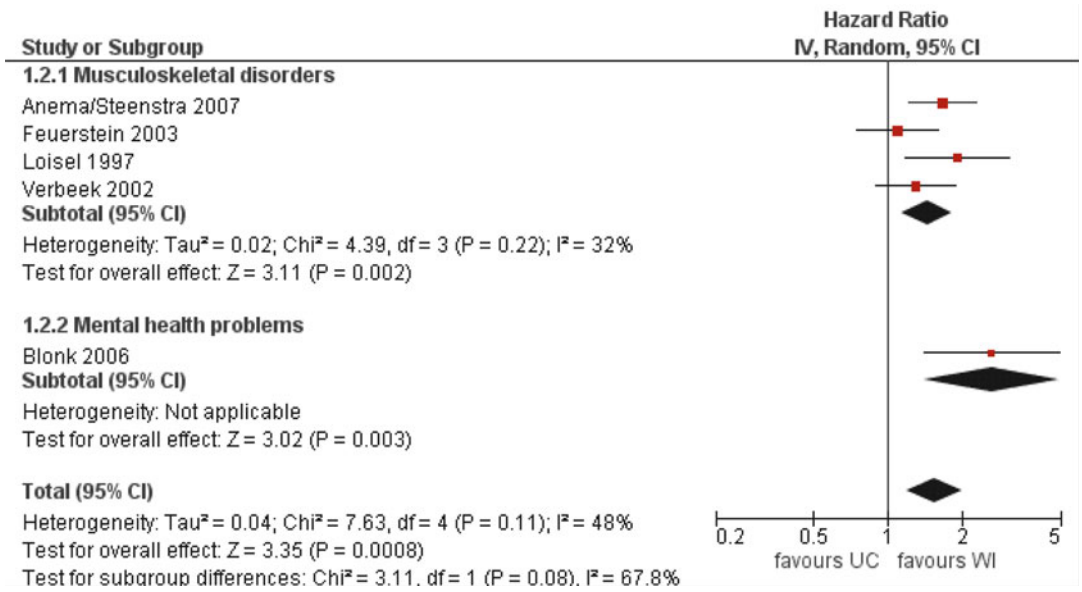

Fig. 21.3 Forest plot for the outcome time until first RTW. Copyright Cochrane Collaboration, reproduced with permission. Van Oostrom, S.H., Driessen, M.T., de Vet, H.C., Franche, R.L., Schonstein, E., Loisel, P., et al. (2009). Workplace interventions for preventing work disability. *Cochrane Database of Systematic Reviews,* (2), CD006955

(95% CI 1.2–3.1) (Loisel et al. 1997). Workers with adjustment disorders who took part in a workplace intervention returned to their work after 122 days, while it took 320 days to RTW for those without this intervention (hazard ratio 2.6 [95% CI 1.4–5.0]) (Blonk et al. 2006). The two studies showing no significant difference on the time until first RTW concerned workers with low back pain and work-related upper extremity disorders. The workers with low back pain returned to their work in 51 days after a workplace intervention and in 62 days without this intervention (hazard ratio 1.3 [95% CI 0.9–1.9]) (Verbeek et al. 2002). It took 21 weeks to RTW after the workplace intervention and 23.1 weeks with usual care for workers with work-related upper extremity disorders (hazard ratio 1.1 [95% CI 0.8–1.6]) (Feuerstein et al. 2003). There was a highly noticeable difference in median duration of time until first RTW between the workplace intervention group and the usual care group ranged from 14 to 198 days in these studies.

The forest plot of time until first RTW shows that workplace interventions were more effective than usual care for time until first RTW, with a pooled hazard ratio of 1.6 (95% CI 1.2–2.0) (Fig. 21.3) (van Oostrom et al. 2009a). Although two individual studies found no significant effect of workplace interventions, the forest plot based on all five studies found a significant hazard ratio in favor of the workplace intervention. The pooled hazard ratio for musculoskeletal disorders was 1.6 (95% CI 1.2–1.8).

21.5.4.3 Effects of Workplace Interventions on Cumulative Sickness Absence Days

Six studies reported cumulative duration of sickness absence, which is defined as the total duration of sick leave for the entire 12-month follow-up of the studies (Bultmann et al. 2009; Lambeek et al. 2010; van Oostrom et al. 2010; Anema et al. 2007; Verbeek et al. 2002; Arnetz et al. 2003). Four out of six studies showed a significant difference in total days of sickness absence during the follow-up. For workers with chronic low back pain, the median number of days of sick leave (including recurrences) during the 12 months of follow-up in the integrated care group was 82 days compared with 175 days in the usual care group

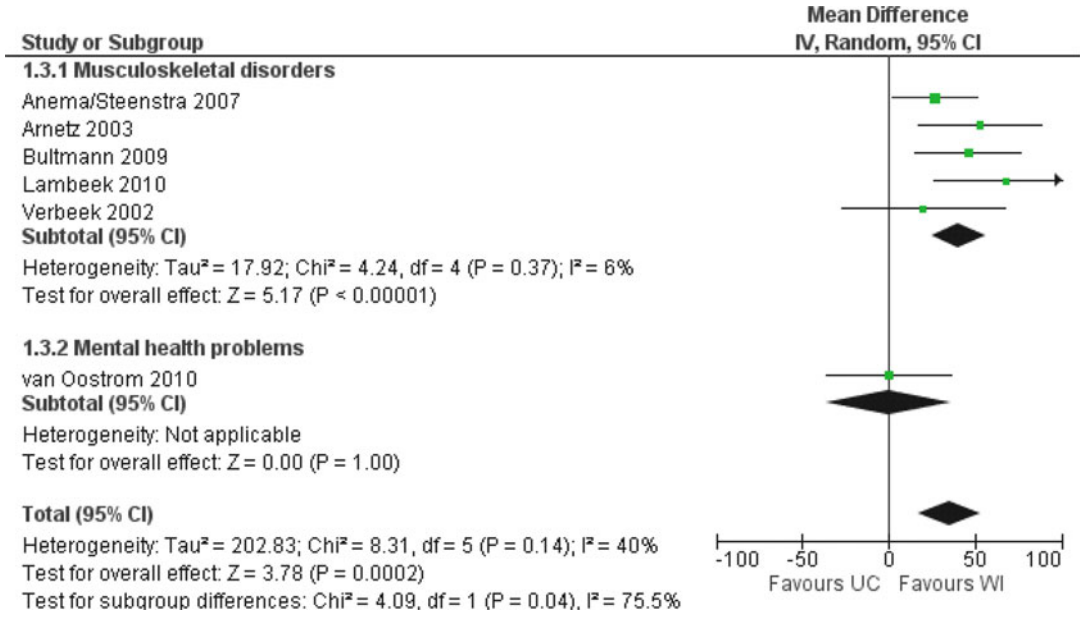

Fig. 21.4 Forest plot for the outcome cumulative sickness absence days

(Lambeek et al. 2010). A difference of a total of 27 days of absence in favor of the workplace intervention is shown for workers with low back pain (Anema et al. 2007). Arnetz and coauthors conducted a study among sick-listed workers with musculoskeletal disorders that showed a significant difference of 53 days in total, again, in favor of the workplace intervention (Arnetz et al. 2003). Another study among workers with musculoskeletal disorders found a lower number of sickness absence hours after a workplace intervention with an average 476 h in the group that received a workplace intervention and 892 h in the control condition (Bultmann et al. 2009). These results are confirmed when evaluated on the short term (0–6 months) and in the long term (6–12 months). However, positive effects of workplace interventions on total days of sickness absence were not supported in one study among workers with low back pain and in one study among workers with distress. Verbeek and coauthors found no significant difference on the total duration of sickness absence in a 1-year follow-up, being 114 days in total for those who took part in a workplace intervention and 134 for those in usual care (Verbeek et al. 2002). The total number of days of sick leave for workers with distress was 141 days in both groups (van Oostrom et al. 2010).

The forest plot of cumulative sickness absence days shows that workplace interventions were more effective than usual care, with a pooled estimate of 35 days (95% CI 17–53 days) (Fig. 21.4) less sickness absence with the workplace interventions. The pooled estimate for musculoskeletal disorders was 41 days (95% CI 25–56 days) less sickness absence with the workplace interventions.

21.5.4.4 Summary of the Evidence on RTW Outcomes

The evidence on the outcomes, time until first and sustainable RTW, and total days of sickness absence showed positive findings regarding the effectiveness of workplace interventions. The studies from the updated search have confirmed and further strengthened the evidence for effectiveness of workplace interventions for workers with musculoskeletal disorders (van Oostrom et al. 2009a); however, the evidence regarding the effectiveness of workplace interventions for workers with mental health problems is still scarce and

inconsistent. Only two studies addressed workers sick listed due to mental health problems, with one of them showing unclear conclusions. No studies for other health conditions were identified. This means that the positive findings on the effectiveness of workplace interventions to facilitate RTW of workers with musculoskeletal disorders cannot be generalized for now to workers with other health conditions.

21.5.4.5 Effects of Workplace Interventions on Functional Status

All five studies on low back pain and the study on work-related upper extremity disorders evaluated perceived functional status by questionnaire (Bultmann et al. 2009; Lambeek et al. 2010; Anema et al. 2007; Loisel et al. 1997; Verbeek et al. 2002; Feuerstein et al. 2003). Only two studies found a significant difference in functional status (Lambeek et al. 2010; Feuerstein et al. 2003). The other four studies showed that functioning increased within both groups, but there was no difference between the groups at follow-up. Functional limitations due to upper extremity complaints, which were assessed by questioning participants to rate their difficulties performing 12 common daily activities, were also significantly lower among those workers who took part in a workplace intervention than for those receiving usual care.

21.5.4.6 Effects of Workplace Interventions on Symptoms

Regarding pain, five studies on low back pain reported baseline and follow-up values (Bultmann et al. 2009; Lambeek et al. 2010; Anema et al. 2007; Loisel et al. 1997; Verbeek et al. 2002; Feuerstein et al. 2003). All of these studies showed that pain decreased significantly within both groups, but no differences between the workplace intervention and usual care were found. The study on adjustment disorders reported that scores for depression, anxiety, and stress had decreased after 4 and 10 months of follow-up in both groups (Blonk et al. 2006). Oostrom and coauthors also found no differences between the improvements on stress-related symptoms in the workplace intervention group and the usual care group (van Oostrom et al. 2010). A study on upper extremity disorders showed no difference on upper extremity pain and symptoms (Feuerstein et al. 2003).

21.5.4.7 Effects of Workplace Interventions on General Health

The study on upper extremity disorders and one study on low back pain evaluated the effect of workplace interventions on general health (Verbeek et al. 2002; Feuerstein et al. 2003). For workers with upper extremity disorders, a significant difference between the two groups at 16-month follow-up was found, in favor of the workplace intervention group (Feuerstein et al. 2003).

21.5.4.8 Summary of Evidence on Health-Related Outcomes

In general, workplace interventions were not effective to improve health outcomes among workers with musculoskeletal disorders. The lack of effect on health outcomes may be explained by the focus of a workplace intervention on reducing barriers to RTW and not on symptomatic recovery. RTW seems to be influenced by a worker's ability to function and to adapt to pain rather than through complete resolution of pain and symptoms (Baldwin et al. 2007; Bultmann et al. 2007).

21.6 Working Mechanism of Workplace Interventions

To this date the working mechanism of workplace interventions is largely unknown. By its definition, a workplace intervention carries two important elements: the involvement of relevant stakeholders during the RTW process and the implementation of changes at the workplace and in the work organization. The involvement of relevant stakeholders is crucial for the successful implementation of interventions at the workplace. Applying a workplace intervention without involvement of the sick-listed worker is likely to fail: the real problems of a worker may be easily overlooked and solutions may be suboptimal if there is no support from the worker himself. The supervisor is

also a key player when implementing a workplace intervention. Through personal contact with the worker, knowledge of his or her work activities, and the workers' role in the department, a supervisor can identify additional problems in the work situation from his or her view. He/she can then assess the feasibility of work modifications. Workers and supervisors have often conflicting interests and concerns in the RTW process (Frank et al. 1998). By reaching consensus between them about the work modifications, the support for the intervention implementation is higher. By the commitment of both on a feasible action plan for RTW with clear agreements on responsibility of each, there is a higher chance that the actions will take place in real life.

When workplace interventions are aiming to facilitate RTW for musculoskeletal disorders, it is uncertain whether the provision of work modifications or the communication process leading to these modifications—alone or combined—is effective. In many studies, the number of work modifications or adaptations that is actually implemented is quite low (Loisel et al. 2001; Anema et al. 2003; van Oostrom et al. 2009b; Lambeek et al. 2010); therefore, one can assume that the provision of work adaptations alone cannot be the only effective component. From the analysis of these studies, it was difficult to separate the different components of workplace interventions. We hypothesize that the combination of work modifications or adaptations and structured communication are the crucial components for these interventions effects.

Moreover, it is argued that RTW is accompanied by a behavior change in sick-listed workers. Only few studies explored determinants of the RTW behavior, like attitude to RTW, social support, and self-efficacy to RTW (van Oostrom et al. 2007; Brouwer et al. 2009; Vermeulen et al. 2009). Brouwer et al. found evidence for the relevance of behavioral determinants in predicting the duration of sick leave (Brouwer et al. 2009). This prospective, longitudinal cohort study revealed an association between the work attitude, social support and self-efficacy, and a shorter duration until RTW for employees on long-term sickness absence, which supports the relevance of behavioral determinants for RTW. For more detailed information we refer to Chap. 10. However, it is not clear whether workplace interventions might impact upon the determinants of RTW behavior. Future studies identifying the most effective working component(s) of workplace interventions are needed.

21.7 Workplace Interventions: Implications for Future Research?

Most studies reported on the effectiveness of workplace interventions for musculoskeletal disorders, and only two studies focused on mental health problems. One reason for the lack of effectiveness studies on health problems other than musculoskeletal disorders may be related to differences in workers' compensation systems. For instance, in the USA, disabled workers can only apply for workers' compensation if they can prove that their health problems are work-related, and mental health problems are not considered for worker's compensation benefits. An important difference between musculoskeletal disorders and mental health problems was the duration of sickness absence until a RTW. Time until RTW in the studies concerning workers with mental health problems was generally longer than in workers with back pain. It seems more difficult to discuss RTW in case of mental health problems, both for supervisors and for health professionals (van Oostrom et al. 2007). Despite a shift towards a more proactive approach for RTW of individuals with mental health problems in the last decade in some countries, it is still more acceptable to RTW after an episode of low back pain than after an episode of mental health problems. A focus group study indicated that culture is a barrier for RTW. In many healthcare environments, the traditional view that employees should take the necessary time to recover completely before they RTW still exists (Oomens et al. 2009). Sometimes workers and supervisors are afraid of a possible increase in stress when a worker with mental health problems RTW in a too early stage. However, studies showed that earlier RTW is not associated with

an increase or decrease in stress-related complaints (Blonk et al. 2006; van der Klink et al. 2003; Bakker et al. 2007; Schene et al. 2006) but is part of the recovery process. A (partial) RTW could assist a worker to regain control of his/her life and to recover more quickly. To overcome possible barriers for a RTW, a participatory workplace intervention seemed a well-suited approach. However, the lack of motivation to RTW and cognitions about being able to work with existent mental health problems seemed important barriers for the success of such an intervention. This is supported by the finding that workers who before a workplace intervention intended to RTW despite stress-related symptoms achieved a sustainable RTW much sooner and frequently than those without this intention (van Oostrom 2010). Elements of cognitive interventions may be additionally needed for these workers to prepare them to RTW. More research is needed into effective strategies to facilitate the relatively long-lasting RTW process of workers with mental health and other health problems.

The studies described in this chapter concern workers with a part-time or full-time permanent work arrangement. The percentage of fixed-term employees without an employment at the labor market increased in the past decade in Europe. This issue has been considered remarkably important in many developing countries where unemployment rates are very high and RTW means also seeking for a new job. Workers without an employment contract are, for instance, temporary agency workers (employed only on a short-term contractual basis), those working in the informal sector (no work registry), and unemployed workers. These workers are at high risk for long-term disability pension (or even long-term disability without a pension) since there is no workplace or employer to return to when sick listed. Vermeulen and colleagues developed a participatory RTW intervention for temporary agency workers and unemployed workers sick listed due to musculoskeletal disorders (Vermeulen et al. 2009), consisting of a stepwise procedure rather similar to the workplace interventions described in this chapter. The intervention aimed at making a consensus-based return-to-work plan with the possibility of a temporary (therapeutic) workplace. In a RCT, it was shown that the median duration until sustainable first RTW was 161 days in the participatory RTW intervention group, compared to 299 days in the usual care group. The participatory return-to-work program resulted in a significant advantage in RTW rate but only after 90 days of sickness absence (hazard ratio 2.2 [95% CI 1.3–3.9]) (Vermeulen et al. 2011). This study does not fulfill the strict inclusion criteria of the systematic review (update), since a substantial part of the participants was unemployed at the moment of randomization for the study.

21.8 Conclusions and Recommendations

In conclusion, workplace interventions are effective to reduce sickness absence among workers with musculoskeletal disorders when compared to usual care. This conclusion is in line with the Cochrane review that was conducted in 2009, but the updated search confirmed and further strengthened the evidence for workers with musculoskeletal disorders. The literature review presented further showed that evidence for improvements in health outcomes after workplace interventions compared to usual care was not found. This was an expected finding since the focus of a workplace intervention is on reducing barriers to RTW and not on symptomatic recovery. Unfortunately, no conclusions could be drawn regarding interventions for people with mental health problems and other health conditions, owing to a lack of studies.

Workplace interventions are a relatively new approach to reduce or prevent work disability. They seem to be designed to adopt a new paradigm shift, that is, shifting from disease prevention and treatment, with a main focus on symptom recovery, to disability prevention and management, with a main focus on RTW (see also Chaps. 5, 6 and 13).

Although the findings regarding workplace interventions are promising, especially for musculoskeletal disorders, there is still a need for more research in the following areas: (1) identification of the successful feature of workplace interventions and (2) workplace interven-

tions for workers with mental health or other health problems and workers with or without employment contracts.

Healthcare providers, other stakeholders, and policy-makers are recommended to implement workplace interventions to facilitate a RTW for workers with musculoskeletal disorders. Since symptoms, functioning levels, and general health may not improve more than with usual care, all stakeholders in the RTW process (worker, supervisor, healthcare providers, unions, insurers) should agree on a common goal of the workplace intervention, that is, the facilitation of RTW.

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Sickness and Disability Policy Interventions

22

Johannes R. Anema, Christopher Prinz, and Rienk Prins

This chapter provides insight into changes and effects of sickness and disability benefit policies using data comparison between various countries and the successful example of an active integration policy approach implemented in the Netherlands.

22.1 A Categorization and Cross-Country Comparison of Work Disability Policies

22.1.1 Introduction

Disability policy has become an urgent matter for governments in recent years (OECD 2010). Until two decades ago, policies of most countries were biased towards generous and easily accessible disability benefits, with less emphasis on helping people with disability return to or stay at work. The economy suffered significantly from spending on disability benefits. The onset of the global economic crisis has worsened the situation. Governments are now more focused on preventing further inflow to disability benefits and increasing labor force participation of people with disability. As the best way to fight benefit dependence is to promote reintegration into work.

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22.1.2 Models of Work Disability Policies

OECD (2010) distinguished three disability policy models, building on Esping-Andersen's (1990) politically based typology of three qualitatively distinct welfare state models: the social–democratic model, the liberal model, and the corporatist model. According to the OECD, the social–democratic disability policy model is characterized by a relatively generous and accessible compensation policy package and a broad and equally accessible integration policy package with a particularly strong focus on vocational rehabilitation. This policy model is potentially expensive and will not necessarily result in the highest possible labor market participation. The liberal disability policy is characterized by a much less generous compensation policy package with lower benefit levels and a much

P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_22, © Springer Science+Business Media New York 2013

higher threshold to get onto benefits. This policy model is less expensive overall, but the stronger inbuilt employment incentives resulting from less generous benefits are only partly harvested with an intermediary integration policy focus. The corporatist disability policy model can be seen as intermediate in comparison to the other two models. Benefits are relatively accessible and generous, and employment programs are quite developed but not at the level of the social–democratic model. Employment and beneficiary outcomes of such a policy model can be rather mixed. In the following, the OECD typology is used to measure and compare sickness and disability policy change across OECD countries.

22.1.3 Two Main Disability Policy Dimensions

Two qualitative policy indicators were developed in OECD (2003) in order to make it possible to compare policies across countries and over time, each of the two reflecting one of the two major dimensions of disability policy. The first indicator covers the benefit system or compensation measures. The second indicator covers employment and integration measures. Both indicators consist of ten (unweighted) subdimensions and have an overall score ranging from 0 to 50 points. A higher score on the compensation indicator, everything else being equal, means greater system generosity. On the integration indicator, a higher score indicates a more active approach. The combination of these two indicators, or policy dimensions, characterizes a country's disability policy approach. The indicators first shown in OECD (2003) were updated for a longer period and extended to a larger number of countries in OECD (2010), allowing measurement of the extent of change in the period 1990–2007.

22.1.4 Three Main Trends in Sickness and Disability Policies in OECD Countries

In the past two decades, there have been policy reforms in most OECD countries aimed at reaching a new balance between compensation and labor market integration, as to improve employment chances for people with disability and reduce public expenditures. These reforms can be classified in three main broad trends: an expansion of employment integration measures, an improvement of the institutional setup, and a tightening of benefit schemes (OECD 2010).

22.1.4.1 Expanding Integration Policy

In the past few decades, the disability policies of virtually all OECD countries have shifted their focus from income replacement towards a more employment-oriented approach (OECD 2010). Measures are aimed at helping people with disability to stay in, return to, or find work. These policies can take different forms and often include a combination of measures aimed at supporting workers and employers, coupled with stronger responsibilities for companies. One measure that most countries have introduced is antidiscrimination legislation to ensure equal treatment of people with disability (and other disadvantage) in employment (job promotion, hiring, and dismissal procedures) and other areas (education, mobility, etc.). Modified employment quotas (in countries that use such a quota system[1]) are another tool used to stimulate employers to retain or hire people with a disability, for instance, by reducing the number of companies excluded from the obligation to employ a certain share of workers with disability. Stronger employer incentives have been introduced in different forms to give more binding obligations for individual employers. Examples are making employers responsible for sickness benefit payment for providing (reasonable) workplace accommodation. Also, supported employment programs are introduced in many countries. These programs help to integrate people with disability into the regular labor market by first providing a trial workplace and then offering training and help on the job. Another measure is to improve and modernize sheltered employment. Basic sheltered employment was perceived as perpetuating the segregation of peo-

[1] System that obliges employers to hire a minimum proportion of employees with a disability.

ple with disability and hindering their integration into the regular labor market. Now several countries have modernized their sheltered employment regulations, for instance, by strengthening the focus on progression into the open labor market or by developing new forms of sheltered employment closer to the regular labor market. Improved wage subsidies are used to create employment for people with disability that would not have been possible without the subsidy.

22.1.4.2 Improving the Institutional Setup

In addition to expanding integration policy, many countries have improved their structure of systems and service provision (OECD 2010). Several countries are providing better coordinated services by moving towards a one-stop-shop benefit and service provision for people with disability and other clients with benefit dependency. In particular, in many countries, steps are taken to increase the cooperation between the public employment service and the benefit authority or the social insurance institution, for example, by better sharing of information or cross-funding of interventions. Another measure to improve the institutional setup is by giving better incentives for benefit authorities, as done in several countries. For instance, by raising reimbursement rates for active intervention, municipalities are motivated to avoid benefit payments. A more recent development in some countries is a shift from bulk funding of employment services to outcome-based funding of services, based on actual employment outcomes. Another development in a few countries is to give clients more freedom of choice in selecting a provider and the services they need.

22.1.4.3 Tightening Compensation Policy

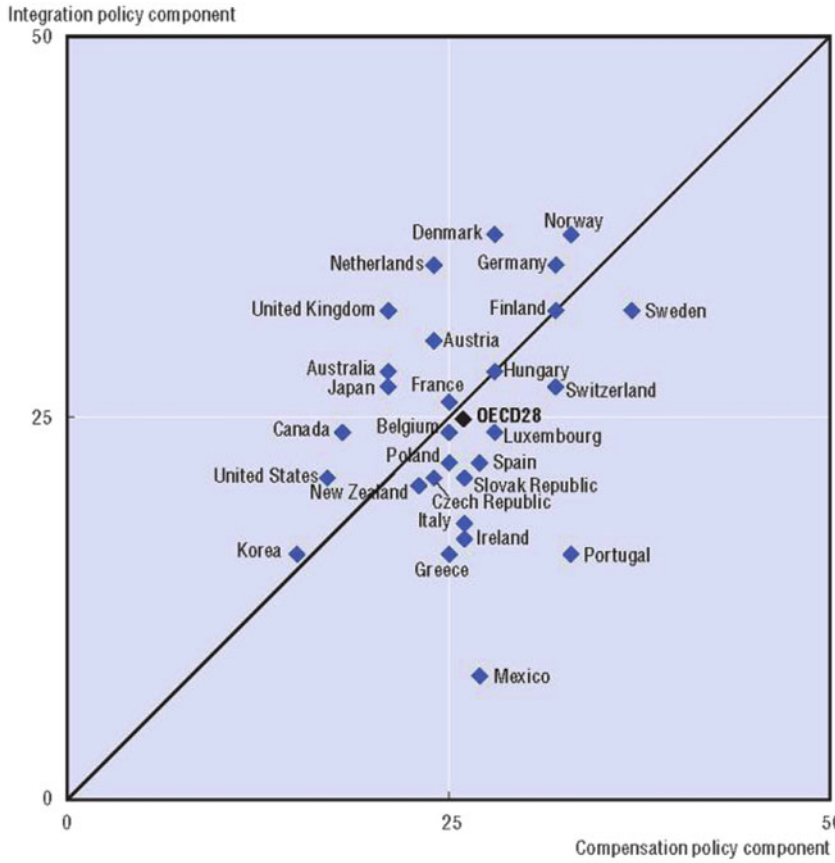
Several measures are applied to restrict the benefit systems (OECD 2010). Assessment criteria have become more stringent in some countries. A measure that is applied in several countries is to make medical criteria to determine disability benefit entitlement more consistent. Assessments by general practitioners have moved to a more uniform evaluation, in some cases through the provision of clearer sick-listing guidelines for the main diseases. Several countries are using more stringent vocational criteria to determine disability benefit eligibility. For instance, some countries changed the system from strict own-occupation assessment to a general labor market criterion. Reforms have also led to changes to benefit payments. Both the duration of payment and the level of disability or work incapacity required for benefit entitlement became more stringent in most countries. Some countries pursue promoting stronger work incentives, for instance, by introducing a tax credit and the possibility to combine disability benefit receipt with income from work. Several countries have applied stricter sickness absence monitoring to reduce long-term sickness absence.

22.1.5 Sickness and Disability Policy Reforms in OECD Countries: A Comparison

22.1.5.1 Measuring Policy Change in the Past 15 Years

There is large variation across countries in the two policy indicators mentioned above (see Fig. 22.1). On a 50-point scale, scores on the compensation indicator range from around 20 in most English-speaking countries, Korea, and Japan to over 30 points in most of the north European countries, Portugal, Germany, and Switzerland, with a higher score representing countries with more generous and accessible benefit systems. Countries differ slightly more on the integration indicator, from around 15 points in many south European countries, Ireland, and Korea to 35 points or more in Denmark, Germany, the Netherlands, and Norway.

There is a strong correlation between the two indicators; most countries show either a low or a high score on both indicators. Only a large difference between the two indicators indicates a clear policy orientation: the higher the integration score relative to the compensation score, the more pronounced is the integration orientation of a policy setup, and vice versa. Only a few countries have a dominant indicator, focusing their policy orientation on either compensation or integration.



Note: The higher the score, the more generous and accessible the benefit system (X axis) and the more developed the rehabilitation and employment stance of the policy (Y axis). The maximum score is 50 on both scales. The difference between the two indices is an indication of policy orientation, *e.g.* a compensation index that is significantly higher than a country's integration index indicates a strong compensation focus, and *vice versa*.

Fig. 22.1 Large variation in disability policy orientation across the OECD. Compensation (*x* axis) and integration (*y* axis) policy codes in 2007 for 28 OECD countries, country values on the two ordinal 50-point scales of the OECD disability policy typology indicator. *Source*: OECD (2010), *Sickness, disability and work: Breaking the barriers* (*A synthesis of findings across OECD countries*)), OECD Publishing, Paris

There has been a large shift on the two policy dimensions in many countries since 1990 (see Fig. 22.2). Changes in the integration policy score are all positive and sometimes very large, while changes in the compensation policy score are mostly negative, though less pronounced. This means that most countries shifted their policy orientation from compensation to integration and from a largely passive to a more active employment-oriented approach. However, this strong shift towards a more active disability approach does not yet seem to be reflected in the labor market outcomes of people with disability. A possible explanation is that policy implementation is lagging behind policy intentions and that policy has yet to translate into actual changes in everyday practice.

22.1.5.2 Policy Clusters and Policy Convergence

These changes in disability policies across the OECD have implied convergence both within and between groups of countries (OECD 2010). A cluster analysis over the 20 subcomponents of

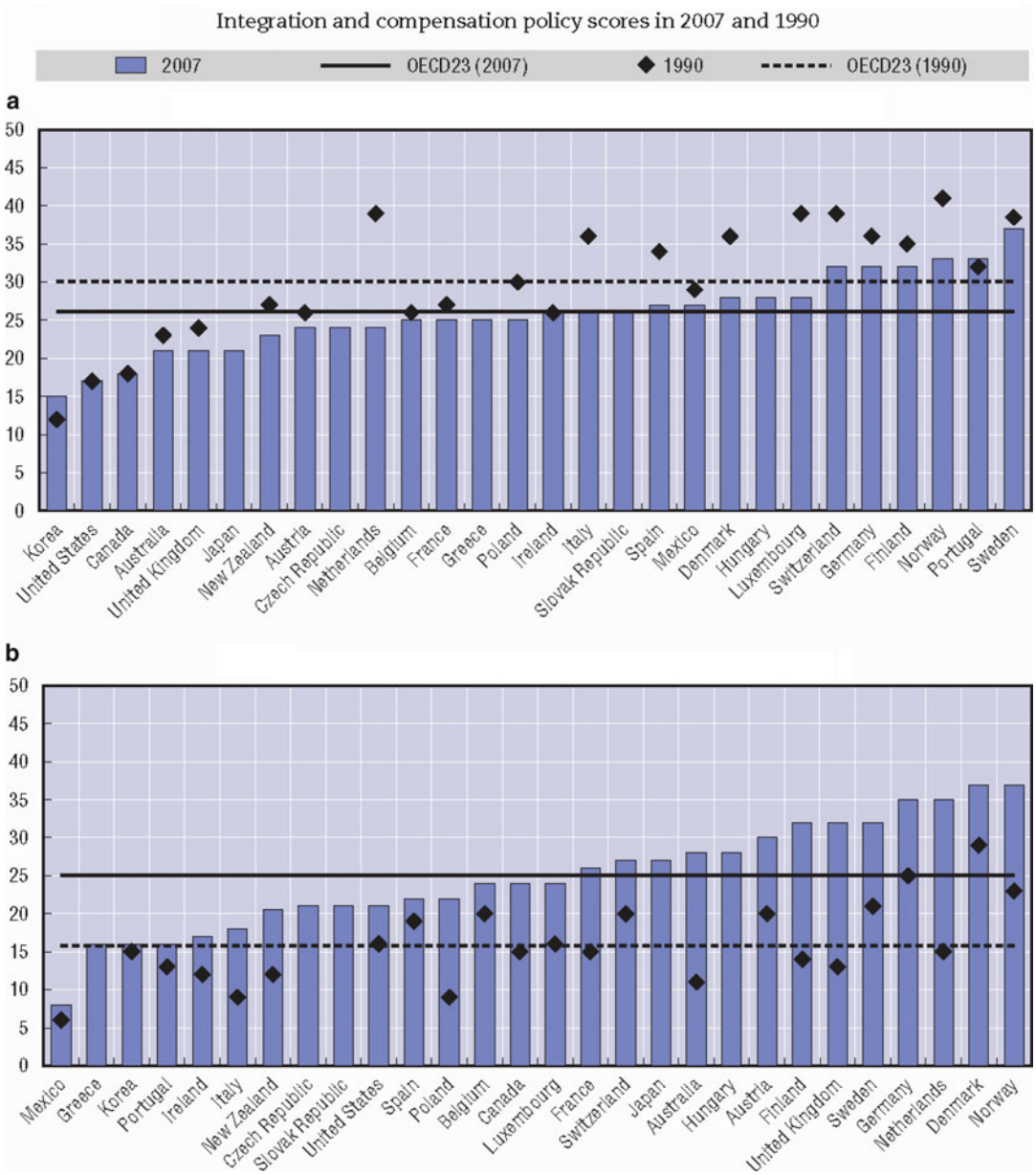


Fig. 22.2 Disability policy is changing fast in many OECD countries. (**a**) Compensation index ranking (from least generous to most generous in 2007). (**b**) Integration index ranking (from least active to most active in 2007). *Source*: OECD (2010), *Sickness, disability and work: Breaking the barriers* (*A synthesis of findings across OECD countries*), OECD Publishing, Paris

the compensation indicator and the integration indicator identifies the three types of policies mentioned in Sect. 22.1.2 (the social–democratic model, the liberal model, and the corporatist model) and additional subgroups or variants within each main group, as elaborated in Table 22.1. The social–democratic disability policy model has two subgroups. The first includes

Table 22.1 Three distinct disability policy models across the OECD. Results from a cluster analysis based on the OECD disability policy typology

"Social-democratic" model (mostly north European countries)		"Liberal" model (OECD Pacific and English-speaking countries)		"Corporatist" model (mostly continental European countries)		
Sub-group A	Sub-group B	Sub-group A	Sub-group B	Sub-group A	Sub-group B	Sub-group C
Denmark	Finland	Australia	Canada	Austria	France	Czech Republic
Netherlands	Germany	New Zealand	Japan	Belgium	Greece	Ireland
Switzerland	Norway	United Kingdom	Korea	Hungary	Luxembourg	Italy
	Sweden		United States		Poland	Portugal
						Slovak Republic
						Spain

Source: OECD (2010), *Sickness, disability and work: Breaking the barriers* (*A synthesis of findings across OECD countries*), OECD Publishing, Paris

Denmark, the Netherlands, and Switzerland. It is less generous than the second subgroup on both compensation and integration, but provides better work incentives. It also has the strongest sickness absence monitoring and/or sick-pay eligibility control focus of all models. The second subgroup is the most generous in the OECD and comprises Finland, Germany, Norway, and Sweden. On the other hand, it also has the strongest employer obligations of all models.

Also within the liberal disability policy model, two subgroups can be distinguished. The first, including Australia, New Zealand, and the United Kingdom, has far better organized and coordinated and thus better accessible services. The second subgroup, including Canada, Japan, Korea, and the United States, has the most stringent eligibility criteria for a full disability benefit and the shortest sickness benefit payment duration. The corporatist disability policy model has three subgroups. The first, covering Austria, Belgium, and Hungary, has the strongest employment orientation of this policy cluster, well-developed rehabilitation and employment programs, and low benefit levels. The second subgroup comprising France, Greece, Luxembourg, and Poland has the most generous sickness and disability benefits of these three subgroups and includes temporary disability benefits and more attention to sickness absence monitoring. The third subgroup includes the Czech Republic, Ireland, Italy, Portugal, the Slovak Republic, and Spain. It has comparatively underdeveloped employment and rehabilitation policies and therefore a stronger compensation orientation even though the sickness benefit level is lower than in the other subgroups of the corporatist cluster.

However, the disability policies of the clusters characterized by the three models have all converged in the same direction in the past 20 years. All models have moved upwards on the integration policy dimension. Since the upward move is also comparable in size, differences across policy models have essentially remained unchanged. Considerable convergence is found on the compensation policy dimension; countries with more generous benefit systems have seen more downward change, whereas countries with the least generous benefit systems have seen an upward shift. In conclusion, policy models have become more similar over the past 20 years, but they still remain distinct.

22.1.5.3 Effects on Disability Benefit Rolls

The impact of these policy changes on the number of people claiming disability benefit has been explored with a multivariate regression analysis (OECD 2010). Results show a positive effect of compensation measures on the number of disability beneficiaries. Integration policy change had only a very small effect on recipients' disability benefit rates.

The specific subcomponents of compensation and integration policy were explored in detail in OECD (2010). Benefit accessibility and generosity were positively associated with disability beneficiary rates, as was a more generous sickness policy. Moreover, the more stringent medical and vocational assessment appeared to be

correlated with an increasing beneficiary caseload. This may be due to the fact that such changes take a while to be implemented properly or due to the difference between legislation and actual implementation. Employment programs, vocational rehabilitation, and changes in work incentives were all correlated with a decreasing number of persons receiving a disability benefit. Antidiscrimination legislation, on the other hand, is associated with higher shares of disability benefit recipients. An explanation for this might be that such legislation, while protecting workers in existing employment, may hinder the hiring of workers with disability.

22.2 Understanding Cross-Country Differences in the Return to Work of Long-Term Sick-Listed Workers

22.2.1 Introduction

The OECD methodology and analysis improve our understanding of broad policy trends and their impact on outcomes on a macro-level, especially on the number of people receiving disability benefits, but cannot reveal the effect of individual policy measures and the way they are implemented on the labor market integration or reintegration of disabled workers. There are very few studies which try to compare the effect of policy measures on actual return to work (RTW) across countries. One such study, a multinational cohort study to evaluate the effect of integration and compensation measures in six different countries/jurisdictions, was initiated several years ago by the International Social Security Agency (ISSA) (Bloch and Prins 2001). Integration measures were defined in this study as healthcare interventions and workplace interventions. Chronic low back pain (LBP) was used as an example due to its high prevalence of disability benefits claimants in most countries. The study was conducted in Denmark, Germany, Israel, the Netherlands, Sweden, and the USA (states of New Jersey and California). Two-year follow-up data from 2,825 claimants sick-listed for 3 months due to chronic LBP were collected and analyzed. Because all national cohort studies had a common core design comprising several identical basic features, it was possible to collapse the datasets into a homogenous standardized dataset for multinational analysis.

22.2.2 Description of the Compensation Measures for RTW in Six Countries

In general, there were three different arrangements in those countries for claimants based on (compulsory) wage replacement, sickness benefits, and (temporary or permanent) disability benefits or pensions for long-term work disability. Main characteristics of the compensation systems of the involved countries between 1994 and 1997 were defined into compensation measures by the members of all national research teams before the onset of the study. The compensation measures were dichotomized as present or absent in a specific compensation system (see Table 22.2).

The start of payment of a benefit or wage replacement after filing the claim varied between 0 days in most countries and one waiting day in Israel and Sweden and 1 week in the USA.

Countries differed in the administrative procedure to legitimate a sickness benefit claim. In all countries except the Netherlands, a medical certificate was needed, mostly from a treating physician to filter inappropriate claims. In the countries, the moment of eligibility assessment for a work disability pension was very different, from starting very early after the claim onset up to after 1 year in the Netherlands. In order to evaluate the effect of an early or late entitlement to long-term disability benefits or rehabilitation, the countries were dichotomized in early entitlement or late entitlement (i.e., >3 months after the start of claim). Also the degree of work incapacity required to be eligible for disability benefits was very different among countries, ranging from 15% in the Netherlands to 100% in the USA. Most countries required a high threshold of 50% work incapacity or more to be eligible for a disability benefit. There were clear differences

Table 22.2 Compensation policy variables (1994–1997) defined by the international panel (derived and modified from Bloch and Prins 2001)

	DNK	GER	ISR	NLD	SWE	USA
Income loss[a]	+	+	+	−	+	+
Waiting days[b]	−	−	+	−	+	+
Medical certicates needed for a sickness benefit[c]	−	+	+	−	+	+
High minimum (≥50%) of work incapacity needed for a long term disability benefit[d]	+	+	−	−	−	+
Risk of dismissal[e]	+	−	+	−	+	+
No or late entitlement to a long term disability benefit[f]	−	−	+	+	−	+

DNK Denmark; *GER* Germany; *ISR* Israel; *NLD* The Netherlands; *SWE* Sweden; *USA* United States, + present, − absent
[a]Income loss when reporting sick (financial incentive)
[b]No compensation of initial days of sickness absence
[c]A medical certificate needed that should filter inappropriate claims
[d]High minimum degree (≥50%) of work incapacity needed to be eligible for full a partial disability benefits
[e]Risk of dismissal: no legal obstacles—i.e., no job protection—to dismiss long–term incapacitated employees
[f]No or late (>3 months after the start of claim) entitlement to long term disability benefits or rehabilitation
Source: Journal of Occupational Rehabilitation, Anema et al. (2009)

among countries regarding the risk of dismissal during sickness absence: the Netherlands and Germany had a long fixed period of protection against dismissal, whereas the other countries had no legal obstacles to dismiss long-term incapacitated employees.

22.2.3 Differences in Applied Healthcare Interventions for RTW in the Six Countries

There were large differences in the applied healthcare interventions to improve RTW in the six countries. It was also surprising that each country had specific popular treatments for chronic back pain. The USA had the highest frequency for surgery (35.1%), Israel and Denmark for pain relieving medication (86.9% and 78.9%, respectively), and Germany for passive treatment like medicinal baths (in 67%) and manipulation (41.7%). In Sweden, acupuncture (31%) was very popular. Active treatments were popular in the USA and the Netherlands (exercise therapy, 63.0%) and in Germany and Denmark (back schools, 28%). All interventions were categorized in surgery, active treatments (consisting of training/gymnastics and back schools) and passive treatments (consisting of pain relieving medication, massage, heat/cold and electric therapy, medicinal baths, manipulation, and acupuncture). The differences in frequencies of medical interventions between countries were all significant ($p \leq 0.001$). Summarizing, there was a wide variety of healthcare interventions applied in the countries. Some treatments were common in all countries, but there were also very specific frequently used interventions in each country that are not commonly used in the other countries (Table 22.3).

22.2.4 Differences in Applied Workplace Interventions for RTW in the Six Countries

In the six countries, the social security, employers, and labor market organizations had various sets of workplace interventions that could be applied. The legal and social security framework in a country determined the repertoire of workplace interventions. This resulted in large differences in the frequency of applied workplace interventions. Popular in most countries was adaptation in working hours, job redesign, and workplace adaptation. Changes in number and/or pattern of working hours such as different shifts, less or more hours ("partial work resumption"), and more variation in hours were defined as adaptation in working hours. Job redesign was defined as change of job tasks, including minor changes such as not having

Table 22.3 Medical and work interventions applied for % of claimants ($N = 2.825$) sick listed 3–4 months due to low back pain in six countries, during 2 years since the start of sick leave

N	DNK 563 (%)	GER 358 (%)	ISR 316 (%)	NLD 426 (%)	SWE 374 (%)	USA 460 (%)	TOTAL 2,825 (%)
Medical intervention							
Surgery	12.7	10.7	15.6	23.7	9.2	35.1	17.5
Pain relieving medication	78.9	58.5	86.9	67.0	62.6	72.1	70.4
Passive treatment	1.9	41.7	6.4	7.5	5.2	7.4	10.7
Exercise therapy	57.5	47.6	29.7	63.0	36.8	73.1	51.9
Back schools	28.5	28.8	3.7	12.4	27.8	14.0	20.6
Work intervention							
Adaptation workplace	11.0	2.7	10.1	23.9	9.0	15.1	11.9
Job redesign	27.6	6.1	43.7	35.4	10.0	27.5	23.7
Working hours adaptation	20.5	6.6	39.8	49.2	9.8	28.9	24.2
Job/vocational training	16.1	5.6	5.8	7.7	18.0	12.8	12.0
Therapeutic work resumption	1.6	1.0	0.9	59.7	19.8	4.3	14.6

DNK Denmark; *GER* Germany; *ISR* Israel; *NLD* The Netherlands; *SWE* Sweden; *USA* United States
Source: *Journal of Occupational Rehabilitation*, Anema et al. (2009)

to carry things. Finally, workplace adaptation included any technical aids, such as a different chair or desk/table, special tools, a lifting aid, and an adapted transport during work.

In the Netherlands, the frequency of "adaptation of the workplace" (23.9%), "working hours adaptation" (49.2%), and "therapeutic work resumption" (60.0%) was highest. The latter intervention comprising RTW with ongoing benefits or wage replacement was almost unique to the Netherlands. High frequencies for work interventions were also found in the Israeli (job redesign, 43.7%) and in the Swedish cohorts (job training, 18.0%). In Germany, the frequencies of workplace interventions were the lowest for all types of workplace interventions. The differences in frequencies of workplace interventions between countries were all significant ($p \leq 0.001$).

22.2.5 Effects of Integration and Policy Measures on RTW

A total of 851 out of 2,825 claimants (34.1%) in the six countries had a sustainable RTW at 2 years after the first day of sick leave. Figure 22.3 demonstrates the curves for work disability duration until sustainable RTW stratified for countries. As shown, sustainable RTW after 2 years varied considerably between countries (log rank test $p < 0.001$): ranging from 22% of the claimants in the German cohort to 62% of the claimants in the Dutch cohort. Sustainable RTW was found in 31%, 39%, 49%, and 49% of the claimants in the Danish, Swedish, American, and Israeli cohort, respectively. In addition, RTW patterns in the first and second year varied between countries: from gradual change over 2 years (Denmark, USA, Israel) compared to steep decline in the first year and no changes in the second year (the Netherlands, Sweden, and Germany).

The impact of compensation measures, healthcare interventions, and workplace interventions on sustainable RTW of people claiming a disability benefit was explored with a multivariate regression analysis. The differences between the countries in these measures explained to a large extent the observed differences between countries in duration until sustainable RTW. The variance in work interventions between countries (more workplace adaptation, job redesign, working hours adaptation, and therapeutic work resumption led to more and earlier RTW) accounted for 26% of the variance in (differences in) RTW. The cross-country variance in healthcare interventions (earlier surgery, pain medication, and exercise therapy led to more and earlier RTW) contributed to 18% of the explained variance in

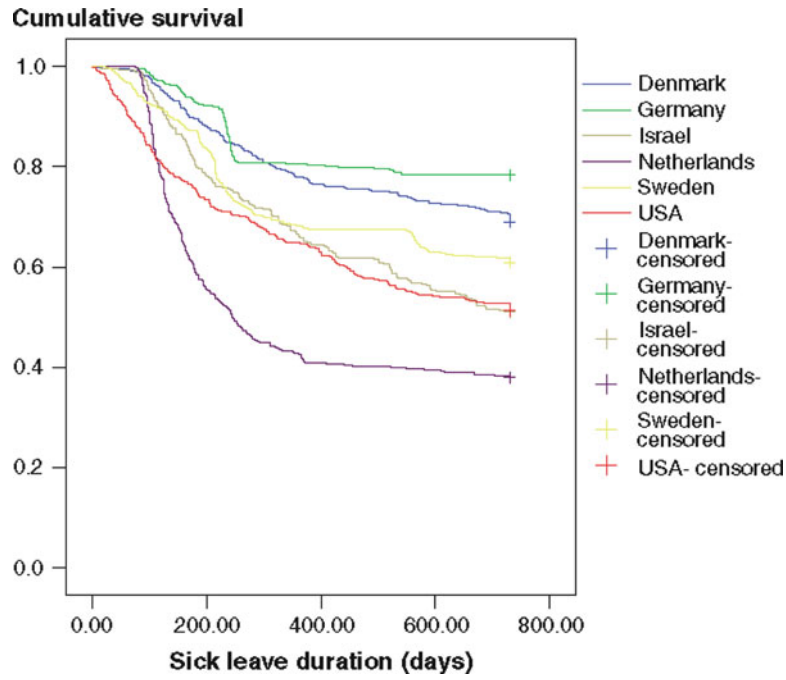


Fig. 22.3 Survival curves of work disabilty duration until sustainable RTW for workers in six countries sick listed 3–4 months due to LBP. *Source: Journal of Occupational Rehabilitation*, Anema et al. (2009)

RTW. Finally, cross-country differences in compensation measures contributed also to the observed differences in sustainable RTW. For the following compensation measures in countries, an effect on earlier sustainable RTW was found: no or late timing of entitlement (>3 months after onset of the claim) to a long-term disability benefit ($p<0.001$) and no high minimum (less than 50%) degree of work incapacity needed for a long-term partial disability benefit ($p<0.001$). The model including various compensation policy measures explained 48% of the variance in RTW between countries.

The main implication of this study is that integration measures, particularly workplace interventions, are effective on RTW. Integration measures should be supported by effective compensation measures, that is, flexible (partial) disability benefits adapted to the individual needs and capacities of the claimant. A delicate balance between those integration and compensation measures seemed to stimulate RTW. Surprisingly the effect on RTW seems to be independent of the underlying political welfare model. Participating countries with a liberal disability welfare policy, like the USA and Israel, seemed to stimulate RTW better than the participating countries with a social–democratic disability policy like Sweden, Denmark, and Germany, which had a much lower RTW rate. The social–democratic policy model in the Netherlands was a positive exception with a largest RTW rate. The implementation of the successful Dutch policy changes in the last decade will be elaborated in the final part of this chapter to understand their possible influence on these positive effects on RTW.

22.3 Lessons on Sickness Absence and Disability from the Netherlands

22.3.1 Sickness Absence Policy Reforms and Current Sickness Absence Policies

In the Netherlands in the 1980s and 1990s, about 9–10% of working days were lost due to sickness absence. This increased social security expenditures, not only in the sickness benefit scheme but

Table 22.4 Overview of reforms in sickness absence policy in the Netherlands

1994: sickness: 2–6 weeks full wage payment
• Next year: 20% reduction in sickness days
1996: sickness: maximum 52 weeks full wage payment
• Impact on sickness absence rates: poor
2002: Improved Gatekeeper Law: return-to-work policy: compulsory
2004: Wage payment during sickness: maximum 2 years
• First year: minimally 70% of wage (≥80–100%) • Second year: 70% (≥80%) • Impact on sickness absence: substantial

also in the disability benefit arrangement, as many long-term sick persons entered the disability benefit rolls after 1 year, namely after termination of sickness benefits.

In that period, the Dutch *sickness* benefits amounted 70% of wages, but in most sectors, social partners agreed to top up benefits to 90 or 100% of wages (with a maximum). Moreover, the two waiting days without income replacement had been abolished in most collective labor agreements. Another feature is that, due to ethical considerations, Dutch treating physicians refused to provide certificates for work absence, arguing that this might interfere with the doctor–patient relationship. Consequently, the main actor to control the phenomenon was the sickness benefit administrator governed by representatives of employers and labor unions.

Since 1994, several measures were taken to reduce sickness absence levels. These measures and their impact are listed in Table 22.4.

In January 1994, a compulsory wage payment period was introduced, including maximally 2 weeks per episode for small employers and maximally 6 weeks for large employers. Due to its success (sickness absence dropped by 20%) from March 1996, the wage payment period was extended: the employers were legally obliged to pay full wages to their sick employees for a maximum of 52 weeks. Public sickness benefits remained available for a small category of employees, namely, those with a temporary labor contract, and for personnel victim of bankruptcy.

As Dutch labor law prohibits dismissal during sickness, the only way to limit the employer's financial risk was to try to have the sick employee returned to work as quickly as possible.

The employer can insure the financial risk of wage payment in the private insurance market, but he/she also was free to pay the costs himself or herself. Monitoring of sickness absence, checking of work incapacity, and initiating return-to-work measures were then laid in the hands of the occupational health services. Employers were obliged by law to contract these services, either in-company or as an external (private) service.

In 2002, the Improved Gatekeeper Law came into force, with the aim to reduce long-term sickness absence especially by reducing the inflow in the disability benefit scheme. The law required the provision of a work resumption plan, agreed upon by employer and employee (Table 22.5).

The 2004 law extended compulsory wage payment from 1 to 2 years. Since then, in a detailed and stepwise way, the actions employer and employee have to take in case of sickness absence have been prescribed. Major elements of these procedures are shown in Table 22.5.

22.3.2 Policy Efforts to Reduce High Number Work Disability Pensions in the Netherlands

For a long time, the Netherlands also had one of the most generous disability insurance systems in the OECD. "Medical" eligibility criteria only regarded the loss of functional capacities in the light of the original job. Moreover, the threshold for entering the scheme was low: a minimum of 15–25% loss of work capacity qualified for a partial benefit. However, in some periods, regulations allowed provision of full benefit (70% of last wage, often topped up in collective labor agreements) in case the client with partial disability could no longer return to the labor market. Administrative criteria were limited: sickness benefit receipt for 1 year automatically led to transfer to the disability claim procedures, and no further minimum insurance periods were requested.

Table 22.5 Protocol included in "Improved Gatekeeper Law"

Day 1	Employee reports sick with employer; employer informs occupational health service (OHS) or occupational physician
Week 6	Occupational physician makes a "problem analysis" (identifies problems, explores solutions)
Week 8	Employer and employee make an "action plan" (RTW return-to-work plan)
Every 6 weeks	Regular contact employer–employee
Week 42	Employer informs social security agency of work incapacity of employee
Week 44	Social security agency informs employer and employee of their obligations
Week 47–52	Employer and employee evaluate progress and adapt plan if needed; plan (now) should include actions for work resumption with another employer
Week 87	Employee receives disability benefit claim form, employer receives request for wage data, etc. from social security agency
Week 91	Employer and employee make "reintegration report" and send in with disability benefit claim to social security agency
Month 24	Social security agency evaluates employers and employee's efforts to work resumption, before starting disability claim process
Week 104	In case of assessment of full or partial loss of work capacity, start disability benefit (or extended wage payment, in case of insufficient actions taken to labor reintegration)

By 2000, around 11% of the working-age population was drawing disability benefits. A major reform to the system was agreed by the government and the social partners in 2003–2004, and took effect in 2006. The reform, which applied only to persons who suffered disability in 2004 or later, reduced the inflow into the disability benefit scheme from 70,000 to 100,000 per year that had prevailed over the preceding decade to some 40,000 in 2007 and 2008—a major accomplishment. Those already receiving benefits at the time of the reform continued to receive benefits defined under the old rules. However, most of those younger than age 45 have had their entitlement reassessed under the criteria used in the new system. Again, there is a strong case for arguing that the success of the latest reforms, which have changed the incentives facing employers and employees drastically, was made possible by the (failed) earlier reform which, building on fast growing new scientific evidence, created a consensus for the need for change.

22.3.3 Impact and Evaluation

Several evaluative studies (de Jong et al. 2010) were held to assess the implementation and impact of measures taken in the field of sickness absence management and disability benefit dependency. For several stakeholders, it could be concluded that the measures in general affected their attitude and behavior.

Employers indicated (which was partly confirmed in employee surveys) that they had become more aware of the costs of sickness and disability. They also had become more interested in human resource policy and working conditions. Moreover, they also had learned that they themselves have possibilities and tools to lower sickness absence. On the other hand, the new procedures also led to complaints about the paper work and the time they (or their supervisors) had to spend on sickness absence management.

Employee surveys showed also a positive impact on employee's opinions. Workers had become more aware of their own responsibilities during sickness absence and that an active role is requested for recovery and work resumption. They also learned that long-term sickness and disability benefit dependency would imply serious loss of income. But also negative consequences of the new scheme were reported: a substantial minority also reported fear related to pressures (from their employer or occupational physician) to be forced to RTW too early.

Healthcare professionals (apart from the occupational physicians) became slowly familiar with

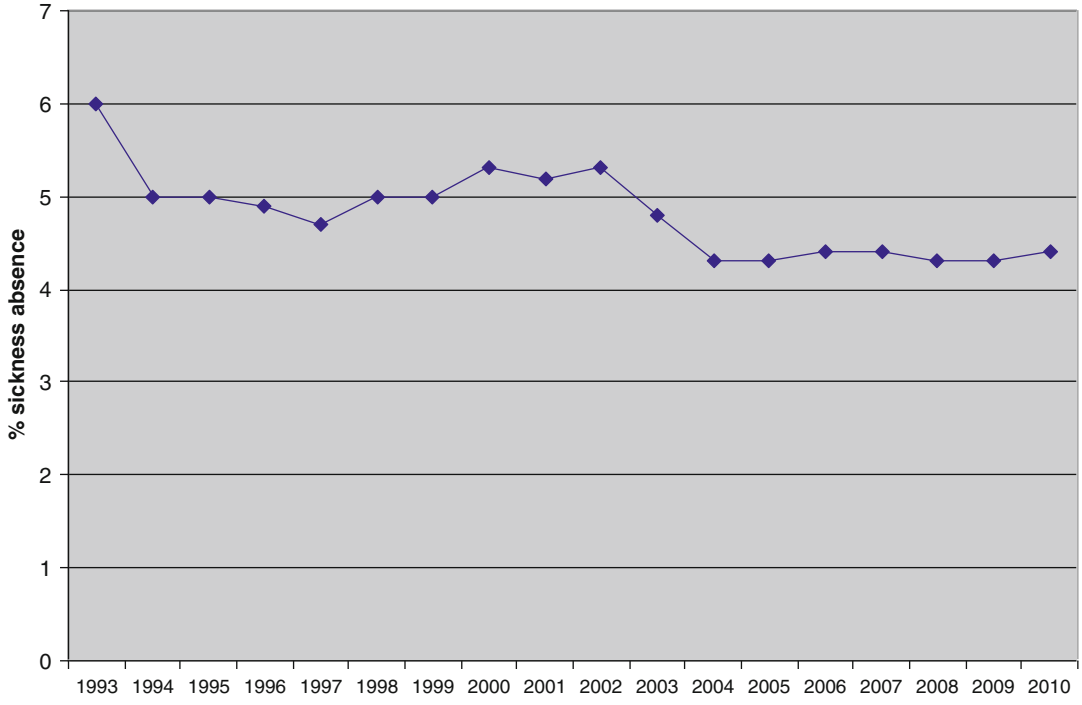


Fig. 22.4 Percentage of working days lost due to sickness absence in the Netherlands between 1993 and 2010. *Source*: Centraal Bureau voor de Statistiek, StatLine 2012, Den Haag/Heerlen

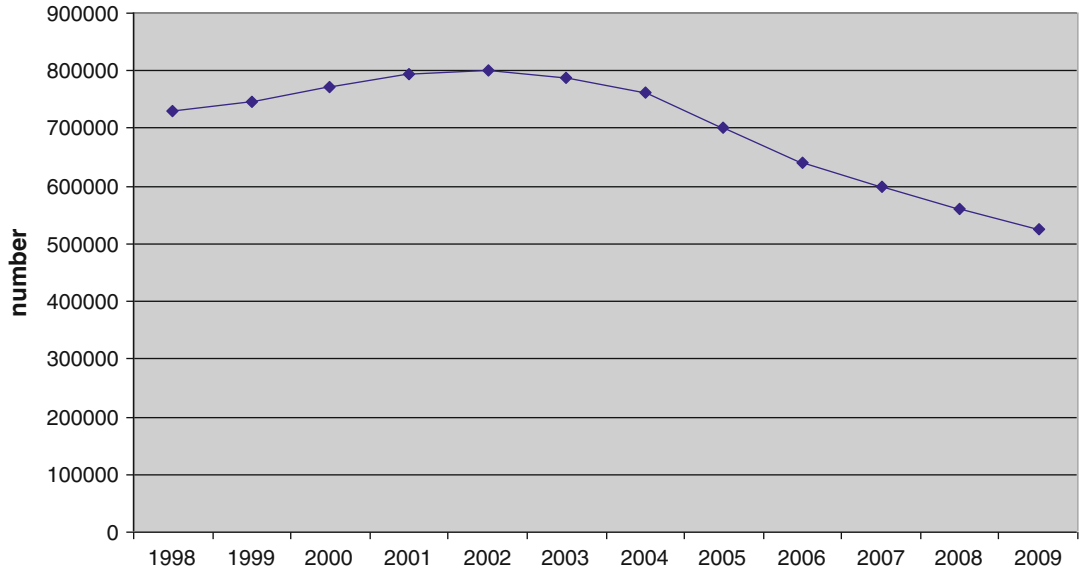


Fig. 22.5 Number of disability benefit recipients in the Netherlands between 1998 and 2009. *Source*: Centraal Bureau voor de Statistiek, StatLine 2012, Den Haag/Heerlen

the new procedures and resisted initially to the viewpoint that in many cases work resumption can start before full recovery and—when feasible—the goal might be partial work resumption. They further expressed objections against "demedicalization" and too strong emphasis on the behavioral side of sickness absence of their patients. Physicians having a social medicine specialty (occupational physicians and social insurance physician) were the strongest advocates of the new approach.

22.3.4 Summarizing: Pillars of Dutch Sickness Absence and Disability Policy

In conclusion, the aims of current Dutch policies towards sickness absence and disability benefit dependency were initially the reduction of public expenditures (sickness benefits and disability benefits). In due course, a second objective was added, that is, to keep more people in employment because of future labor force deficits and the need to keep social services and healthcare system financially sustainable. Underlying the changes was a paradigm shift in relation to work incapacity and RTW. Instead of focusing on *in*capacities, the *remaining* capacities should be addressed when thinking of and acting on sickness absence management and disability prevention. Consequently, instead of aiming at work resumption after full recovery, a stepwise approach should be used when feasible. Within this framework, partial work resumption can occur during recovery and as soon as possible. This change required a shift of responsibilities. Income replacement in case of sickness would no longer be provided by an (anonymous) administrator in social security, but instead by the employer whose expenditures might function as incentive to actively engage in work reintegration. Measures to address sickness absence were laid in the hands of the two main stakeholders: the employer and employee. Service provision (rehabilitation, labor reintegration) was no longer a monopoly of public agencies. These agencies now had to compete with new (private) providers of labor reintegration and other services.

It should not be forgotten that certain additional conditions supported the change in attitude and behavior of employer and workers. These supporting policies include compulsory workplace occupational safety and health services. Every employer is required to contract an occupational health service both to advise the worker and employer on sickness absence management and disability prevention and also for services relating to "regular" occupational health and safety activities. Another supporting policy is increased flexibility in the provision of return-to-work measures. OHS providers now have more budgetary opportunities to select reintegration measures that are more custom made financed by the Dutch Employee Benefit Schemes (UWV). Workers received the right to have a personal budget to make their own plan for labor reintegration (with a current, former, or new employer). Finally, preemployment medical examinations are restricted, as has been the case for many years. These assessments have been forbidden (with some exceptions) in order to avoid employer discrimination against less healthy workers.

The current Dutch policies resulted in a substantial drop of the percentage lost working days and in the number of work disability benefit pensions in the Netherlands after abolishment of sickness benefits for initial period of sick leave and the introduction of 2–6 weeks wage payment from the employer (2003–2004). Also, a substantial drop occurred after introduction of the revised gatekeeper model (2002–2004).

22.4 Conclusion

This chapter provides an overview of changes in sickness benefit and disability policies in the OECD countries in the last 15 years. Although there is still a large variation in sickness benefit and disability policies between OECD countries, disability policies all converged in the same direction in the past 20 years. Considerable convergence is found on the compensation policies; countries with more generous benefit systems have seen more downward change, whereas countries with the least generous benefit systems have seen an upward shift. In addition, most

countries shifted their policy orientation from compensation to integration and from a largely passive to a more active employment-oriented approach. The OECD study showed a positive effect of compensation measures on the number of disability beneficiaries. However, the change in integration policies had only a very small effect on disability benefit recipiency rates. A possible explanation is that policy implementation is lagging behind policy intentions and that policy has yet to translate in actual changes in everyday practice. It might also be that policies were not effective to change behavior or that there is resistance to implementation, for example, due to unexpected side effects.

A comparative six-country study initiated by International Social Security Agency (ISSA) evaluated the implementation and effectiveness of integration and compensation measures on sustainable RTW of workers on long-term sick leave due to LBP. It showed that countries with an active integration policy approach as well as countries with a strict compensation policy approach were successful. Work interventions were the most effective component of a successful integration policy approach. The Dutch integration policy approach is a good example of the success of implementing work interventions by introducing appropriate incentives for employers. Finally, Dutch policy changes in the last decade on sickness benefits level and disability compensation rates led to positive effects on RTW rates.

22.5 Note

An important part of this chapter including figures and tables is based on research published previously with permission of the publishers:

– Section 22.1 of this chapter draw heavily on OECD (2010): *Sickness, disability and work: Breaking the barriers* (*A synthesis of findings across OECD countries*), a report that summarizes the results of a 4-year OECD project led by Christopher Prinz. The opinions expressed and arguments employed herein are those of the author and do not necessarily reflect the official views of the OECD or of the governments of its member countries.
– Section 22.2 of this chapter draw heavily on a paper *Can Cross Country Differences in Return-to-Work After Chronic Occupational Back Pain be Explained*? *An Exploratory Analysis on Disability Policies in a Six Country Cohort Study*, published in *Journal of Occupational Rehabilitation* in 2009. Authors: J. R. Anema, A. J. M. Schellart, J. D. Cassidy, P. Loisel, T. J. Veerman, A. J. van der Beek.

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Cost-Effectiveness of Interventions for Prevention of Work Disability

23

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This chapter provides an overview of the evaluative methods to determine the cost-effectiveness of interventions to prevent work disability and presents examples of economic evaluations of WDP interventions.

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23.1 Introduction

Decision-making in the work disability prevention (WDP) arena is complex given the scarcity of resources, multiple stakeholders, and competing interests. Decisions can be based on multiple reasons: historical, political, ethical, social, legal, and economical. This chapter focuses on economic evaluations, which generate information on cost-effectiveness of interventions for prevention of work disability, that is, "value for money."

This chapter provides an overview of the evaluative methods to determine the cost-effectiveness of interventions to prevent work disability and presents examples of economic evaluations of WDP interventions. The chapter is organized into six sections. First, we introduce the context of economic evaluations and present three examples of scientific studies in which an economic evaluation was conducted. Second, we explain the general principles of economic evaluations. Third, we present an overview of the different types of economic evaluations as background information for those who are not familiar with this topic. Fourth, we discuss issues pertaining to measuring and valuing changes in health-related productivity. Fifth, we discuss how the results of economic evaluations in WDP research should be interpreted and used by professionals and other stakeholders. And sixth, we end the chapter with recommendations for practice as well as research and with conclusions. It should be noted that the technical steps of conducting economic evaluations are not

P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_23,

addressed in depth in this chapter as these topics are addressed in standard texts on the methodology (Drummond et al. 2005a; Tompa et al. 2008; Drummond and McGuire 2007).

23.2 Context of Economic Evaluations

As is the case in many areas of human activity, resources in the work disability prevention area are scarce. Therefore, stakeholders within the work disability prevention arena—workers, unions, employers, occupational health and safety (OHS) professionals, insurers, and society—must make decisions regarding the allocation of these scarce resources in order to prevent waste and ensure system sustainability. Limited resources and budgets—and the fact that monetary funds can only be spent once—mean that stakeholders need to know which interventions are cost-effective, that is, "good value for money." Economic evaluations are a vehicle for gaining such insight into cost-effectiveness. Indeed, in recent years, the recognition of economic evaluations as an essential part of program evaluation in OHS has grown (Burdorf 2007). However, economic evaluations of WDP interventions remain rather scarce. The chapter starts with three published examples of economic evaluations of WDP interventions. Next, different types and examples of economic evaluations of intervention-level data and model-based economic evaluations used in WDP research are presented. The aim is to provide a flavor of the type of the interventions that have been evaluated in economic terms. For a more comprehensive overview, readers are referred to existing reviews (Tompa et al. 2008; Uegaki et al. 2010).

23.2.1 Graded Activity in OHS

Nonspecific low back pain (LBP) is a common condition that can result in extended periods of work absenteeism and healthcare use. Literature suggests that initiation of return-to-work activities in the subacute phase of low back pain may be promising. Hlobil et al. (2007) conducted an economic evaluation alongside a randomized controlled trial involving sick-listed airline workers with subacute, nonspecific low back pain. The objective was to compare the costs and benefits from a company's perspective of a graded activity intervention to usual care for this worker population. A total of 134 predominantly blue-collar workers were randomized to either the graded activity or usual care groups. Data were collected on healthcare resource use by means of cost diaries, and data on sick leave were obtained from the electronic database of the occupational health services department. At the end of the first follow-up year, mean investment costs for the graded activity intervention were €475 per worker. A comparison of total healthcare costs between the two groups showed that the costs were €83 higher in the graded activity group compared to the usual care group. The extra costs associated with the graded activity group were offset by mean savings of €999 (95% CI, −1073; 3115) due to a reduction in productivity loss. The potential cumulative savings were an average of €1661 (95% CI, −4154; 6913) per worker over a 3-year follow-up period. From a company's perspective, the graded activity intervention for subacute, nonspecific LBP appears to be a cost-beneficial return-to-work intervention.

23.2.2 Minimal Intervention in General Practice

Stress-related mental health problems are a growing concern among the working population. Treatment is often sought in primary care. Uegaki et al. (2010) investigated whether a general practitioner-based minimal intervention for workers with stress-related sick leave (MISS) was cost-effective compared to usual care (UC). An economic evaluation was conducted from a societal perspective alongside a randomized controlled trial. The randomization took place at the level of the general practitioner. Forty-six general practitioners (GPs) and 433 patients participated: 24 GPs and 227 patients in the MISS group and 22 GPs and 206 patients in the usual care group. Cost and effect data were collected using a combination of questionnaires, interviews, and computerized medical records. No statistically

significant differences in costs or quality-adjusted life years (QALYs) were observed. The results indicated that the minimal intervention was slightly more effective and less costly than usual care (i.e., the mean incremental cost per QALY was €7,356 and located in the southeast quadrant of the cost-effectiveness plane). Depending on the amount that society would be willing to pay to gain an additional QALY—say given a range from €0 to €100,000—the probability that the MISS was cost-effective compared to usual care increased from 58 to 90%. At a willingness-to-pay level of €25,000 for an extra QALY, the probability of cost-effectiveness was 80%. An analysis of preplanned subgroups of patients was also performed. The results pertaining to the subgroup diagnosed with stress-related mental disorders indicated that the MISS intervention was more effective and less costly (i.e., the mean incremental cost per QALY was €28,278 and located in the southeast quadrant of the cost-effectiveness plane). For this subgroup, the probability of the MISS being cost-effective compared to usual care was 92% from a willingness-to-pay level of €0. It was concluded that the minimal intervention was not cost-effective compared to usual care for a heterogeneous patient population. Therefore, widespread implementation was not recommended. The intervention, however, may be cost-effective for the subgroup diagnosed with stress-related mental disorders. This finding should be confirmed before implementation for this subgroup is considered.

23.2.3 Case Management Intervention by Supervisor

Working women can experience a myriad of physical and mental health problems following childbirth, and sick leave is relatively common. Work presenteeism may also be an issue; however, the extent to which it is the case is unclear. Furthermore, little is known about cost-effective ways to intervene. Uegaki et al. (2011) evaluated whether supervisor case management (SCM) during maternity leave is cost-effective from a societal perspective in reducing sick leave and improving QALYs compared to common practice (CP). An economic evaluation was conducted alongside a randomized controlled trial, in which 541 working women from 15 companies participated. Cost and effect data were collected using questionnaires. No statistically significant between-group differences in QALYs, mean hours of sick leave or work presenteeism, or costs were observed. In terms of cost-effectiveness, the results indicated that SCM was less effective and more costly than CP. The probability that SCM was cost-effective compared to CP remained relatively constant at 20%, regardless of increasing levels of willingness to pay for each additional QALY from €0 through €50,000. Overall resource use during the first year postpartum was low. Mean total costs were €3678 (95% CI, 3386; 3951). Over a third (37%) of the total costs were related to costs of health-related productivity loss, which, in turn, were attributable to sick leave (48%) and work presenteeism (52%). The results indicated that SCM was not cost-effective compared to CP for a healthy population of working mothers. Therefore, implementation is not warranted. A post-hoc cost analysis from a company's perspective was also in line with this conclusion. The cost-effectiveness of SCM for working mothers with more severe postpartum health problems needs to be investigated. Also, work presenteeism accounted for half of the total health-related productivity loss and warrants attention in future studies.

23.3 Principles of Economic Evaluations

An economic evaluation is defined as a *comparative analysis of two or more alternative courses of action in terms of both their costs and consequences* (Drummond et al. 2005a). It provides insight into efficiency by combining information about whether or not a given intervention is more or less effective (compared to another) with information about whether it is more or less costly. This comparative analysis is undertaken at the margin, that is, it is based on a starting point of the existing mix of health and other programs available in society. In the end, insight is obtained on the extra cost for each additional unit of effect gained by one particular intervention *relative* to

another. Decision-makers can use this information about relative value to determine which interventions (among many) are worth considering and to establish priorities regarding budget allocation. It is important to note that information from an economic evaluation may only be one of many pieces of information considered in the decision-making process.

There are three basic components of economic evaluations: costs, consequences (also referred to as outcomes, effects, or benefits), and perspective. Costs refer to the inputs or the resources that are consumed to provide the intervention in question. They reflect the resources such as health professional time for providing services, capital expenditure for equipment or upgrades, worker time to receive the intervention, and overhead costs. Consequences refer to the changes in health (e.g., symptoms, function, and health-related quality of life) as well as associated changes in productivity, which reflect the ability to fulfill social roles in terms of paid and unpaid work. Perspective refers to the stakeholder/decision-maker point of view taken for the analysis. The perspective determines which costs and consequences are deemed "relevant" and therefore included in the analysis. A broad societal perspective that includes all costs and consequences regardless of who pays or gains is a recommended consideration in most method texts. However, a more specific perspective, such as that of the company or insurer, is also possible. In general, consideration of the various relevant stakeholder perspectives is important to consider, in order to better understand the distribution of costs and consequences.

The information from economic evaluations is complementary to what is known as the three other "E's" of decision-making: efficacy, effectiveness, and equity (Table 23.1) (Mauskopf 1998; Trueman et al. 2001).

Economic evaluations can be classified as being full or partial, depending on whether or not the aforementioned definition is fulfilled completely. For decision-making, the full economic evaluations are preferred. Partial economic evaluations include cost analysis, cost description, and cost-outcome description. A cost analysis only compares the costs of alternatives, and it provides information about potential cost savings. However, less expensive interventions might also result in lower levels of effectiveness. If a decision is then made in favor of the less expensive intervention without consideration of the trade-off in outcomes, consequences such as health benefits that maintain the production capacity of workers may be foregone. A cost description assesses the costs of a single alternative only, whereas a cost-outcome description assesses both the cost and consequences of a single alternative only (Drummond et al. 2005a).

Table 23.1 The four E's of decision-making applied to work disability prevention

Four E's of decision-making	Key question
Efficacy	Does the intervention reduce work disability under ideal circumstances?
Effectiveness	Does the intervention reduce work disability when adopted in the real-life community or workplace?
Efficiency	Does the intervention reduce work disability to a maximum extent at the least cost?
Equity	Who pays for the work disability prevention intervention and who benefits from it?

For completeness in terms of decision-making on economic grounds, information from economic evaluations should be supplemented with information on the financial impact of implementing of a particular intervention in a specific setting (Mauskopf 1998; Trueman et al. 2001; Mauskopf et al. 2007). This type of information is known as budget impact analyses (Trueman et al. 2001; Mauskopf et al. 2007). The results from budget impact analyses give insight into affordability and can be used to assist with annual budget planning (Mauskopf 1998).

23.4 Types and Scope of Economic Evaluations

As stated earlier, an economic evaluation is a comparative analysis of both the costs and consequences of two or more alternative courses

Table 23.2 Types of economic evaluations (Drummond et al. 2005a)

Type	How health consequences are measured and valued
Cost-effectiveness analysis (CEA)	In the natural units, e.g., days of work absenteeism avoided or kilograms of weight loss
Cost-utility analysis (CUA)	Healthy years, often reported as quality-adjusted life years
Cost-benefit analysis (CBA)	Monetary units

of action. Occupational health services (OHS) economic evaluations can be classified into three main types, depending on how the principal consequence is measured and valued. The three types are cost-effectiveness analysis, cost-utility analysis (CUA), and cost-benefit analysis (Table 23.2). In this section, we discuss these three different types and their scope as well as summarize the ways economic evaluations can be conducted.

Two other types of economic evaluations are also found in the literature—cost-minimization analysis (CMA) and cost-consequence analysis (CCA). A CMA is used when the consequences of the two or more alternatives under consideration are deemed to be equivalent and thus cost is the determining factor (Drummond et al. 2005a; Tompa et al. 2008). Because of uncertainty around cost and effect estimates, a CMA cannot be determined in advance and can only be applied in rare situations (Briggs and O'Brien 2001). In a cost-consequence analysis, costs and consequences are presented in disaggregate form without any attempt to combine them into a summary measure. Also, monetary and other values may not be fully assigned (Tompa et al. 2008; Mauskopf et al. 1998).

23.4.1 Cost-Effectiveness Analysis

In a cost-effectiveness analysis (CEA), health consequences reflect clinically relevant outcomes related to the objective of the interventions in question. These outcomes may be disease specific or generic. The changes in these outcomes are not valued explicitly, but are implicitly assumed to be of worth as they are clinically relevant (Drummond et al. 2005a). Often a single health outcome of interest is defined. However, additional ones are possible, though different health outcomes cannot be combined into one summary measure. For example, in the case of chronic low back pain, the outcomes of interest could include reduction in pain intensity, improvement in daily function, disability days saved, and less time to return to work.

The primary summary measure of a cost-effectiveness evaluation is the incremental cost–effectiveness ratio (ICER). The ICER is calculated by dividing the difference in costs between the two alternatives by the difference in effects (i.e., ICER = Δ Cost/Δ Effect). The judgment of whether or not a given intervention is cost-effective compared to another alternative is based on how the estimated ICER relates to how much society or a decision-maker is willing to pay for an additional unit of effect (WTP_T) across all disease categories, patient (worker) populations, and therapies (Table 23.3) (Drummond et al. 2005a; Stinnett and Mullahy 1998). For example, if society's willingness to pay to prevent one worker from getting injured is $10,000, then an intervention that costs $8,000 per injury prevented compared to the current situation would be considered cost-effective and worth undertaking. On the other hand, an intervention that costs $12,000 per injury prevented would not.

The ICER decision rule can be rearranged in to what is known as the "net benefit framework" in which either a net monetary benefit (NMB) or a net health benefit (NHB) can be calculated (see Table 23.3 for details). In this framework, the nonlinear ICER is transformed into a linear relationship. Advantages include mitigation of the problem with interpreting (negative) ratios and confidence intervals containing undefined values (Stinnett and Mullahy 1998). This framework also permits regression analysis and calculation of 95% CI in the standard fashion (Hoch et al. 2002). In this framework, an intervention is considered cost-effective if the net benefit, whether in monetary or health terms, is greater than zero.

Table 23.3 Cost-effectiveness decision rules in relation to the willingness to pay for an additional unit of health effect (WTP_T)

	Scenario	Decision
Incremental cost-effectiveness ratio (ICER)	Δ Cost/Δ Effect < WTP_T	New intervention is cost-effective compared to existing situation/program
	Δ Cost/Δ Effect > WTP_T	New intervention is not cost-effective compared to the existing situation/program
Net monetary benefit (NMB)	(Δ Effect × WTP_T)–Δ Cost > 0	New intervention is cost-effective compared to existing situation/program
	(Δ Effect × WTP_T)–Δ Cost < 0	New intervention is not cost-effective compared to the existing situation/program
Net health benefit (NHB)	Δ Effect–(Δ Cost/WTP_T) > 0	New intervention is cost-effective compared to existing situation/program
	Δ Effect–(Δ Cost/WTP_T) > 0	New intervention is not cost-effective compared to the existing situation/program

23.4.2 Cost-Utility Analysis

A CUA is a specific form of CEA, in which the consequences are measured and valued in terms of QALYs. The QALY is a composite measure that captures health gains from both reduced morbidity (i.e., quality of life) and reduced mortality (i.e., quantity of life) (Drummond et al. 2005a). A strength of CUA is the composite nature of the QALY as an outcome, which allows comparisons across different diseases and population groups. These broader comparisons allow decision-makers to determine how health gains can be maximized for a given population and determine which interventions to reduce or eliminate to free up funding for the new one (Drummond et al. 2005a). A limitation, however, is that QALYs may be too generic and insensitive to subtle changes in health outcomes, rendering them inappropriate for assessing the effects of interventions in certain population groups, for example, to assess mental health problems in working adults (Chisholm et al. 1997; Uegaki et al. 2010). In general, the QALY may not be sensitive to health changes in populations of relatively healthy people, which is a concern in the evaluation of primary preventive interventions in the workplace. This problem can be mitigated by including the use of a disease-specific quality-of-life tool.

23.4.3 Cost–Benefit Analysis

In a cost-benefit analysis (CBA), relevant health outcomes are measured and then assigned monetary values. If the monetary value of incremental health and other benefits of an intervention exceed the incremental cost of costs, then an intervention is considered worth undertaking (Drummond et al. 2005b). It should be noted that the data in a CBA are presented in a similar way to that in a NMB analysis (see Sect. 23.4.1). The key difference, however, is that in a NMB, the willingness-to-pay value is constant across disease categories, patient/worker populations, and therapies. In contrast, in a CBA, health values can be translated into monetary terms in different ways. The most common ways are the human capital approach (HCA), revealed preference approach, and stated preference approach. The latter is known as the willingness-to-pay approach and is the most widely accepted approach (Stinnett and Mullahy 1998). Two different summary measures are often calculated in CBAs; they are the benefit-to-cost ratio and the net present value.

A strength of a CBA is that it allows for comparison of health programs with non-health alternatives, unlike CEA and CUA which can only be used in the health domain. This broader scope is possible because all costs and benefits in a CBA

Table 23.4 Summary of strengths and limitations of each type of economic evaluation

Type of economic evaluation	Summary measure	Strengths	Limitations
Cost-effectiveness analysis (CEA)	Incremental cost per incremental unit of effect	▪ Clinically relevant consequences	▪ Ratio poses challenges for interpretation and statistical analysis ▪ Willingness-to-pay thresholds are often implicit
	Net monetary benefit (NMB)	▪ NMB provides a summary measure in monetary terms ▪ Provides a solution to problems caused by a ratio	▪ Willingness-to-pay thresholds are often implicit
	Net health benefit (NHB)	▪ Provides a summary measure in health terms ▪ Provides a solution caused by a ratio	▪ Willingness-to-pay thresholds are often implicit
Cost-utility analysis (CUA)	Incremental cost per incremental QALY (ICER)	▪ QALY is composite measure that captures both quality and quantity of health gains ▪ Allows comparisons across all health programs, whether related to WDP or not	▪ Generic QALY may not be sufficiently sensitive to capture the effect of preventive WDP interventions
Cost-benefit analysis (CBA)	Net present value	▪ Easy to interpret results in a monetary form ▪ Can permit comparison of WDP interventions with interventions in other sectors	▪ No consensus regarding the methodology to elicit willingness-to-pay values in order to translate health gains into a monetary value
	Benefit-cost ratio Cost-benefit ratio	▪ Common and easy to understand	▪ Ratio dependent on what was included as a benefit or cost

are converted into a monetary value. The main limitations are that there is no consensus regarding the methodology to convert health outcomes into monetary values and that values elicited for willingness to pay may be correlated with ability to pay (Drummond et al. 2005a; Stinnett and Mullahy 1998). This latter issue may result in social preferences biased towards health issue affecting individuals with higher incomes and greater wealth.

Table 23.4 proves a summary of the types of economic evaluations and their respective strengths and limitations.

23.4.4 Intervention-Level Data Versus Decision Analytic Modeling

Economic evaluations can be conducted in at least two ways: (1) using intervention-level data collected from a prospective study (preferably a randomized controlled trial) or (2) using decision analytic modeling. A key conceptual difference between these two (complementary) methods lies in the technique used to identify the most economically appropriate intervention alternative.

23.4.4.1 Economic Evaluations Based on Intervention-Level Data

Economic evaluations based on intervention-level data should preferably be conducted alongside randomized control trials (RCT), because that is the most valid study design to evaluate effectiveness. If randomization is not possible, non-randomized controlled studies or before-after designs can be used. These designs will be discussed below.

In economic evaluations conducted alongside RCTs (i.e., trial-based or "piggyback" economic evaluations), relevant costs and consequences are collected from all individuals participating in each intervention arm for the same follow-up period as for the effectiveness study. A key strength is that data are collected prospectively. The main limitations are that usually only two to three comparators are feasible, while in OHS often more

interventions are available. Also, the duration of the follow-up period is often short, sometimes no longer than one year. The impact of an intervention on preventing work disability may extend beyond one year, especially for conditions that are recurring in nature or have a long latency. While the RCT design is considered the gold standard for evaluating the effect of interventions, they are not always feasible in the workplace setting. An example of an economic evaluation alongside an RCT is described in Case 1.

Case 1: Example of an Economic Evaluation Alongside an RCT

Lambeek et al. (2010) investigated the cost-effectiveness, cost-utility, and cost-benefit of an integrated care program compared to usual care for sick-listed patients with chronic low back pain. The RCT took place in both the primary and secondary care settings in The Netherlands. The duration of follow-up was 1 year. A societal perspective was used, and data on the costs and consequences were collected using questionnaires. The cost side included direct healthcare costs, such as primary and secondary care, home care, and drugs; direct non-healthcare costs, such as alternative care and informal health; and indirect costs due to productivity loss from work absenteeism. The consequences were duration until sustainable return to work and QALYs. In the cost-effectiveness analysis with sick leave as the consequence of interest, the productivity loss costs were excluded from the cost side in order to avoid double counting. Confidence intervals for the incremental cost-effectiveness and cost-utility ratios were estimated using bootstrapping and presented using cost-effectiveness planes and cost-effectiveness acceptability curves. The total costs (in 2007 British pounds) of the integrated care group (mean, £13,165; SD, £13,600) were significantly lower than those of the usual care group (mean, £18,475; SD, £13,616). The mean difference in direct costs was £217 (95% CI, −£131; £662) in favor of the usual care group. The mean difference in productivity loss costs was −£5,527 (95% CI, −£10,160; −£740) in favor of the integrated care group. The cost-effectiveness analysis indicated that an additional £3 would need to be investigated in integrated care for one day earlier return to work compared to usual care. The CUA demonstrated that integrated care dominated usual care, and the cost-benefit analysis showed that the net societal benefit of the integrated care compared to usual care was £5,744.

A before-after study is an alternative in which concerns for bias can be addressed by adjusting for contextual factors using interrupted time series analysis. An example is described in Case 2.

Case 2: Example of an Economic Evaluation Using a Before–After Design

Tompa et al. (2009) performed a cost-effectiveness and cost-benefit analysis of a participatory ergonomics process at a Canadian plant of parts manufacturer. The economic evaluation was conducted using a before-after design without a separate control, and the analysis was performed from the perspective of the firm. The cost side included the implementation costs, including personnel time and equipment costs (e.g., trainer, worker time in training, and costs of the changes being introduced) and ongoing costs of the intervention (i.e., team meeting time). The consequence side included measures of health and productivity (e.g., workers' compensation claims, modified duty, first aid, weekly indemnity, and casual absenteeism), which were extracted from the employer's administrative records.

Analyses were conducted using interrupted time series, that is, multivariate regression analysis in which results were adjusted for contextual factors. Contextual factors included the intervention time period dummy; number of regular production hours; number of overtime production hours; months with demands by a customer for higher quality; months with low demands for product; months with stressful labor relations; and turnovers. Sensitivity analyses were conducted to test the robustness of the results. The findings demonstrated that introduction of the participatory ergonomic process resulted in a significant reduction in the duration of disability insurance claims and the number of denied workers' compensation claims. The economic outcomes in 2001 Canadian dollars were a cost-effectiveness ratio of $12.06 per disability day averted and a net present value of $244,416 for a 23-month period with a benefit-to-cost ratio of 10.6.

23.4.4.2 Decision Analytic Modeling

In contrast to economic evaluations based on intervention-level data, model-based economic evaluations collect and synthesize data from multiple sources, such as clinical trials, observational studies, meta-analyses, databases, administrative records, and case reports. Strengths of the modeling approach are that findings can be extrapolated to longer follow-up periods, a much larger number of comparators are possible, and the cost-effectiveness of interventions can be investigated for situations where a clinical trial is not feasible for ethical reasons. Limitations are that the quality of the model is dependent on the quality of the available data, assumptions must be made when data are lacking, and the lack of transparency (Drummond and McGuire 2007). Also, model inputs are customized to a specific context; therefore, the generalizability of results will be limited.

Case 3: Example of an Economic Evaluation Using Decision Analytic Modeling

Evanoff and Kymes (2010) used a Markov decision analytic model to evaluate the cost-benefit of use preemployment screening of all prospective employees for carpal tunnel syndrome (CTS) compared to a strategy of not screening for CTS. A dynamic cohort of 10,000 workers was used and the analysis was conducted from the employer's perspective. Data for model parameters were informed by the literature and expert opinion. Key parameters were employee turnover rate, incidence of CTS, prevalence of median nerve conduction abnormalities, relative risk of developing CTS among asymptomatic individuals with abnormal nerve conduction test results, preemployment screening costs, and workers' compensation costs for each case of CTS. A 5-year time horizon and a 1-year cycle were used. Costs included were screening costs for new employees and workers' compensation claims for those who developed CTS. The outcome was the expected incremental cost per employee position. Uncertainty of the parameters was tested using probabilistic sensitivity analysis. The base case analysis demonstrated that total employer costs were higher when screening was used (median costs per employee position over 5 years with screening, US$503; median costs without screening, US$200). Screening had a 30% probability of being cost-beneficial compared to no screening.

23.5 Measuring and Valuing Changes in Health-Related Work Productivity

The prevention of work disability implies helping workers maintain or regain their ability to work. Consequently, work disability prevention interventions have an impact on work productivity.

In OHS economic evaluations, health-related work productivity is a unique outcome of interest and can be attributed to both work absenteeism and work presenteeism. It can also be operationalized as work disability days averted or time to full return to work. In this section, we highlight a few issues related to work productivity that can have bearing on economic evaluations. For a more complete discussion on measuring work absenteeism and presenteeism, please refer to Chap. 4. Also, it should be noted that another aspect of productivity is that related to other (unpaid) social roles and role functioning.

Changes in health-related work productivity can be translated into monetary terms (i.e., valued) in different ways, depending on whether the economic evaluation is conducted from a societal or company's perspective. In economic evaluations from a societal perspective, two common methods are the HCA and the friction cost method (FCM) (Oostenbrink et al. 2004). The basic formula for estimating the costs of health-related productivity loss in the HCA is to multiply the units of work time lost by the price weight per time unit. For instance, the number of work absenteeism days multiplied by the daily wage. The FCM takes a similar approach, but it is assumed that productivity loss is limited to the time it takes to find and train a replacement for the injured/ill worker, which is known as the friction period. Effectively, any work absenteeism beyond the friction period is not counted as a productivity loss, as it is assumed that pre-injury/illness productivity levels are achieved by the organization and society (Koopmanschap and van Ineveld 1992; Koopmanschap et al. 1995). The probability that there is a difference between the HCA and FCM will be greater in cases where there is a high level of long-term work absenteeism among the workers included in the study. The difference is such that the FCM estimates will be smaller than those calculated by the HCA. It should be noted that estimates using the FCM will be context specific as a friction period may differ across different occupational settings and, for a particular country, depends on its own particular labor market characteristics. Furthermore, for a given country, the friction period will change over time. Lastly, the assumptions underlying the FCM may not always apply to some decision contexts, such as situations with an aging population and the promotion of accommodation in order to keep people longer in the work force.

With respect to economic evaluations from a company's perspective, changes in health-related productivity losses are often measured in terms of work time lost. This time loss is often valued using the HCA (i.e., units of time loss × price weight per unit of time loss). A recent systematic review found that a challenge in comparing the valuations of health-related productivity losses across studies is that there can be considerable variation in the time units measured, price weight, composition of the price weights, source of price weights, and inclusion of other elements (Uegaki et al. 2011). An overview of the observed variation is provided in Table 23.5. With regard to the price weight used to value the time loss, one common price weight should be used for all subjects or for the same occupation. This is because the difference in the effect of the intervention is on the difference in change in health-related productivity. The valuation is to help make the effect more interpretable and relevant. The use of worker-specific price weights will make it difficult to discern whether differences are driven by differences in hours or price weights (Oostenbrink et al. 2004).

Furthermore, comparability can be difficult due to differences in terms of the inclusion of other elements in the basic HCA equation of units of time loss × price weight per unit of time loss (Table 23.5). Examples are an elasticity value for productivity that indicates that work absenteeism leads to a less than proportional decrease in productivity loss to worked hours (Proper et al. 2004); loss of operating income (Cohen et al. 2003; Morales et al. 2004; Samad et al. 2006); turnover (Blaze-Temple and Howat 1997) and replacement (Cohen et al. 2003; Samad et al. 2006; Aldana et al. 2005) costs; a general rule of thumb of adding twice the direct costs to account for indirect "spillover" effects (Engst et al. 2005; Spiegel et al. 2002); and consideration of function characteristics in the form

Table 23.5 Sources of variation in the valuation of work time loss in economic evaluations from a company's perspective (Uegaki et al. 2011)

Valuation component	Component subtypes	Description of the subtypes based on reviewed studies
Time units	Hours	Changes in health-related productivity quantified in hours of work time missed
	Days	*Not otherwise specified:* changes in health-related productivity quantified in days of work time missed not otherwise specified. That is, no differentiation was made between whole and partial days of time loss
		Net or adjusted days: changes in health-related productivity quantified in which a differentiation was made between whole and partial days of time loss
		Gross or unadjusted days: although partial days were measured, partial days were quantified as whole days of time loss
		Calendar days: changes in health-related productivity quantified in terms of calendar days. Note that price weight correspondingly reflected a calendar day as opposed to a work day
Price weights	Worker specific	The specific salary or wage of a worker is used
	Job specific	A uniform price weight is used for all workers in the same job function
	Job and gender specific	A uniform price weight is used for all workers in the same job function but further differentiated for gender
	Generic	One uniform price weight is used with no differentiation for job function, gender, or age
	Not specified	No description of the price weight was provided
Composition of price weights	Wage plus benefits	The price weight encompasses wages plus secondary benefits
	Wage only	The price weight consisted only of the wage rate
	Not specified	No description of the composition was provided
Source of price weight	Company	Administrative databases
	Literature	Published literature
	National	National databases such as the US Bureau of Labor
	Participants	Participant self-report
	Not specified	Source not specified
Additional elements	Elasticity	This represents the less than proportional decrease in productivity loss to worked hours
	Loss of operating income	This represents the average contribution to the company's global productivity that is lost when a worker is absent due to a health problem. This was determined from company data
	Turnover	This represents the costs associated with having to recruit, hire and train a new employee. It should be noted that there was variation in how these costs were estimated
	Replacement	This represents the costs related to replacing a worker temporarily. The calculation method of these costs varied or not specified in each study
	Indirect cost multiplier	A general rule of thumb of 2x the direct savings were used to account for savings from "indirect" spillover effects such as overtime, turnover, recruiting and training, increased employee morale, and/or nonworker's compensation-related absenteeism
	Wage multipliers	These represent weights based on the theoretical model of Pauly et al. that the productivity loss costs of a worker's complete absence is more than full wage plus benefits per day worked

of wage multipliers (Lo Sasso et al. 2006; Pauly et al. 2002; Nicholson et al. 2006). It is important to report their inclusion as well as the rationale in order to provide insight into potential biases. Currently, there is no consensus regarding the inclusion of these factors.

23.6 Interpretation and Usability of Results

In this section, we discuss interpretation and usability of results in relation to perspective, transferability, decision rules, and relevant consequences.

23.6.1 Perspective

Economic evaluations can be conducted from a broad societal perspective and from a specific stakeholder perspective, such as that of a company, insurer, or worker. The main advantage of the societal perspective is that all costs and consequences are taken into consideration, regardless of who bears the burden and who gains the benefits. It is most comprehensive and can be particularly insightful in terms of the distributional impacts of the intervention if data are presented in disaggregate. This disaggregated information can be particularly useful for the purposes of assessing the generalizability of the findings (Drummond et al. 2005a). The results of an evaluation from a societal perspective may not be directly interpretable for a particular stakeholder because certain costs and consequences that are not relevant from a specific point of view may be included. However, if disaggregated information is provided, a reader may be able to discern the costs and consequences associated with a particular stakeholder. It should be noted that what is relevant for a particular stakeholder in one country may not be the same as in another, because of the differences in the organization of labor and health systems. As a result, there will be differences in the costs and consequences considered, which will impact the trade-off and the extent of cost-effectiveness observed. Also, the choice of price weight may differ between perspectives and between countries, which can affect the degree to which a given intervention is cost-effective compared to another. With respect to productivity loss from work absenteeism, for example, a price weight based on the national average may be used in an analysis from a societal perspective, whereas from a company's perspective, the price weight may be based on an average of the participating company or companies.

23.6.2 Transferability

A WDP intervention that is cost-effective in one sociopolitical setting may not necessarily be cost-effective in another. This may be due to the effectiveness of intervention being context specific or the values ascribed to costs and consequences. The usability of results depends on the degree of transferability of the study. This, in turn, depends on the transparency of the data reported.

With respect to measurement methods and time units of health-related productivity changes, this would mean extracting the amount of work loss from databases, instead of presenting only costs. An example of how costs may be misleading is a situation where billed charges in an insurance database do not reflect actual cash payments or costs (Reiter et al. 2007). However, extracting productivity data may be a challenge when relying on databases originally designed for administrative purposes, such as insurance claims data, and not collected specifically for the studies being evaluated. In addition, the composition and source of corresponding price weights used to value the health-related productivity changes should be presented. Finally, the sociopolitical context in which the study takes place should be described, so that readers from other jurisdictions can see how the distribution of costs and gains is similar or different to theirs.

23.6.3 Decision Rules

Explicit decision rules facilitate transparency in the decision-making process. However, in practice, information about the maximum willingness-to-pay threshold is often lacking, particularly in the WDP arena. For decision-making within the healthcare sector, some implicit values for society's willingness to pay for a unit gain in quality-adjusted life year exist. For instance, these values are £30,000 in the UK and €80,000* a unit gain in quality-adjusted life year (disease burden) in The Netherlands (Council for Public Health and Health Care 2006). The degree to which these decision rules can be directly adopted for all stakeholders in the case of WDP needs to be determined. Moreover, research is warranted into decision rules that incorporate more work-relevant outcomes and that are defined from other stakeholder perspectives. In the interim, a practical solution is to present ICERs or net benefits as a function of a range of willingness-to-pay thresholds.

23.6.4 Relevant Consequences

In the healthcare literature, the QALY is recommended for economic evaluations from a societal perspective. However, whether or not this recommendation can be applied directly to WDP is questionable. Perhaps a generic measure capturing the quality and quantity of working life is warranted (Burdorf 2007). An example of such a measure was recently conceptualized and is known as the productivity-adjusted life year. This measure aims to express the amount of health and productive time lost due to poor working conditions and associated illness (Eysink PED 2007).

23.7 Recommendations and Conclusions

23.7.1 Implications for Practice

The number of economic evaluations of WDP interventions is scarce. However, results from several economic evaluations of WDP interventions for workers on sick leave due to LBP can provide some indications to guide practice as to intensity and timing of WDP interventions.

First of all, primary preventive interventions seem to cost money in order to obtain an effect. Hence, employers or other stakeholders should be aware that it will be difficult to obtain a positive return on investment for primary prevention. Of course, there are many other reasons to still decide in favor of these interventions. WDP interventions aiming at return to work (RTW) of sick-listed workers are much more often beneficial from a financial perspective. Then, the question of when to implement which intervention becomes important. It seems that WDP interventions for workers sick listed due to LBP might be more cost-effective for low-intensity interventions, such as Swedish back schools or participatory ergonomics, than for high-intensity, multidisciplinary treatment interventions, such as long-lasting back schools. However, although there is a lack of evidence for high-intensity interventions, the results seem to be more positive for patients sick listed due to *chronic* LBP (Lambeek et al. 2010). Sick leave episodes due to musculoskeletal disorders generally have a similar RTW pattern: >90% returns to work within one month, but chances of RTW become low after sick leave lasting 3 months or more. Hence, from a financial point of view, it seems to be better to refrain from intervention up to 4 weeks of sick leave. After 4–8 weeks sick leave, a relatively cheap, low-intensity intervention might be the best option. If the sick leave episode is lasting more than three months, then high-intensity interventions are worth considering.

23.7.2 Implications for Research

In this section, we present four recommendations for future research.

First, as context matters, a brief description of the sociopolitical setting should be provided so that readers can determine the degree of similarity with their own setting. This information will also provide insight into why certain costs or consequences were or were not included. For example, in economic evaluations from a company's perspective, lost work time from absenteeism could be measured as a non-compensable health problem or a compensable health problem, that is, "work-related or not work-related" (Uegaki et al. 2011). In studies conducted in countries that have a workers' compensation system (e.g., Canada and United States), there is different treatment of work-related and nonwork-related time loss. In contrast, in countries such as The Netherlands, such a differentiation does not exist. Another example is interventions to prevent work disability following childbirth in The Netherlands; it is important to recognize how (current) legislation spreads the burden of health-related work absenteeism differently across two key stakeholders (i.e., public sector and the employer).

Second, though economic evaluations are often conducted from only one perspective, there is no restriction on the number of perspectives that can be considered in an evaluation. Given the complexity of decision-making in occupational health (compared to the healthcare arena) with multiple

stakeholders (Franche et al. 2005), and the fact that decisions are based on an interaction between stakeholders rather than one decision authority, future studies should consider all relevant perspectives (Culyer and Sculpher 2008). The broad societal perspective should be used as costs and consequences will be covered comprehensively and can be supplemented with analyses from specific stakeholder perspectives. Being able to make head-to-head comparisons between perspectives will facilitate decision-making as sources of agreements and discrepancies will become visible, and negotiation points between parties will be identified (Brouwer et al. 2006).

Third, to determine the specific stakeholder perspectives that warrant particular attention, it may be helpful to ask the following questions: (1) where will the intervention be implemented; (2) who decides if the intervention will be implemented; (3) who will pay for the intervention; (4) who will benefit from the intervention; (5) what are the key outcomes of the intervention; and (6) who is funding the study. In most cases, a societal perspective will be warranted.

Lastly, continuing efforts are recommended to "customize" and further develop methodology for economic evaluation customized to the WDP arena, such as:

Develop decision rules that incorporate more work-relevant outcomes and that are defined from various stakeholder perspectives.

Develop a generic measure capturing the quality and quantity of working life.

Develop measurement protocols for wage multipliers and compensatory mechanisms for use in the valuation of productivity loss from a company's perspective.

In conclusion, as resources to prevent work disability are scarce, economic evaluations are a necessary part of program evaluation. This chapter provides an overview of methods and examples from the literature. While economic evaluations can differ in terms of type and scope, three basic building blocks are costs, consequences, and perspective. Using both a societal perspective and a specific stakeholder perspective will facilitate transferability and usability of results.

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24 Informing the Public: Preventing Work Disability and Fostering Behavior Change at the Societal Level

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In the past decade, multi media campaigns have been held in several countries to change the general public's maladaptive beliefs and behaviors about back pain and work disability. In this chapter, we will describe: (1) Previous campaigns and their results; (2) key lessons learned from these campaigns; (3) the key questions remaining; (4) future research and strategies that should be attempted.

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24.1 Public Reeducation for Back Pain

Back pain and its associated disability continue to be one of the most common and costly problems facing industrialized countries (Lane et al. 2002; Woolf and Pfleger 2003). It is one of the leading reasons for work loss in most industrialized nations. This includes both lost time from work and reduced work capacity in those remaining at work. Related to healthcare expenditures, authors of a recent US-based study reported that in 2005 back and neck pain alone were responsible for $85.9 billion (US dollars) in healthcare expenditures, or 9% of the estimated total US national expenditure for health care (Martin et al. 2008). The authors also report that health expenditures have increased substantially since 1997, without corresponding improvement in self-rated health status in those responding to the survey. Since back pain is so common, it has been the target of public health interventions aimed at informing the public about evidence-based management of the condition. This chapter will describe previous campaigns and lessons learned from their evaluation, describe key questions remaining unanswered, and highlight some future research and evaluation strategies that should be attempted.

P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_24,

Clinical practice guidelines advocate that back pain is most often a benign, self-limiting condition and suggest that early management should include minimal medical intervention, reassurance, and advice to stay active and remain at suitable work (Arnau et al. 2006; Snook 2004; van Tulder et al. 2004, 2006). This is a reversal of decades of medical advice and yet many healthcare providers and the general public still appear to hold contrary opinions (Harber et al. 1988; Linton et al. 2002; Werner et al. 2005). Results of surveys in a variety of countries indicate that public beliefs are not in line with the current evidence (Gross et al. 2006; Ihlebaek and Eriksen 2003; Klaber Moffett et al. 2000). Many still believe that back pain is a result of serious injury or pathology that requires rest. Individuals holding such views are more likely to take time off from work during back pain episodes.

Given the mismatch between public beliefs and current evidence-based recommendations, many back pain disability prevention strategies have aimed at changing beliefs (Burton et al. 1999; Symonds et al. 1995). Mass media campaigns designed to alter societal views about back pain have been undertaken and evaluated in Australia, Scotland, Norway, and Canada (Buchbinder et al. 2001b; Gross et al. 2010; Waddell et al. 2007; Werner et al. 2008b). Table 24.1 compares and contrasts the major characteristics of each campaign and has been adapted from a paper discussing these campaigns in greater detail (Buchbinder et al. 2008). Each of the campaigns will be discussed below and their results highlighted.

The first mass media campaign was performed in the state of Victoria in Australia between 1997 and 1999 and was funded by the Victorian WorkCover Authority, the manager of the Victorian workers' compensation system (Buchbinder et al. 2001a, b). The campaign came about in response to a tripling in workers' claims for compensation related to back pain in the preceding decade and was designed to (1) alter population beliefs about back pain, (2) influence medical management of the condition, and (3) ultimately reduce disability and workers' compensation-related costs (Buchbinder et al. 2001b). The main messages of the campaign were derived from The Back Book, an educational booklet for patients based on the biopsychosocial model (Bigos et al. 2002; Burton et al. 1999), and all relevant professional bodies endorsed the campaign and its messages.

In Scotland, the Health Education Board for Scotland (HEBS) and the Health and Safety Executive (HSE) launched a major public education campaign about back pain in October 2000. Twenty organizations representing health professionals, employers, and unions were involved. The main messages were to stay active, try simple pain relief, and if you need it, get advice. Specific recommendations regarding work were not presented.

The Canadian campaign was performed in the province of Alberta and was sponsored by the Alberta Government (Alberta Human Resources and Employment, Workplace Health and Safety), the Workers' Compensation Board-Alberta, and local safety associations (Alberta Hotel Safety Association, Manufacturers' Health and Safety Association, Alberta Construction Safety Association). It aired between May 2005 and April 2008 and the themes were similar to those in Australia. Like the Australian and Scottish campaigns, it was created in response to the high prevalence and cost of back pain in that setting, and it has also received widespread endorsement from local health associations.

In contrast to the campaigns carried out in other countries, the Norwegian campaign in two counties (Vestfold and Aust-Agder) was initiated by the Norwegian Back Pain Network, a network of researchers, rather than a government body. It was launched in 2002 to coincide with the launch of the multidisciplinary Norwegian guidelines for acute low back pain. As well as a media campaign directed to the general public, it included an information campaign directed towards physicians, physiotherapists, and chiropractors in primary health care; an information campaign directed towards social security officers; and a practical intervention in six cooperating workplaces.

These campaigns have addressed widely held misconceptions about back pain that view it as a serious, disabling condition requiring rest. Key

Table 24.1 Characteristics of the Australian, Scottish, Norwegian, and Canadian mass media campaigns

	"Back pain, don't take it lying down"	"Working Backs Scotland"	"Back@It"	"Active Back"
Setting and population	State of Victoria, Australia	Scotland	Province of Alberta, Canada	Vestfold and Aust-Agder counties, Norway
Health care provision for the general population	Dual system of universal health care (Medicare) and private health insurance	Publically funded health system	Dual system of universal health care and private health insurance	Medicare covers all inhabitants but each visit to a health practitioner also incurs a small fee
Health care provision for injured workers	State-based work cover insurance paid for by employers, managed by the Victorian WorkCover Authority for the state government, provided by several insurance companies. Administration is paid for through employer premiums	Both private insurance and public pensions available	Province-based Workers' Compensation Board legally mandated to provide care for injured workers. Administration is paid for through employer premiums	Employers cover full salary the first 16 days of sickness, Medicare thereafter, for the employees
Period of campaign	Sept 1997 – Dec 1999	Oct. 2000 – Feb. 2003	May 6, 2005–2008	April 2002 – June 2005
Who performed the campaign?	Victorian WorkCover Authority	United Kingdom Health and Safety Executive, National Health System Health Scotland	Multiple funding partners including: Alberta Government, WCB-Alberta, local industrial safety associations.	The Hospital of Rehabilitation, Stavern and The Norwegian Back Pain Network, The Communication Unit
Rationale for campaign	Rising cost of back pain claims; recognition that educational interventions directed at general practice likely to be ineffective without concomitant education of the public and employers; and recognition of importance of attitudes and beliefs in the development of disability from back pain	Rising costs associated with back pain and reversal in the management strategy of back pain. Perceived need for public education about the condition.	Rising costs associated with back pain. Perceived need for public education about the condition.	Rising cost of disability and use of health care due to low back pain; great confusion and divergence of beliefs about management amongst the public and amongst different health professionals; multidisiplinary guidelines for acute back pain launched in April 2002
Who had input into the content?	Consulted widely with international and local experts, multidisciplinary committee composed of representatives from national or state professional organisations with an interest in back pain, medical defence organisation, employer and employee groups	National partnership including all health professionals who treat back pain in primary care and occupational health, employers, unions, and patients' organizations	Organizing commmittee composed of representatives from the funding organizations. Consulted widely with local and international experts	Steering committee composed of the owners of the campaign, and reflecting all health professional groups

(continued)

Table 24.1 (continued)

	"Back pain, don't take it lying down"	"Working Backs Scotland"	"Back@It"	"Active Back"
Basis of campaign	Simple evidence-based messages derived from *The Back Book*	U.K. Clinical Guidelines and Occupational Health Guidelines	Simple evidence-based messages derived from *The Back Book*	5 specific statements based on the Norwegian Guidelines
Intended Audience	General population, health care providers (particularly general practitioners), employers	General population and health care providers	General population, general practitioners, employers	General population, health care providers in primary care, employers and employees
Main messages	Back pain is not a serious problem; positive attitudes are important and it is up to you; continue usual activities, don't rest for prolonged periods, continue exercising and remain at work if possible; Xrays are not useful; surgery may not be the answer; keep employees at work	1) Stay active; 2) Try simple pain relief; 3) If you need it, get advice	Back Pain: Don't Take it Lying Down The key to feeling better sooner is to stay active	Back pain is not dangerous, X-ray is not useful, activity makes improvement, surgery is rarely necessary
Messengers	International back pain experts, sports personalities who had successfully managed back pain, actors, comedians, health care professionals, Minister for Health	Well-known Scottish sports personality	Local health care professionals and organizations, Olympic Gold Medalist	Animation figure (humorous)
Endorsements	Widespread endorsement from relevant national or state professional medical bodies (incl. general practice, orthopaedic surgery, rheumatology, rehabilitation, physiotherapy, chiropractic, osteopathy, sports and occupational medicine)	NHS Health Scotland and U.K. Health and Safety Executive	Widespread endorsement from local health associations (physicians, surgeons, physiotherapy, and chiropractic)	The National Medical Association, The Norwegian Physiotherapist Association, The Norwegian Chiropractic Association, The Directorate for Health and Social Affairs

Primary Media	Television commercials aired during prime time	Radio ads	Radio ads and website	4 issues of a 16 page information paper to all households, local TV, radio and cinema commercials, specific web page for the campaign
Other media	Radio, billboard and print advertisements, posters, seminars, visits by well-known personalities to workplaces, publicity articles and publications	Website, practice guidelines distributed to health professionals treating patients with back pain, pamphlets and posters aimed at the general population	Website (www.wcb.ab.ca/back@it)	Website (www.aktivrygg.no)
			Posters, pamphlets, bus and billboard advertisements and informational articles in the public and industry news publications. Some television public service announcements	Posters with the messages of the campaign at health care clinics
Additional interventions	*The Back Book* made widely available and translated into 16 languages. Copies sent to doctors, physiotherapists, chiropractors, osteopaths, massage therapists and workers' compensation case managers for provision to patients/those making a new back pain claim. All Victorian doctors sent evidence-based guidelines for the management of employees with compensable back pain	Focus on re-educating health professionals including orthopedic surgeons.	Specific focus on employers and health care providers to distribute posters and pamphlets.	All primary care doctors, physiotherapists and chiropractors sent copy of Guidelines, and invited to specific courses
				In addition, a specific intervention in 6 cooperating workplaces
Overall cost	$A10.1 million over 3 years	Unknown	~$CDN 1 million over 3 years	NOK 2 mill (USD 315,000) in direct costs
Intensity and frequency	Intense campaign for 12 months, followed by less intense period for 12 months and then final intense campaign for 3 months. 'Top-up' low intensity yearly ads were planned but never implemented	Continuous website. Radio ads during peak listening months only	Continuous website. Radio ads during peak listening months only	Live website throughout the period, four 1-month campaigns during the period
Marketing Evaluation	Focus groups to measure community awareness, public opinion	Monthly awareness surveys	Awareness measured on an annual basis	Consulted at halfway to determine general awareness
Results	Belief and Behavior change of the general public	Belief change but no behavior change	Belief change but no behavior change	Belief change but no behavior change

messaging in the campaigns has included advice to stay active, and all campaigns focus on a similar theme of staying active when the back hurts. Messages delivered to the public via the mass media need to be brief and focused on simple key messages. For this reason the theme of "stay active" was chosen, with some information provided in the Australian and Norwegian campaigns about the importance of staying at work or early return to work. Unfortunately, specific messages and recommendations for individuals are not possible via mass media, and therefore the Scottish and Canadian campaigns avoided messages about work partially to avoid recommendations about staying at unsuitable workplaces. The assumption was that the "stay active" message would be interpreted as "stay at work" where possible. The implications this subtle messaging difference had for the campaigns will be discussed later in the chapter.

Important differences exist across campaigns in terms of their scope, amount of funding, as well as media used. The campaign from Victoria, Australia, was the most successful one in demonstrating a sustained change in beliefs related to back pain as well as behaviors such as work disability and healthcare utilization (Buchbinder and Jolley 2005; Buchbinder et al. 2001a). This campaign was very well funded; predominantly aired on television; featured recognizable spokespeople, comedians, and a wide variety of clinical experts; and contained practical information about how to stay active and stay at work (i.e., exercise, modify work demands). As well, the messages were endorsed by all relevant clinical organizations that had a stake in treating back pain, and this was prominently noted in the television commercials. The campaign had the approval of employer and employee organizations (i.e., unions and industry safety associations) ensuring that stakeholders were "on side" (Frank et al. 1998). In conjunction with the campaign, Victorian doctors were mailed evidence-based guidelines for the management of compensable back pain. Evaluation indicated the population exposed to the intervention showed sustained improvements in back pain beliefs (i.e., were less likely to think back pain needed to be rested) (Buchbinder and Jolley 2005) as well as dramatic reductions in work-related disability (15% reduction in compensation claims) and healthcare visits (20% reduction in medical costs per claim) for the condition (Buchbinder et al. 2001a, b).

Subsequent campaigns in Scotland, Norway, and Canada also seem to have resulted in belief changes, but did not measurably impact healthcare use or disability behaviors such as work loss (Gross et al. 2010; Waddell et al. 2007; Werner et al. 2008b). An explanation for this is likely to be multifactorial. For example, these campaigns were undertaken on a much more limited budget, relied on other media besides television, and did not have the capacity to present the breadth of specific advice about how to stay active in a convincing manner. As mentioned, some did not provide explicit advice about staying at work. These important differences may partially explain why subsequent campaigns have not proven as successful as the original Australian campaign. However, factors unrelated to the campaigns, such as legislation and health policy, also likely played an important role.

24.2 Key Lessons Learned from Previous Campaign Evaluations

These studies have resulted in some key lessons including:

1. Beliefs about back pain and associated work disability are quite consistent across cultures, with a large proportion of people still believing that back pain requires rest and time off work.
2. Beliefs about back pain are amenable to change, with improvements in beliefs consistently seen following public education campaigns.
3. Improvements in beliefs appear to be long lasting, with changes observed at times years following the intervention.
4. Behavior changes (i.e., reduced work disability) were not clearly linked to changes in beliefs about back pain. Despite more evidence-based beliefs in the population, most evaluations did not observe changes in key

behavior outcomes such as work disability, indicating that factors other than beliefs guide behaviors as well.
5. The Australian campaign appears to have been the most successful, which may have been due to greater resources achieving greater message penetration and/or other factors that will be discussed.

24.3 Unanswered Questions

Despite this important knowledge, there are still many unanswered questions related to informing the public. For example:
1. Why did the Australian campaign lead to improvements in beliefs and behaviors, while the others did not? Put another way, other than greater penetration of the key messages, were there other contextual factors of the Australian campaign that were not active in other countries?
2. What is the best method of changing health behavior at the societal level?
3. Are expensive mass media campaigns needed, or can less costly messaging be as effective?
4. Are mass media campaigns sufficient on their own to produce behavior change, or are other interventions also needed?
5. What is the specific role of healthcare providers and institutions (i.e., government and insurance companies) in educating the general public?
6. What is the optimal strategy or strategies for obtaining positive behavior change (i.e., reduced work loss) at the societal level?
7. Do findings from back pain campaign evaluations apply to other conditions leading to work disability?

24.4 Where Do We Go from Here?

These questions can only be answered through ongoing research and evaluation. The remainder of this chapter will discuss population-based strategies for preventing work disability and achieving behavior change at the societal level that should be evaluated for back pain. We will discuss the importance of considering the role and interplay of public education, law and legislation, health public policy, and social marketing in achieving a sustained reduction in the societal burden of back pain. We will also discuss the potential of theory to efficiently integrate these factors in future evaluations.

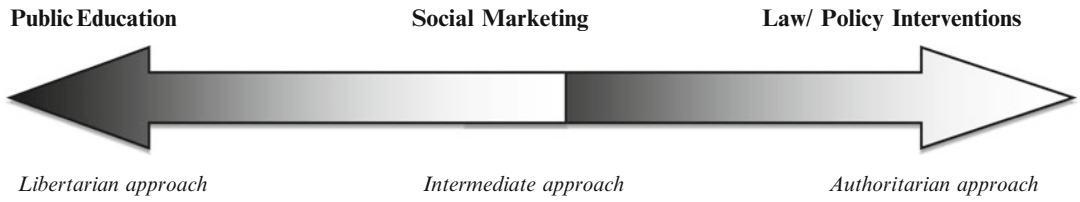
24.4.1 Strategies for Achieving Social Change

When considering health at the population level, the distinction between health beliefs and associated behaviors is critical and complex (Glanz et al. 2002). Although people might believe a certain activity or product is healthy, whether they actually modify their behavior to undertake the activity or use the product is a separate issue. This may depend upon many other factors, such as their ability, environmental factors, addiction, habit, and choice (Glanz et al. 2002). The transition from a healthy belief to a corresponding change of behavior depends partially on a perception that the positive health outcomes outweigh the burdens of changing behavior, but also on a supportive social, environmental, and political context (Bandura 2000).

Given the complexities inherent to health-related behavior change, Rothschild has proposed a framework for the management of public health and related social behavior (Rothschild 1999). In this framework, behavior change strategies are viewed on a continuum from public education at one end to law and health policy at the other (see Fig. 24.1). Social marketing resides somewhere between education and law on the continuum, incorporating both education and contextual modifications to facilitate change. Each of these strategies will be discussed in the context of work disability due to back pain.

24.4.1.1 Public Education

One of the most basic assumptions about human behavior is that what people believe guides what they do (Rosenstock et al. 1988). This assumption implies that detrimental health behavior is caused by a lack of awareness or knowledge on



(Incorporates components of education and contextual changes)

Provision of information	Use of commercial marketing techniques to change health behaviors	Legislation changes to limit or facilitate access to a behavior
Assumes the public will act on health information provided to appropriately change behavior	Assumes behavior is explained by a lack of opportunity and strives to provide both motivation and opportunity	Assumes the public is unwilling to change health behavior and requires forced compliance

Based on: Rothschild ML. Carrots, sticks and promises: A conceptual framework for the management of public health and social issue behaviors. *Journal of Marketing*. 1999;63:24-37.

Fig. 24.1 Rothchild's model of social behavior change. Based on Rothschild (1999)

the part of the individual. From a back pain perspective, if an individual holds the belief that back pain is due to serious structural pathology that requires rest to heal, they will be more likely to rest and take time off work when experiencing an episode of pain (Gross et al. 2006; Werner et al. 2005). Changing this belief should change the resulting behavior, and this has been the focus of previous back pain mass media campaigns. Other examples of public education strategies in addition to mass media campaigns include classes or "schools" where multiple people with the health condition receive education about their condition, distribution of booklets or educational pamphlets to patients, or direct education by healthcare providers. Each of these has been tested in populations of patients with back pain, with modest positive results (Brox et al. 2008; Burton et al. 1999; Coudeyre et al. 2007; Heymans et al. 2005; Sorensen et al. 2010).

Social determinants of health have been found to influence knowledge and beliefs about back pain. Male gender, lower household income, lower educational attainment, suboptimal health literacy, and blue-collar occupation have all been associated with maladaptive back pain beliefs (Bowey-Morris et al. 2011; Briggs et al. 2010; Gross et al. 2010; Halligan and Aylward 2006). As has been seen from evaluations of back pain mass media campaigns, education is typically effective in changing beliefs irrespective of social determinants but may have less ability to alter behavior. This is due to a variety of reasons, including the fact that other factors besides beliefs influence health behaviors (Armitage and Conner 2001; Hornik and Yanovitzky 2003). Attitudes about the health condition play an important role, as does the broader context in which the individual resides. For example, if a worker experiencing back pain believes staying active is important but is unable to continue work at a heavy level, that worker is unlikely to stay active within the context of work if modified work duties are not provided by the employer. There are also situations when the person's environment plays a critical role in influencing whether the person remains active or not, such as the presence of a solicitous spouse or family member who takes over required home and personal care activities. The message-only approach is unlikely to work in these situations. Additionally, people are often exposed to conflicting educational messages in media (Freedhoff 2010). For example, people may be less likely to self-manage back pain through activity when they hear media advertisements from health professionals offering "curative" treatments as the only way to recover (Stretching the truth 2010).

Clearly education has a role in changing behavior; however, its effects may vary depending upon the broader context and audience members exposed to it. Recent research is showing that initial experiences with back pain occur early in the lifespan, at times within the teenage years (Dunn et al. 2011; Roth-Isigkeit et al. 2005). Perhaps, educational initiatives need to target individuals earlier in the lifespan, during key formative years when maladaptive beliefs and attitudes about the condition are being shaped. Such a change in audience would require dramatic changes in the messaging and media used in future public educational campaigns. Strategies such as comics, children's books, or using cartoon celebrity spokespeople could be useful techniques for disseminating advice. From a research and evaluation point of view, the behavior outcome of such a strategy would take many years to be measurable.

In the case of previous back pain mass media campaigns, it is important to consider the key differences between campaigns in terms of scope, timing, and key messaging. It may be the case that a larger campaign with more expansive messaging, as was done in Australia, is needed to obtain behavior change. Not only was higher penetration of the campaign observed (86% awareness in Australia vs. 60% in Scotland, 39% in Norway, and 49% in Canada), back pain beliefs became more evidence-based across the population to the same extent irrespective of demographic, clinical, socioeconomic, and occupational factors. However, it is important to recognize that there were other favorable features of the Australian campaign that augmented the overall educational messages and may have contributed to behavior change. These will be discussed within the context of Rothschild's framework (see above Fig. 24.1).

24.4.1.2 Law and Public Policy

Another important avenue for changing health-related behavior is through supportive legislation and policy related to the condition of interest (Rothschild 1999). As noted above, smoking cessation educational activities have been augmented with legal or public policy interventions such as increased taxation on tobacco products (Ross et al. 2010) and bylaws against smoking in public places like restaurants, bars, or airplanes (Wakefield et al. 2010). Restricting access to the activity combined with ongoing messaging related to adverse health effects has proven successful for reducing smoking rates at the population level.

Such strategies assume that behavior is explained not entirely by knowledge or beliefs but also by motivation. Incorporating societal rules to prohibit undesirable behaviors may create the necessary incentive for people to act upon what they already know to be healthy. In this section, law and health public policy will be considered together although it is recognized that health public policy can often be developed and implemented without formal legislation.

In the case of back pain and other painful musculoskeletal conditions, public policy has been observed to dramatically influence behaviors such as work disability and healthcare utilization (see Chaps. 12–14). Legal or health policy interventions also have the potential to play a major role in reducing work disability from back pain (see Chaps. 19 and 24). Such interventions could include restrictions on the amount of advertising allowed by providers or companies offering unproven curative interventions, or system changes to alter access to health services, wage replacement benefits, or reimbursements for unproven treatments. For example, during the Canadian campaign, one policy of the workers' compensation board mandated that injured workers visit a physician or health provider every 2 weeks for follow-up. If claimants off work due to back pain did not visit their physician at 2-week intervals, they were at risk of having their case closed as noncompliant with care. It is unlikely that an educational campaign focused on self-management via activity would impact the number of visits to physicians while such a policy is in place. Other examples of how changes in laws or health policy have led to altered disability or health utilization behaviors for people with musculoskeletal conditions have been discussed elsewhere (Cassidy et al. 2000; Quintner 1995; Stephens and Gross 2007).

During the Australian campaign, some information was presented about policies or laws that supported the campaign's key messaging. In addition to educational messages explicitly encouraging people with back pain to remain at or return to work, several advertisements featured an employer discussing the possibility of being fined if the company did not help a worker with back pain return to work (see Case Study 24.1) (Buchbinder et al. 2003). Other advertisements provided advice to employers about the importance of having modified work policies to enable workers to return to work early and despite back pain, along with the potential reductions in claim costs this provides (Case Study 24.1). It is important to note that these policies and financial incentives were already in place in the jurisdiction and the campaign messaging only highlighted them. However, highlighting the supportive policies may have been a major reason for the changes observed in associated behaviors. Not only did subsequent non-Australian campaigns fail to explicitly provide advice regarding work, they did not feature messaging of this type. As well, the Australian mass media campaign had the support and participation of all major stakeholders, including not only the various healthcare professionals with a stake in treating back pain but also employer groups and workers' unions. Stakeholder endorsement and participation has been deemed critical for successful back pain interventions (Frank et al. 1998).

Of note, the only subgroup that the Australian mass media campaign failed to influence were general practitioners with a special interest in back pain (Buchbinder et al. 2009). Prior to the campaign, these doctors also had significantly poorer (i.e., non-evidence-based) beliefs about back pain compared with their colleagues without a special interest in back pain. These findings reveal that having a special interest in a health problem does not necessarily guarantee beliefs will be in line with evidence-based knowledge and that special interests may in fact be an important barrier to carrying out evidence-based care.

In Norway, the additional information provided to healthcare providers as part of the campaign (i.e., multidisciplinary guidelines) did not modify their beliefs about back pain to be more in line

Case Study 24.1 Scripts of Two Australian Television Advertisements

Policy-Focused (*Upstream*) *Ad*

Employer: "Do you know that I can be fined $25,000 if I don't take Joe back to work? How the hell am I supposed to get him back? He's done his back in."
Secretary: "Are you asking me?"
Employer: "Ah…yes, go on."
Secretary: "You could change the job a bit. Get some bench-height trolleys. That way Joe wouldn't have to lift the parts on and off after he's machined them."
Employer: "He wouldn't have to twist or bend."
Secretary: "You'd get Joe back and you'd save yourself $25,000 in fines."
Employer: "Why didn't I think of that?"
Secretary: "Because you're the boss…and I'm just a secretary."

Behavior-Focused (*Downstream*) *Ad*

Employer: "You know, I want Joe back but it is just too hard."
Secretary: "Joe's been with us a long time. You owe it to him."
Employer: "Oh I know, I know. He did his back in here. But what can I get him to do?"
Secretary: "Is this a serious inquiry?"
Employer: "Yes, it is."
Secretary: "Well maybe think about changing the way Joe does his job. Talk to the occupational rehab person. They deal with this thing all the time."
Employer: "Good idea. I should have thought of that earlier."
Secretary: "Yes, you should have. Maybe Joe wouldn't have hurt his back in the first place."

with current evidence. During the campaign, healthcare providers were informed about the campaign via letter and were provided written material about evidence-informed management of back pain as well as handouts for their patients. They were also invited to various continuing education activities including meetings and lectures about back pain. Beliefs regarding management of the condition and participation in work activities (based on Deyo's seven myths (Deyo 1998)) were collected before, during, and after the campaign (Werner et al. 2008a). In keeping with the Australian findings, misconceptions increased among chiropractors that reported the greatest interest in back pain and saw the greatest number of patients per week with the condition, compared to physicians and physiotherapists. In addition to the provider's beliefs, data on health consumption as surgery and referrals for imaging was collected as an indirect outcome on health professionals' practice, with no effect of the campaign observed (Werner and Gross 2009). Changing beliefs and practice among healthcare professionals is particularly challenging, but of great importance due to their impact on the individual patient, and additional specific policy initiatives directed at healthcare providers may also be necessary, as well as evidence-based education early in their professional training.

In locations where supportive law or policy already exists, future mass media campaigns are likely to be more successful if they build on this and highlight the policy and laws as part of the messaging strategy. Campaigns thus augment legislative and health policy interventions and potentially enhance their effectiveness. Where supportive laws and health policy are not in place, this could be an effective avenue for fostering behavior change. Alternatively, detrimental laws or health policies related to compensation for back pain could be changed. However, policy makers meet conflicting interests. While, in most European countries, government benefits are available to all ill or injured citizens irrespective of the contribution of work, in North America and Australia, compensation for work loss due to illness or injury is a gained right for workers, with back pain considered a compensable condition. If back pain were to be withdrawn from this right, it would implicate a view of back pain as a natural condition. This may be true, but still difficult to implement, as it would likely be considered as a loss of a gained right among workers. However, as early as 1995, an International Association for the Study of Pain task force proposed the radical alteration of limiting wage replacement funding for back pain to 6 weeks unless credible diagnostic evidence (i.e., diagnosis other than nonspecific back pain) indicated permanent or long-term disability (Fordyce and International Association for the Study of Pain. Task Force on Pain in the Workplace 1995). Implementing such a restrictive policy in societies where being off work is perceived as a right might not be perceived as a public gain and could have clear implications for leaders proposing the legislation. Additionally, individuals holding such views are unlikely to agree wholeheartedly with messages regarding the importance of staying active and staying at work. Such restrictions of eligibility for sick listing and wage replacement benefits have recently been put in place in Sweden with mixed response (Gomes et al. 2009), but this initiative has not yet been formally evaluated. While law and health policy changes may be needed in some jurisdictions more than others (Anema et al. 2009), deciding what policies should be put in place to benefit the health of the population is controversial and currently a matter of debate with several conflicting interests.

In Australia, it has been suggested that back pain become one of several national health priority areas (NHPA) (Briggs and Buchbinder 2009). The NHPA initiative seeks to focus public attention and health policy on areas of health that impose a significant national burden, but also where improved health outcomes are attainable to reduce that burden (Australian Institute of Health and Welfare and Commonwealth Department of Health and Family Services 1997). This could provide a more cohesive focus for policy, legislation, and public awareness of back pain and opportunities for appropriate public health and workplace initiatives. This type of policy window of opportunity is critical to placing issues like back pain prevention and management on the agenda (Beland 2010; Ritter and Bammer 2010).

24.4.1.3 Social Marketing

While education attempts to change the individual and law and policy attempts to change the broader social context, social marketing typically strives to do both. Social marketing "is about (a) influencing behaviors, (b) utilizing a systematic planning process that applies marketing principles and techniques, (c) focusing on priority target audience segments, and (d) delivering a positive benefit for society" (Kotler and Lee 2008). It is based on the assumption that behavior is explained by a lack of opportunity as opposed to a lack of motivation (Rothschild 1999). In addition to providing education about the health condition, social marketers attempt to change the social context to provide a legitimate and attractive alternative to the status quo. For example, social marketing aimed at reducing drunk driving has combined education about the risks of the behavior along with advice about and provision of feasible alternatives to the activity (i.e., inexpensive rides home from pubs or bars) (Deshpande et al. 2004). As such, social marketing goes beyond education about health conditions and includes attempts to "nudge" and "hug" individuals towards positive health behaviors without imposing penalties or serious consequences (French 2011; Thaler and Sunstein 2009). In this manner, individual autonomy and responsibility for health is maintained.

Social marketing may consist of efforts to influence the behaviors of individuals within a society (i.e., downstream marketing) or the behavior of governments or health policy makers (i.e., upstream marketing). Marketing efforts aimed at governments or policy makers attempt to influence the creation of laws and supportive policy when these are not already in place. The choice of the target audience (upstream or downstream) governs what messages and marketing approaches are used. Detailed benchmarking criteria have been outlined to assist in planning social marketing interventions (see Case Study 24.2) (Mah et al. 2008; Social Marketing National Benchmark Criteria 2010). This includes detailed planning, segmentation analysis of the target audience, consideration of the four P's of traditional marketing (promotion, product, price, place), strategic planning for how to engage all relevant stakeholders, as well as formal evaluation.

Case Study 24.2 Social Marketing Benchmark Criteria

Customer orientation (*know the audience*). The intervention uses formative research based on primary or secondary data sources to identify audience characteristics and needs, or the intervention elements are pretested with a sample of the target audience.

Behavior. The intervention seeks to influence the behavior of individuals or groups and has specific measurable goals.

Theory-based design. The development of the intervention and/or understanding of the audience explicitly relies on behavior or social theories or models.

Insight. What moves and motivates

Exchange of value. The intervention motivates people to adopt or sustain behavior by offering benefits (tangible or intangible) and/or reducing costs (barriers) related to the behavior. The exchange concept is actualized through the design and implementation of the marketing mix.

Competition. Considers competing behaviors or messages that may influence the target audience to not perform the desired behavior. What competes for the time and attention of the audience?

Segmentation and targeting. The intervention's audience is divided into subgroups called "segments" that share something in common (e.g., job type, demographic characteristics, desires, or readiness to change) that make them more likely to respond similarly to the intervention. The intervention strategy targets or is customized for the selected segment(s). Propose segmenting the market if it is appropriate for the health context/behavior.

(continued)

Case Study 24.2 (continued)

Methods mix. Four primary domains:

1. Informing/encouraging
2. Servicing/supporting
3. Designing/adjusting the environment
4. Controlling/regulating

The intervention attempts to use all four "P's" of traditional marketing:

Promotion—Communication with the audience to make a product or service familiar, acceptable, and desirable.

Product—A product (or service) is a bundle of benefits that satisfies a need for the audience. The product augments the desired health behavior.

Price—Identification and reduction of the monetary and nonmonetary costs of performing a behavior.

Place—Reduction of the location cost of a product or service as well as carrying out the behavior achieved through enhancing convenience and accessibility.

Strategic Planning

Partnership and stakeholder engagement. The intervention builds, enhances, and retains good relationships with the target audience, for example, by ensuring service quality or audience satisfaction or by audience participation in the design of the intervention.

Review and evaluation. Research aimed at evaluating the effectiveness of the intervention.

Based on criteria from the National Social Marketing Centre and core concepts from Mah et al. 2008

In terms of promotion, social marketing considers a variety of techniques to spread information including advertising, public relations, sales promotion, and direct marketing (see Case Study 24.3). While many of these are done separately, recent recommendations include striving to integrate these techniques due to the high volume of marketing messages and "noise" the public is exposed to daily (Alden et al. 2011). Due to exposure to thousands of messages, marketers have to create messages that cut through the clutter. Ensuring consistency in messaging is one way to do this and improve message recognition. As a result, integrating various communication elements becomes critical and could occur on several fronts. First, the promotion strategy should be consistent with the marketing strategy (i.e., with the behavior being promoted, brand positioning). Second, the audience should be exposed to consistent messaging across the ad campaign, publicity from journalists, incentivizing attempts of sales promotion, and so on. These strategies result in less confusion of the audience members and higher intervention effectiveness. Such integrated messaging should be considered for the case of back pain to outline the most appropriate means of disseminating information to the target audience.

Given the huge expense associated with traditional means of advertising in the mass media and shifting preferences for web-based communication, it may be that future campaigns spread messaging predominantly via less expensive methods such as the Internet including social

Case Study 24.3 Integrated Social Marketing Communication. Based on Alden et al. (2011)

1. Advertising—paid, sponsor-identified, nonpersonal media communications
2. Marketing public relations—publicity, events, advocacy (structural changes, pass laws), fundraising, sponsorship
3. Sales promotion—special incentive to encourage immediate "sale," uptake, or use (i.e., samples, coupons, gifts, contests)
4. Direct marketing—direct contact with target via personal "selling," direct mail, direct response ads

media. For example, if well-known celebrities or sporting figures are enrolled as spokespeople, websites such as YouTube and social networking sites such as Facebook or Twitter could be used to widely and inexpensively disseminate advice to followers. How best to incorporate "direct to consumer" marketing should also be considered. Traditionally, healthcare providers have provided one-on-one education for individuals with back pain. This has proven successful in smoking cessation but depends highly on the knowledge, beliefs, and interests of the healthcare providers. In the case of back pain, as knowledge, beliefs, and interests vary across providers, this may not be the ideal venue for providing advice to stay active (Linton et al. 2002; Werner et al. 2008a). Back pain sufferers typically seek care when pain is severe, and recent qualitative research has indicated that advice to stay active is not well received during acute bouts of severe pain (Young et al. 2011). Education could take the form of mailed pamphlets or email messages from public health agencies, employers, or insurance companies. Messaging provided at the location of the desired behavior (i.e., workplaces) may also be more effective than via the mass media, or as a supplement to this, as was done in the Norwegian campaign (Werner et al. 2008b). For example, employers could be targeted to provide rewards or incentives to workers who demonstrate desirable behaviors such as participation in worksite exercise sessions or modified work programs. Messaging by "Low Back Pain peers" who are able to remain working while experiencing LBP may be considered (Werner et al. 2007).

Peers could highlight strategies for and the benefits of staying at work. Financial incentives are currently offered to companies via reduced compensation or insurance premiums due to participation in modified work programs; however, these incentives are rarely passed on to frontline workers participating in the programs if they are socially acceptable. Sales promotions (i.e., providing monetary/nonmonetary incentives) are another strategy that has not been used in back pain messaging yet are worthy of exploration. Given the emphasis on behavior change in social marketing, sales promotion strategies are warranted.

In the case of back pain, the issue of sustainability of behavior change is important since it is a recurring phenomenon. Ideally, individuals would have their beliefs changed regarding the importance of activity via education, and this would be combined with long-term changes in their context to allow integration of the desired behaviors. Provision of education alone may be less likely to lead to long-term, sustained changes without modifications to the social context. For this reason, augmenting education and law and policy changes with social marketing may be more effective for changing back pain-related behavior. Indeed, the Australian campaign appears to have moved beyond education to include components of social marketing both in how it was conceived and what the messages were. Besides just talking about back pain and how to manage it through exercise and activity, the campaign provided explicit advice about implementing changes and modified work programs at worksites (see Table 24.2). The combination of education and advice about the condition, combined with attempts to foster more supportive work contexts, moves this campaign more into the realm of social marketing.

Lastly, considering the expense of public education or social marketing campaigns and the frequent exposure to advertising messaging in modern society, it may be worthwhile merging back pain campaigns with other public health campaigns addressing different conditions but similar target behaviors. Staying or becoming active and participating in exercise is not only beneficial for back pain but is a key message of other health condition campaigns such as obesity, diabetes, heart disease, and arthritis, among others. All of these campaigns include advice to stay active as a key message, and perhaps there is opportunity to build on each other. For example, the successful "10,000 steps" campaigns focusing on increasing physical activity via pedometer use share many similar goals as the "Stay Active"

Table 24.2 The methodological and practical implications of using critical realism to guide mass media campaign evaluation

Critical realist tenet	Methodological implication	Direction for future research
Reconciling subjective and objective realities	Perceptions and observed patterns contribute to knowledge or "truth"	Systematic review of the literature regarding beliefs, highlighting potential differences across factors such as country, culture, and socioeconomic status
	This truth is fallible and open to revision	Use findings to explore (1) *why* people hold their beliefs and (2) how these beliefs specifically impact behaviors
Mechanisms and context interact to manifest change	Causal mechanisms can be numerous and are often hidden	Create hypotheses of potential mechanisms that change beliefs to behaviors in different populations
	Mechanisms are activated by circumstances within contexts	Evaluate the impact of circumstances such as policy (e.g., workers' compensation policy dictating healthcare utilization) and geography (urban vs. rural) on changing back pain behaviors
Stratified nature of reality	The *actual*, *real*, and *empirical* strata must all be included in the evaluation	Explore the potential bidirectional interactions between strata (e.g., evaluate how or if changing the beliefs or behaviors of healthcare providers impacts policy development)
	Questions about "why" correlations exist are asked	
	Interactions between strata are potential points of inquiry	
Social world as an open system	Contextual variables are understood, not controlled	Design interventions that target multiple relevant parts of the system (context)
	Variables are in constant flux with the potential to interact with one another	
Methodological eclecticism	Methodology and methods must match the question being asked	Use qualitative methods (e.g., focus groups, one-on-one interviews), to explore why people hold particular beliefs
		Use quantitative methods (e.g., intervention studies) to test hypotheses and to develop and test theories (e.g., structural equation models)

back pain campaigns (De Cocker et al. 2007; Harvey et al. 2009). Perhaps synergies and efficiencies could be obtained if campaign organizers worked together to target this common behavior goal.

24.4.2 Importance of Theory in Media Campaign Evaluation

24.4.2.1 When to Choose Education, Law, or Policy or Social Marketing?

Theory is an essential element of evaluation research (Pawson 2003). Choosing an appropriate theory is pivotal for developing and implementing an evaluation that will provide meaningful findings and plausible explanations for those findings (Pawson and Tilley 1997). An appropriate theory is chosen through careful consideration of the complexity of the phenomenon, the research objectives, and the foundational assumptions of the theory. Evidence in the field of back pain research supports that education, law, policy, and social marketing may each be effective for changing behaviors, but what should be the prime focus of future public health initiatives? This will depend largely on the nature of the target audience as well as the social context in which they reside. Appropriate theories and frameworks can clearly outline the principles and structures that directly inform what will be evaluated within the audience and context as well as how the evaluation will be completed (Bhaskar 1989; McEvoy and Richards 2003; McKenna 1997).

Rothschild's conceptual framework is an example of a framework that can be used to guide determination of social change strategy. He has proposed a categorization system whereby audiences can be analyzed for the purpose of selecting the most appropriate strategy (Rothschild 1999). This system indicates that the most effective strategy for obtaining behavior change depends on characteristics of the target audience including motivation and readiness to change, opportunity to change, as well as ability to change. If a population is deemed motivated to change, has appropriate opportunity to change, and is prone to behave, education alone is likely to be effective. If they are motivated but do not have the opportunity or ability to change, social marketing may be effective. If an audience is not motivated to change yet has the opportunity and ability, legal or policy interventions are required. Other combinations of the factors will require a combination of education, social marketing, and law.

This categorization system is conceptual but some validity evidence has been presented from studies of work injury prevention initiatives (Lavack et al. 2008). Developers of future back pain public health initiatives should carefully consider the nature of their audience and the context before deciding what behavior intervention strategies to use. However, recognizing that most populations are not entirely homogeneous in the areas of motivation, opportunity, and ability to change, it is likely that a combination of the three will be required for most impact. As mentioned, this appears to have been the approach taken by the organizers of the Australian campaign. Given that all subsequent campaigns have been substantially different, replicating the initial Australian campaign as closely as possible with careful and rigorous evaluation of effectiveness is required.

24.4.3 Using Metatheory to Expand the Potential of Rothschild's Conceptual Framework

Just as Rothschild's framework is based on specific assumptions about what is necessary for social behavior change, assumptions about knowledge and reality can also have a significant influence on designing and evaluating public health initiatives. Critical realism is a metatheory with the potential to enhance the design and evaluation of initiatives for changing health beliefs and behaviors. A metatheory transcends a specific discipline, population, or phenomenon. Critical realism was initially developed by philosopher Roy Bhaskar (Bhaskar 1989; Clark et al. 2007), in response to the need for a middle ground between realist and relativist social perspectives (Clark et al. 2008; McEvoy and Richards 2003). The theory has been used and refined (Clark et al. 2008) in areas including evaluation (Pawson and Tilley 1997) as well as economics (Lawson 1997), and crime prevention (Pawson and Tilley 1994). Critical realism can enhance the power of an evaluation by providing explanations for the success or failure of an initiative through its assumptions about what constitutes knowledge and reality (see Table 24.2) (Clark et al. 2008; Lawson 1997). These assumptions underpin the particular questions that are asked, data collection and analysis, and interpretation of findings. Essentially, critical realist tenets outline the structure that explains why and how an initiative did or did not work (Clark et al. 2008; Pawson and Tilley 1997).

24.4.3.1 What Would Change If Critical Realism Guided Evaluations of Public Health Initiatives?

What would be different if back pain campaigns used critical realist principles to guide evaluation? We propose that the principles would impact the evaluation in three ways:

1. Point of focus for the study—The focal point of the evaluation would be on the interaction between the context and the potential mechanisms instead of the intervention, as the primary change catalyst. A review of possible structures (e.g., norms, values, politics, economics) and mechanisms would initiate the evaluation. For example, a review of the Alberta, Canada, context would reveal that legislation is a structural variable that mandates injured workers to see their physicians every 2 weeks for status reports. This structural influence could negatively impact an individual's

capacity to make behavior choices consistent with the campaign message of self-management because the system requires them to adhere to behaviors that focus on medical support and validation. In fact, an individual may have a mechanism that is consistent with the campaign's message (e.g., personality adhering to self-reliance) but is receiving contrary messages from the system.

2. Use of methodology—As noted in Table 24.2, methodological eclecticism is a tenet of critical realism (Clark et al. 2008; McEvoy and Richards 2003). Although the use of qualitative and quantitative methodologies in realist evaluations has been debated (Clark et al. 2007; Connelly 2007; McEvoy and Richards 2003; Pawson and Tilley 1997), most realists agree that the appropriate use of various methods positively impacts evaluation quality (McEvoy and Richards 2003). Using a combination of qualitative and quantitative methods in mixed and multiple method designs would enhance the explanatory power of an evaluation by matching the methodology to the question (Pawson and Tilley 1997).
3. Use of conceptual frameworks—Conceptual frameworks can be integrated into a critical realist-driven evaluation. Critical realism's principles are overarching and dictate the assumptions about knowledge and reality while conceptual frameworks refine and direct investigations pertaining to a specific change hypotheses that can exist in the real and actual domains (Clark et al. 2008; Lawson 1997). For example, combining Rothschild's framework with critical realism expands explanatory power by addressing one level of reality (i.e., the actual) in relation to causal pathways (Clark et al. 2007; Lawson 1997). More specifically, the framework hypothesizes potential causative variables (e.g., social marketing strategy). A question combining Rothschild's framework with critical realist principles could be "what are the mechanisms activated by health policy that result in health behavior change?"

In summary, the meta-principles of critical realism provide specific ontological and epistemological values that could expand an evaluation's explanatory depth (i.e., how and why a program works or doesn't work with particular people in a particular place and time). Under these broad tenets, conceptual frameworks provide the structure to guide a specific element or hypothesis of change. Integrating a conceptual framework with critical realism expands the framework's explanatory power as it relates to its primary thesis.

24.5 Summary and Conclusion

Evaluations of previous back pain mass media campaigns highlight that education alone is unlikely to be sufficient to foster positive and persisting societal behavior change such as reduced work disability. Four mass media campaigns have been undertaken and evaluated in separate countries (Australia, Scotland, Norway, and Canada), and only the Australian campaign resulted in changes to both work disability and beliefs. The Australian campaign was larger in magnitude, but was also accompanied by supportive laws and policies in the jurisdiction. The other three campaigns were much smaller in scope, had more limited messaging, and were not always as supported by institutional policies and legislation. Educational endeavors should likely be augmented with supportive laws, health public policy, and social marketing endeavors to foster sustained change in outcomes such as work disability and health utilization (see Chap. 5). Future campaigns and their evaluations should take this into account. Critical realism may provide a suitable theoretical perspective to evaluate future campaigns, and provide detailed information on why campaigns did or did not work.

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Return to Work Stakeholders' Perspectives on Work Disability

25

Amanda E. Young

This chapter aims to highlight various stakeholder perspectives on work disability through a discussion of the burdens they carry, their role in decreasing the burden of disability, and the activities they can undertake.

25.1 RTW Stakeholders

A RTW stakeholder is defined as any person, organization, or agency that stands to gain or lose based on the results of the RTW process. Groups that may be affected include workers, workers' families and dependents, workers' employers, coworkers, labor union groups, legal representatives, healthcare providers, workers' compensation or disability insurers, health insurance companies, government agencies, injured workers' local communities, and the societies in which stakeholders reside.

In order to make the task of considering stakeholder views manageable, stakeholders have been categorized into five groups: workers, employers, payers, healthcare providers, and government/society. These stakeholder groupings were chosen by referring to a systems theory perspective, which maintains that people with disabilities and their life outcomes are influenced by the family, school, peer, independent living, employment, health and rehabilitation service, and social–political–economic environments (Power and Hensherson 2001). Within this model, those that have the most *immediate impact* on RTW outcomes include employees, employers, health and rehabilitation providers, payers, and the social–political–economic environment. This categorization is similar to that suggested by Frank et al. (1996) who identified the main RTW stakeholders as patients (workers), employers, labor unions, healthcare providers, and payers. Further explanation of the various stakeholder groups follows.

Workers are those who have time away from the workplace due to a disabling condition. Included within this group would be the interests of workers' families, friends, and their labor and legal representatives. These affiliates were included in this grouping, as it was believed that they would have interests that were similar to those of workers.

Employers are the organizations employing the person experiencing work disability and include individuals relating to the worker through the workplace (i.e., owners, supervisors, human resources managers, and coworkers).

Healthcare providers are all those that provide health care aimed at helping the worker recover and rehabilitate. Such stakeholders can include general practitioners, occupational physicians and physiotherapists, surgeons, occupational therapists, chiropractors, nurses, vocational

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_25,

rehabilitation providers, psychologists, social workers, and other medical specialists.

Payers are those paying for activities designed to help workers recover from their condition, assist them to resume employment, and compensate them for their work disability. Depending on the situation, the payer may be an insurance company, government agency, a self-insured employer, or the workers themselves.

Society encompasses the broader context and including the political, economic, and legislative systems, education system, civil sector, health and social security systems, volunteer organizations, and other aspects of human life relating primarily to how we live and cooperate in social groups. While in some countries government is synonymous with the "payer," for the current purpose, government is defined in terms of its role in maintaining and regulating society. Depending on specific employment, health, and compensation systems, some stakeholders may play multiple or different roles; for example, the government is the payer in some systems, whereas the employer is the payer when self-insurance or paying for accommodations are concerned. In addition, depending on the context, significant variation in interest and roles is likely within each stakeholder group.

25.2 Stakeholder Perspectives

The sections that follow elaborate on various work-disability-related issues of concern as they relate to each of the stakeholder groups. Table 25.1 contains a summary of the issues as reported in the literature, cross-tabulated by report type (i.e., original research, review/interpretation of the literature, or professional opinion). The presentation is built on the premise that a successful return to employment is a primary mechanism for decreasing the burden of work disability. As such, discussion focuses around promoting RTW, with only a brief mention of other work-disability reduction opportunities such as decreasing administrative and medical treatment costs.

Before proceeding, it is worth noting that there is a general consensus that the global burden of work disability is "overwhelming" (p. 395) and needs to be reduced (Eijkemans and Takala 2005) and that improving RTW outcomes and processes is a way to achieve this. While there are a number of strategies and interventions that have been shown to be effective (Franche et al. 2005), stakeholders often have differing priorities, and there is a lack of agreement on just what the problem is, factors that influence it, and how the problem should be addressed (Maiwald et al. 2010). To further complicate matters, some stakeholders have little incentive because they are able to shift costs to others (Frank et al. 1998). While there are providers with incentives that are not necessarily aligned with RTW, the argument has been made that piecemeal approaches are unlikely to be effective, and that for initiatives to be optimally successful, a coordinated approach is required (Frank et al. 1998). When reading the following materials, consider the extent to which the various stakeholder groups struggle with the same problems and how they might be encouraged to work together to reduce the burden of work disability.

25.2.1 Workers

Although there are numerous RTW stakeholders, it can be argued than few take a more important role in the work-disability prevention than does the worker. In the majority of circumstances, a worker's employment status and earnings potential are related in some way. Although this may not be of importance immediately after the onset of work disability, in the long term, successful work resumption will financially benefit most workers (Bloch and Prins 2001). In addition, there are other benefits associated with a successful RTW, including health and quality of life gains, reestablishing one's sense of self if work has previously been important, maintaining or achieving a desired place in society, or the ability to perform other important life roles within the family and community (Szymanski et al. 2003; Waddell and Burton 2006; Schuring et al. 2011).

RTW is typically measured in terms of productivity (Burton et al. 1999; Lerner et al. 2000, 2001), time contribution, responsibility level, pay received, and receipt of specific benefits

Table 25.1 Summary of literature suggesting the importance of work-disability-related issues of concern to the various stakeholder groups

	Reference type		
Work-disability-related issues of concern	Original research report	Review/interpretation of the literature	Professional opinion
Worker			
Current and future financial position	Bloch and Prins (2001); Kirsh and McKee (2003)	Pransky et al. (2005)	–
Health—current and future; physical, mental, and emotional	Mittag et al. (2001)	Waddell and Burton (2006); Pransky et al. (2005)	–
Productivity/quality of work	–	Pransky et al. (2005)	–
Timeliness and quality of RTW-related medical services	Rudolph et al. (2002); Shilts and Managhan (2003); Deyo and Diehl (1986)	–	–
Trust, stigmatization, dignity, and respect	Strunin and Boden (2004a); Westmorland et al. (2002)	–	–
Quality of life/life satisfaction/job satisfaction	Mittag et al. (2001); Drake et al. (2004); Westmorland et al. (2002)	–	–
Sense of self/self-image	Jakobsen (2001)	Szymanski et al. (2003); Waddell and Burton (2006)	–
Social status	Mittag et al. (2001)	Szymanski et al. (2003); Waddell and Burton (2006)	–
Participation in family and community life	Strunin and Boden (2004b); Cott (2004)	Waddell and Burton (2006); Pransky et al. (2005)	–
Other stakeholders' compliance with regulations	Shilts and Managhan (2003)	–	–
RTW compatible with pace of recovery/capacities	Shilts and Managhan (2003); Sum and Frank (2001)	–	–
Employer			
Disruptions to functioning/productivity	Uegaki et al. (2007); Hunt et al. (1993); Amir et al. (2010)	–	–
Adjustments needed to meet financial and productivity goals	–	Thomason (2003)	–
Rehabilitation planning—detecting work rehabilitation needs and taking early action	Larsson and Gard (2003)	–	–
Mitigation cost-effectiveness	Uegaki et al. (2007)	–	–
Insurance costs	Franche et al. (2005)	Guzman et al. (2003)	–
Sick leave costs	Franche et al. (2005)	–	–
Compliance with government regulations	Franche et al. (2005)	–	–
Workforce satisfaction	Fisher (2003); Westmorland et al. (2002)	–	–
Worker moral and company image	–	Westmorland and Williams (2002)	–
Healthcare providers			
Diagnosis and treatment of the health problem	Yassi et al. (1990)	Rainville et al. (2005)	Pransky et al. (2001)
Financial position	–	–	Young et al. (2005)

(continued)

Table 25.1 (continued)

Work-disability-related issues of concern	Reference type		
	Original research report	Review/interpretation of the literature	Professional opinion
Professional reputation	–	–	Young et al. (2005)
Patients ability to return to participation without compromising their health or reducing their use of services	–	Franche et al. (2005)	–
Role conflict/lack of role clarity	–	Frank et al. (1996); Bruckman and Harris (1998); Reynolds et al. (2006)	–
Treatment efficacy for RTW	–	–	Robinson et al. (1997)
Own ability to make recommendations regarding patient's ability to RTW	Soklaridis et al. (2011)	–	–
Payers			
Impact of payments on financial solvency	–	–	Young et al. (2005)
Appropriateness of care	–	Margoshes and Webster (2000)	–
Likelihood and characteristics of additional absences	Wasiak et al. (2004)	–	–
Workplace safety culture	–	Wickizer et al. (2001); Williams and Westmorland (2002)	–
Quality of work life	–	–	Sim (1999)
Costs in relation to productivity/economic gains	–	Rubin and Roessler (2001)	–
Administrative workload	Kirsh and McKee (2003)	–	–
Lack of control of the RTW process	Ydreborg et al. (2007)	–	–
Making determinations with little time and information	Ydreborg et al. (2007)	–	–
Why is the duration of disability increasing	–	Hunt et al. (1996)	–
Why are healthcare costs increasing	–	Hunt et al. (1996)	–
Effectiveness of cost containment strategies	–	Wickizer et al. (2001); Hunt et al. (1996)	–
Society			
Health and disability costs	–	Waddell et al. (2002)	–
Cost–benefit ratio of RTW services	Fulton-Kehoe et al. (2000)	–	–
Productive workforce goals	–	Sim (1999)	–
Citizen's health, safety, and prosperity	–	Schriner (2001); Drake (2001)	–
Adherence to legal requirements	–	Bickenbach (2001)	–
How to stimulate RTW and dependency on benefits	Bloch and Prins (2001)	–	–
Community response to adversity	Buchbinder and Jolley (2004); Thulesius and Grahn (2007)	Buchbinder (2008); Black (2008)	Briggs and Buchbinder (2009)

(McMordie et al. 1990; Malec et al. 2000; Johnstone et al. 2003). While the importance of these outcomes is unquestionable, research suggests that the extent to which they capture what is important to workers is limited, for rehabilitating workers also experience financial, emotional, and physical hardship (Kirsh and McKee 2003). Studies investigating a broader range of worker-centered consequences of work disability indicate that in the workers' compensation setting, satisfaction with received care, job stability, concerns about adequate healing, avoiding reinjury, self-image, and family consequences are all important to workers (Keogh et al. 2000; Pransky et al. 2000; Rudolph et al. 2002; Strunin and Boden 2004a, b; Wickizer et al. 2004; Franche and Krause 2002). Similarly, job satisfaction, health status, and socioeconomic status have been reported as important to workers in a non-workers' compensation setting, with an example being RTW following myocardial infarction/coronary artery bypass (Mittag et al. 2001).

Perceived flexibility of a RTW schedule has also been identified as important for facilitating RTW and preventing longer-term work disability. Although committed to resuming employment, injured workers are concerned that the proposed schedule for doing so is compatible with their pace of recovery (Shilts and Managhan 2003). Worker goals for RTW incorporate the desire to have appropriate workplace accommodations, including assistive technology and flexible schedules (Sum and Frank 2001). Furthermore, identified flexibility of work schedule and demands has been identified as one of the ways in which workers with chronic illnesses assessed their RTW success (Jakobsen 2001). Interestingly and consistent with the findings that physical recovery is only loosely related to RTW, research has indicated that the effectiveness of modified work procedures is not causally linked to physical protection (Krause et al. 1998). This adds further support to growing evidence pointing to psychosocial factors greatly influencing the work-disability experience.

Another burden that injured workers carry relates to the care they receive during the course of recovery. Timeliness and quality of RTW-related medical services have been found to rank highest among issues of concern to US-based workers' compensation claimants (Shilts and Managhan 2003). In particular, workers want access to information about (1) their treatment regimens, particularly about problems with pain management; (2) their rights regarding the choice of healthcare providers and the timeliness of their claim management; and (3) whether all parties in the RTW process were "following the laws" (Shilts and Managhan 2003). Additional concerns include the effect of RTW on levels of pain, ongoing medical care, quality of work, future earning and employment capacity, and the impact of functional limitations on home life (Pransky et al. 2005). Studies outside the occupational health field have also examined other features of work disability that are important from the worker perspective, and these have been found to include general life satisfaction (Drake et al. 2004) and preparation for other life roles (Cott 2004). Initiatives that are likely to resonate with injured workers likely include those that are focused on the alleviation of pain and distress, encourage workplace support and accommodations, and ensure job safety and security (Franche et al. 2005). In addition, workers are likely to feel relief when their problem is adequately explained (Deyo and Diehl 1986).

25.2.2 Employers

Much of the variability in RTW outcomes is accounted for by what takes place at the workplace (Loisel 2005). Given that workplace interventions can decrease sickness absence (van Oostrom et al. 2009; Shaw et al. 2003), employers are key players in the quest to decrease the burden of work disability. In their attempts to control costs, employers want to decrease insurance costs, the direct costs of sick leave, and ensure compliance with government regulations (Franche et al. 2005). For employers, work-disability reduction may be measured in terms of cost-effectiveness and the impact on the functioning of the employer's organization (Uegaki et al. 2007). Achieving success will involve maintaining or

restoring workforce satisfaction, both at the individual and company level (Fisher 2003). During the RTW process, the employer is therefore motivated by the direct and indirect impact of the worker's absence on everyday operations, as well as short- and long-term financial results (Hunt et al. 1993).

For an employer, work disability creates disruptions (Larsson and Gard 2003), requires adjustments so that financial and production goals can be met (Thomason 2003), and may lead to increases in insurance premiums (Guzman et al. 2003). Such disruptions affect both the productivity and the cost of production inputs (capital and labor), potentially leading to lower profits and to a situation where optimal RTW cannot be achieved (Larsson and Gard 2003; Amick et al. 2000). Thus, while empirical evidence is lacking, it can be inferred that in the case of their valued employees, employers have a stake in ensuring timely and sustained work resumption and stand to gain significantly from their workers' timely return to productivity. However, it should be noted that for some employers, a (dysfunctional) worker's absence from the workplace may be viewed as a positive. With this being particularly true in cases where such an employee's salary is paid by some type of insurance benefit. A concrete example comes from cancer research where it has been found that employer's representatives can harbor concerns about survivor's ability to engage in work-related activities and meet the demands of employment (Amir et al. 2010).

In response to a need to maintain financial viability, most employers will want to minimize the monetary cost of work absences. In the short term, the direct costs (i.e., the insurance premium or social security tax) are usually fixed, and their primary concerns most likely relate to changes in the organization of production and the associated expenditure for either hiring temporary workers or paying overtime to maintain the needed level of productivity (Thomason 2003).

From the employer's perspective, another opportunity to decrease work disability is through the way the RTW is managed. It has been found that RTW can be facilitated through certain practices such as offering modified duties and other accommodations (Shaw and Feuerstein 2004) and effectively communicating with other stakeholders (Kyes et al. 2003). In addition, employers may be concerned with how the worker's absence affects workplace morale and company image (Westmorland and Williams 2002). Employers will want to control worker turnover and job satisfaction (Fisher 2003; Westmorland et al. 2002) so as to avoid expenses associated with losing and replacing a productive staff member (see also Chap. 11).

25.2.3 Healthcare Providers

For many, a return to work is viewed as a function of medical treatment. As such, healthcare providers are viewed as playing an important role in preparing an injured worker to RTW and, as elaborated in Chap. 13, play a role in work-disability prevention. Based on the professional codes governing their practice, healthcare providers are accountable for delivering ethical care and treatment. Potential gains from assisting in successful RTW include the positive experience of helping clients achieve restoration or adaptation of functional capacities (World Health Organization 2002). At times there may also be a significant financial gain if referrals to or contracts with their service grow in response to success. In general, it can be said that healthcare providers want their patients to return to active participation (including work), but they want them to do so without compromising their physical health or reducing their utilization of the healthcare services (Franche et al. 2005).

Depending on the severity, duration, and nature of the condition, a person with a work disability will consult a range of healthcare providers during the course of his or her recuperation. These providers are a heterogeneous group, with varying roles (Pransky et al. 2002; Anema et al. 2002). In the majority of cases, healthcare provider's focus is likely to be on diagnosis and treatment of the health problem (Yassi et al. 1990; Pransky et al. 2001; Rainville et al. 2005), which at times may conflict with the goal of RTW (Frank et al. 1996; Bruckman and Harris 1998). In the case of family

physicians, their role is to restore health, optimize capabilities, and minimize the negative effects of injury. Within this context, they can be called on to assess functional ability for RTW. This task is not without its challenges for it is typically not consistent with their training, which, by and large, centers around assessing and treating symptoms (Soklaridis et al. 2011). Indeed, it may be said that a significant burden that healthcare providers carry is a lack of role clarity (Reynolds et al. 2006).

While role ambiguity can be a problem for some healthcare providers, others, for example, occupational health care and vocational rehabilitation specialists, have an explicit focus on RTW and receive specific training in the vocational implications of work disabilities (Pransky et al. 2002). Once again, though, there is variation in what is of priority, as this group's focus on RTW is strongly dependent on their role and primary tasks. Healthcare providers focus on restorative or adaptive approaches to functional recovery will be interested in determining if the treatment they are administering is impacting on their patient's ability to work (Robinson et al. 1997). Healthcare providers may also be asked to give legal opinion about the work ability of an employee or to issue a medical declaration required by the payer for permanent work-disability compensation (Pransky et al. 2001). To do this, they need to know the worker's work-related functional disabilities and thus require some knowledge of their clients' job environment and responsibilities. For many, this information is not readily available. As such, providers can experience difficulty arriving at determinations that accurately reflect an individual's work-disability status.

Beyond those providing medical services, functional restoration and testimony are those who deliver vocational services with the aim of helping work-disabled persons find appropriate work. This group of providers views vocational guidance, communication, a supportive work environment, and a stimulating social environment as opportunities to decrease work disability (Dekkers-Sanchez et al. 2011). Along these lines, it has been concluded that a program of services that emphasizes workplace assessment as an important complement to healthcare services is advisable to decrease work disability (Ouellette et al. 2007).

25.2.4 Payers

While this grouping is composed of individuals and agencies that can collectively be referred to as payers, in that they pay for activities designed to help workers recover and be compensated for their injuries, it should be noted that the mechanism and motivation for payment is not homogeneous. In some cases payments are made by an individual or collective and take the form of out of pocket expenses, taxes, and insurance premiums. In others, payments are made from moneys collected in case a disability situation arises, as is the case when an insurer is the payer. Let us first consider the case of insurers. Although liability varies depending on the details of the coverage, in general, insurers (1) assume the health-care costs associated with the worker's recovery, (2) replace lost wages while the worker is off work, (3) compensate workers for any permanent injury, and/or (4) fund educational or vocational retraining and accommodations that the person requires to resume employment. At a macro level, insurers benefit from RTW through lower or no compensation payments, helping the payer to maintain financial solvency. However, it should be noted that there are cases were a lump sum payment, in which case RTW is not viewed as a goal, maybe be viewed as a preferable option. In addition, insurers, like other payers, benefit from a timely and successful work resumption as this reduces the negative impact of work disability and lowers the likelihood of another work absence (Wasiak et al. 2004). Finally, RTW interventions implemented by payers (including insurers) often enhance workplace safety culture, reducing both the risk of injury and the overall absence burden (Wickizer et al. 2001; Williams and Westmorland 2002). Thus, although varied in rationale, it can be concluded that at least at the macro level, it is in the payers' interest to facilitate such a return.

Regardless of the system setting, payers can share a common goal—providing impetus for the workers' timely and safe RTW. Typically, this impetus is expressed in terms of economic and humanitarian motives for the provision of RTW services, with the relative weight attached to these motives differing from country to country (Brooker et al. 2000). In some countries, the payer draws more heavily upon a social responsibility philosophy, paying close attention to outcomes such as quality of life; economic gains realized from improved RTW outcomes remain important but may receive a lower priority (Cifu et al. 1999). In other countries, the payer's motivation in ensuring a safe and sustained return to employment is aligned more with the financial imperative. If services for RTW are premised on an economic model, then acute and post-acute care, vocational rehabilitation, and workplace interventions must yield benefits from cost control and increased productivity that are equal to or greater than the initial investment of resources (Rubin and Roessler 2001) (see also Chaps. 4 and 20).

As a means of reducing financial losses attributed to work disability, the payer may initiate case management and adopt cost containment approaches such as fee schedules, provider choice limitations, and managed care approaches (Wickizer et al. 2001). Often, the payer is involved in facilitating communication between other stakeholders and identifying barriers to RTW (Shaw et al. 2001). As such, they need information regarding the type and permanence of workers' inabilities, as well as available workplace accommodations. Gaining access to this information can be a burden within itself. For the payer, there is frustration associated with a lack of control over the process and the time consuming task of waiting for medical reports (Ydreborg et al. 2007). In addition, there is also the stress associated with limited time and information upon which to make determinations (Ydreborg et al. 2007).

Using guidelines and evidence-based medicine, payers also pay attention to the appropriateness of medical care and other benefits and how they relate to achieving the RTW objective (Margoshes and Webster 2000). Again, there is an administrative burden associated with gaining access to this information. In some instances, this can be so much so that control of administrative costs is a priority for some workers' compensation schemes (Kirsh and McKee 2003). Other priorities include answering questions such as why is the duration of disability increasing, why are healthcare costs increasing, and can these costs be actively controlled through case management (Hunt et al. 1996).

25.2.5 Society

The role of society is to make decisions and implement initiatives that are in the broader public interest. However, this can be challenging because governing groups are often comprised by members belonging to various special interest groups. In the worst-case scenario, this can result in counterproductive squabbling and inefficient decision-making. As was the case in British Columbia, where, in 1995, the governing board of the workers' compensation commission was suspended because representatives were deeply divided and could not bridge differences (Hunt et al. 1996). Societies' motivation and interests in RTW may be less tangible and easy to define than other stakeholder views; however, it is reasonable to argue that the views of society are embodied in its legislation, approach to social security, and healthcare service provisions. Thus, it may be said that societies' motivations shape the macro (i.e., institutionalized) level of both RTW itself and the context within which it occurs. This point is further elaborated in Chaps. 12 and 22 where policy interventions are linked with the different types of welfare states.

For society, achieving RTW minimizes the expenses and liabilities incurred due to continued health- or disability-related costs (Waddell et al. 2002). In addition, employees who return to the workforce improve the cost-benefit ratio for RTW services, as society realizes gains in its productivity and resource base (Fulton-Kehoe et al. 2000). Societies have a stake in returning persons to work, as not doing so impacts their ability to meet productive workforce goals (Sim 1999). Prompt and successful work resumption

also increases the revenue base necessary to fund benefits and services for society members.

In addition to maintaining economic growth, most societies strive to achieve some level of health, safety, and prosperity of their citizens. However, how they achieve these goals depends on philosophy and tradition. Although present in policies of many developed countries (Schriner 2001), the desire for RTW may rest on different foundations. In some cases, public policy regarding RTW reflects more of an emphasis on social responsibility for the individual in its use of social insurance and rehabilitation interventions (Schriner 2001; Drake 2001); in other cases, societies may take a more passive role and ensure that the overall objectives of the RTW policies are met and intervene only if markets fail (Schriner 2001; Burton 2004). (Please see Chap. 22 for a further discussion of the impact that policy can play in preventing work disability.)

As stakeholders in the RTW process, society's role is to ensure that programs are providing mandated and quality RTW services. Societal mandates regarding provision of RTW services eventually result in legal requirements. Information needs arising from these legal requirements stress more the issue of whether practices of employers, service providers, and employees meet the letter of the law. However, society also wants to know how it can stimulate RTW and avoid long-term dependency on benefits through administrative, financial, and legal incentives and disincentives built into the sociopolitical system (Bloch and Prins 2001).

In many countries, there is legislation that requires individuals with work disabilities to work together with their employers to ensure early and safe return to appropriate work (e.g., Canada's Workplace Safety and Insurance Act, Dutch Gatekeeper Law, or New Zealand's Injury Prevention, Rehabilitation, and Compensation Act). In addition, there are societies with legal requirements for nondiscrimination in returning employees to their jobs and for retaining them for a specified period (Workplace Health Safety and Compensation Commission of New Brunswick 2001; Cater 2000). This legal perspective adds yet another dimension, in that information is needed not only about the quality of the services but also about whether those services met enforceable legal requirements (Bickenbach 2001). Again, there is an administrative burden associated with accessing and processing this information.

Beyond mandating service provision, policy makers can also play a role in shaping the way people view and respond to a health condition and setting societal priorities. An example of this comes from Australia where work-disabling back pain was the subject of a mass media self-management education campaign. Evaluations of the campaign indicated that it was successful in enhancing people's self-management ability and promoting long-term behavior change (Buchbinder 2008) and that this effect was persistent at 3-year follow-up (Buchbinder and Jolley 2004). Also in Australia, back pain is being considered for inclusion as a National Health Priority area, with the belief that making it such will provide a focus for policy, legislative, and public awareness and promote best-practice management of the condition (Briggs and Buchbinder 2009).

Societies may also see that it is their role to incentivize people "trapped" in a work-disabled state to return to the workforce. An example of this line of thinking comes from research conducted in Sweden that suggests that legislators can play a role in re-incentivizing workers through strategies such as body repair, sense of self-repair, workplace repair, rehumanizing, controlling sick leave insurance, and strengthening monetary work incentives (Thulesius and Grahn 2007). Another example comes from the UK where there has been a call for the replacement of sick notes, with fit notes with the aim of switching the focus to what an injured worker can do, rather than what they cannot (Black 2008).

25.3 Stakeholders' RTW Priorities

While there is a lot of material detailing stakeholders' work-disability burdens, not a lot is known about what is most important to address. A study that provides some insight was conducted with the aim of identifying key priorities in back disability prevention (Guzman et al. 2007).

Although not all stakeholder groups were included, the researchers found very little agreement regarding what would likely impact disability outcomes. This was particularly true with regards to the impact of changes to physical functioning and activities required at work. What consensus could be made centered on the idea that care provider reassurance had a high impact, and there was moderate consensus that expectation of recovery and decreased fears had a high impact. Interestingly, when researchers from this group conducted a follow-up study of what influences the choice of priority, they found that participant's background (including stakeholder affiliation) had very little to do with their reported priorities (Guzman et al. 2007), thus supporting the notion that there is substantial variation within stakeholder groups.

Another study that shed some light on the priorities of RTW service providers and RTW consumers was conducted in Western Ontario. In the qualitative study, six healthcare providers, two employer representatives, an insurance adjuster, three injured workers, one family member, and two worker representatives were asked to rank the importance of 48 indicators of RTW success. Their aggregated responses indicated that the most important factor was that the worker is able to maintain his or her recovery. The next highest-rated statement related to ensuring that the worker's human and charter rights are intact and respected by all return to work stakeholders. The third highest-ranked statement related to the worker performing his/her work at a level equal to what any healthy employee would be expected to do. Interestingly, "that the worker achieved maximum recovery from his/her illness or injury" was not rated as being of great importance (Leyshon 2010).

25.4 Priorities Synthesized

Based on the preceding review, a number of conclusions regarding stakeholder similarities can be drawn. One of the most important of these is that, while not always true at the microlevel, at least at a macrolevel, everyone has the potential to gain from the worker successfully returning to work. Given this commonality, it can be concluded that all stakeholders have the potential to decrease their respective burden through the worker achieving a safe, timely, and sustainable return to productivity. Although similarities in stakeholders' interests were identified, differences were also noted. In particular, stakeholders appeared to differ with regards to the importance of efficiency vs. effectiveness. For some stakeholders, efficiency of RTW is likely to be less important, and ensuring RTW effectiveness will be a priority. For others, particularly those concerned with the amount of resources utilized during the RTW process, maximizing efficiency of RTW will be of greater importance. These differences can at least partly explain why, even though work resumption appears a "win-win" for all concerned parties, good outcomes may not always be achieved.

Another possible explanation is that while stakeholders may all have something to gain from RTW, they are also driven by broader objectives. As depicted in Fig. 25.1, while reducing work disability may be a shared goal, stakeholders are likely to have a number of other goals they would like to achieve. If putting efforts into decreasing work interferes with stakeholders' ability to achieve their other goals, then the extent to which decreasing work disability is seen as desirable may be questioned and the resources available for work-disability prevention may be limited. To evaluate the net benefit of disability prevention initiatives, the extent of conflict between multiple goals has to be identified. The interplay between pursing RTW and the achievement of other goals will impact stakeholder's expenditures, gains, and thus commitment to the goal of work-disability prevention.

Uncertainty regarding the attainability of disability reduction will arguably affect the pursuit of the goal. As such, decreasing uncertainty and understanding how RTW impacts on other goals appear as an avenue for increasing stakeholder commitment. Communicating these issues and explaining the complexities of RTW is, therefore, required. An understanding should be reached regarding not only common ground but also when and why stakeholders differ. With such

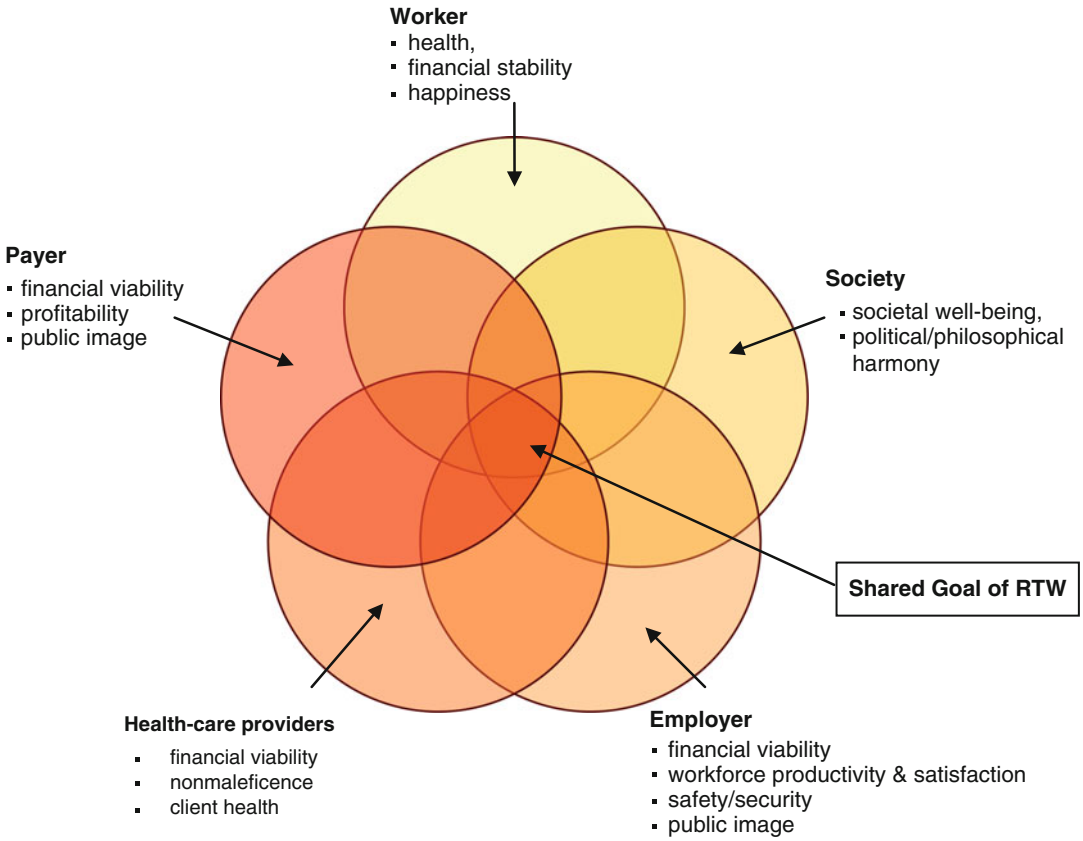

Fig. 25.1 Depiction of stakeholder groups demonstrating the common goal of successful RTW, along with examples of stakeholders' other, possibly competing, goals

an understanding, RTW outcomes have been shown to improve (Loisel et al. 1997; Department of Work and Pensions 2002). However, it should be noted that while improving communication can produce favorable outcomes (Mortelmans et al. 2006a), improving communication might not be enough (Mortelmans et al. 2006b). Beyond improving communication, others suggest adopting a holistic approach that focuses on workplace culture and is targeted to both the individual and the organization (Yassi 2005). In addition, others stress the importance of establishing common ground (Briand et al. 2008) and adopting an integrated approach (Frank et al. 1998) that involves shared commitment (Eijkemans and Takala 2005) and collaboration (Reynolds et al. 2006).

While this chapter has discussed each of the stakeholder group's interests as being somewhat homogeneous, it should be emphasized that individual and contextual factors play a large role in shaping the specific interests of a given individual/organization. Individual and contextual factors such as age, education, preinjury position, work value, familial responsibilities, national policy, economic climate, and philosophical position are likely to influence what specific aspects of work-disability reduction are of priority.

25.5 Conclusion

Improving our understanding of the nature of the consensus and tensions among RTW stakeholders is an avenue for helping them collaborate in their attempts to reduce the burden of work disability. Embracing a comprehensive approach, which highlights the differing perspectives of the various stakeholders, appears to be a possible avenue for

facilitating cooperation and commitment to the goal of work-disability reduction. In particular, given their central roles in the RTW process, enhancing collaboration between workers and their employers would appear to be fruitful avenue for work-disability prevention at both the micro- and macrolevel.

Acknowledgment This chapter reproduces, in part, material published in the article: "Return-to-Work Outcomes Following Work Disability: Stakeholder Motivations, Interests and Concerns" (Young et al. 2005). As such, I take this opportunity to acknowledge my earlier coauthors and thank them for their contribution to this work.

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Part VI

The Challenge of Implementing Evidence

Core Components of Return-to-Work Interventions

26

Katia M. Costa-Black

In order to maximize research utilization, effective intervention components of return to work interventions must be well understood. This chapter analyzes the use of scientifically sound implementation methods applied in the healthcare field and presents the key findings from two evidence synthesis studies on core components of return to work for individuals with musculoskeletal disorders' and with mental health conditions.

26.1 Introduction

In the last decade, there has been a growing interest on implementation of evidence-based return-to-work (RTW) interventions for work disability prevention and management. This well-deserved attention to implementation science is not exclusively observed in the work disability field. Numerous human services including health promotion, education, and social services, as well as various healthcare delivery services are reaching the point of better defining the "evidence bases" of the services and then moving forward towards improving methods and processes to implement them in various communities (Fixsen et al. 2005; Kitson et al. 1998). Once knowledge of evidence-based interventions is accumulated, then the question becomes how to make the best use of it.

The challenges and complexities of implementing an evidence-based intervention or program should not be underestimated. One particular challenge is to understand service delivery processes and contextual factors which can influence the success or failure of implementation (Fixsen et al. 2005). Another challenge resides in replicating an effective content in a different context (Galbraith et al. 2011). This chapter deals with this later challenge, i.e., it aims to uncover the current knowledge on RTW intervention components, which it is essential to consider when replicating effective interventions in different contexts.

A large number of effective RTW interventions varying from a single component intervention to multicomponent interventions (e.g., an intervention "package" usually combining occupational, clinical, and administrative interventions) are available today. These multifaceted interventions are usually offered as part of a proactive disability management or occupational rehabilitation scheme for workers affected by musculoskeletal disorders (MSDs), mental illnesses, cancer, traumatic brain injury, cardiovascular disorders, and other common health problems found in the workplace (please refer to Chaps. 17 and 18) (Waddell et al. 2009). New research on the implementation process and the outcomes of these interventions has shed light on the degree of complexity involved in their execution, mainly due to the fact that they require minimum level of engagement of a diverse group of

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_26,

stakeholders who may have competing interests regarding the timing and implementation of RTW actions (Loisel et al. 2005; Tjulin et al. 2009; Pomaki et al. 2010). The successful implementation of RTW interventions is important for all stakeholders involved. Yet in practice it often fails because it depends on a complex interplay of the motivations, perceptions, prejudices, attitudes, and feelings of those involved in the process (i.e., the workers themselves and the individuals and groups within the healthcare system, the workplace system, and the insurance/compensation system).

In order to promote a coherent concerted action by various stakeholders based on the best available evidence and to increase research utilization by practitioners, it is necessary to identify the essential components of these interventions. Knowledge of core components of RTW interventions can benefit many entities such as insurance and healthcare organizations interested in delivering best quality care services to workers. These entities must deal with complex healthcare systems and recent downscaling of social welfare systems coupled with social demands to prove their efficacy and quality of care delivery. Furthermore, stakeholders (e.g., healthcare providers, insurers, and employers) often have to choose which interventions to implement for their populations, and need guidance in implementing them in a cost-efficient manner without diminishing the intervention's effectiveness. Only by clearly defining core components is possible to designate the right amount of resources to implement an intervention and to measure its success. Another advantage when identifying intervention components is that the entire organization will be more willing to commit to deliver an intervention with great *fidelity* if all the effective components are known and understood by everyone.

Because of the complexity of RTW interventions, variety of study designs, and lack of description of intervention content and theory, it remains challenging to identify and consequently to replicate universally recognized core components of RTW intervention. This chapter explores this challenge and covers the following topics: (1) the methods and concepts that are important to identify core components with attention to the latest research developments in implementation science, (2) a summary of the latest evidence on core components of RTW interventions for workers with MSDs and with mental health conditions based on two literature syntheses, and (3) the research gaps which are important if we wish to foster better knowledge utilization of the fundamental components of RTW interventions in practice.

26.2 Extracting Core Components: Concepts and Methods

Any evidence-based intervention tested in a specific setting with a particular social, legal, and cultural context, is likely to be different, even very different, in another setting. However, if one wishes to replicate an intervention that has worked in one particular setting to another setting, an initial step is to identify which of its elements should be maintained and which ones could be adapted to the new setting (Damschroder et al. 2009). Core components are defined here as the intervention characteristics or "active ingredients" that must be kept intact when the intervention is being replicated or adapted, in order for it to produce outcomes similar to those demonstrated in the original evaluation research (Fixsen et al. 2005). This concept denotes the idea of *fidelity* to those components that most likely produce an intervention's main effects, while balancing any need to attach to particular adaptable features in each different setting. *Fidelity* is the faithful implementation of the program components.

Another important concept with regards to implementing evidence-based interventions is *adaptation*.

In real-world settings, modifications to the intervention features that have been tested in research trials, are often necessary to insure that the specific needs and cultural aspects of the target population are taken into account. These modifications guarantee the ownership of the intervention by the community of users and help them maintain and sustain the intervention over time (Fixsen et al. 2005).

Despite the noted tension between *fidelity* and *adaptation,* both are essential elements of prevention intervention program design and they are best

addressed by a planned, organized, and systematic approach. Towards this aim, an innovative program design strategy is to develop hybrid prevention programs that "build in" *adaptation* to enhance program fit while also maximizing *fidelity* of implementation and program effectiveness.

Overall, both *fidelity* and *adaptation* are essential elements for a successful implementation strategy. The modifiable features of the intervention need to be balanced with core components that are responsible for keeping *fidelity* to 'what' can explain the intervention efficacy. As an example, say that a certain type of ergonomic intervention is demonstrated effective by high-quality randomized control trials (RCTs). The ergonomic intervention is the core component. In this hypothetical example, the people wishing to replicate this ergonomic intervention in a different setting (and/or country), faced serious opposition of local employers. Looking at the implementation features in the original setting, they realize that the original ergonomics intervention was established by an agreement between researchers and employers, and the implementation was fully funded by a research grant. When they realize the difference in the replicating environment, a solution is sought to make the ergonomic intervention acceptable to local employers. The solution was to seek financial support for implementing the intervention from the compensation system. This type of *adaptation* is always necessary when implementing an intervention that was developed in a context and transferred to another. The content of the ergonomic intervention that explains its effectiveness is retained as it has been described in its originally tested environment.

Very recently, several methods have been developed to help program evaluators and developers to keep abreast with *fidelity* and *adaptation*. Essentially, these methods propose a systematic approach to identify core components and intervention features. The "systematic and scientific distillation" of the core components of an intervention has been developed by the new emerging field of implementation science (Greenhalgh et al. 2004). Although implementation science is a recent field and the methods are still being tested, scientists have developed promising processes from many implementation stories in business and healthcare fields (Fixsen et al. 2005; Greenhalgh et al. 2004). Recently, Damschroder et al. (2009) made a synthesis of 19 theories/constructs of implementation of interventions and developed the Consolidated Framework for Implementation Research (CFIR). This framework demonstrates a process for adapting the core components of an intervention to a variety of contexts. One key element of this framework is the identification of the core components of the intervention, as an initial step for preparing the intervention to be adapted to the local context with *fidelity*.

Another important framework that can be used for adapting interventions, is the Intervention Mapping, derived from the field of health education and promotion (Bartholomew et al. 2001). Recently, this method has been used to adapt and develop RTW interventions for particular target groups and settings (van Oostrom et al. 2007; Ammendolia et al. 2009; Vermeulen et al. 2009). Intervention Mapping is composed of five steps: (1) creating a matrix of proximal program objectives, (2) selecting theory-based intervention methods and practical strategies, (3) designing and organizing a program, (4) specifying adoption and implementation plans, and (5) generating program evaluation plans (Bartholomew et al. 2001). In step 2, core components of interventions are identified by literature review or theories about determinants.

Another approach to extract core components via the theoretical understanding of an intervention is described and used in the field of community psychology (Lee et al. 2008). This method proposes to look into the logic model or program theory, when not enough information about the components is obtained from empirical studies. Knowing the intervention logic or theory can facilitate the identification of components, because it can clearly show the relationship between components and effects. In a multifacet RTW intervention, the components are interrelated and the intervention effects are often described or tested as an intervention "package." Due to this challenge, very few studies can be found presenting the theory or logic model of these multifaceted RTW programs or interventions. In a qualitative study involving a multidisciplinary

rehabilitation team, Durand et al. (2003) described the PREVICAP program impact theory developed in Quebec, Canada. From this study, three groups of intervention components (i.e., those related to the worker, the work environment, and the interaction between the two) were identified and described. The importance of identifying these components resides on the fact that a rehabilitation team can orient the RTW activities around them, helping them to keep good integrity of effective intervention components (*fidelity*) (Durand et al. 2003).

Another method used to identify intervention components is evidence synthesis (e.g. traditional systematic reviews, realist syntheses, narrative syntheses, etc.) (Galbraith et al. 2011). Evidence synthesis plays an important role on intervention effectiveness, and in expanding our understanding of the conditions that are necessary for the successful real-world implementation of interventions. In the work disability prevention field where numerous RCTs have been conducted, evidence synthesis methods such as Cochrane Reviews are often used to assess the quality of evaluative studies (such as RCTs). Other evidence syntheses (e.g., narrative reviews and realistic reviews) are recently being used in this field in order to convey the evidence coming from a wider range of research designs (Pomaki et al. 2010; Hong 2010; MacEachen et al. 2006). Although meta-analysis remains on the top of the evidence-based pyramid when it comes to the medical model of disease and causal powers, for work disability it offers little insight into the mechanisms that influence RTW outcomes, since the effectiveness of the intervention is analyzed within a black box of causal efficacy. Understanding the outcomes details and the functional relationship between components and their effects, is critical when extracting intervention core components (Damschroder et al. 2009).

Furthermore, moving away from a disease cure paradigm to a work disability prevention paradigm requires a great effort to engage different stakeholders in research and in practice. Most methods for identification of core components that exist today propose to use a combination of techniques, preferably with the participation of relevant stakeholders and/or end users of the intervention in order to arrive at a more "user-friendly" and "user-supported" report of findings (Galbraith et al. 2011). Although no specific method of identification can guarantee that the relationship between the core components and the outcomes is fully captured, studies suggest that researchers using a more systematic and informed-based decision approach are more likely to succeed (Galbraith et al. 2011). In the next session, two examples of systematic and informed-based syntheses of the evidence on core components of RTW interventions for two target populations are showed.

26.3 Synthesis of the Evidence on Core Components of RTW Interventions

26.3.1 For individuals with Musculoskeletal Disorders

A nontraditional literature review was conducted on theories and characteristics of effective interventions and reputational programs in order to extract the core components of RTW interventions for individuals with MSDs (to be published). This multidisciplinary research project, titled "Knowledge synthesis on the core components of intervention to foster the utilization of evidence-based RTW interventions for workers with work disability from MSDs", involved the participation of eight researchers from different countries and five decision-makers (knowledge users from different communities from within Canada). The decision-makers were mainly involved at the stage of formulating research questions, during the search of seminal papers about RTW interventions, and for a final input during the synthesis process.

A meta-narrative review approach proposed by Greenhalgh et al. (2005) was used. This novel review method was chosen mainly because different bodies of literature are pulled together and each group is analyzed for its scientific quality and importance in the field (with the involvement of decision-makers in the review process). Moreover, it makes use of a narrative-interpretative reasoning which is a very useful approach to

synthesizing complex evidence data obtained from qualitative and quantitative studies. The final advantage of using this technique was that the review process dealt directly with the issue of translatability of intervention components by involving knowledge users and by approaching a large range of evidence (i.e., incorporating different research designs) based on its contribution to the field and its quality. The narrative analysis of different types of studies assisted the researchers in moving away from "methodological gold standards" and instead focusing on insuring the theoretical robustness and practical applications of findings (Popay 2006).

Following an exploratory search phase (including peer consultation, manual searching of relevant journals, and using a snowballing approach of all "seminal" publications), more formal and systematic search strategies were used. The search was limited to the period from January 1990 to December 2010 using a list of key terms sensitive to each database consulted (Medline, Embase, PsycINFO, CINAHL, the Cochrane Library, Social Sciences Abstracts, Scopus, and Compendex). This process was incremented by retrieving publications from recognized sources of gray literature (i.e., organizations sites such as National Institute for Health and Clinical Excellence, Institute of Work and Health, and the European Agency for Safety and Health at Work) and also using gray search engines such as Google Scholar and Health Management Information Consortium.

At the start of the appraisal phase, the objective was to be as inclusive as possible. Two reviewers independently appraised the titles and abstracts in relation to predetermined selection criteria determined by the relevance and worthiness of the study to our research questions. All studies or reports which described or tested the effects of RTW intervention (or one of its components) for workers presenting with MSDs were included (first-level screening). The RTW intervention was defined as an action or actions taken by a professional or a group of stakeholders in order to facilitate RTW or to improve an RTW-related outcome (e.g., decrease duration on temporary work disability, preventing new episode of occupational disability or transition to permanent disability, maintaining working ability, reducing sickness absence, reducing costs associated with work disability, and increasing chances to RTW). The main exclusion criteria were as follows: studies describing RTW interventions for serious MSDs (red flags), studies describing or testing an intervention that focuses on pain as an outcome rather than on RTW outcomes, and studies about vocational rehabilitation interventions (e.g., new skills training for job placement, supported employment programs, etc.).

All studies that passed the first-level screening were then appraised for methodological quality and relevancy in the field using a modified version of the critical appraisal form proposed by Greenhalgh et al. (2005) (second-level screening). A specific data extraction form was elaborated by the research team and used for extracting the core components of intervention from original studies evaluating intervention effectiveness (randomized trials, nonrandomized trials, and observational studies of high quality).

The entire search process identified 2,446 references, from which only 76 original studies, 14 scientific reviews, and 7 research reports met our inclusion and quality appraising criteria. From the 76 original studies, 27 were high-quality studies testing intervention "effectiveness," and from these studies a list of 15 intervention components were retained (Table 26.1). These components were further evaluated in terms of the supporting body of evidence coming from other than only, high quality "effectiveness" research. These other evidentiary sources were the remaining original studies (49) (i.e., economic evaluation studies and relevant complementary studies such as qualitative research, conceptual papers, process evaluation research, and/or surveys describing or reporting a single intervention component or multifaceted RTW programs). Highly relevant systematic reviews and reports were also analyzed in terms of the support they provide to the extracted components. The main findings show core components that are recommended based on an interpretative analysis of a combination of different types of evidence that has passed the study's quality and relevance screening. A log sheet with the

Table 26.1 Description of core components of evidence-based return-to-work (RTW) interventions for musculoskeletal disorders (MSDs)

	Intervention component	Basic description
Interface with worker	Cognitive behavioral approach	Workplace-based or nonworkplace-based cognitive behavioral treatment where attributions, expectations, beliefs, self-efficacy, personal control, attention to pain stimuli, problem solving, and coping self-statements are addressed either in one-to-one or group sessions
	Education to promote self-care and pain management	Basic advice to patient on pain management and self-care, such as instructions on taking pain medication on a fixed schedule and information about healthy lifestyle
	Education/advice about activity and work	Advice and recommendations to patient for appropriate levels of activity at home and at work and regarding RTW expectations
	Exercise program	An exercise program with job specificity or not including various types of physical activity, work hardening, conditioning program, or graded activity program
	Protocol-based clinical management	The administration of a clinical protocol to assist patients to obtain appropriate medical care and early RTW
	Work disability (or ability) assessment	Evaluation of disability factors or RTW obstacles using different tools or techniques (e.g., questionnaire, interviews, etc.)
Interface with workplace	Ergonomic or workplace assessment	A worksite visit or a full workplace assessment to identify work demands, work process, job characteristics, features of equipment and design of the workplace, loads handled, pace of the job, postural requirements, and environmental characteristics of the jobsite
	Participatory ergonomics	A collaborative ergonomic intervention process involving the ergonomist, the worker, and a selected workplace group, which includes a workplace assessment, problem inventory, work modification, and case management
	Provisional work accommodations	Transitional or temporary modifications in the job or tasks regarding working hours, duties, pace of work, performance expectations, and/or modification of the workstation. Workers can be temporarily assigned to a different job function or light duty if available
	Workplace at the center of the rehabilitation plan	The connection of clinical interventions to work participation goal with the rehabilitation activities progressively centralizing in the workplace, at the worker's regular job. It is also called therapeutic RTW
	Workplace modification (permanent)	A workplace modification is offered (negotiated) to accommodate the situation of an individual's health situation and functioning
Interface with stakeholders	Administrative provisions	Any action to avoid delays on RTW/rehabilitation involving employers or other stakeholders
	Communication between stakeholders	An interactive communication process between different players including healthcare providers, workplace actors, and workers, aiming to facilitate the RTW
	Team-based approach	Interdisciplinary, multidisciplinary, or an integrated teamwork is used to deliver and coordinate different types of treatments as part of a comprehensive rehabilitation approach
	RTW coordination or case management	A set of activities designed to manage and coordinate the RTW process more effectively, usually done by someone such as a job coach, a case manager, or a healthcare provider

exact descriptions about each intervention component as presented by the studies authors, was kept. This information assisted the researchers in verifying if there was coherence in the definition of a core component, and also in identifying the meaning of the components for different research traditions. Using the registry of the descriptions coming from the studies' authors, it was possible to define each component as showed on Table 26.1 (the components identified were also classified according to the corresponding interface of interaction). These definitions assisted in the process of verification of evidence with regards to each component, and they should be taken in consideration in future studies on evaluation and/or implementation of these components.

Table 26.2 Core components of RTW interventions for MSD and the supporting body of evidence

Intervention components		Supporting evidence					
		Effectiveness studies	Economic studies	Complementary studies	Reports	Reviews	
Interface with worker	Cognitive behavioral approach	+++	++	+++	+	++	A
	Education to promote self-care and pain management[a]	++	+	++	+	0	C
	Education/advice about activity and work[a]	+++	+	++	+	+	B
	Exercise program[a]	+++	++	+++	0	++	A
	Protocol-based clinical management	+	+	+	+	0	C
	Work disability (or ability) assessment	++	+	++	+	0	C
Interface with workplace	Ergonomic or workplace assessment	++	+	+++	+	++	A
	Participatory ergonomics[a]	+	+	+	+	+	C
	Provisional work accommodations	+	+	+	0	+	C
	Workplace at the center of the rehabilitation plan	+	+	+++	+	++	B
	Workplace modification (permanent)[a]	++	+	+++	+	++	A
Interface with stakeholders	Administrative provisions	+	+	++	0	+	C
	Communication between stakeholders	+++	+	+++	+++	+	B
	Team-based approach	+++	+	++	+	+	B
	RTW coordination or case management	+++	+	+++	++	+	B

0 No support was found or studies were not clear on the effects of the component
+ Between 1 and 3 studies clearly support this component
++ Between 3 and 5 studies clearly support this component
+++ More than 5 studies clearly support this component
[a]At least one study shows that this component has been tested as a single component

Table 26.2 shows a synthesis of the evidence compiling 15 intervention components identified up until completion of this review. The table presents the components with the related source and level of evidence. Three main groups of intervention components of a RTW intervention were identified: (1) components that have a direct interface with workers, (2) components that have an interface with the workplace, and (3) components that have interface with different stakeholders. These components are the activities and actions reported in the literature as essential for achieving successful RTW outcomes. They may compose the tested intervention either as a single or multi-components. When these components are replicated (as a single or multi-components), they should be kept without alteration of their main principles as described on Table 26.1. However, each component has some adaptable features (or periphery as referred by the CFIR), which can be determined according to specific local settings. For instance, the component "team-based approach" indicates that there is good evidence for the use of an interdisciplinary, multidisciplinary, or an integrated rehabilitation team approach. The integrated approach is a "team-based approach", which combines occupational rehabilitation with clinical treatment. An example of the adaptable feature related to this component would be the difference that exists in the team composition

Table 26.3 Grading of evidence used in this project

A. Strong research-based evidence (for the component which has at least ++ "effectiveness studies" and ++ "reviews")
B. Moderate research-based evidence (for the component which has at least + "effectiveness studies" and + "reviews")
C. Limited research-based evidence (for the component which has at least + in any particular study type)

from one place to another. Lambeek et al. (2010) describes a RTW intervention tested in the Netherlands consisting of an integrated team approach composed by a clinical occupational physician, a medical specialist, an occupational therapist, and a physiotherapist. Meanwhile Bultmann et al. (2009) tested the effectiveness of another RTW intervention in Denmark and described an interdisciplinary team approach consisting of an occupational physician, an occupational physiotherapist, a chiropractor, a psychologist, and a social worker whose role is that of caseworker. For program developers, it is essential to learn the strength of the evidence that can support the implementation of a "team-based approach" (as one component of a RTW program). Contextual variations (such as the ones made for the Netherlands and Denmark), are then decided according to each setting. These variations will determine the appropriateness (or the "fit") of the intervention component in a specific setting and will facilitate the logistics of "how to implement" (Fixsen et al. 2005).

Table 26.3 shows the grading system used to determine the levels of evidence of each component, once all studies were appraised. This grading system follows similar methodology as the one proposed by the National Institute for Health and Clinical Excellence. The extent of the different levels of evidence (i.e., from strong to limited evidence) must be interpreted with caution. Although reviews and effectiveness studies are in the high hierarchy of levels of evidence, one must consider that all components have some supporting evidence coming from other types of studies (including economic evaluation studies and relevant complementary studies). This makes an argument for the utilization of any of the 15 components listed on the table (which are by definition the most essential components to consider if one wishes to replicate effective RTW interventions).

Naturally the components with grading A or B are the most desirable to maintain in an RTW program. Components with limited evidence today might present strong evidence tomorrow and vice versa (depending on the invested amount of RTW intervention research). Other components not listed on Table 26.2, may also be essential for effective RTW. Their importance is not yet fully recognized scientifically given that the studies reviewed do not clearly state their effects on RTW outcomes or there is conflicting or insufficient evidence not supporting their inclusion. The issue of the strength of recommendation of each component must be dealt with cautiously and analyzed with respect to the targeted areas for research as the next steps in the development of implementation agenda for work disability prevention.

Moreover, recommendations about the real-world utilization of the core components must be clear with regards to the evidence on their effectiveness. The outcomes from the "effectiveness" studies reviewed, concentrated on individual-related outcomes, and they were limited in considering other systems-related outcomes (beyond the personal system). It becomes apparent that for work disability prevention research, it is important to evaluate and include other types of evidence derived from cost-effectiveness analysis and qualitative studies in order to capture the effects of the RTW process in other systems (e.g. in the workplace system with keeping good productivity level, or in the compensation system with the resolution of disability claims).

It was observed with this literature review of the RTW intervention components for MSDs that there is a general lack of standard nomenclature about intervention content. Many published RTW interventions that could be very promising in reducing the burden of work disability lack detailed documentation of content and definitions of components (Hong 2010). This issue can lead to inappropriate conclusions about the effectiveness of these interventions and to inappropriate recommendations for research uptake. It is strongly recommended that researchers prepare

possible knowledge transfer during research trials by documenting details of the intervention and also ensuring that all relevant stakeholders are integrally involved in all aspects of the research uptake (Popay 2006; Eke et al. 2006).

26.3.2 For Individuals with Mental Health Conditions

A synthesis of the core components of RTW and Stay at Work (SAW) interventions for workers with mental health conditions is presented on Table 26.4. This literature synthesis was drawn from a recently published report titled "Best Practices for RTW/SAW Interventions for Workers with Mental Health Conditions" (Pomaki et al. 2010). This report was prepared by the Occupational Health and Safety Agency for Healthcare (OHSAH) in British Colombia (Canada) as part of a joint effort between OHSAH's team and participating stakeholders from the healthcare sector, including unions, employers, healthcare providers, and workers' representatives. The method used in the report to identify the best practice components of RTW intervention for individuals with mental health conditions, was a systematic literature review that considered quantitative studies, qualitative studies, guidelines, reviews, and reports. The main targeted group reviewed was workers with common mental health conditions as primary or secondary diagnosis: mood disorders (major depressive disorder, bipolar disorder, cyclothymic disorder, dysthymic disorder), anxiety disorders (generalized anxiety disorder, panic disorder, phobias, acute stress disorder, agoraphobia, post-traumatic stress disorder, obsessive-compulsive disorder), adjustment disorders, and burnout.

A full description of the systematic review process is available elsewhere (Pomaki et al. 2010). The authors' approach to identification of components of RTW interventions for individuals with mental health conditions was based on the recognition of fundamental principles of best practices related to those components. These so-called best practices principles were classified according to the following levels of interventions:

1. Organizational level: interventions directed towards the whole organization to improve the physical or psychosocial environment within which the worker functions.
2. Disability management practice level: interventions directed towards the practice of disability management that can either aim to improve existing practices or introduce new RTW practices.
3. Individual level: interventions focus on the individual worker that try to improve worker care, access to care, or help the worker better adapt to his/her environment.

Table 26.4 presents the "principles of best practice" that were found to have strong or moderate evidence. Similar to the synthesis review for MSDs previously described, this synthesis review consistently incorporated stakeholder feedback to facilitate dissemination and improve the relevance and acceptability of the findings. Many fundamental components of RTW/SAW intervention for mental health conditions are quite similar from ones identified in the synthesis of evidence for MSDs. In particular the following intervention components present significant similarities: work accommodations (especially if delivered as a supportive option facilitated by the employer and meaningful to the worker); RTW coordination (for mental health conditions, this component also relates to the required level of training of company supervisors described in Principle 1); improved communication activities about the RTW situation as well as current policies and benefits related to RTW; and the utilization of workplace-based and work-focused cognitive behavioral interventions. Other common work-incapacitating health problems might share the same fundamental intervention principles and components. More research is needed to confirm this hypothesis.

As the examples of the OHSAH report and the meta-narrative review described in the previous sub-session, it is clear that scientists are beginning to recognize the value of understanding intervention components as a means to improve research-to-practice translation and dissemination of evidence-based care in the field of work disability prevention. These different approaches for evidence synthesis are important examples

Table 26.4 Principles of best practice and related components of RTW/SAW interventions for individuals with mental health conditions (adapted from OHSAH's report (Pomaki et al. 2010))

Organizational level	Principle 1: Clear, detailed, and well-communicated organizational workplace mental health policy • Promotion of a people-oriented organizational culture • Recognition that workers have mental health needs and identification of the factors that impact worker mental health and well-being in the workplace • Training supervisors on workplace mental health, which can improve awareness of the occupational implications of mental health conditions while presenting supervisors with opportunities for identifying and facilitating early intervention for mental health conditions
Disability management practice level	Principle 2: RTW coordination and structured, planned, close communication between workers, employers, unions, healthcare providers, and other disability management stakeholders • RTW coordination and negotiation amongst stakeholders • Structured and planned close communication between the worker, supervisor, healthcare provider(s), union representatives, and other disability management stakeholders. This includes in-person/telephone contacts and written information for workers with mental health conditions on current policies and benefits
	Principle 3: Application of systematic, structured and coordinated RTW practices • Application of RTW practices that activate the worker and help keep the worker engaged in the RTW process • The use of adapted implementation of established guidelines currently available for occupational physicians • Check-ins at distinct times, to assess progress in the RTW process and the worker's needs • RTW practices should be specific, goal-oriented, and most importantly maintain a focus on work function, workplace behavior, and RTW outcomes
	Principle 4: Work accommodations are an integral part of the RTW process, and the context of their implementation determines their effectiveness • Work accommodations as part of the RTW process are recommended, taking into account the circumstances of the worker and the workplace • Work accommodations should include a sensible redistribution or reduction of work demands on the worker and his/her coworkers • Making transitions to less stressful environments may be beneficial for workers who are unable to change or cope with the fast-paced, high-pressure nature of their working conditions • Senior management support for work accommodation and coworkers support are essential
Individual level	Principle 5: Facilitation of access to evidence-based treatment reduces work absence • The utilization of workplace-based and work-focused cognitive behavioral interventions • The intervention needs to be symptom focused and delivered by mental health professionals • For optimal results, cognitive behavioral therapy-based interventions should be combined with work accommodations and/or counseling about RTW

for researchers seeking to integrate knowledge transfer activities and participation of knowledge users when evaluating the evidence on intervention effectiveness. Both reviews have non-traditionally investigated "effectiveness" from a pragmatic view of "what is worthwhile" to implement, by integrating the perspectives of knowledge users in the synthesis process. Further, both reviews presented a broader consideration of intervention effectiveness by analyzing different types of study designs with strong consideration of the cumulative knowledge coming from non-medical field. For instance, OHSAH's report looked at the different effects of workplace-based interventions by including studies that measured a large range of health and non-health-related

outcomes such as disability duration, workplace productivity, quality of work (improved worker's sense of self), workers' quality of life, and economic outcomes.

26.4 Targeted Research Areas to Foster Utilization of Evidence on Core Components

26.4.1 From Core Components to a Better Understanding of the Implementation Process

It appears that research on the effectiveness of many RTW interventions continues to grow in popularity, and a number of core components can be extracted from the literature. Nonetheless there continues to be substantial gaps in our understanding of how they can be successfully implemented. At this nascent stage of implementation research in the field of work disability prevention, it is important to avoid "reinventing the wheel." Researchers in this field can learn from healthcare and non-healthcare studies that have successfully tested implementation guidelines and frameworks in practice (Fixsen et al. 2005; Damschroder et al. 2009). A new and interesting debate is arising in the area of implementation of multifaceted RTW interventions by analogy to methods already validated or in use by other research fields. An example is the IM method described earlier which was derived from health promotion and recently used in the development of new RTW interventions (van Oostrom et al. 2007; Ammendolia et al. 2009; Vermeulen et al. 2009).

Kitson et al. (1998) argue that successful implementation of research into practice is a function of the interplay of the level and nature of the evidence, the context or environment into which the research is to be placed, and the method or way in which the process is facilitated. The level of the evidence as demonstrated by the two heretofore mentioned syntheses of core components on RTW interventions is high in terms of the cumulative knowledge acquired thus far on effective actions and activities to prevent work disability for individuals with MSDs and mental health conditions (although these are largely underutilized). Knowledge utilization for work disability prevention requires that all relevant stakeholders became aware and sensitized to the evolving nature of the evidence in this field. More researcher-user collaboration should be encouraged when interventions are tested or designed, since with time they can become redundant or neglected if they are not accepted by a community of users or if they are not feasible to implement (Kitson et al. 1998).

Moreover, there is an urgent need for identification and appraisal of the evidence on the implementation of multifaceted RTW intervention in order to clarify key issues such as program compliance, i.e., how well a method is followed in practice; the appropriate adjustments that can be made to local conditions without interfering with the effect of the intervention; and the professional training required and the requisite competencies of professionals to deliver intervention components. Several recent research studies can be found that address some of these issues. For example, Shaw et al. (2008) have addressed the issue of the role and competency of a RTW coordinator, who should in principle be an unbiased, autonomous case manager with very specific professional skills (Shaw et al. 2008). In spite of some research identifying this and other key conditions of implementation, there is a general lack of synthesis of evidence in this area that makes translatability difficult.

It is also important to acknowledge that for successful utilization of core components of evidence-based RTW interventions, additional efforts are needed to define program components in terms of the combination that must be kept intact in order to produce program outcomes similar to those demonstrated in the original evaluation research. Implemented RTW interventions generally consist of multiple components, some not always able to demonstrate its success in isolation, but when combined these components may function as the determining mechanisms of the intervention effectiveness. Since RTW is fundamentally a human process, this combination is likely to change according to each jurisdictions and experience of program developers (MacEachen et al. 2006). Nonetheless, the two reviews show that for different target populations (i.e., mental health condi-

tions and MSDs), similar components are observed and they are comparable and valuable to decision-makers/stakeholders searching for universal solutions to achieve the best RTW outcomes. When a number of core components have already been identified, it is important that more research is undertaken to validate the existing set (as a single or a multicomponent intervention) and to uncover other promising core components, including the core components of implementation—which are by nature context specific. The specific development and validation of the methods to identify "universally" recognized components of evidence-based RTW interventions may in the future guide effective translational research in work disability prevention.

26.4.2 The Adaptation Issue: Taking Context into Consideration

A starting point to boost up knowledge utilization is to identify the "universal" components of the intervention, preferably once the question of effectiveness of intervention is clearly answered, and there is a general consensus about the logic or theory of the intervention. While intervention components might be recognized as "universal," intervention features and the related implementation process vary widely from country to country and from place to place within countries (Fixsen et al. 2005; Damschroder et al. 2009).

Implementation is a relatively new challenge for the field of work disability and an area that needs substantial increase on investment from relevant funding agencies. A particular need is to develop *adaptation* guidelines that oversee contextual readiness and characteristics of local populations, and determine the transfer skills necessary for implementation while maintaining the same level of effectiveness of the original intervention (Fixsen et al. 2005; McKleroy et al. 2006). In order to develop these guidelines, more research is needed on comparing the implementation processes and features for different RTW programs, taking into account the context where implementation happened (independent of the implementation outcomes). Although following completion of such comparative analysis, local circumstances may change due to changes in policy or stakeholders' behavior, an understanding of a context-specific implementation process is essential for better evidence utilization in practice (Fixsen et al. 2005).

When the setting is different, program developers must seek to develop an appropriate fit. From the knowledge already available on implementation research applied in different health services, it is possible to withdraw valuable recommendations for adapting innovation into current practice. These are generic recommendations but are nevertheless valuable across multiple sites and clinical contexts. A community-based organization created by a university group in the United States (the Work Group for Community Health and Development at the University of Kansas) developed a Web site called "the Community Tool Box" which contains key principles and guidelines to help achieve successful *adaptations* in healthcare (The Community Toolbox by the Work Group for Community Health and Development at the University of Kansas 2012). This group recommends careful thinking and planning as to why, when, and how to adapt an innovation with attention to cultural traditions. For that it is necessary for program developers to show respect for different cultural values and identities. It is also important not to bypass the community ownership and its ability to connect with relevant stakeholders and with other communities.

Any evidence-based RTW program should establish its own specific strengths and identity according to well-defined local *adaptations*. Because RTW interventions use a multifaceted approach involving different types of interactions and professionals, a local consensus-focused process must take place with relevant stakeholders to help program developers devise tailor-made intervention *adaptations* and implementation characteristics. These precisions are related to the effective methods of delivery, the dose and intensity needed, the required level of stakeholders' involvement, the staff training and support they need, recruitment and compliance issues, etc. If no investment exists on research at that

level, program developers will face a difficult implementation process with, potentially, multiple resources wasted. A local consensus process in the form of a feasibility or needs assessment study can be a good opportunity to identify all these contextual issues, especially ones related to needed changing behavior of the people involved in the implementation. This process has been tested and a model has been proposed with regards to identification of contextual issues in the field of work disability prevention (please refer to Chap. 27) (Fassier et al. 2011).

The CFIR is also an excellent point of reference for attending to key conditions of implementation related to the context (up until now these are often poorly described in intervention research) (Damschroder et al. 2009). This framework presents a comprehensive classification of dimensions that can then direct researchers and program developers towards a foundation of excellence in service delivery while supporting each program own specific strengths and identity. Given the uniqueness of each site and the range of stakeholders involved, it becomes clear that there is a need to balance *fidelity* and *adaptation* of intervention components. More research is needed to empirically determine the type and amount of flexibility required to foster better utilization of evidence-based components deemed effective.

26.5 Conclusion

Core components are intervention components that must be maintained without alteration to ensure program effectiveness. In view of the diversity and level of complexity of interventions proven effective in reducing work disability and in facilitating the RTW process, it remains challenging to identify and prioritize intervention components. This chapter has analyzed the use of scientifically sound implementation methods and models developed and applied in other healthcare fields, to inform those working in the work disability prevention field on how to overcome this particular challenge. It also presented the key findings from two evidence synthesis studies on core components of RTW for individuals with MSDs and with mental health conditions.

The evidence presented on core components does not recommend its own interpretation. Understanding the fundamental components of evidence-based interventions is but a starting point towards successful implementation. More efforts are needed to achieve a level of consensus amongst stakeholders on intervention and implementation core components in this field. Questions about contextual *adaptations* and optimum conditions for implementation are beginning to be raised related to evidence-based RTW interventions. Recommendations on the use of knowledge of core components must be sensitive to these questions (which still need more investigation) and to the evolving nature of the evidence about the interventions.

The summary of the evidence presented reveals our partial understanding of the most important "active ingredients" of RTW interventions. Certainly more research development in this area is needed not only to foster implementation of evidence-based approaches but also to develop an acceptable nomenclature for knowledge dissemination of evidence-based components. For now, the valuable concepts and methods presented in this chapter provide general insights as to how to move beyond intervention effectiveness and embrace knowledge translation.

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Identifying Local Obstacles and Facilitators of Implementation

27

Jean-Baptiste Fassier

This chapter aims at describing the likely barriers and facilitators encountered when implementing return-to-work interventions in a new context so that implementation strategies may be defined.

27.1 The Challenge of Implementing Evidence

The evidence-based medicine (EBM) movement was developed in the 1980s and defined as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient (…)" (Sackett et al. 1996). EBM was developed in order to improve the appropriateness of clinical decisions on the part of healthcare practitioners and clinical outcomes in patients. Evidence-based clinical practice guidelines (CPG) are one of the tools that were developed to ease the uptake of scientific evidence by clinicians in the form of readable and actionable knowledge. However, since its development, it became clear that healthcare practitioners' behaviors could not be easily modified by the simple release of CPG (Cabana et al. 1999; Haines et al. 2004). Then new ideas for reducing "knowledge-to-action gap" began to emerge. Studies on the determinants of (non) uptake of guidelines by healthcare practitioners identified barriers and facilitators at the individual level (practitioner and patient's level), the organizational level (local organization and culture), and at a more governance level including legal, political, and economic issues (Cabana et al. 1999; Saillour-Glenisson and Michel 2003). The characteristics of guidelines were also pointed out as likely determinants of their (non) adoption, leading to the development of standards for guidelines' development intended to increase their credibility and usability (AGREE 2003).

Whereas the EBM movement focused initially at the individual level of providers' behavior, it evolved secondarily towards a more comprehensive vision of care with its organizational and political dimensions (evidence-based healthcare and evidence-based policy). In this respect, the literature about organizational change and the diffusion of innovation is essential to understand implementation issues in healthcare. The diffusion of innovations' topic was studied by Rogers (1995a) whose findings were largely used in the healthcare context (Berwick 2003).

The growing importance of translating research findings into improving the quality of healthcare led to many appellations describing a new field of practice and research: knowledge transfer, knowledge translation, knowledge transfer and uptake, etc. Some confusion resulted from the superposition of different terminologies, even though their concepts were often similar (Graham et al. 2006).

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_27,

The Canadian Institutes of Health Research developed their own knowledge translation strategy and refined the knowledge-to-action framework with a knowledge creation cycle and an action (application) cycle (Straus et al. 2009). Comprehensive reviews were conducted by Greenhalgh et al. (2004a), Fixsen et al. (2005), and Damschroder et al. (2009) aiming to clarify and synthesize the many constructs and theories related to organizational change and the diffusion of innovations in healthcare. Greenhalgh et al. provide useful definitions of diffusion (passive spread), dissemination (active and planned efforts to persuade target groups to adopt an innovation), implementation (active and planned efforts to mainstream an innovation within an organization), and sustainability (making an innovation routine until it reaches obsolescence) (Greenhalgh et al. 2004a, b). These reviews agree to distinguish three possible levels of influence on the implementation process, i.e., the level of individuals (personal values, self-efficacy, knowledge and beliefs about the intervention, etc.), the level of the inner context (organizational culture, structure characteristics, readiness for implementation, etc.), and the level of the outer context (external policy and incentives, health needs and resources, etc.). These reviews also insist on the importance of describing the innovation/intervention characteristics that are likely to ease or impede its adoption (compatibility, complexity, relative advantage, trial ability, etc.). Eventually, the process of change and implementation is described as complex and nonlinear with back and forth movements requiring multiple social interactions.

To summarize, the implementation of evidence-based changes and innovations in healthcare is usually an unpredictable, slow, and haphazard process which takes place at the individual level (modification of one's behavior), at the organizational level (introduction of new procedures), or at the governance level (such as legal or economic measures) (Berwick 2003; Greenhalgh et al. 2004b). It is therefore highly recommended to perform a context analysis that identifies potential barriers and facilitators at these different levels prior to introducing a new intervention (Damschroder et al. 2009). The evidence about the effectiveness of different strategies to improve patient's care and outcomes points out that no single intervention is effective under every circumstance but that a combination of different strategies is more likely to be effective, presumably because barriers are addressed at different levels (Grimshaw et al. 2003). However, there is little indication to date about the best way to identify and evaluate barriers and facilitators and how to link implementation strategies with the context analysis (Baker et al. 2010). Moreover, future research should evaluate the relative cost-effectiveness of different implementation strategies in order to avoid duplication of efforts by those interested in replicating an intervention.

Similarly to other fields in healthcare, the knowledge-to-action gap has been documented in the field of work disability prevention in several countries with little uptake of the evidence by the different stakeholders (Loisel et al. 2005a). Loisel et al. described in Quebec (Canada) the failure of the Quebec work rehabilitation consortium that aimed at integrating the principles of the Sherbrooke model into the routine organization of care for low back pain workers (Loisel et al. 2005a). Despite the robust evidence of the effectiveness and cost-effectiveness of the Sherbrooke model, the efforts undertaken by the researchers to spread and sustain this evidence-based model at the provincial level eventually failed. Plausible reasons for this failure at the Workers' Compensation Board level were budget cuts and the reluctance of case managers to refer workers to the rehabilitation program (Loisel et al. 2005a). Similar cases of failed programs and policies were reported in Australia, Norway, the United States, and France (Loisel et al. 2005a). These failures were linked to different kinds of barriers at the political level (change in elected government), the financial level (lack of appropriate and sustainable funding), or the individual level (work overload and/or personal reluctance of the stakeholders). In light of these experiences, particular attention should be paid to implement research findings at the multisystem level when it comes to dealing

with a complex innovation such as work disability prevention intervention involving different stakeholders (Loisel et al. 2005a; Franche et al. 2005a; Roquelaure 2008).

27.2 Work Disability Prevention Programs as Complex Interventions

Complex interventions are conventionally defined as interventions with several interacting components (Craig et al. 2008). They may present different dimensions of complexity such as the number of interactions and the level of interactions between components, the number of behavior changes required by those delivering or receiving the intervention, the number of groups or organizational levels targeted by the intervention, the number and variability of outcomes, and the degree of flexibility or tailoring of the intervention that is permitted (Craig et al. 2008). This definition is in line with the complexity of social interactions at stake in work disability prevention illustrated by the arena model of Loisel et al. (2005a) (see Chap. 6). Considering that complex innovations and interventions are known to be harder to implement, it becomes obvious that work disability prevention programs and return-to-work (RTW) interventions should be considered as high-risk projects, which require a carefully planned implementation. More specifically, it is recommended to identify the conflicting needs of all the stakeholders (Franche et al. 2005a) and to identify the barriers and facilitators at the different levels within each category of stakeholder (Fassier et al. 2011).

27.3 Barriers and Facilitators to the Implementation

In accordance with the multisystem attention proposed by the ecological case management model by Loisel et al. (2005a) and developed in Chap. 6 of this handbook, elements likely to hamper or facilitate the implementation of interventions have been reported in the scientific literature. The following sections provide a synthesis of the evidence of such barriers and facilitators explored and described with regard to the healthcare system, the workplace system, and the insurance system.

27.3.1 Barriers and Facilitators in the Healthcare System

The report from the Quebec Task Force on spinal disorders issued in 1987 (Spitzer 1987) has been decisive in developing the field of work disability prevention. This Task Force was the first official document reporting on abnormal variations in the provision of care for low back pain workers from one region to another, especially regarding the number and length of physiotherapy visits. The Spitzer report was also the first so-called clinical guideline intended to raise the quality of care and health outcomes of patients with low back pain (Spitzer 1987).

In the following years, many countries issued their own clinical guidelines for low back pain with a relative consensus about their content (Koes et al. 2001; van Tulder et al. 2004; Airaksinen et al. 2006; Arnau et al. 2006), including recommendations specifically aimed at preventing work disability due to low back pain. These features are the identification of psychosocial risk factors of chronic pain and disability (yellow flags), the advice of maintaining usual activities as far as possible, the limitation of sick leave prescriptions, and the limitation of imaging tests (Koes et al. 2001; van Tulder et al. 2004; Airaksinen et al. 2006; Arnau et al. 2006). Considering the little uptake of these guidelines in clinical practice, it is important to understand the determinants of (non) adherence of healthcare practitioners to clinical guidelines for low back pain since they are likely barriers and facilitators to the implementation of interventions for workers with low back pain. Different types of studies such as surveys of practice, implementation of guidelines, and qualitative inquiries uncovered a wide range of barriers and facilitators for research uptake among physicians and allied healthcare professionals. An important finding of this

literature is the worldwide observation of such barriers and facilitators in North America (Li and Bombardier 2001; Ammendolia et al. 2002a; Freeborn et al. 1997; Cretin et al. 2001; Schectman et al. 2003; Côté et al. 2009), in Europe (Schers et al. 2000, 2001; Bekkering et al. 2003; Luijsterburg et al. 2004; Overmeer et al. 2005; Poiraudeau et al. 2006; Chenot et al. 2008a; Rutten et al. 2009; Espeland and Baerheim 2003; Harting et al. 2009), and in the Middle East (Dahan et al. 2007) among a range of healthcare practitioners (mainly general practitioners, physiotherapists, and chiropractors). Tables 27.1 and 27.2 describe the barriers and facilitators identified within the healthcare system at different levels.

27.3.2 Barriers and Facilitators in the Workplace System

Several researchers studied the implementation of occupational health and safety interventions with the aim to understand the mechanisms of the implementation process. Van der Molen et al. proposed a model detailing different phases to implement a participatory ergonomics intervention (van der Molen et al. 2005). Despite the analytical interest of this model, its limitation is that the model is more prescriptive than evidence-based, and also it focuses more on primary prevention than on interventions to RTW (Anema et al. 2003). Baril-Gingras et al. (2006) studied the determinants of changes brought by occupational health and safety interventions across a range of economic sectors. Based on the study of seven interventions, the researchers propose a research model to analyze the influence of the intervention, the inner context of the workplace (social relations, work organization, resources, etc.), and the outer context (regulatory constraints, interorganizational network, etc.) on the adoption of preventive changes in the workplace. More specifically, Baril and Berthelette conducted a multiple case study to identify the organizational determinants of the implementation of RTW interventions, measures, and policies in the workplace (Baril and Berthelette 2000b). They propose an evidence-based model grounded in the in-depth analysis of 16 workplaces. This model emphasizes the different levels of influence both inside and outside the workplace, some of them being technical (size, activity, resources of the workplace) and some others belonging to the management and the social relations in the workplace.

Qualitative research on implementation issues brought many insights on the nature of the barriers and facilitators encountered at different levels during the RTW process (Baril et al. 2003b; MacEachen et al. 2006, 2007, 2010a, b; Tjulin et al. 2009, 2010, 2011a; Baril et al. 2003a; Driessen et al. 2010; Maiwald et al. 2011; Ståhl et al. 2010).

Baril and Berthelette (2000a), Driessen et al. (2010), MacEachen et al. (2010a), Maiwald et al. (2011), Stahl et al. (2010), and Tjulin et al. (2009, 2010, 2011a) reported on particular implementation experiences allowing the identification of several barriers and facilitators. Van Eerd et al. (2010a) conducted a systematic literature review on the process and implementation of participatory ergonomic interventions that details many barriers and facilitators. MacEachen et al. (2006) conducted a systematic review of the qualitative literature on RTW after injury that emphasizes the importance of social relations and mutual interactions as key factors in the implementation of RTW measures. Examples of barriers and facilitators mentioned by these qualitative reports at the individual, workplace, and outer context levels are given in the tables below (Tables 27.3 and 27.4).

To summarize, barriers and facilitators in the workplace system were described at the individual, workplace, and outer context levels. They may be related to technical categories such as work organization or to social categories such as the management or social relations in the workplace (Baril and Berthelette 2000b). Mutual interactions between these levels (individual, workplace, and contextual levels) and categories (work organization, management, social relations) are also to be taken into account before, during, and after the RTW process (Tjulin et al. 2010).

Table 27.1 Barriers identified within the healthcare system

External level: outer context such as legal, economic, or political context		
Legal issues	Medical secrecy that may act as a barrier to shared information and decision making	Fassier et al. (2011); Baril et al. (2003b)
	Complexity and bureaucracy of procedures and form filling for healthcare practitioners and patients	MacEachen et al. (2006, 2007, 2010a)
Economic issues	Fee-for-service reimbursement basis as an incentive to medicalization by healthcare professionals	Fassier et al. (2011)
	Lack of financial incentives for healthcare practitioners to get involved in complex cases management	MacEachen et al. (2010a)
Public health issues	Lack of access to recommended treatments (multimodal treatment for chronic low back pain)	Fassier et al. (2011); Espeland and Baerheim (2003); Chenot et al. (2008b)
	Physician shortage leaving physicians over-engaged	MacEachen et al. (2010a)
	Poor interactions between primary and inpatient care	Edlund and Dahlgren (2002)
Organizational level: inner context of a hospital, liberal practice, rehabilitation, or occupational health service		
Organizational culture	Focus on physiological rather than occupational outcomes	Fassier et al. (2011); Baril et al. (2003b)
	Exclusive focus on chronic pain patients	Fassier et al. (2011)
	Influence of colleagues on patient's experiences and expectations	Schers et al. (2001); Dahan et al. (2007)
	Previous bad experiences with practice guidelines	Cretin et al. (2001)
Resources	Staff turnover	Cretin et al. (2001)
	Lack of appropriate information system	Fassier et al. (2011); Cretin et al. (2001)
	Lack of technical support from the administration	Cretin et al. (2001)
	Competing demands for resources and staff time	Fassier et al. (2011); Cretin et al. (2001)
	Limited attention to the training needs of the personal	Cretin et al. (2001)
Collaborations	Problems in the cooperation with colleagues	Fassier et al. (2011); Espeland and Baerheim (2003); Chenot et al. (2008b)
	Lack of structured collaborations between healthcare facilities or with other stakeholders	Fassier et al. (2011); Baril et al. (2003b); MacEachen et al. (2006, 2010a); Baril and Berthelette (2000a)

(continued)

Table 27.1 (continued)

Individual level: healthcare practitioner		
Knowledge and skills	Lack of knowledge or familiarity with the guidelines	Overmeer et al. (2005); Harting et al. (2009); Dahan et al. (2007, 2008)
	Lack of knowledge of workplace issues and social legislation	Baril et al. (2003b); Edlund and Dahlgren (2002)
	Biomechanical view of low back pain or work disability	Fassier et al. (2011); Côté et al. (2009); Ammendolia et al. (2002b); Tjulin et al. (2009)
	Professional's own beliefs or fear avoidance	Fassier et al. (2011); Poiraudeau et al. (2006); Schers et al. (2001)
	Lack of professional skills (psychological evaluation and behavioral treatments)	Fassier et al. (2011); Côté et al. (2009); Harting et al. (2009); Edlund and Dahlgren (2002)
	Lack of relational skills (to face difficult patients and resist their expectations)	Schers et al. (2001); Espeland and Baerheim (2003)
	Tensions arising from the diverse obligations of the primary care physician's role	Freeborn et al. (1997)
Values	Lack of agreement with recommendations	Li and Bombardier (2001); Côté et al. (2009); Overmeer et al. (2005); Schers et al. (2001); Harting et al. (2009)
	Lack of expected results	Côté et al. (2009); Overmeer et al. (2005); Espeland and Baerheim (2003); Harting et al. (2009)
	Fear of not meeting patient's expectations	Côté et al. (2009); Chenot et al. (2008b)
	Perceived patients' preferences	Schers et al. (2000, 2001)
	Reluctance to address psychosocial issues	Edlund and Dahlgren (2002); Pincus et al. (2010)
Practice	Return-to-work program lacking compatibility with usual practice	Fassier et al. (2011); Côté et al. (2009); Guzman et al. (2002)
	Advice on work and activity differing from clinical guidelines	Baril et al. (2003b); Guzman et al. (2002); Ikezawa et al. (2010)
	Inadequate, belated, or absent form filling	Baril et al. (2003b); MacEachen et al. (2010a)
	Avoidance of injured workers	MacEachen et al. (2010a); Lippel (2007)
	Lack of contact with the employers	Baril et al. (2003b); Friesen et al. (2001)
Resources	Lack of resources (time, training)	Fassier et al. (2011); Cretin et al. (2001); Harting et al. (2009); van Oostrom et al. (2009)
Individual level: patient		
Expectations	Focus on pain and expectations of "real" (hands-on) treatment instead of (hands-off) exercise therapy	Côté et al. (2009); Bekkering et al. (2003)
	Patient's wishes, fears, and expectations for the diagnostic (imaging tests) and the treatment (referrals)	Schectman et al. (2003); Espeland and Baerheim (2003); Dahan et al. (2007); Guzman et al. (2002); Espeland et al. (1999)
	Patient's experience in the past (determining their expectations)	Schers et al. (2001)
Negative feelings	Sensation of being judged and disqualified	MacEachen et al. (2006); Svensson et al. (2003); Lippel (1999a)
	Lack of trust towards the healthcare practitioners	Baril et al. (2003b); MacEachen et al. (2006, 2010a); Loisel et al. (2005b)

Table 27.2 Facilitators identified within the healthcare system

External level: outer context such as legal, economic, or political context		
Legal issues	Social legislation pertaining to progressive return to work, work rehabilitation, and collaborations	Fassier et al. (2011); Poot et al. (2009); Stahl et al. (2011)
Public health issue	Possibility of structured interorganizational networks between primary and secondary care, public and private sector, rehabilitation, and occupational health services	Fassier et al. (2011); Poot et al. (2009); Stahl et al. (2011)
Organizational level: inner context of a hospital, liberal practice, rehabilitation, or occupational health service		
Organizational culture	Organizational support to interdisciplinary or transdisciplinary teamwork	Stahl et al. (2011); Cartmill et al. (2011)
	Interest in work disability prevention and return-to-work issues	Fassier et al. (2011)
	Cooperation across organizational borders	Stahl et al. (2011)
Resources	Allocation of specific human and financial resources to intervene in the workplace	Fassier et al. (2011); Poot et al. (2009)
	Discretion in the coordinator role	Stahl et al. (2011)
Collaborations	Establishment of structured collaborations with others take holders in the healthcare system, the workplace, and/or the insurance system	Fassier et al. (2011); Baril et al. (2003b); Loisel et al. (2005b)
Individual level: healthcare practitioner		
Knowledge and skills	Accurate knowledge about workplace issues or legal issues	Baril et al. (2003b); Loisel et al. (2005b)
	Physicians' ability to explain the nature and prognosis of injuries to workers	Guzman et al. (2002)
	Familiarity and agreement with the guideline	Côté et al. (2009)
Values	Professional role conceived with a social role	Fassier et al. (2011)
	Agreement with RTW objectives or with clinical guidelines content	Loisel et al. (2005b)
	Sense of shared goals within the implementation team	Cretin et al. (2001)
	Perceived advantage of a guideline	Rutten et al. (2009)
Practice	Collaborative practice with colleagues and/or other stakeholders	Baril et al. (2003b); MacEachen et al. (2006); Loisel et al. (2005b)
	Personal practice including rehabilitation/occupational objectives	Fassier et al. (2011); Loisel et al. (2005b)
	Personal awareness of one's practice and limitations	Rutten et al. (2009); Harting et al. (2009)
	Respectful and trusting attitude towards injured workers	MacEachen et al. (2006); Lippel (1999a)
	Reassurance and proactive management of injured workers	Loisel et al. (2005b)
Resources	Scientific support and legitimacy provided by the guidelines	Harting et al. (2009); Dahan et al. (2007)
	Adaptation of the guideline to fit the local priorities and circumstances	Cretin et al. (2001)
	Guidelines as a source of uniformity of care	Harting et al. (2009)
	Guidelines as a help to structure interventions	Côté et al. (2009)

27.3.3 Barriers and Facilitators in the Insurance System

Barriers and facilitators were described in the insurance system similarly as in the healthcare and the workplace systems. Qualitative research on RTW programs and implementation studies reported some barriers at the individual level (worker, case manager), the organizational level (insurance agency), and the systemic level (rules and regulations, institutional policies) of the insurance system (Baril et al. 2003b; MacEachen et al. 2006, 2007, 2010a). Other studies focused on the adjudication process and its consequences

Table 27.3 Barriers described within the workplace system

External level: outer context such as legal, economic, or political context		
	Economic competition, restructuration, downsizing	MacEachen et al. (2006); Friesen et al. (2001); Baril and Berthelette (2000b); Daniellou et al. (2008a)
	Seniority clauses of collective agreement conflicting with return-to-work legislation	Baril et al. (2003b); MacEachen et al. (2006)
	Difficulties to comply with early return-to-work requirements and profuse legislation	Eakin et al. (2003); Kenny (1995)
	Vast geographical distances between stakeholders	Maiwald et al. (2011)
Organizational level: inner context of a workplace		
Direction	Rapid turnover of directors and/or managers	Fassier et al. (2011); Daniellou et al. (2008a); van Eerd et al. (2010b)
	Nonreporting and/or contesting workers' accident claims, unfair attitudes	Baril et al. (2003b); MacEachen et al. (2010a); Loisel et al. (2005b)
	Cost minimization policies detrimental to Occupational health and safety (OHS) issues	Baril et al. (2003b); MacEachen et al. (2010a)
Management	Lack of communication, guidance, and supportive management in the RTW process	Friesen et al. (2001); Eakin et al. (2003); Daniellou et al. (2008b); Loisel et al. (2005c); Baril et al. (1994); Roberts-Yates (2003)
	Corporate return-to-work policy unrealistic from the managers' point of view	Tjulin et al. (2010)
Work organization	Production requirements and physical risk factors of musculoskeletal disorders	Baril and Berthelette (2000b); van Eerd et al. (2010b)
	Lack of workplace accommodation	MacEachen et al. (2010a); Baril and Berthelette (2000b)
	Lack of communication between departments	Driessen et al. (2010); Daniellou et al. (2008a)
Social relations	Poor social dialogue, culture of resistance and conflicts	Fassier et al. (2011); Baril et al. (2003b); Baril and Berthelette (2000b); van Eerd et al. (2010b)
	Lack of participation of workers and unions in OHS and RTW issues	Baril et al. (2003b); Baril-Gingras et al. (2006); Daniellou et al. (2008a)
Resource issues	Lack of financial resources	MacEachen et al. (2010a); Driessen et al. (2010); van Eerd et al. (2010b)
	Fear of increasing expenses	Larsson and Gard (2003); Fassier et al. (2009a)
	Lack of human resources	Baril and Berthelette (2000b); van Eerd et al. (2010b)
	Lack of time to engage in the return-to-work process	Driessen et al. (2010); Maiwald et al. (2011); van Eerd et al. (2010b)
	Lack of ergonomic and/or organizational training/knowledge/abilities	Baril and Berthelette (2000b); van Eerd et al. (2010b)
OHS issues	Lack of knowledge, clarity, and/or responsibility of OHS rules and approaches (small businesses)	MacEachen et al. (2010b)
	Lack of formal workplace systems and resources for OHS, including return-to-work arrangements	Baril and Berthelette (2000b); MacEachen et al. (2010b)
	Lack of awareness of participatory ergonomic interventions among management, supervisors, and workers	Maiwald et al. (2011); van Eerd et al. (2010b)
Union issues	Jurisdictional issues with multiple unions within a workplace can hinder cooperation	Baril et al. (2003b); Fassier et al. (2009a)
	Reluctance to facilitate modified work arrangements if the unions support the right of workers to stay off work	Baril et al. (2003b)

(continued)

Table 27.3 (continued)

Individual level: worker, coworkers, managers		
	Mutual distrust or interpersonal conflicts (between colleagues or with the hierarchy)	MacEachen et al. (2006, 2010a)
	Lack of time to get involved in the RTW process	MacEachen et al. (2006); Tjulin et al. (2009); Maiwald et al. (2011)
Managers	Personal work overload/lack of time incurred by the RTW process and work accommodation	Baril et al. (2003b); MacEachen et al. (2006); Tjulin et al. (2009); Baril and Berthelette (2000b); Nordqvist et al. (2003)
	Role conflict between production quotas and the duty to accommodate injured workers	Baril et al. (2003b); MacEachen et al. (2006); Baril and Berthelette (2000b)
	Absent and/or nonsupportive manager	MacEachen et al. (2006, 2010a); Guzman et al. (2002); Tjulin et al. (2010)
	Lack of skills for managing complex psychosocial workplace dynamics	Baril et al. (2003b); Blackman (2003)
	Lack of training about ergonomic principles and observance of injured worker's restrictions	Baril et al. (2003b)
	High turnover rate of frontline managers	Maiwald et al. (2011)
Coworkers	Battling coworkers with resentment and hostility	Fassier et al. (2011); MacEachen et al. (2006, 2010a)
	Burden of extra work experienced when accommodating a returning worker	Baril et al. (2003b); MacEachen et al. (2006, 2010a); Tjulin et al. (2010, 2011b)
	Uncertainty about how to "do" early contact with injured workers	Tjulin et al. (2010)
	Coworkers' expectancy towards the reentering worker to be totally fit for work	Tjulin et al. (2011b)
Workers (returning to work)	Sensation of being judged and obliged to justify their previous absence, pain, disability, and RTW efforts	MacEachen et al. (2006); Tjulin et al. (2010)
	Lack of trust towards the employer	Baril et al. (2003b); MacEachen et al. (2006, 2010a); Loisel et al. (2005b)
	Resistance to meaningless or socially awkward modified work	Baril et al. (2003b); Roberts-Yates (2003); Larsson and Gard (2003)

Table 27.4 Facilitators described within the workplace system

External level: outer context such as legal, economic, or political context		
	Good relations with external agencies (occupational health services, Workers' Compensation Board)	Baril et al. (2003b); Baril and Berthelette (2000b); Daniellou et al. (2008a); Gard and Larsson (2006)
	Legal duties to accommodate injured workers	Fassier et al. (2011)
	Knowledge of each other's roles, responsibilities, and opportunities	MacEachen et al. (2006); Gard and Larsson (2006)
Organizational level: inner context of a workplace		
Direction	Formal commitment and support in RTW	MacEachen et al. (2006); Guzman et al. (2002); Baril and Berthelette (2000b); Driessen et al. (2010); Daniellou et al. (2008a); van Eerd et al. (2010b)
	Formalized RTW policy and procedures, organizational training	Baril and Berthelette (2000b); van Eerd et al. (2010b)

(continued)

Table 27.4 (continued)

Management	Clear definitions of role and responsibilities	Baril et al. (2003b); Gard and Larsson (2003)
Work organization	Recognition of the social consequences of modified work	MacEachen et al. (2006)
	Collaboration between occupational health services and the workplace	Fassier et al. (2011); MacEachen et al. (2006); Baril-Gingras et al. (2006); Baril and Berthelette (2000b); Tjulin et al. (2010)
	Possibilities of job accommodation for injured or disabled workers	Baril et al. (2003b); MacEachen et al. (2006); Loisel et al. (2005b)
	Return-to-work coordinator/facilitator	MacEachen et al. (2006); van Eerd et al. (2010b); Franche et al. (2005b); Shaw et al. (2008)
Social relations	Capacity of collective action among workers	Fassier et al. (2011); Baril-Gingras et al. (2006); Daniellou et al. (2008a); van Eerd et al. (2010b)
	Involvement of workers and unions in OHS and RTW issues	Fassier et al. (2011); Baril-Gingras et al. (2006); Baril and Berthelette (2000b)
	Good social climate	Baril et al. (2003b); MacEachen et al. (2006); Baril-Gingras et al. (2006)
Resource issues	Resources such as organizational and ergonomic training, extra time, and/or money	Fassier et al. (2011); Baril and Berthelette (2000b); Driessen et al. (2010); Daniellou et al. (2008a); van Eerd et al. (2010b)
	Organizational and/or ergonomic training/ knowledge/abilities	van Eerd et al. (2010b)
OHS issues	Clear definitions of role, processes, and responsibilities	Baril et al. (2003b); Baril-Gingras et al. (2006)
	Constitution of a working team	Driessen et al. (2010); van Eerd et al. (2010b)
Union issues	Union organizations and members supporting return to work	Baril and Berthelette (2000b); Fassier et al. (2009a)
Individual level: worker, coworkers, managers		
Managers	Leadership qualities such as problem solving, contact making, empathy, support	MacEachen et al. (2006); Kenny (1995); Nordqvist et al. (2003); Shaw et al. (2003, 2008)
	Integration of occupational health and safety indicators in the manager's evaluation	Baril et al. (2003b); Daniellou et al. (2008a)
	Explicit communication	Tjulin et al. (2011a)
Coworkers	Mutual confidence and interpersonal collaborations, protecting coworkers	MacEachen et al. (2006); Tjulin et al. (2010); van Eerd et al. (2010b)
	Recognition of the worker's entitlement to return to his/her particular job	Tjulin et al. (2011b)
	Accommodation of the reentering worker's needs	Tjulin et al. (2010)
Workers (returning to work)	Motivation and perception to be trusted	Baril et al. (2003b); MacEachen et al. (2006)
	Recognition of the worker's value and experience on the part of the employer and/ or the coworker	Eakin et al. (2003); Tjulin et al. (2011b)
	Importance of returning to work for staying connected and feeling valued	Maiwald et al. (2011)

with some undesirable effects on workers' health and the RTW trajectory (Lippel 1999a, 2007). Two recurrent themes of these studies are the complexity of the adjudication process that may be confusing and time-consuming and the power imbalance between the disabled workers and the "system" which contributes to weaken the injured or disabled workers (MacEachen et al. 2010a; Lippel 2007). Examples of barriers and facilitators mentioned in the insurance system are given in the tables below (Tables 27.5 and 27.6).

27.3.4 Inter-sectorial Barriers and Facilitators

Some barriers have been identified that transcend the limits of a particular system and generate interactions between the healthcare, workplace, and insurance systems. Long ago, divergent paradigms between stakeholders were reported on (Franche et al. 2005a). Discrepancies between stakeholders' perceptions about the causes of work disability, possible solutions, and effective interventions were mentioned (Maiwald et al. 2011). Discrepancies between stakeholders' interests and level of commitment were described regarding the development of structured forms of collaborative work (Ståhl et al. 2010). Miscommunication among parties was described as a barrier to effective collaboration (Baril et al. 2003b; MacEachen et al. 2010a), as well as conflicts and power imbalance between RTW parties with the injured workers frequently being helpless in front of the employer or the insurance case manager (MacEachen et al. 2010a; Lippel 1999a, 2007).

In contrast, facilitators emphasized goodwill among parties that was shared by the different systems at both the individual and organizational levels (Baril et al. 2003b; MacEachen et al. 2006). The importance of trust, respect, communication, and labor relations was acknowledged in the failure or success of RTW programs for injured workers (Baril et al. 2003b). The key role of intermediary players, such as rehabilitation or occupational health consultants and supervisors, was also emphasized in facilitating RTW (MacEachen et al. 2006; Shaw et al. 2003, 2008).

27.3.5 Summary of Barriers and Facilitators

There is solid evidence that work disability prevention programs are expected to face many barriers and facilitators during their implementation with real risks of aborted projects regardless of their relevance or evidence base. Most research focuses on barriers with few papers reporting on conceivable facilitators, which reveals a knowledge gap in implementation science. It is challenging to consider how barriers are distributed in each category of stakeholders, some of which being independent and many of them being interrelated. Interactions between the individual, organizational, and contextual/external levels of barriers and facilitators draw up an even more complex report of the feasibility of implementing an intervention in a new context. These findings should lead researchers and stakeholders in work disability prevention to pay a systematic approach and careful attention prior to implementing any project in order to reach sustainability. The previously mentioned barriers and facilitators should be scrutinized to figure out the degree of feasibility of the intervention and to develop an implementation strategy informed by this context analysis. The next sections describe a conceptual framework to identify barriers and facilitators and the different implementation strategies that may be useful to address them.

27.4 Conceptual Framework to Identify Barriers and Facilitators

It is currently recommended to perform a context analysis prior to implementing a complex or innovative intervention in order to identify barriers and facilitators a priori (Baker et al. 2010; Grol and Grimshaw 2003) and to develop research on implementation strategies for RTW interventions (Roquelaure 2008). However, the literature is very scarce as to the methods for identifying barriers and facilitators with the pragmatic point of view of program planning (Baker et al. 2010). In order to fill this gap, a conceptual frame was

Table 27.5 Barriers described within the insurance system

External level: outer context such as legal, economic, or political context		
Legal issues	Complexity of compensation rules, procedures, and forms	Baril et al. (2003b); MacEachen et al. (2006, 2010a); Fassier et al. (2009b)
	Waiting time, bureaucracy and paperwork, slow pace of adjudication	Baril et al. (2003b); MacEachen et al. (2006, 2010a); Loisel et al. (2005b); Fassier et al. (2009b)
	Legal priority given to primary prevention	Fassier et al. (2009b)
	Requirements from insurance companies to get imaging tests	Espeland and Baerheim (2003)
	Inflexibility of social insurance regulations and enforcement	Ståhl et al. (2010)
Economic issues	Priority given to cost reduction detrimental to work disability prevention	Loisel et al. (2005a); Fassier et al. (2009b)
Political issues	Conflicts between the social security system and the medical private sector	Fassier et al. (2011); Baril et al. (2003b)
	Litigation and high rates of appeals of workers' claims	Baril et al. (2003b); Lippel (2007)
Organizational level: inner context of an insurance agency		
Organizational culture	Institutional culture of suspicion and disrespect	Lippel (2003, 2007)
	General lack of information and guidance of the workers	Lippel (2007); Eakin et al. (2003); Roberts-Yates (2003)
	Lack of collaboration between departments of the same agency or between hierarchical levels	Loisel et al. (2005a); Fassier et al. (2011)
	Absence of face-to-face interactions with the workers (communication by telephone of formal letters)	MacEachen et al. (2010a)
	Erratic payment of economic benefits	MacEachen et al. (2010a); Roberts-Yates (2003)
Resources	Lack of human resources to develop work disability prevention	Fassier et al. (2011)
	Fear of increasing rehabilitation expenses/ willingness to cut expenses	Loisel et al. (2005a); Fassier et al. (2011)
	Limitations of the information system to identify the target population	Fassier et al. (2011)
Individual level: case managers, insurance physicians		
Knowledge	Poor knowledge of social legislation/poor knowledge of the workers' cases	Fassier et al. (2011); Loisel et al. (2005b)
Practice	Inconsistency of the rules' application, variations in the disability assessment process	Baril et al. (2003b); MacEachen et al. (2010a); Steenbeek et al. (2011)
	Negative interactions with workers	MacEachen et al. (2006, 2010a); Loisel et al. (2005b)
	Decisions made without information nor agreement of third parties	Loisel et al. (2005b)
	Disrespect towards workers and/or defiance of other stakeholders	MacEachen et al. (2006, 2010a); Lippel (1999b, 2007); Loisel et al. (2005b)
Resources	Work pressure/lack of time to allow for sufficient length of consultation with complex cases	Fassier et al. (2011); Steenbeek et al. (2011)
Values	Poor opinion of the social security system and legislation	Steenbeek et al. (2011)
Individual level: workers		
	Anti-therapeutic consequences of multiple medical exams	MacEachen et al. (2006, 2010a); Lippel (1999a)
	Lack of trust towards the social security system/case manager	Baril et al. (2003b); MacEachen et al. (2006, 2010a); Lippel (1999a)
	Lack of knowledge of process and procedures, rights, and duties	Baril et al. (1994, 2003b); MacEachen et al. (2007); Kenny (1995)

Table 27.6 Facilitators described within the insurance system

External level: outer context such as legal, economic, or political context		
Legal issues	Social legislation pertaining to return-to-work/ work accommodation	Poot et al. (2009); Fassier et al. (2009b); Durand and Loisel (2001)
Economic issues	Adaptation of the nomenclature of the Workers' Compensation Board in order to reimburse an ergonomic intervention in the workplace for disabled workers	Poot et al. (2009)
Political issues	Development of institutional agreements of inter-sectorial collaborations	Poot et al. (2009); Stahl et al. (2011); Fassier et al. (2009b); Loisel et al. (2003)
Organizational level: inner context of an insurance agency		
Organizational culture	Proactive return-to-work case management	MacEachen et al. (2006)
	Formal policy to identify the target population	Fassier et al. (2009b)
Resources	Allocation of specific resources to work disability prevention	Fassier et al. (2009b)
Collaborations	Development of structured inter-sectorial collaborations	Fassier et al. (2009b)
Individual level: case managers		
Knowledge	Accurate knowledge of social legislation/good knowledge of the cases	Loisel et al. (2005b); Fassier et al. (2009b)
	Relational skills to assist and reassure workers	Loisel et al. (2005b); Fassier et al. (2009b); van Rijssen et al. (2011)
Practice	Proactive case management	Loisel et al. (2005b); Fassier et al. (2009b)
	Trusting relationship between worker and case manager	MacEachen et al. (2006); Lippel (1999a); Loisel et al. (2005b)
	Trusting relationship between rehabilitation team and case manager	Loisel et al. (2005b)
Individual level: workers		
	Confidence in the case manager	Baril et al. (2003b); MacEachen et al. (2006)

built and empirically tested for the identification of barriers and facilitators before implementing RTW interventions (Fassier et al. 2011). A literature review was conducted in three domains of knowledge to identify all possible types of barriers and facilitators likely to be encountered in implementing an RTW intervention: (1) diffusion of innovations, (2) adoption of new evidence, and (3) healthcare program implementation. A list was set of different types of barriers and facilitators for each of the three domains of knowledge, which were secondarily reduced to a smaller number of core categories by thematic synthesis. Eventually, the core categories of barriers and facilitators common to all three domains were retained in the conceptual framework that was comprehensive, parsimonious, and logically coherent. The framework was tested empirically through a feasibility study conducted to assess barriers and facilitators of implementation of a work disability prevention program (the Sherbrooke model) (Loisel et al. 1997) in two regions of the French healthcare system (Fassier et al. 2011). Modifications were made to the initial conceptual framework resulting in a revised conceptual framework that was both theoretically informed and empirically tested. It comprises three parts as represented in Fig. 27.1: (1) the RTW intervention to be implemented, (2) the adoption system (with three levels of adopters: individuals, teams, and organizations), and (3) eight categories for identification of barriers and facilitators under scrutiny of a feasibility assessment.

The definitions of the eight categories of barriers and facilitators have theoretical backgrounds in the literature. *Needs* are defined as the gap observed by the intended adopter between the reality and a desired state. The more a situation is

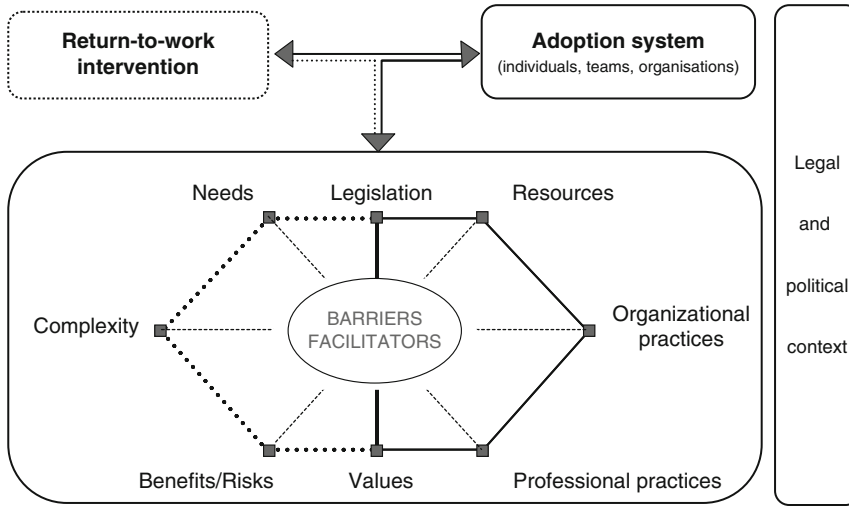

Fig. 27.1 Conceptual framework to identify barriers and facilitators Fassier et al. (2011)

perceived as intolerable, the more a potential intervention is likely to be implemented successfully. *Complexity* is defined as the extent to which the intervention is perceived by the intended adopters as complex to understand and to use. The more an intervention is perceived by the adopters as simple to understand and to use, the more easily it will be adopted and implemented. *Benefits* are defined as the benefits of the intervention as perceived by the intended adopters (cost savings, time savings, gain of legitimacy, etc.). The more an intervention has clear benefits perceived by the adopters, the more easily it will be adopted and implemented. *Risks* are defined as the risks of the intervention as perceived by the intended adopters (additional costs, workload, etc.). The more an intervention involves clear risks perceived by the adopters, the harder it will be to adopt and implement. *Values* are defined as the ideal and cognitive references of the adopters related to the worker's rehabilitation and his/her RTW issue. The more the intervention is aligned with the ideal and cognitive references of the adopters, the more easily it will be adopted and implemented. *Professional practices* are defined as individual professional behaviors of the adopters related to the worker's rehabilitation and his/her RTW issue. The more an individual professional behavior is aligned with the components of the intervention, the more easily it will be adopted and implemented. *Organizational practices* are defined as organizational culture and routines in the adoption system related to the worker's rehabilitation and his/her RTW issue. The more the organizational culture and routines are aligned with the components of the intervention, the more easily it will be adopted and implemented. *Resources* are defined as the provision of resources by the institution to support the implementation of the intervention (financial and human resources, time, social capital, etc.). The more an intervention is supported by the institutions/authorities, the more easily it will be adopted and implemented. *Legislation* is defined as the policy, rules, and regulations in the adoption system that are related to the worker's rehabilitation and his/her RTW issue. The more the policy, rules, and regulations are aligned with the components of the intervention, the more easily it will be adopted and implemented.

The nature of this conceptual framework is eclectic or so-called mosaic because the categories of barriers and facilitators come from different theoretical and/or disciplinary backgrounds (de Leeuw 2001). The eight categories of the conceptual framework give an initial picture of the kinds of barriers and facilitators that may be encountered in implementing an RTW intervention.

Although different kinds and levels of barriers and facilitators may influence each other, no causal links are hypothesized. This conceptual framework is not intended to have an explanatory or predictive value and should be considered as a guide to test the feasibility of implementing an RTW intervention in a new context at a given point in time. The next step in the implementation process would be the choice of different implementation strategies/activities specifically tailored to the barriers and facilitators identified.

27.5 What Is Next? Further Issues in Implementing Evidence

The main unresolved issue in implementation science pertains to the methods that should be used to draw implementation strategies informed by the identification of obstacles and facilitators (Bosch et al. 2007; Grol et al. 2007) (see also Chap. 27). A recent Cochrane review about the effectiveness of tailored interventions to overcome identified barriers to change pointed out that 20 of the 26 studies included made no reference to any theoretical underpinning in developing interventions (Baker et al. 2010). A typology of interventions designed to improve professional practice and the delivery of effective health services was established by the Cochrane Effective Practice and Organisation of Care (EPOC) review group. This includes various forms of continuing education, quality assurance, informatics, financial, organizational, and regulatory interventions that can affect the ability of healthcare professionals to deliver services more effectively and efficiently. Given the variety of both obstacles and facilitators and the number of potential interventions to overcome them, the development of methods to tailor implementation strategies to the context analysis should be a matter of particular concern in future research (Baker et al. 2010; Bosch et al. 2007) (see also Chap. 27).

Another debate in the field of program planning relates to the necessary balance between the flexibility and the fidelity of the interventions that are implemented. Fidelity in implementation requires that the core components of an intervention should be respected so that its effectiveness can be expected in the new setting or at least assessed (Keith et al. 2010). However, this point of view is balanced by the necessary adaptation of an intervention by its adopters so that it responds and fits better to the needs of the adopters in their own context (Greenhalgh et al. 2004b; Damschroder et al. 2009). Whereas this issue has been discussed in the field of prevention and health promotion (Saunders et al. 2005), it remains largely unexplored for work disability prevention programs with the exception of the individual placement and support model which implementation fidelity was analyzed and discussed in the United States and Canada (Menear et al. 2011; Corbiere et al. 2010).

Another question of growing importance is the question of the routinization and sustainability of innovations/interventions after their initial implementation. Routinization is defined as the integration of the innovation in the mainstream of an organization so that it operates on a routine basis beyond the initial efforts of its integration (Rogers 1995b). The notion of sustainability was extensively discussed in the field of public health and program planning (Scheirer et al. 2008; Pluye et al. 2004a, b, 2005), with a temporal dimension (maintaining program activities, continuing to serve substantial numbers of clients), a structural dimension (building and sustaining collaborative structures), and a cognitive dimension (maintaining attention to the ideas underlying the projects by disseminating them to others). The issue of sustainability is critical in view of past routinization failures of work disability programs that were described in several countries (Loisel et al. 2005a). It has been argued that program sustainability usually begins with the first events, suggesting that program planners should consider program sustainability from the very beginning of a research project or experimentation (Pluye et al. 2005). The utilization of the intervention mapping protocol for the development of RTW programs is in accordance with this recommendation since it allows identifying the main stakeholders and their needs from the beginning (Vermeulen et al. 2009; Ammendolia et al. 2009; van Oostrom et al. 2007).

Finally, the effectiveness and cost-effectiveness of tailored implementation strategies should be evaluated to determine their relevance in the context of limited resources and to support well-planned dissemination of innovations in work disability prevention.

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Building an International Educational Network in Work Disability Prevention

28

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Work disability prevention, a recently recognized major health-related social and financial burden, is in need of recognition and diffusion in search of appropriate solutions. An international educational effort to address it is described below.

28.1 Introduction

Throughout this book, there have been a number of ad hoc arguments on the emerging field of work disability prevention, which proposes a different perspective of work and health, bringing attention to new conceptualization, new thinking, and innovative interventions. This field requires the collaboration of several different disciplines and of many stakeholders whom can greatly benefit from sharing their multiple perspectives. In turn, this means that new teaching and practices are necessary in order to tackle the work disability problem affecting most developed and developing economies. Certainly, the diverse cultural and legal backgrounds that vary within a province, a state, or one country to the next must be taken into account. This was the rationale for developing a comprehensive training program able to exchange new knowledge in the field with a vision of international collaboration among researchers and educators. With an unexpected opportunity launched in 2001, a group of researchers in Canada embraced the challenge of proposing the first training program in work disability prevention that utilized transdisciplinary principles in order to foster new and innovative research worldwide. The proposal was submitted to the Canadian Institutes for Health Research (CIHR) via a request for application (RFA) entitled *CIHR Strategic Training Initiative in Health Research for the 21st Century*. One of the core objectives of the RFA was to provide leadership in building capacity within Canada's health research community through the training of researchers and to foster the development and ongoing support of the scientific careers of women and men in health research. This opportunity was seized by a group of 24 researchers working in different fields related to WDP and associated with nine different universities located across Canada. The group covered the following disciplines: anthropology, biomechanics, law, epidemiology, ergonomics, occupational therapy, ethics, engineering, kinesiology, medicine, neuropsychology, physical therapy, psychology, and biostatistics. Our successful application gave birth to the WDP CIHR Strategic Training Program.

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9_28, © Springer Science+Business Media New York 2013

28.2 The WDP CIHR Strategic Training Program

28.2.1 Principles and Development

The proposal put forward in response to the RFA was based on six key elements:

1. *Transdisciplinary approach*: The program would convey to each participant a transdisciplinary perspective of work disability at the beginning of their research training experience. Delivery of this new approach was undertaken by the mentors involved in the training program who provided complementary disciplinary backgrounds and extensive experience in collaborating with researchers and stakeholders from multiple disciplines and different research settings. In addition, through a rigorous review process, the trainees were selected from multiple scientific backgrounds, which gave a unique opportunity for an exchange on the basis of close collaborations and applied transdisciplinary vision. In this way, transdisciplinarity would not be only a subject of study but also an implemented research experience shared by trainees and mentors from different disciplines.
2. *Changing attitudes*: The principles of *rigor*, *openness*, and *tolerance* (de Freitas et al. 2012) were adopted as the fundamental characteristics of the transdisciplinary attitude and vision. *Rigor* in argument takes into account all existing data and is the best defense against possible distortions. *Openness* involves an acceptance of the unknown, the unexpected, and the unforeseeable. It allows someone having a specific disciplinary background and perspective to accept perspectives from other backgrounds, jurisdictions, and disciplinary knowledge. *Tolerance* implies acknowledging the right to ideas and truths opposed to our own. The majority of the program's educational activities would allow trainees to develop these attitudes mainly through facilitated discussions with the program mentors and between the trainees themselves.
3. *A unique program*: At the time of the program's development, a literature search was conducted using several databases and university websites in order to check whether any other program on work disability existed (Loisel et al. 2005; Commonwealth Universities Yearbook 2000; Annulaire national des universités 2001). The result was that no advanced training program (at the PhD or postdoctoral levels) specific to WDP was found. Existing masters and doctoral programs were found to be mostly oriented towards professional training such as vocational rehabilitation, disability management, industrial hygiene, and occupational health and ergonomics. However, these programs were not geared to the training of researchers in the field of WDP nor did they have a transdisciplinary perspective.
4. *A complementary program*: The proposed program was developed as a complementary program to a single disciplinary PhD or postdoctoral education. Thus, it was intended for graduate students registered in a PhD, postdoctoral program, or a new researcher having recently graduated. The rationale behind selecting postgraduate trainees was to ensure that transdisciplinary training in WDP would not interfere with the needed in-depth knowledge acquired in a precise disciplinary field. The WDP training program would allow trainees to broaden their disciplinary vision in order for them to obtain a global view of all the components involved in the WDP field. The new knowledge attained would add to the trainee's own depth of disciplinary expertise the breadth of the WDP field.
5. *Competency-based approach*: A competency-based rather than an objective-based approach was chosen as a means of developing the program with more effective integration of knowledge, skills, and attitudes (Lasnier 2000). This approach has allowed the development of complex abilities designed to facilitate appropriate reflection and action in the researcher's professional life. The curriculum, teaching materials, and teaching

sessions were organized to ensure that at the completion of the program the expected competencies were achieved. This is more than the traditional cognitive knowledge usually taught in PhD training programs, postdoctoral studies, and for new researchers and addresses a specific need for skills in intervention implementation, collaboration with stakeholders, and knowledge exchange.

6. *Collaborative learning*: In the program, collaborative learning is used to facilitate the acquisition of the relevant complex knowledge, skills, and attitudes (Henri and Lundgren-Cayrol 2001). Collaborative learning allows participants (mentors and trainees) to combine resources within groups in order to enhance effectiveness in carrying out individual tasks and to foster the development of the skills required for transdisciplinary teamwork.

The training program proposed by the Université de Sherbrooke (Québec, Canada) to the CIHR competition was funded for 6 years starting in 2002 by four institutes of the CIHR and Quebec research agencies as CIHR partners in this endeavor.[1] In accordance with CIHR requirements, the funding for strategic training programs is 70% of the grant must be disbursed in the form of stipends to successful program applicants. The trainee stipends were calculated to cover tuition fees to the Annual Summer Session, as well as travel and accommodation expenses, making this training education free for the registered trainees. In 2009, a new RFA submitted to CIHR to continue the WDP training program was successful. With another 6 years of funding, it was decided that the WDP program move to the University of Toronto Dalla Lana School of Public Health (Work Disability Prevention Program, Dalla Lana School of Public Health, University of Toronto 2012).

[1] Institut de Recherche Robert Sauvé en Santé et Sécurité du Travail (IRSST), Réseau de Recherche en Réadaptation du Québec (REPAR), Fonds de Recherche en Santé du Québec (FRSQ).

28.2.2 Program Main Characteristics

As mentioned above, this training program was structured to ensure that trainees registered in the 3-year training program had met the required competencies upon completion of the program. The following competencies were extracted and developed into more precise and operational subcompetencies:

1. To analyze a research problem from a transdisciplinary and contextual perspective in order to maximize research relevance and impact
2. To integrate relevant ethical and legal issues into the design and implementation of WDP research
3. To effectively communicate information on a specific research project or methods to all other researchers involved in disciplines in the WDP field
4. To incorporate the elements needed to develop a research approach that factor in the participation of relevant stakeholders
5. To participate in activities promoting knowledge exchange such as scientific presentations, presentations to stakeholders, or publications

The program was implemented at the highest level of education in order to train researchers who were expected to already be part of an educational setting such as research centers and universities. This was a *train the trainer perspective* allowing a large spin-off in capacity building for the WDP field. For these reasons, the following academic level entrance criteria to the program were required: registration in a PhD program, registration as a postdoctoral fellowship program, or being a new researcher (no longer than 5 years after PhD graduation) in a recognized Canadian or foreign university or research center. However, in order of transdisciplinarity to occur, admission criteria were based not only on the applicant's academic record and level of excellence but also on qualitative criteria such as the student's potential contribution to the field of WDP and his or her initial ability to work within a transdisciplinary team. In addition, the admission committee ensures that candidates are chosen from diverse disciplines, different geographical origins, and

Table 28.1 2012 Program mentors with discipline, university, and country

Anema, Han	Occupational physician	VU University Amsterdam	The Netherlands
Baril, Raymond	Anthropologist	Université de Sherbrooke	Canada
Breslin, Curtis	Clinical psychologist	Institute for Work and Health	Canada
Bültmann, Ute	Health science/epidemiology	University of Groningen	The Netherlands
Cassidy, David	Epidemiology	University of Toronto	Canada
Clermont, Dionne	Occupational therapy/ epidemiology	Université Laval	Canada
Cooper, Juliette	Occupational therapy	University of Manitoba	Canada
Corbière, Marc	Psychology, clinical psychiatry	Université de Sherbrooke	Canada
Côté, Pierre	Epidemiology	University of Toronto	Canada
Coutu, Marie-France	Psychology	Université de Sherbrooke	Canada
Dewa, Carolyn	Health economy	University of Toronto	Canada
Durand, Marie-José	Occupational therapy	Université de Sherbrooke	Canada
Feuerstein, Michael	Clinical psychology	Uniformed Services University	USA
Franche, Renée-Louise	Psychology	University of British Columbia	Canada
Gagnon, Denis	Biomechanics	Université de Sherbrooke	Canada
Guzman, Jaime	Rheumatology	University of British Columbia	Canada
Hogg-Johnson, Sheilah	Health Statistics	Institute for Work and Health	Canada
Koehoorn, Mieke	Epidemiology	University of British Columbia	Canada
Krause, Niklas	Occupational epidemiology	University of California	USA
Lambert, Cécile	Nursing/clinical and research ethics	Université de Sherbrooke	Canada
Lippel, Katherine	Lawyer	University of Ottawa	Canada
Loisel, Patrick	Orthopaedic surgeon	University of Toronto	Canada
Lötters, Freek	Physiotherapy	Erasmus University	The Netherlands
MacEachen, Ellen	Sociology	Institute for Work and Health	Canada
Mairiaux, Philippe	Occupational medicine	Université de Liège	Belgium
Pransky, Glenn	Occupational physician	Liberty Mutual Research Institute	USA
Rainville, Pierre	Neurosciences	Université de Montréal	Canada
Scardamalia, Marlene	Psychology	University of Toronto	Canada
Shaw, William	Occupational health psychology	Liberty Mutual Research Institute	USA
Tompa, Emile	Health economy	Institute for Work and Health	Canada
Vézina, Nicole	Ergonomics	Université du Québec à Montréal	Canada

involved in various projects. Approximately ten trainees are recruited each year in this 3-year part-time training program to allow small group training sessions, maximizing exchanges between educators (named "mentors") and trainees and between trainees.

The training program team consists of educators/researchers having applied to the CIHR competition, who have become de facto mentors of the training program (Table 28.1). The program director, CIHR grant principal investigator (PI), and several committees are responsible for the program leadership, and a program coordinator assists the program director in program management. A Mentors' Assembly brings all investigators together to determine general program governance and nominate management committees' members. A Program Executive Committee (PEC) is the program's general managing body, responsible for decision-making on all pedagogical issues, such as training activities, evaluation of the students, evaluation of the program, and program advancement. The PEC has seven members including the program director, five mentors, and the program coordinator. The PEC meets five times a year, usually through video or teleconferencing. A Program Advisory Committee (PAC) consists of the PEC members plus five stakeholders (representing employers, unions, injured workers, and insurers public and private) and two

trainees. The PAC meets once a year and brings an external vision to the training program management and development. An Admissions Committee, made up of three mentors and the program director, assesses and evaluates applications according to program admission criteria and recommends a ranking of candidates to the PEC for final admission decisions.

In order to allow enlargement or renewal of the program's training workforce, the Mentors' Assembly may recruit new mentors, upon request of the PEC. Basic requirements to join the team of mentors include being a university professor with a specific expertise in WDP and teaching capability with a TD spirit. Alumni of the training program holding a university position are preferred choices as they have learned the "spirit" of the program.

The training program structure was developed as a part-time 3-year training program based on several activities. A core portion of the program consists of a 2-week intensive summer session (June) assembling all trainees in Canada. Each year the summer session is dedicated to one of the three themes: "methodological challenges," "sociopolitical challenges," or "ethical challenges" in WDP. During the summer session, three cohorts of trainees (first, second, and third years) attend a mix of joint and separate training seminars. Joint seminars are dedicated to the theme of the year, while other training seminars are specific to a cohort year of trainees and discuss various topics linked to WDP, for instance, determinants of work disability, interventions for return to work, or vulnerable workers.

An important activity that occurs during the summer sessions is the trainees' seminars facilitated by the mentors. Trainees must annually present a seminar on his/her research project to their cohort classmates. The trainees' seminars provide an opportunity to broaden their perspective on their own project. The presentation and topic are critically appraised during a designated time slot, allowing for a long discussion time among all the trainees coming from different disciplinary backgrounds. The trainees face the challenge of presenting their project with enough *rigor*, but avoiding too much specific disciplinary jargon, and at the opposite end explaining and clarifying the fundamentals and significance of their research. For example, a trainee may be preparing a project involving the development of an ergonomic tool designed to measure lumbar effort in the workplace for patients with disability caused by back pain. Presenting their tool development rationale and methods to other trainees who have a background in psychology, disability management, clinical studies, and program evaluation will provide them with an opportunity to be challenged on issues such as the impact of psychological stress at work on physical measures, the feasibility of using complex measurement devices in the course of work, the usefulness of such devices for clinicians working in a work rehabilitation context, and the way such tools may be used to assess program effectiveness. In order to prepare their presentation to colleagues from other disciplines, they may need to conduct a broader literature review that can help them to discuss variables, possible biases, and methodological points from other perspectives than the one in which the project has been based on. This broader discussion might facilitate a better understanding of research uptake and elucidate ahead of time some of the possible obstacles to collaboration and implementation of WDP research. Openness to a more collaborative vision about their own research results is promoted. They also have an ongoing opportunity for improving their skills on knowledge transfer and for improving project's quality. Two mentors (named chair mentors) from different disciplines supervise all training activities in each cohort year. They offer the trainees supportive critique and explanations, and they serve as a link between program management, lecturers, and other trainees. Every morning starts with a half-hour *morning forum* gathering all trainees and chair mentors to answer students' comments, questions, and any relevant thoughts that arose from the previous day learning. This allows general discussions among trainees and mentors to reach a deeper level and to help rethink or correct any ideas about the topics. The morning forum is also an important moment to moderate ideas or beliefs generated from the previous day's activities.

June sessions are preceded by mandatory 6-week eLearning courses. One course is specifically designed for first year trainees to introduce them to the basics of WDP through e-discussions of selected readings under mentor's supervision. The other course is for all trainees and is designed to prepare them for the theme of the year (methodological, sociopolitical, or ethical challenges). Lectures or appropriate activities are organized with ongoing online discussions between trainees and the supervising chair mentors. At the beginning of the June session, a feedback session is organized allowing a general discussion on the e-training learning and experience. Approximately 30/35 trainees and an average of 25 mentors and 10 invited guest speakers attend the annual June session. As previously mentioned, the June summer session is a series of lectures in which all three trainee cohorts attend some, while other lectures are trainee cohort year specific. For example, all trainees attend the lectures on transdisciplinarity, disability insurance issues, and the "theme of the year" (methodological, sociopolitical, or ethical challenges). First year trainees have a case study on work disability, quantitative/qualitative methods issues in WDP, a workplace structured visit; second year trainees have introduction to evaluative research, RTW outcomes, and interventions in WDP; and third year trainees have introduction to health economics, work disability in vulnerable populations, effects of cancer on work and implementation science. Third year trainees are also required to work in small groups to develop and present a project proposal that is assessed by a jury of mentors through a small competition. Trainees' performance and behavior are assessed by their chair mentors in a formative way at the end of the first week and in a summative way at the end of the session.

Finally trainees must complete one or two optional courses during the 3-year program. They may choose between writing an article to be published in a scientific journal or deliver a presentation in a scientific meeting and deliver a knowledge exchange activity for stakeholders in the WDP field. These courses have to be supervised by a mentor (selected from outside of their usual research setting with a different disciplinary background) and approved by the PEC.

28.2.3 Program Evaluation

The WDP training program has attracted PhD candidates, post-doctoral fellows and young researchers from a very large number of primary disciplines (Fig. 28.2, 28.3). It has been assessed in different ways. First, CIHR has required and conducted a peer-review evaluation several times during the funding period with the program management and the program trainees. Also, the June session provides an excellent opportunity to evaluate its own program through questionnaires to mentors and trainees on the quality of program activities. Finally, the PEC has conducted a special study with program alumni and trainees through interviews and focus groups (Loisel et al. 2009). Each year the program coordinator writes a report from the June session evaluations. The report is presented and discussed by the PEC, and appropriate program changes may be decided. This has led to progressive improvements and updates of the training program. CIHR evaluations have been regularly very positive, acknowledging by the end of the first granting period that the *Program continues to be recognized as innovative and the only formalized advanced training program for WDP in the world*. In the interviews and focus groups, alumni and trainees have said that the most appreciated aspect was the networking with mentors and other trainees, which allowed them to forge long-term professional relationships (Loisel et al. 2009). They also underlined the opportunity to collaborate on new research projects with a large diversity of expertise. In fact many joint international articles have been published from 2003 to 2009 (Fig. 28.5). The trainees appreciated the *atmosphere* as positive and open and facilitating collaboration between trainees. In addition, the value of the close relationships with the caliber and the number of mentors was highlighted as well. The few negative points that emerged were directed at the June session venue or at the organizational level.

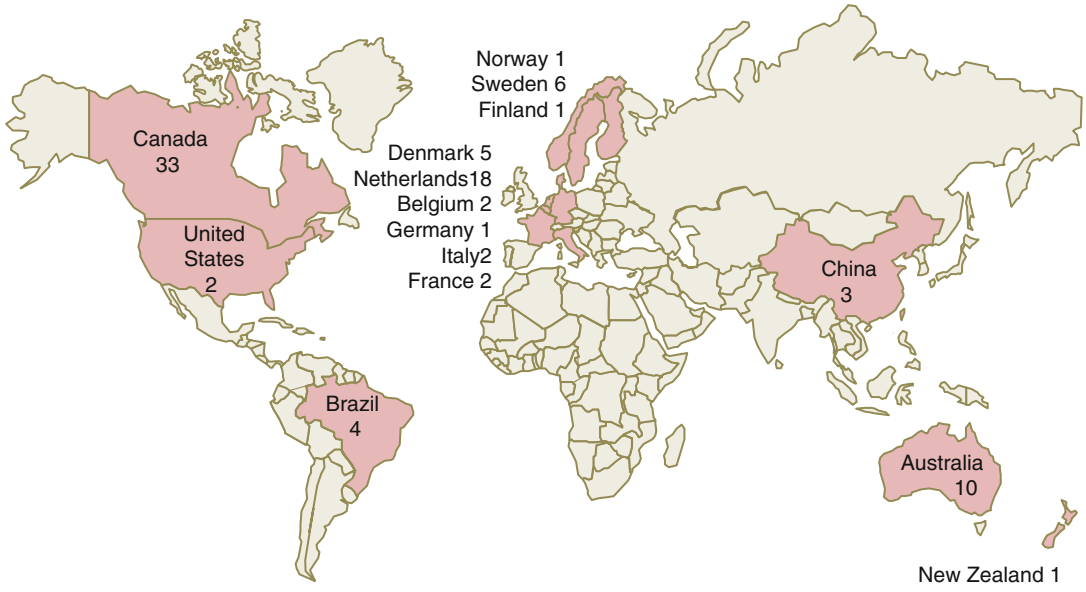

Fig. 28.1 Characteristics of trainees distributed following their nationality 2003–2012

They were mostly technical points (classroom distribution, meals quality, etc.) that the program management tried to address for the following year. Also there has been an expressed desire to develop a platform that would allow an ongoing networking between June sessions. Clusters of trainees created discussion groups, but more formal platforms developed by the program itself were needed. This point was addressed in the program renewal through request for the development of a Community of Practice (CoP) in WDP, and preliminary steps have been taken for its development (e.g., the creation of a CoP Steering Committee and a workshop which included stakeholders' participation in 2010). In addition, because knowledge transfer and exchange are at the core of the program's objective, many alumni and trainees of the training program have either attended or been involved in the organization of the first scientific meeting of the Scientific Committee "Work Disability Prevention and Integration" (WDPI) of the International Commission for Occupational Health (ICOH), held in Angers, France (2010). Worth noticing has been the program's capacity to rapidly expand internationally. Starting as a Canadian program with a team of Canadian researchers, it has rapidly gained an international recognition as trainees from many countries have applied and been enrolled (Fig. 28.1). The first expansion happened in Europe, mainly the Netherlands and Northern Europe. This is likely due to early research developments in WDP in this region. The program's growing reputation led to extending the program mentorship internationally, recruiting university educators from the Netherlands, the USA, and Belgium, as well as program alumni hired by universities as new mentors. These international mentors participate as well in the program leadership through the various governing committees. Also trainees have registered from both more economically developed to less economically developed countries from four continents, extending worldwide the network of WDP researchers and trainers at the highest level of education (Fig. 28.4). The expected transdisciplinary participation has been maintained with 15 different disciplines now recorded and having more and more international transdisciplinary scientific production (Fig. 28.5).

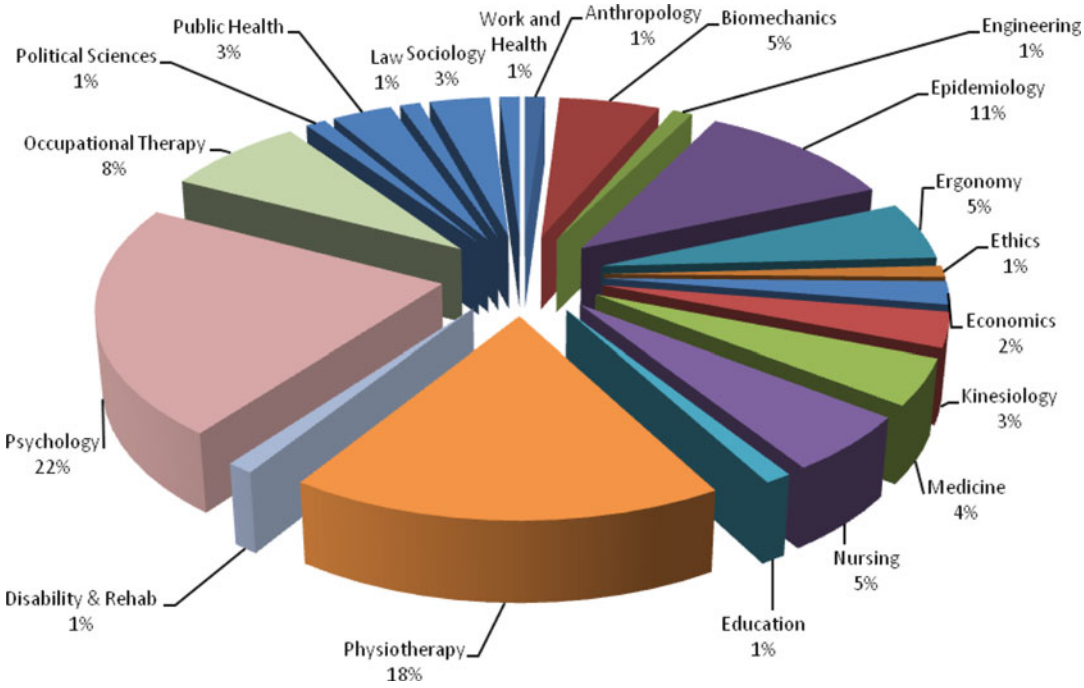

Fig. 28.2 Characteristics of trainees distributed following their primary discipline 2003–2012

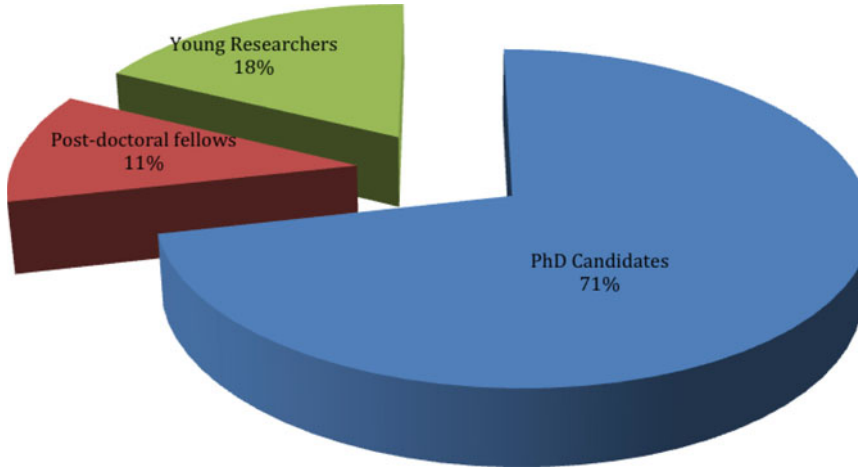

Fig. 28.3 Characteristics of trainees: status at enrollment 2003–2012

28.2.4 Future of the Program

CIHR funding of this training program has allowed its development and continues to support it throughout many years; however, its support cannot be expected to be endless, and alternative funding is needed to guarantee the program's sustainability. Since the program has an international scope, it should not rely only on Canadian funds, and this is an important subject being discussed and explored among the program mentors who are spread across the globe.

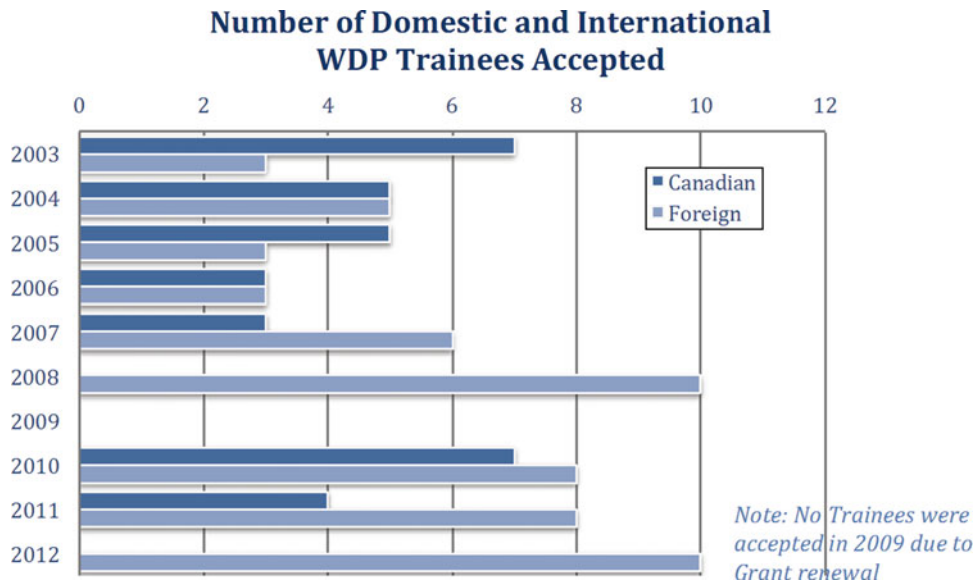

Fig. 28.4 Expanding the number of international students 2003–2012

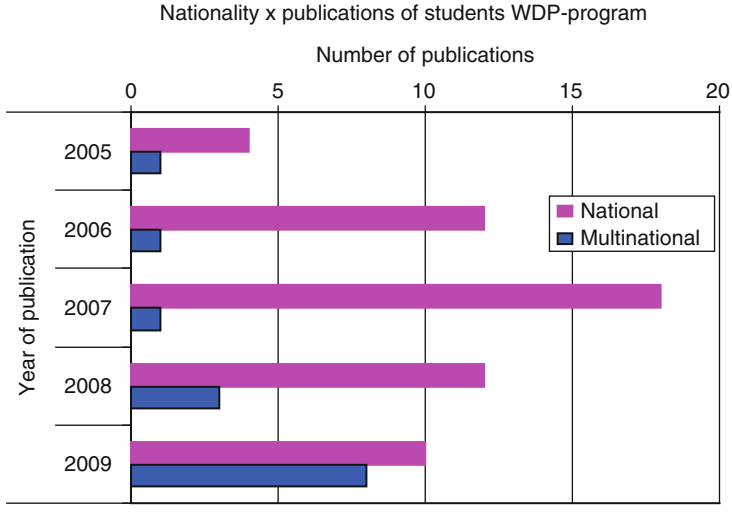

Fig. 28.5 Number of joint publications including international students

The development of a CoP in WDP may be a viable means to seek solutions to this problem. The CoP's main aims are the following: (1) to maintain and to develop a network of program mentors, alumni, and trainees allowing continuous sharing on scientific topics and research projects development and (2) to develop knowledge exchange with the WDP field stakeholders, mainly workplace employees, public and private insurers, and healthcare providers involved in work disability treatment, management, and prevention. Thus far, this training program has not only trained researchers but also *trained the trainers* in WDP from diverse countries. These researchers/trainers are important knowledge brokers often involved with building capacity in

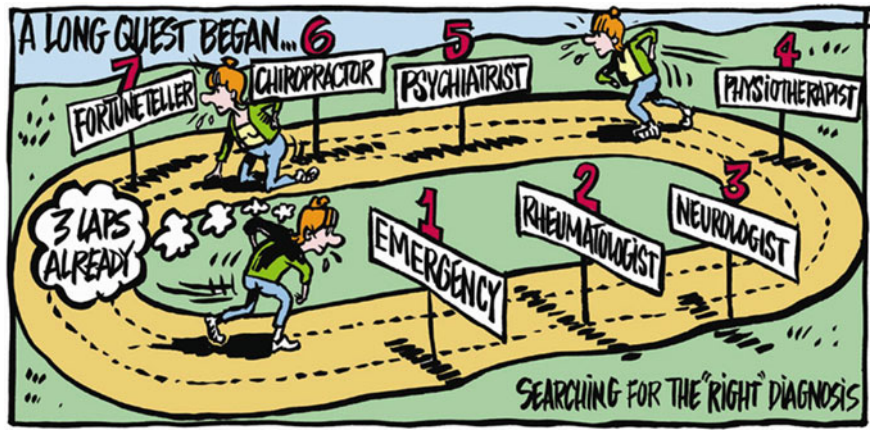

Fig. 28.6 Running for a diagnosis of disorder without finding the work disability issues

WDP research, policymaking, and academics. This is not an easy task given the constant nature of the realm of work and socioeconomic transformations occurring in the world. A particular helpful example of a hands-on transferring of WDP research into "real-world" practices is the development of a Return to Work Coordinator (RTWC) training program described below.

28.3 Training Return to Work Coordinators

Assisting workers to reassume work after work disability of more than 2 months duration has proven to be a challenge in many cases, as previously outlined in many chapters of this book. The challenge is mainly due to the multifactorial causes of work disability involving many systems and players in the arena of RTW (see Chap. 6). A further obstacle is legislation that often targets determination of impairment rather than a full consideration of what work disability might represents beyond the causes of impairment itself. In other words, *running* in the arena of work disability may be an impossible challenge for a disabled worker alone and even for the involved stakeholders (Fig. 28.6).

Evidence of success in RTW from interventions involving interdisciplinary teams has shown that when skillful professionals are able to manage and coordinate actions between the disabled worker and the different stakeholders, then they can obtain successful outcomes (see Chaps. 18 and 22) (Loisel et al. 2009). From this piece of scientific knowledge came the idea that specialized professionals appropriately trained might be key players in preventing work disability by facilitating RTW coordination and by promoting stakeholders' agreement. In a recent survey of 12 principal investigators of successful RTW interventions (mostly RCTs), "all principal investigators identified the RTW coordinator as the most important person related to the success of their interventions more important than administrators, medical staff, or others involved in the RTW process" (Gardner et al. 2010). Even if there exist some individuals or groups playing this role, there is little formal training and professional recognition of it. In eight focus groups consisting of approximately 75 RTW coordinators representing three countries (Canada, USA, and Australia) the RTW coordinators were asked to describe the knowledge, skills, attitudes, and behaviors required for effective RTW coordination and to express them as specific competencies (Pransky et al. 2009). An affinity mapping process (Holtzblatt and Jones 1993) followed by a survey of approximately 148 RTW coordinators allowed reducing and regrouping the 904 competencies reported condensed into 100 classified by ranking of perceived importance and distributed

Table 28.2 The 25 highest rated competency items (5 = essential, 1 = less important)

Item	Mean rating	Standard deviation
Respecting and maintaining confidentiality	4.80	0.480
Having ethical practices as an RTW coordinator	4.67	0.621
Having listening skills	4.60	0.625
Ability to communicate well verbally (phone, in person) and in writing (including email)	4.59	0.604
Being consistent between what you say and what you do	4.56	0.574
Being approachable and available	4.52	0.644
Being committed to the goal of early RTW	4.51	0.705
Ability to relate well to workers and employers	4.50	0.655
Ability to respond to others in a timely fashion	4.49	0.724
Ability to instill trust and confidence in your role as the RTW coordinator	4.49	0.589
Having organizational and planning skills	4.47	0.694
Being respectful of other people: their role, their beliefs, and their cultures	4.43	0.701
Ability to sort through data and identify what is important	4.40	0.687
Being able to communicate in a nonthreatening way	4.40	0.697
Ability to uncover and evaluate underlying problems affecting RTW	4.39	0.725
Being honest and frank in communications	4.35	0.689
Ability to adjust communication to a particular situation and individual people	4.35	0.755
Ability to evaluate and accurately describe job requirements	4.35	0.736
Having patience with each stakeholder involved in the RTW process	4.34	0.667
Having relationship-building skills	4.34	0.752
Ability to focus on facts and accurate information	4.33	0.684
Being diplomatic and tactful	4.33	0.741
Ability to work effectively as part of a team	4.33	0.794
Being fair and objective in judgment and actions	4.33	0.664
Ability to effectively deal with stress, deadlines, and expectations	4.32	0.692

Reproduced from Pransky et al., JOR 2009, with permission

in six affinity groups: professional credibility, communication, individual personal attributes, administrative skills, conflict resolution skills, problem solving skills, evaluation skills, and information-gathering capacity (Pransky et al. 2009). The 25 highest rated competency items are presented in Table 28.2.

Most of these competencies are of behavioral nature and are not characteristic of a specific recognized profession, albeit some professions may include some of them. These findings have significant implications for selection, training, and development of RTW coordinators (Pransky et al. 2009). They may have learned through a specific training program, but most were confident that essential RTW coordination skills could only be acquired by on the job training, mentorship, supervision, and feedback. Presently, few training programs worldwide are based on such competencies. In Canada, NIDMAR training and certification is based on e-courses and multiple choice question e-examination (National Institute on Disability Management and Research 1999). In the USA the Disability Management Employer Coalition, in conjunction with the Insurance Education Association, offers certification as a professional disability manager after completion of online courses (Certified Professional Disability Manager 2012). In Australia, the Certification of Disability Management Specialists Commission offers a 2-day course for professionals having prior work in the field (Training for Return to Work Coordinators 2012). It looks unlikely that only short e-courses are enough to allow the attainment of the competencies and skills required for the

complex role of an RTW coordinator who has to address the complexity of workers' situations and of the work disability arena. Recently, with the support of the Canadian Memorial Chiropractic College (CMCC) in Toronto, the author of this chapter has developed a specific Work Disability Prevention Advanced Certificate for Health Professionals wanting to specialize in RTW coordination (Work Disability Prevention, Canadian Memorial Chiropractic College 2012). This advanced training has been developed directly from the above-mentioned research on RTW coordinator competencies (Pransky et al. 2009) and includes four 36-h courses and a 4-month practicum. It is expected that all professionals issued certification in this program will be capable to well navigate in the arena of RTW which involves so many players such as disabled workers, workplace parties, insurers, and healthcare providers.

28.4 Conclusion

Work disability prevention is embedded in a specific paradigm with its own determinants and multiple stakeholders. Understanding the disability paradigm, knowledge of the evidence-based effective interventions, and the ability and skills for building appropriate relationships with the stakeholders are common grounds for those interested working in this field. Moreover, researchers need to familiarize themselves with methods and transdisciplinary work proven effective in this field. Further development in the field will only happen when appropriate education at diverse levels and within various disciplinary environments—including healthcare, rehabilitation, human resource management, policy, and law—is delivered. The two above-mentioned programs are starting points for further great education development in this field: the first one geared towards researchers at the international level and the second one geared towards local practitioners with multiple backgrounds. Education for the public also needs to be developed, following the example of what was done in the Victoria State in Australia (see Chap. 24) (Buchbinder et al. 2001).

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ERRATUM TO

Handbook of work Disability

Prevention and Management

Patrick Loisel and Johannes R. Anema

P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*, 3
DOI 10.1007/978-1-4614-6214-9, © Springer Science+Business Media New York 2013

DOI 10.1007/978-1-4614-6214-9_29

The publisher regrets that the names of the co-editors–Michael Feuerstein, Ellen MacEachen, Glenn Pransky, and Katia Costa-Black–were inadvertently omitted from the title page.

The online version of the original book can be found at
http://dx.doi.org/10.1007/978-1-4614-6214-9

Appendix

Work Disability Theories: A Taxonomy for Researchers

Angelique de Rijk

Introduction

Simply stated, a theory is a statement about which phenomena are related in what way (direction, and positively or negatively) and about why they are related (Polit and Beck 2004). They are frameworks for understanding reality, allowing to make sense of several single observations and predict the occurrence of phenomena (Polit and Beck 2004; Punch 1998). Theories may thus advance our understanding of work disability and facilitate research uptake. In this field of research, there is a high mountain of theories, and work disability prevention researchers may be confused. At this moment there is no consensus on what would be the best work disability theory. This is also a difficult question, as "theories (…) cannot be proved" (Polit and Beck 2004, p. 119) like interventions' effectiveness may be. "A theory is a scientist's best effort to describe and explain phenomena" (Polit and Beck 2004, p. 119) at a certain moment. There can be a degree of general acceptance of a theory, which can change when new evidence or observations undermine or supplement a previously accepted theory (Polit and Beck 2004). Theories should not be regarded as evidence in itself but as frameworks to observe, study, and interpret in a more systematic way.

This appendix aims to supply researchers in this field with a taxonomy of different theories which have a basis in the social sciences (psychology, sociology, economy, policy/political science, and anthropology). The social sciences have been the main source for theoretical development in this field (Allebeck and Mastekaasa 2004). The taxonomy has been inspired by a literature review of work absence by Harrison and Martocchio (1998) published almost 15 years ago. Another source of inspiration has been the overview of research approaches and explanatory models presented by Allebeck and Mastekaase (2004). They used the different scientific disciplines, e.g., medicine and economics, as a starting point for their categorization. However, this approach can lead to confusion, because the same theory can be used by various disciplines (see also Sect. A.5). While these reviews focused on either causes of sickness absence and related research type or scientific discipline, the present taxonomy focuses on the *explanatory mechanisms* behind the theories. The taxonomy has also been updated with supporting literature and models more recently published. In the taxonomy presented, only theories that have been empirically studied are included.

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9, © Springer Science+Business Media New York 2013

The key questions to be addressed in this appendix are:

- How is work disability conceptualized in theory-driven research (Sect. A.2)?
- What is the role of theory in work disability research and practice (Sect. A.3)?
- What are the theories used in work disability research and how do they differ from each other (Sect. A.4)?

Finally, conclusions will be drawn and discussed. Also future developments in theory development are sketched, and researchers are offered practical recommendations (Sect. A.5).

To Be Explained/Understood: Work Disability

In the theory-driven research that lays the foundation for this appendix, work disability is often measured in terms of sickness absence. Sickness absence is defined and measured in different ways. This variety reflects that sickness absence is determined not only by the employee's incapacity to perform his or her work but also by legislation, the organization's policies, and professional routines. Research in political sciences and public administration has for example shown that the obedience to legislation of professionals working in the public services varies (van Kümpers et al. 2002). Thus, the same definition of sickness absence in legislation might lead to slightly different definitions used in practice. Even though, legislation in most countries distinguishes between (1) "temporary" sick leave arrangements, lasting between 6 weeks and (more than) 2 years, and (2) disability pensions in case of longer work absence or permanent disability. Researchers distinguish basically between:

1. Reporting sick leave, this is operationalized as days to onset of the first sickness absence spell, frequency of sickness absence during 1 year, etc.
2. Absence duration or sickness absence spell, i.e., the period between reporting being work disabled and returning to work; this can be operationalized as sick days per year or per absence period.
3. The frequency of return to work (RTW) at a set point in time.

The current taxonomy does not distinguish between temporary sick leave and disability pension. Instead, a distinction is made between theories (1) explaining becoming work disabled, (2) theories explaining (or predicting) duration of work disability, and (3) theories that aim to understand the return-to-work process. Conceptually, these are very different outcomes. These outcomes also differ in terms of measurement.

Established theories for presenteeism, that is "decreased on-the-job performance due to the presence of health problems" (Schultz and Edington 2007, p. 548), do not yet exist. A search in the literature with the keywords "presenteeism" and "theory" or "model" yields (at this moment) null results. Presenteeism has been primarily studied from a cost perspective (Schultz and Edington 2007; Brooks et al. 2010; Pauly et al. 2008). In Sect. A.5 the necessity to develop and test theories in relation to presenteeism will be discussed.

Theory: What Is It (Not)?

A theory is a statement about which phenomena are related in what direction, whether these relationships are positive or negative, and about what are the explanations for the relationships (Polit and Beck 2004; Punch 1998). Regarding the phenomena, a great number of factors have now been related to work disability. If we combine two extensive reviews (Alexanderson 1998; Krause et al. 2001), the following list can be made:

(a) Sociodemographic factors
(b) Psychological limitations
(c) Attitudes and beliefs
(d) Health behaviors
(e) Health-related characteristics
(f) Medical and vocational rehabilitation interventions
(g) Individual task level job characteristics
(h) Factors at the organizational level
(i) Employer- or insurer-based disability prevention and management interventions
(j) Factors related to local community
(k) Social policy and legislation
(l) Macroeconomic factors

However, we often have little understanding of the explanations for the relationships with

work disability (or why intuitively plausible associations are not found to be stronger). A statistical relationship between a factor and work disability can be interpreted from many different theoretical perspectives. It is how the explanation, or rather the line of reasoning, is treated that distinguishes theory-driven research from not theory-driven research.

A theory can improve a study's quality. Coherence and thereby the validity of a study increases when measures, design, and analysis all fit within the same line of reasoning (the theory) (Polit and Beck 2004; Punch 1998). For example, a theory on stakeholder collaboration to reduce work disability requires that all stakeholders are questioned and/or observed. A theory supports the researcher in making choices about the research process. "The design, data collection method, data analysis and interpretation of the findings 'flow' from the theory" (Polit and Beck 2004, p. 132). Finally, results of different studies can be compared better—that is, easier and more systematically—if their theoretical background is known (Polit and Beck 2004; Punch 1998).

The Taxonomy of Work Disability Theories

The taxonomy of work disability theories is presented in Fig. A.1 with the relevant section (in brackets) of the appendix.

A first and fundamental distinction is made between theories that explain and theories that help to understand. Theories that explain are deterministic, positivist theories that reflect cause and effect relationships. The preferred method to test this type of theory is a quantitative one (e.g., a survey that is analyzed with statistical techniques). Theories that explain can be tested for their validity in a specific group, situation, and moment (Polit and Beck 2004).

Theories that help to understand however focus on the processes underlying the relationships in specific cases. The preferred method is a qualitative one (interviews and/or observations analyzed with qualitative methods). A theory that helps to understand is often used as a loose conceptual framework to inform data collection and interpretation, allowing for new concepts and relationships to emerge from the data (Polit and Beck 2004).

This distinction of theories that explain and theories that help to understand is based on the two major research paradigms in social science. A research paradigm is a view on how research should be done. It consists of a set of assumptions about the social world and the proper techniques for research (Punch 1998). In order to better recognize the different research paradigms regarding work disability, it is necessary to explain these paradigms in somewhat more detail. The "explaining paradigm" focuses on explaining results (also named effects or outcomes). This paradigm assumes that cause and effect can be easily distinguished and thus, the researcher's aim is to distinguish cause and effect relations by testing the assumed model. It is easy to recognize these theories, as they are often visualized as model with variables and arrows between them. Alternative names are empirical-analytical research, positivist, realist, essentialist, deterministic, or experiential research. To study cause and effect, quantitative methods are preferred. However, also qualitative approaches can be used for research aimed at explaining, for example, thematic analysis (e.g., Braun and Clarke 2006). This research paradigm is dominant in epidemiology, psychology, economy, and medicine but also found in sociology and health sciences (Polit and Beck 2004; Punch 1998; Braun and Clarke 2006).

The "understanding paradigm" focuses on understanding specified phenomena from the perspective of the involved actors. This paradigm regards theory as a collection of concepts and is sometimes visualized as a diagram model but most often is only described. The aim is to unravel the background of motivations and to describe processes. Alternative names are "interpretative research" or constructionist research, although some authors regard constructionism as a specific branch of qualitative research in itself. Qualitative methods are necessary to study processes from the perspective of actors with the aim of improving understanding. There are many different specific methods for collecting and analyzing data, with each having different underlying specific assumptions on the relationship between

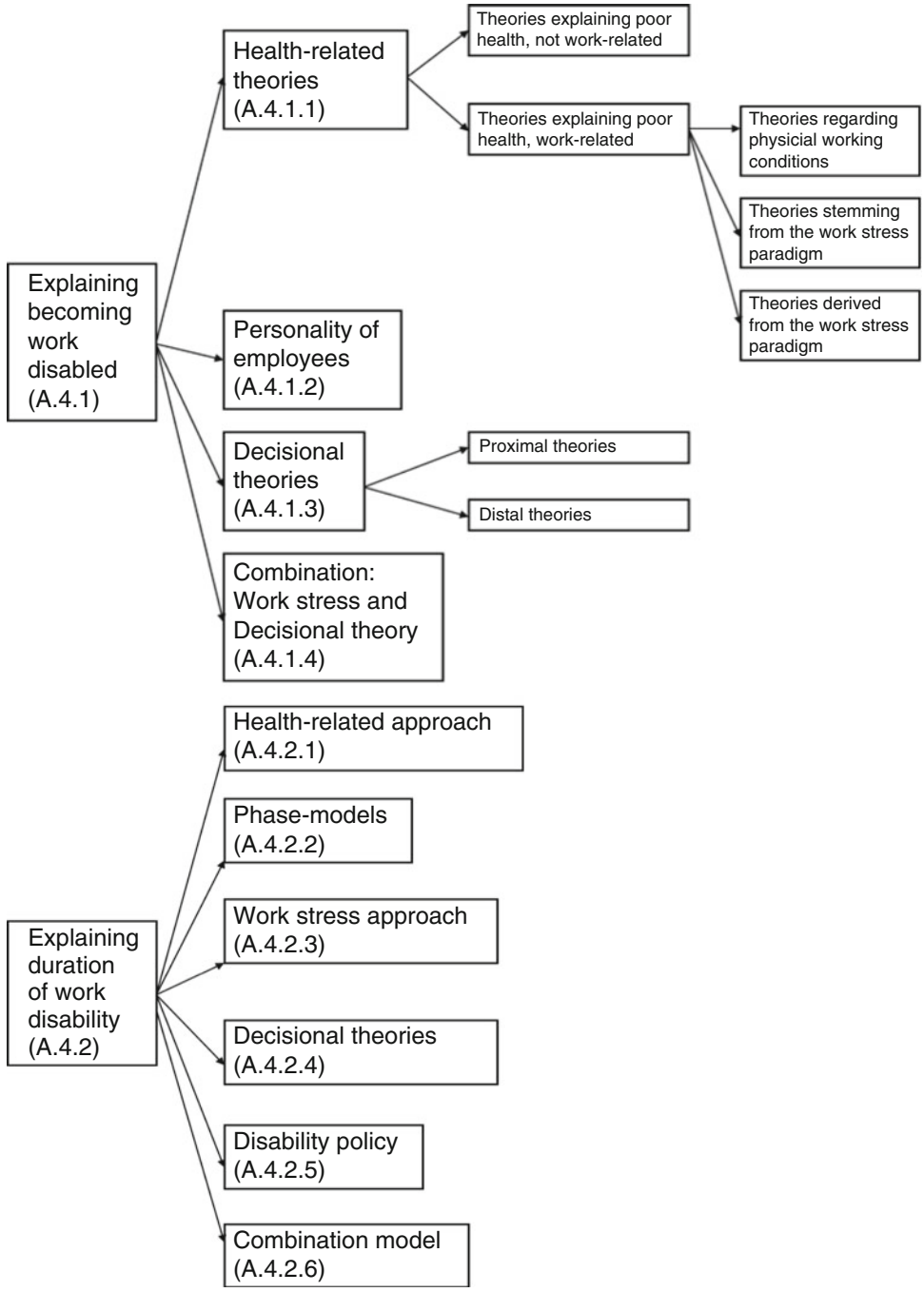

Fig. A.1 Taxonomy of work disability theories

reality and research (epistemology) and on what the aims of research should be. The "understanding paradigm" is found in research from sociology, political science, and philosophy but also psychology and health sciences (Polit and Beck 2004; Punch 1998; Braun and Clarke 2006).

With regard to the taxonomy showed in Fig. A.1, most of the theories can be classified as

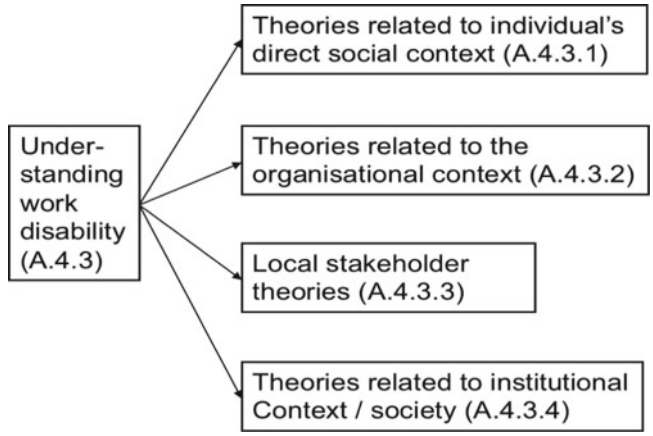

Fig. A.1. (continued)

"middle-range" theories that attempt to explain a narrow range of experiences, but some of these are based on "grand theories" or "macro theories" that describe large segments of the human experience (Polit and Beck 2004).

Theories That Explain Becoming Work Disabled

Theories that aim to explain becoming work disabled describe the possible determinants that lead to work disability. They can be categorized into:

- Health-related theories. These can be classified as ones that are not work-related and those that are work-related.
- Theories regarding the personality of employees.
- Decisional theories. Proximal theories, which explain why a person decides to report sick on a certain day, are distinguished from distal theories, which explain an increased general need for absence from work.
- Theories that combine work stress theory with decisional theory (behavioral theory regarding reporting sick).

Health-Related Theories

In work disability research, theories that explain health focus primarily on determinants of the unhealthy workplace. They focus on exposure to adverse physical or psychological working conditions, but also include theories regarding how people handle unhealthy workplaces. The majority is derived from the work stress paradigm. Recently, theories are developed that are derived from the work stress paradigm and also include the interaction between work and private life stressors, referred to as work-life balance or work-family interference.

1. Theories explaining poor health, not work-related

Medical theories are not in the focus of this appendix. The consequences of illness for functioning in paid work can be studied from the perspective of the International Classification of Functioning, Disability and Health (ICF model) that is largely inspired by social science theories (WHO (World Health Organization) 2001) (see Chap. 6). This model includes also nonwork-related factors that explain (reduced) functioning. Nevertheless, there seems hardly any research available yet that used the ICF model as a framework for the research on work disability (Cerniauskaite et al. 2011).

2. Theories regarding the unhealthy workplace

There are three types of theories regarding the unhealthy workplace: (a) theories regarding physical working conditions, (b) theories stemming from the work stress paradigm, and (c) theories derived from the work stress paradigm.

(2a) Theories focusing on the physical working conditions

Physical agents (e.g., heavy lifting, smoke, and chemical agents) in the working place can hurt employees (in)directly. There are many

physical hazards, each with their specific biological explanation (Koh and Baker 2009). Theories from the social sciences address the behavioral explanation of how symptoms that develop from exposure to these physical hazards might become chronic (see Sect. A.4.2.2).

(2b) Theories stemming from the work stress paradigm

Many empirical studies focus on the relationship between work-related characteristics (task-related or organizational factors) and work disability. They are all based on the work stress paradigm that states that jobs are source of stress. In Table A.1 the most important stress theories and their results are presented.

There are different work stress theories. One group of theories predicts that stress arises if the individual does not cope well enough with the stressor due to using the wrong coping strategy or other individual characteristics such as being a type A person or having an external locus of control (Cooper and Payne 1991; Latack and Havlovic 1992). Schreuder et al. (2011) for example used coping theory as basis for their study and found an effect of problem-solving coping and social coping on reduced sickness absence in nurses. A second group of theories predicts that stress arises when *work tasks* put too much burden on the individual. Regarding the latter, there are two important models: the Karasek job demand-control (JDC model) (Johnson and Hall 1988; Karasek 1979) and the job characteristics model (Hackman and Oldham 1975), which are discussed in Chap. 11 "workplace issues." The JDC model, which is presented in Fig. A.2, assumes that employee's health and work motivation are explained by two essential characteristics of the work situation: the work demands (working quickly, having insufficient time to finish the work) and the control over how to perform the work and developing oneself in the work. The initial assumption was that high demands can be moderated by high control. High strain jobs are jobs with high demands but low control.

The job characteristics model, which is presented in Fig. A.3, assumes that skill variety, task identity, task significance, autonomy, and feedback lead to positive psychological states and in turn to advantageous outcomes such as high job motivation and satisfaction (Hackman and Oldham 1975).

For both models a relationship between the determinants of occupational stress (the stressors) and work disability can be found, although the relationship is rather small in case of the job characteristics approach (Fried and Ferris 1987; Kivimäki et al. 1997, 2000; Kristensen 1991; Laine et al. 2009; Smulders and Nijhuis 1999). Also, some studies found that the effects of job demands and job control on work disability are moderated by grade of employment (North et al. 1996) or hardiness (a psychological response) (Hystad et al. 2011). The third group of work stress theories focuses on *aspects of the organization* that can increase stress: lack of coworker and supervisor social support (Johnson and Hall 1988) and an organizational climate of tense and prejudice (Piirainen et al. 2003). For the latter, an association with work disability has been found (Piirainen et al. 2003). Regarding lack of social support from the workplace findings are mixed. Some authors found no effect (Rugulies et al. 2007; Melchior et al. 2003; Tamers et al. 2011), while for example Melchior and colleagues (Melchior et al. 2003; Tamers et al. 2011) found positive effects on work disability (sickness absence) with the stress-reducing effects of social support. Sinokki et al. (2010) also confirmed that the support in the workplace can reduce the effects of ill health on sickness absence.

The previous work stress models focus either on the worker alone or on factors related to the workplace. There are also work stress models that focus on the interaction between worker and workplace. One of the oldest models is the Michigan stress model, which incorporates both the perception of work stressors and personal resources, such as personality to cope with stressors (Kahn et al. 1964). There seems to be a lack of studies on the Michigan stress model with work disability as an outcome, which might also be related to the criticism that the model is more a "black box" of potential stress-inducing factors than an explanatory model for the development of work stress. Jones et al. (2005) found indirect effect of the model. They found in one analysis neuroticism, demands, control, support, and role clarity to explain job satisfaction. In a following

Table A.1 Theories stemming from work stress paradigm

Level involved	Theory	Explained in	Applied to WD? (examples)	Confirmed in example?
Individual	Coping with (job) stress; type A Locus of control	(Cooper and Payne 1991; Latack and Havlovic 1992)	(Schreuder et al. 2010) (coping)	Yes, problem-solving and social coping related
Task	Job demand-control (support) model	(Johnson and Hall 1988; Karasek 1979)	(Kivimäki et al. 1997, 2000; Kristensen 1991; Smulders and Nijhuis 1999)	Yes, related to sickness absence
Job-characteristics model: skill variety, task identity, task significance, autonomy, feedback		(Hackman and Oldham 1975)	(Fried and Ferris 1987)	Yes, but small effect on sickness absence
Organization	Social support	(Karasek 1979)	(Rugulies et al. 2007; Melchior et al. 2003; Sinokki et al. 2010; Tamers et al. 2011)	Mixed findings regarding sickness absence
–	Organizational climate: tense and prejudice	(Piirainen et al. 2003)	(Piirainen et al. 2003)	Yes, related to sickness absence
Combination work-worker	Michigan stress model	(Kahn et al. 1964)	(Jones et al. 2005)	Only indirectly related to sickness absence
–	Person-environment fit	(Edwards 1991)	–	–
–	Effort-reward imbalance	(Van Vegchel et al. 2005)	(Head et al. 2007; Schreuder et al. 2010)	Yes, related to sickness absence
–	Organizational justice model	(Elovainio et al. 2002)	(Head et al. 2007; Elovainio et al. 2002)	Yes, related to sickness absence
Role	Role conflict; role ambiguity	(Rizzo et al. 1970)	(Rugulies et al. 2007; Inoue et al. 2010)	Yes, related to sickness absence
Resources	Job demands-resources model	(Bakker et al. 2003)	(Bakker et al. 2003; Schaufeli et al. 2009)	Yes, related to sickness absence

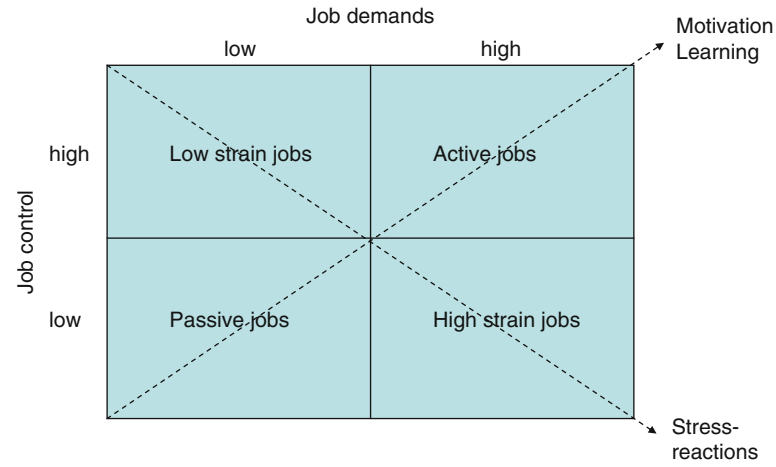

Fig. A.2 Job demand-control model (based on Karasek (1979))

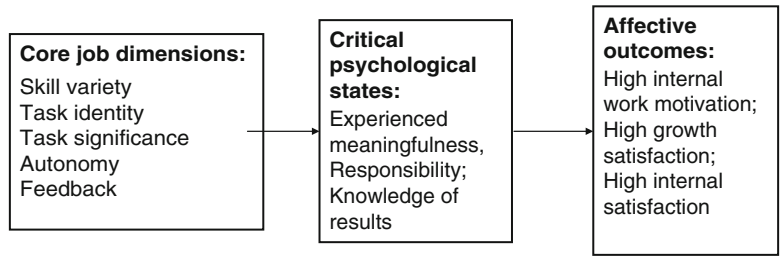

Fig. A.3 The job characteristics model (based on Hackman and Oldham (1975))

analysis, job satisfaction was found to be related to distress, which in turn related to sickness absence by increasing somatic health problems.

The person-environment fit model is a follow-up of the Michigan stress model and assumes work stress to be a misfit between person and environment (individual needs vs. environmental opportunities, the suppliers, and individual opportunities and the environment needs, the demands) (Edwards 1991). No studies have been found in relation to indicators of work disability. However, the Work Compatibility Improvement Framework combines various theories among which the job characteristics model, the person-environment fit model, and the job demand-control model. It is presented as a practical model to be used for integrative assessment of risk factors for work disability (Genaidy et al. 2007).

The effort-reward imbalance model (ERI model) predicts stress as an outcome of an imbalance between the efforts paid by the employee (job demands, obligations, intrinsic factors as but also critical coping and need for control) and the rewards received from employer and society in terms of appreciation, income, job security, etc. (Siegrist 1996). The ERI model is presented in Fig. A.4. It is well demonstrated that the combination of high efforts and low rewards has negative effects on psychological well-being (Van Vegchel et al. 2005). The ERI model was used to explain "becoming work disabled" in the prospective Whitehall II study and confirmed (Head et al. 2007). Several studies found evidence for the relationship between several measures of low rewards and sickness absence (Peter and Siegrist 1997; Schreuder et al. 2010).

The organizational justice model (Elovainio et al. 2002) resembles the effort-reward imbalance model (Head et al. 2007). The relational injustice model refers to fairness of treatment at work. Relational justice refers to the relationship between supervisors and employees. To what

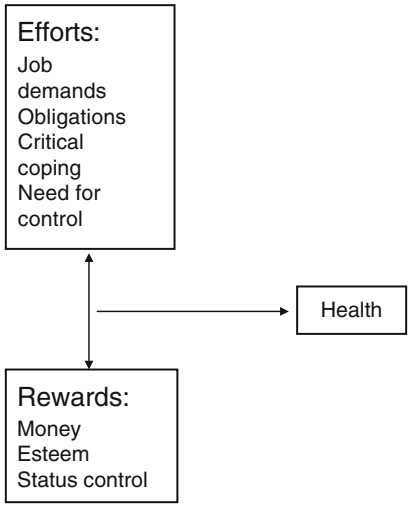

Fig. A.4 The effort-reward imbalance model (based on Siegrist (1996))

extent does the supervisor consider employees' viewpoints, is he or she able to suppress personal biases, and does he or she take steps to deal with subordinates in a fair and truthful manner? Low relational justice is assumed to increase psychological distress and risk of stress-related morbidity. This was also demonstrated in the Whitehall II study (Head et al. 2007).

Also, role theory can explain stress as an outcome of work characteristics. There are two potential stressors: role conflict and role ambiguity. Role conflict refers to having to take conflicting roles at the same time, for example, to coach and support subordinates and at the same time execute instructions from the higher management that will impose too much burden on the subordinates (Rizzo et al. 1970). Role ambiguity refers to lack of clarity about one's role. Rugulies et al. (2007) demonstrated particularly role conflict to relate to work disability (sickness absence). Inoue et al. (2010) demonstrated in a large study among Japanese male employees the relationship between job ambiguity and work disability (long-term sickness absence).

A more recently developed model focuses on *resources* in relation to job demands: the job demands-resources model. The demands refer to physical, social, and organizational aspects that require sustained physical and/or psychological efforts. Resources refer to those physical, psychological, social, or organizational aspects of the job that reduce demands, and the subsequent negative outcomes are functional in achieving work goals and/or stimulate employee's performance (Bakker et al. 2003). The model explains both energy depletion, which can lead to work disability, and job motivation. The JDR model is confirmed for explaining work disability (sickness absence) (Bakker et al. 2003; Schaufeli et al. 2009).

Many studies on the relationship between work characteristics and sickness absence use the stress theories implicitly but do not really test them. Originally, all work stress theories postulate that that work characteristics lead to experienced stress, which will lead (by mediating and moderating effects of other variables) to strain and next to increased morbidity (illness) which leads to sickness absence (e.g., Koh and Baker 2009). As shown above and in Table A.1, many studies have confirmed that the adverse work characteristics in the mentioned models have negative outcomes such as experienced stress or sickness absence. However, only few studies have actually tested whether the relation between the determinants of stress (the stressors) and sickness absence is mediated by stress or illness. Piirainen et al. (2003) demonstrated worse organizational climate to be related to increased health problems, which in turn was related to increased absence. Bakker et al. (2003) in a cross-sectional study and Schaufeli et al. (2009) in a longitudinal study demonstrated that job demands and resources explain burnout, which in turn explained sickness absence. Bakker et al. (2003) also demonstrated this for complains of arm, neck, and shoulder. Several studies have also demonstrated that chronic stress leads to increased morbidity, such as cardiovascular diseases (e.g., Schreuder et al. 2011; Van Vegchel et al. 2005; Peter and Siegrist 1997; Manninen et al. 1997), diverse musculoskeletal disorders, and respiratory disorders (Manninen et al. 1997). However, it seems that studies that investigate whether somatic illness mediates between stress and sickness absence are lacking. This major research gap will be addressed in the conclusion of this appendix.

There might be alternative theoretical explanations for the relationship that is found between work stressors and sickness absence. Sickness absence can also be conceptualized as a behavioral response to job-related stress in order to discharge accumulated stress. Many researchers refer to both the stress-related and this behavioral explanation when studying sickness absence from the perspective of a work stress model (e.g., Head et al. 2007; Peter and Siegrist 1997; Schaufeli et al. 2009). Also, the Conservation of Resources theory (Hobfoll 1989, 1998) might explain why employees report sick in cases of stress. The line of reasoning of this alternative theoretical explanation is that employees experiencing high levels of stress want to keep or regain their energy (their personal resources) and reporting ill can help to survive.

Another alternative explanation concerns the *decrease* in sickness absence in cases of positive work characteristics. Positive work characteristics lead to positive outcomes such as motivation and job satisfaction, and these factors lead to decreased sickness absence. Particularly the job demand-control model (Karasek 1979), the job characteristics model (Hackman and Oldham 1975), and the job demands-resources model (Bakker et al. 2003; Schaufeli et al. 2009) pay attention to the positive outcomes of work. Schaufeli et al. (2009) found engagement to be predictive of absence frequency, but with 3% explained variance. This suggests that positive outcomes of work such as motivation, satisfaction, and engagement are not very predictive for reducing work disability rates. Already in 1998, Harrison and Martocchio (1998) concluded in their extensive review that the proportion of variance in sickness absence by job satisfaction is generally low (5% or lower).

(2c) Theories that are derived from the work stress paradigm

The work-family conflict (or work-family balance) approach is a theory that relates to the work stress paradigm. Work-family conflict is a form of conflict between different social roles. The pressures from the work and family domains lead to stress outcomes such as job dissatisfaction, burnout, distress, and depression. Work-family conflict can be reciprocal in nature, in that work can interfere with family and family can interfere with work. The relationship to sickness absence is confirmed although some studies found only effects of home on work or vice versa (Clays et al. 2009; Jansen et al. 2006). Having children, sometimes used as an indicator of work-family conflict, is only a weak predictor of sickness absence (Mastekaasa 2000).

Theories Regarding the Personality of Employees

A second type of theories that explain becoming work disabled (reporting sick) states that the employee's personality, such as emotional instability, hostility, and impulsiveness, leads to elevated levels of absence from work (Harrison and Martocchio 1998). A criticism of this approach is that it is not a fully articulated theory as studies have identified very different personality traits among people with work disability. Some describe the idea that enduring personality traits account for absenteeism's moderate stability as "absence-proneness." Another fundamental difficulty is that personality and sickness absence might be related because they both relate to (mental) illness. Finally, personality is often confused with behavior (Harrison and Martocchio 1998). In a recent study Henderson et al. (2009) seem to confuse temperament (suggesting personality) and (perceived) childhood behavior. Despite these criticisms, there is evidence that some personality characteristics (i.e., neuroticism) function as underlying factors for perceived work characteristics that relate to work disability (Jones et al. 2005). Also, Kivimäki et al. (2002) showed that it is the *combination* of personality characteristics that counts. For instance, hostility led to work disability (sickness absence) to a lesser extent when the hostility did not trigger a low sense of coherence. Further, hostility was found to be a moderator between organizational injustice and work disability (Elovainio et al. 2003). The recent interest in personality as predictor of work disability is expressed in new studies on the genetic basis for disability pension and sickness absence. For example, Narusyte et al. (2011) found a relationship between the levels of sickness

absence in twins. Future research is necessary to find the possible causal pathways between personality, proneness to disorders, environmental factors, and work disability.

Decisional Theories

A third group of theories explaining becoming work disabled concerns decisional theories that explain the decision to report being work disabled. These theories are very much grounded in the absence and sickness absence research area. In contrast with the approaches that assume sickness absence to be the consequence of health-related problems, Nicholson (1977) draw attention to the behavioral aspect of absence from work and suggested that sickness absence can be avoided (to some extent) because it is a decision. In the taxonomy presented in Fig. A.1, decision is defined as a broader concept than in Nicolson (1977). All behavioral theories that are based on the assumption that sickness absence is not merely a question of health are categorized as decisional theories. These theories do not regard absence due to illness as "involuntary absence" but suppose that some kind of decision-making process plays a role. Moreover, a distinction needs to be made between proximal theories that explain the decision to report sick because of illness on a specific day and the distal theories that incorporate thoughts that raise the general need for sickness absence.

1. Decisional theories: proximal theories

   Eleven theories can be distinguished as proximal theories for the decision to report sick:

   1. *Economic* theory assumes that employees are rational human beings, who are always trying to maximize welfare. So people try to have the highest income with the lowest effort. From this assumption one can derive different more specific hypothesis regarding the role of working hours, income level, benefit level, etc. (Allebeck and Mastekaasa 2004).
   2. Illness as a constraint for attendance at work. Older psychological theories regarded illness as a constraint to choose for attendance at work (Steers and Rhodes 1978). They hypothesized that employees will decide on every day whether they were ill or not, and thus whether they would go to their work. This theory was later criticized, as employees might only consider this when there is a specific reason (see theory mentioned under 4).
   3. *Attenda*nce *requirements* (organization of work, financial position, opportunities on the labor market) and adjustment latitude (the opportunities people have to reduce or change their work effort when ill) determine sickness absence in case of decreased work ability (Johansson and Lundberg 2003).
   4. Owens and Briner (2003) developed an interesting *two-stage decision-making process model* of the decision not to attend work that takes place every day before going to work (or not): at stage 1 certain events trigger the individual into thinking about being absent; at stage 2 there is a conscious decision-making process as to whether to be absent. According to this model, the conscious decision is not about to attend work because this is a routine (and thus they criticize Steers and Rhodes' model (Steers and Rhodes 1978). The decision not to attend work is made under the condition that there has been a specific trigger to consider work attendance at all. Triggers for the attendance decision can be the experience of physical symptoms, the experience of psychological symptoms, anticipated aversive event at work that day, particularly significant events outside work, and practical difficulties getting to work. These triggers lead to the decision-making process.
   5. *Work-family conflict* can be understood as factors that push and pull persons between work and home (Alexanderson 1998) and thus as a motivational process.
   6. A Dutch model based on qualitative research on sickness absence distinguishes different aspects of the individual and workplace situation that are taken into account before reporting sick. This model (Veerman 1993) explains that "absence

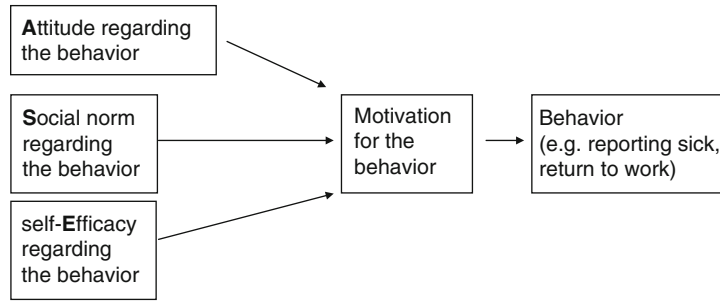

Fig. A.5 ASE model (adapted from De Vries et al. (1988))

necessity" is moderated by a "sickness absence threshold." This threshold is influenced by "absence opportunities" and "need for absence." Absence opportunities refer to organizational factors and legislation that allows absence. Need for absence refers to the subjective values of the job and how much does an employee want to report sick because of the job? This threshold is not taken into account unless there is a necessity to report sick because there are complaints. Similar to Owens and Briner (2003)'s model previously described, this model represents a two-stage process: first there must be an absence necessity, after that a weighting process starts. The model is often referred to as the threshold model, but this name neglects the complexity of the decision to report sick represented by this model. Høgelund (2001) presented a conceptual framework in which the factor "(dis) incentives for work resumption" constituted a factor that increased or decreased the threshold for reporting sick when being work incapacitated.

7. The *Attitude, Social norm, and self-Efficacy model (ASE model)*, which is discussed in Chap. 10 (psychosocial factors for work disability and return to work), is a motivational theory (e.g., De Vries et al. 1988) recently applied for studying sickness absence. It can be hypothesized that not only the expectancy that the behavior will lead to valuable effects (the attitude towards sickness absence), but also the social norms (regarding sickness absence) and the self-efficacy (regarding working while experiencing symptoms of illness) will influence the motivation to report sick. The model is presented in Fig. A.5. This theory has been tested for return to work (Brouwer et al. 2009, 2010; De Rijk et al. 2008a) but not (yet) for reporting work disability.
8. The *social exchange model* focuses on the effects of perceived inequity in the employment relationship. An equitable exchange between what employees invest in their relationship with the organization and what they receive back in return is regarded as a key element in this relationship. Absenteeism and turnover are regarded as important means available to employees to restore the equity. In a study (Geurts et al. 1999) perceived inequity in the employer-employee relationship leads directly to absenteeism. The authors concluded that absenteeism should be considered as a direct attempt to restore an equitable exchange relationship rather than a way of coping with an unpleasant emotional state (Geurts et al. 1999).
9. The *effort-reward imbalance model* (Siegrist 1996; Peter and Siegrist 1997; Van Vegchel et al. (2005)) describes the stress caused by certain conditions as explained in Sect. A.4.1.1. In addition to that, a more behavioral hypothesis is underlying the model. If an employee has the feeling of lacking a reward for his or her efforts (even though the efforts are

average), reporting sick is one thing to do to improve the balance between effort and reward. This is called "calculated disengagement" (Peter and Siegrist 1997, p. 1113).

10. *Relational injustice* affects sickness absence (Head et al. 2007). Relational injustice refers to the relation between employer and employee. Although the model is regarded as a work stress model, it might also be the case that relational injustice leads to sickness absence because of withdrawal behavior.
11. The *Conservation of Resources theory* of Hobfoll (1989, 1998) explains reporting sick as a conscious way to restore or keep energy, that is, resources. Because of the conscious component, this theory could be categorized as a decisional theory as well.

2. Decisional theories: distal theories

Distal theories do not explain the decision on a given day but explain the determinants of an increased general need for sickness absence. Although often not described in so many words, these theories assume that decisional determinants play a background role in the individual's decision to report sick. Some of the proximal theories presented above incorporate factors from distal theories as well. Two groups of distal theories are distinguished: (1) theories that address work-related factors and (2) theories related to how individuals deal with their sickness, including perceptions of sickness and coping. Theories that address work-related factors assume that reporting work disability is affected by the employee's perception of how he or she is being treated by the organization in general. The most important examples of these theories are:

1. The *psychological contract* (Nicholson and Johns 1985) might influence the threshold for reporting sick. The psychological contract refers to the assumptions about one's employment.
2. *Absence culture* (Nicholson and Johns 1985). Absence culture is defined as "the set of shared understandings about absence legitimacy and the established 'custom and practice' of employee absence and its control" (Nicholson and Johns 1985, p. 136). Absence culture is assumed to be affected by the psychological contract and by the values and beliefs of the supervisors, coworkers, and the larger social environment around the organization.
3. *Job satisfaction.* It is assumed that job satisfaction reduces sickness absence. Even though, low correlations between job dissatisfaction and sickness absence are found (Harrison and Martocchio 1998). The explanation for this is that job dissatisfaction does not exert major influence over absence behavior on a day-to-day basis, but when other events already dispose an individual to consider being absent, they may play a role in the decision-making process (Harrison and Martocchio 1998; Smith 1977).
4. Lastly, *low job control* can lead to a perception of *organizational injustice*, which can lower the threshold for reporting sick in turn. Elovainio et al. (2004) demonstrated that effect.

Other distal theories assume that the decisions regarding reporting work disability (and thus being absent from work or not) are determined by how employees regard their ill health. Two good examples of these theories are:

1. *Illness* and *perceived health.* Kristensen (1991) distinguishes between "(1) illness, which is an individual's own subjective perception of having poor health, and (2) disease, which is a medically ascertained and diagnosed sickness" (Kristensen 1991, p.17). He found support for the effect of an individual's own sickness perception on sickness absence. More recently, evidence is found for the effect of perceived health on sickness absence (Boot et al. 2008, 2011) although this relationship seems to be partly explained by work characteristics and work adjustments (Boot et al. 2011).
2. *Illness perceptions*. Illness perceptions refer to the patient's perception about the consequences of the illness, the timeline (cyclical vs. chronic), control (in relation to treatment and personal life), coherence, and causality (in terms of psychological cause, risk factors, and immunity). A relationship with receiving disability pension and illness perception has been demonstrated (Boot et al. 2008).

Theories That Combine Work Stress Theory with Decisional Theory

Sometimes, work stress theory and decisional theory are combined (Veerman 1993; Høgelund 2001). Work stress theories explain illness (due to work) and thus the necessity to report sick, proximal decisional theories explain why an individual actually reports sick in that particular case. The effort-reward imbalance model (described within the group of theories derived from the work stress paradigm) explains stress as a combination of high effort and low reward but at the same time also absence as a result of a negative decision due to high effort and low reward (Siegrist 1996; Van Vegchel et al. 2005; Head et al. 2007). The pros and cons of combining theories will be addressed in Sect. A.5.

Theories That Explain Duration of Work Disability

Theories that explain the duration of work disability focus either on why the work disability lasts and/or why return to work takes place. In line with that, these theories are either tested with duration of sickness absence as outcome measure (e.g., number of sickness absence days) or return to work (e.g., days until return to work, being returned to work after a certain time period such as 1 year). Five different types of theories are distinguished regarding duration of work disability:

1. Health-related approach
2. Phase models
3. Work stress approach
4. Decisional theories
5. Disability policy theories

Health-Related Approach

Krause et al. (2001) demonstrated convincingly the relationship between what was named "clinical measures" and prolonged work disability (delayed return to work). Clinical measures covered both diagnoses and indicators for subjective health and for limitations. Even though, research on the effects of health on return to work is in need of a more defined theory (Krause et al. 2001).

Phase Models

Phase models describe returning to work as a gradual process, during which the employee progressively returns to work. Interventions designed to stimulate a progressive return to work are stage-specific. Three phase models that have been tested can be found:

1. *Stages towards return to work*. The model describes the sequence of medical care, medical rehabilitation, vocational rehabilitation consisting of medical rehabilitation (decreasing over time) and nonmedical rehabilitation such as education, work training (increasing over time), etc. After that a decision is made (Selander et al. 2002). In earlier studies, Marnetoft et al. (2001) had demonstrated the positive effect of a vocational rehabilitation program on return to work and even on later sick leave (Selander et al. 1999).
2. *Readiness for change model* (Franche and Krause 2002). This model proposes that individuals will progress from one stage to the other towards certain behavior. The stages distinguished are pre-contemplation (elaborating on whether you want to change behavior), contemplation (thinking about how to change behavior), preparation for action, action, and maintenance. The model is confirmed for quitting smoking. The model also explains that the individual can relapse back. Although suggested for studying return to work, no studies have been found on the model.
3. *Phase models for disability* (Franche and Krause 2002). In health psychology, models that explain the chronicity of pain and fatigue have been developed. The underlying idea is that once complaints (such as pain and fatigue) are being experienced, an additional process comes into play. Psychosocial factors such as attention to the symptoms, avoiding activity, and thus general decrease of the condition determine whether the complaints become chronic or not. That implies that physical and injury factors are determining in acute phase, but psychosocial factors in the subacute and chronic phases (Franche and Krause 2002).

A model that has not been used for research until now is worth mentioning because of its elaborate

theoretical and empirical underpinnings. The *Readiness for Return-to-Work Model* of Franche and Krause (Franche and Krause 2002) combines the readiness for change model and a phase model for disability. The individual's social context ((non-) occupational social environment, compensation system, social security system, and health care system) and the individual himself determine the

- Decisional balance between pros and cons of returning to work
- Their perceived self-efficacy regarding returning to work
- The change process, that is the process of recovery, rehabilitation, and return to work

The effect of the social context is assumed to depend on the stage towards return to work (Franche and Krause 2002). A scale fitting with the theory has been developed. The Readiness for Return-To-Work (RRTW) scale (Franche et al. 2007) is largely based on the stages in the readiness for change model (Franche and Krause 2002). Although the model has already inspired others (e.g., Shaw et al. 2006), it has not yet been tested. Another conceptualization of the phases towards return to work is presented by Young et al. (2005). They distinguish between (1) off work, (2) work reentry, (3) retention, and (4) advancement. For each phase, they have identified goals and subgoals, key return-to-work actions, and outcome indicators.

Work Stress Approach

The work stress approach is applied not only to explaining work disability but also to explaining duration. Janssen et al. (2003) found for example that high job demands before reporting sick predicted earlier return to work after sickness absence. They concluded that job demands might thus also work as a pressure to return to work. The effects of job control and supervisor support were in the expected direction: both reduced the duration of sickness absence. Even though the effects were relatively small, their results showed that work characteristics appear to play a limited role later in the course of the sickness absence process. The job demand-control model was originally developed to explain stress reactions from work, and the findings of Jansen and colleagues confirm the assumption that a work stress theory fits better with explaining reporting sick than with explaining sickness absence duration and return to work. Moreover, social support during illness by the supervisor may be more effective in reducing sickness absence duration than previous support. Change in work characteristics and whether work modifications are offered might theoretically be better predictors of duration and return to work than work stressors perceived previous to reporting sick.

Decisional Theories

Parallel to reporting sick, return to work is also modeled as a decision that is taken after certain conditions are fulfilled. Particularly *distal theories* relating to the factors that lead to decision to return to work after sickness absence can be distinguished. Two models are found:

1. The *Attitude*, *Social norm*, *and self-Efficacy model* (*ASE model)* (e.g., De Vries et al. 1988) can also be applied to return to work (see Fig. A.5). The decision to return to work after sickness absence is according to this model explained by the motivation to return to work and (the lack of) obstacles. This motivation is composed of the attitude regarding (returning to) work, the perceived social norm within the employee's social circle regarding return to work, and the experienced self-efficacy regarding return to work (De Rijk et al. 2002; De et al. 2003). Relationships between the three motivational determinants and return-to-work motivation were found, and work motivation was correlated with actual return to work (De Rijk et al. 2008b). More recently, Brouwer et al. (2009, 2010) demonstrated the effects of perceived work attitude, self-efficacy, and perceived social support (instead of social norm) on time to return to work. Richard et al. (2011) found self-efficacy to be related to less failure in return to work.
2. A model focusing on *subjective obstacles to return to work* was introduced and tested by Berglind and Gerner (2002). They distinguish three types of subjective obstacles to returning to work:
   - Do not want (which links to attitude)
   - Cannot manage (which links to self-efficacy)
   - Cannot get (which links to possibilities)

The authors demonstrated for each of these determinants a relationship with return to work.

Disability Policy Theories

All previous theories focused on the level of the individual. There are also theories for the relationship between the national policy on work disability and the return-to-work rates. These theories often have the shape of hypotheses based on a more general theory rather than a model of determinants. An important basis for many of these hypotheses forms the regime theory on different types of welfare states (Bambra 2007). Three interesting examples of research using disability policy theory are mentioned here. In political science, a theoretical distinction is made between two principally different types of disability policy: having an emphasis on a compensation policy with broad access to disability benefits but fewer reintegration measures or having an emphasis on reintegration by stimulating return to work combined with more restricted access to disability benefits (OECD 2003). Anema et al. (2009) demonstrated that these policy differences explain differences in return-to-work rates between various countries. Differences were mainly explained by differences in reintegration interventions and less to differences in access to disability benefits. Dragano et al. (2010) studied how welfare regimes and labor policies were related to work disability in 12 European countries. They also included unhealthy psychosocial working conditions in their model. Heymann et al. (2010) studied the effect on the health and productivity of the workforce of sick leave policies in 22 countries.

Combination Model

The risk factor interventions strategy model describes three broad categories of risk factors for delayed return to work (Shaw et al. 2006). The risk factors are linked to that in the model of Franche and Krause (2002) but also include other theories. First there is the group of immobilized workers, characterized by being fear avoidant, having pain catastrophism, physical dysfunction, and poor expectations for resuming activity. Second there is the group of unemployed, characterized by high physical demands at the workplace, poor employer response, lack of work modifications, and short job tenure. Finally, there is the overwhelmed group, characterized by mood symptoms, life adversity, work stress, and fears and worries (Shaw et al. 2006). Steenstra et al. (2010) demonstrated these different groups to exist in a Dutch sample.

Theories That Aim to Understand Work Disability

Theories aiming at understanding work describe the context under which work disability might develop in order to better understand the process underlying work disability. These theories are presented as a description of closely linked assumptions and are mainly studied with qualitative methods. They stem from sociology and policy science. They focus on the individual's direct social context (e.g., sickness role by Parsons (Radley 1994; Shilling 2002)), the organizational context (e.g., habitus by Bourdieu (Virtanen et al. 2004)) or the institutional context (in terms of legislation) (Van Raak et al. 2005), and society (Stone 1984). Although they largely vary and researchers using some of them will not recognize all as belonging to a clearly determined group, the theories labeled as aiming at understanding work disability have in common that the individual worker is not their main entity. Further, these theories take the social context into account in a broader sense than just one variable, for example when paying attention to historically grown routines and beliefs. These theories also have different ideas about human motivation—an important factor in many explanatory theories for reporting sick and returning to work. The theories focusing on understanding motivation as a phenomenon result from the interaction of the individual with the social environment, and they also assume something as a group level motivation to exist as a part of belonging to a certain group. Also, these theories tend to include ideas on power differences between groups and introduce an explicit normative dimension into work disability research.

Theories Related to Individual's Direct Social Context

Two major theories address the direct social context:

1. *Sick role* (Radley 1994; Shilling 2002). Work disability practitioners often refer to *sick role* and illness behavior when they try to explain why a certain individual stays sick. Despite its popularity, this is not exactly what Parsons meant when he introduced the concept of sick role in 1951 (Radley 1994; Shilling 2002). Parsons wanted to show that illness and health are social dimensions. The sick role is an adaptive device within society: taking up this role is a sign for others that the ill person should be restored to the world of the healthy people. Taking up the sick role is also reinforced by others; it is not a solely individual decision. Moreover, there are alternatives such as self-treatment of symptoms with no change in role (e.g., take an aspirin), the designation of the person as a malingerer (e.g., as a result of the doctor finding no disease), or ignoring signs and carrying on as normal (Radley 1994; Shilling 2002). In this theory, illness is regarded as a generalized disturbance in of the person's role capacity. This leads to the individual being accorded a different status in society—that of the role of the sick person. This role has four main features:
   - Being exempted from the performance of your social duties. This is not an individual transition; it requires validation by others, for example a sick note.
   - The sick person is not held responsible for his or her state.
   - While the sick cannot make himself better, due to the social pressures he is obliged to remove himself from a situation in which he behaves like healthy person, such as going out with friends. Often the exemption from social duties such as work is emphasized, and it is suggested to be advantageous for the individual, but this point of the theory emphasizes the disadvantage of isolation from social life due to the sick role.
   - The sick is obliged to seek qualified help when appropriate (Radley 1994).

     Although not explicitly referring to Parsons' sick role theory, Verdonk et al. (2008) studied highly educated female employees with mental health problems with a methodology allowing for understanding the interaction between direct social environment and individual. They showed how these women had developed an individualized focus on their work-related problems, which delayed solutions in the workplace, allowed employers not to take responsibility, isolated them from partners and friends, and hampered successful reintegration.
2. *Empowerment theory* (Van Hal et al. 2012). Van Hal et al. (2012) studied empowerment from the perspective of the normative notion that people should make an active, autonomous choice to find their way back to the labor process. This is rooted in the definition of empowerment as a process or approach that includes the client-professional relationship. In this qualitative research, they found how some return-to-work interventions aiming at activation can actually lead to disempowerment. For example, the talking and focusing on reflection does not help clients that mostly learn by just doing. These insights might be helpful to better understand the effects of return-to-work interventions (Van Hal et al. 2012).

Theories Related to the Organizational Context

Virtanen et al. (2004) have applied Bourdieu's theory of social field, habits, and practice to improve the understanding of sickness absence practices. According to this theory, a constant, what they name, "historical and cultural locality context" (i.e., the historically grown social context of the area in which the employees live and work) tends to reproduce prevailing sickness absence practices. This theoretical framework explained variations observed in sickness absence figures between three Finnish local governments in 1991–1993. Accordingly, sickness absence can be understood by two theoretical concepts:

- "Social field" is defined by them as the characteristics of the local community in terms of access to economical, cultural, and social capital. They found that the local health care characteristics, type of work, and sociocultural

characteristics were related to sickness absence level.
- "Habitus" (Latin for habits) is defined by them as the socially shared habits, formed in historical and cultural processes. Habitus functions as a generative scheme which is necessary for purposes of adapting in society or for "knowing without knowing" how to act properly in different social situations. Individual sickness absence could be partly understood from socially shared habits.

It is not that this theory neglects the individual level, but individual choices are assumed to be built upon the structural conditions made up by social field and habitus (Virtanen et al. 2004).

Local Stakeholder Theories

Recently, researchers on return to work have focused on the various stakeholders involved, and made a *stakeholder analysis* at meso- or microlevel (Maiwald et al. 2011; Tiedtke et al. 2012; Tjulin et al. 2010). These studies demonstrate the differences in perspectives between stakeholders but also the experiences of uncertainty, vulnerability, confusion, and invisibility that employees—and sometimes also other stakeholders—report. These differences are rarely presented on studies that use a model aiming at explaining work disability.

Another recent development is *collaboration theories*, which focus on stakeholders' collaboration, trust, and conflict in sickness absence guidance and return to work. De Rijk et al. (2007) developed a model based on Resource Dependence theory, Institutional theory, and sociological theory on Cooperation (RDIC model) to study the backgrounds of cooperation between stakeholders and lack of cooperation in different cases. They demonstrated the positive role of legislation and mutual dependency on cooperation. Ståhl et al. studied interorganizational collaboration in sickness absence and found that trust is essential for cooperation (Ståhl et al. 2010, 2011).

Theories Related to Institutional Context/Society

Two theories that are related to the institutional context, that is the legislation, norms, and values in society, are worth mentioning:

1. From a political science perspective, Stone (1984) has developed the theory on *distributive programs* that inspired many. According to Stone (1984), all sickness absence and disability programs can be understood as "*distributive programs*." The programs decide between those who are allowed to receive a benefit (and thus are in need) and those who are not (and thus should work for their bread). These programs use *categories* to delineate the boundaries between work- and need-based distributions of welfare. There is always a tension between the two distributive principles (the need-based principle and the work-based principle), and the distinction between those who are in need and those who are not is always changing. Disability programs are sensitive to economic conditions and are related to the structure of unemployment in the labor market. These changes are not always expressed in legislation and also take place at the level of the decisions made by the disabled and the work disability practitioner. Stone (1984) assumed that to be labeled as disabled, one must be characterized by:
   - A special moral status of innocence and suffering
   - Incapacity: working incapacity, earning incapacity
   - A disability that is demonstrated with a clinical method

   Due to these three characteristics, she argues, the label "disabled" is flexible. What is regarded as suffering and being incapable varies across time and professionals. Stone also regards clinical methods as a reflection of values of professionals. Despite the theory being valued, there is little research based on it. Meershoek et al. (2007) used this theory to study sickness certification in Dutch disability schemes and demonstrated variations of professionals in their judgment of disability.
2. *New institutional theory* (an umbrella term for theories from economics and sociology on how institutions rules shape human behavior) can also be used to study how to improve work disability policies (protocols, legislation) in practice. Van Raak et al. (2005) studied the

case of stakeholder collaboration on return to work in the light of legislation in two different countries (Belgium and the Netherlands). They distinguished eight characteristics on the basis of new institutional theory that might affect how legislation is perceived by the users. They found striking differences in how legislation described duties (so-called must rules) in the Netherlands and made suggestions (so-called may rules) in Belgium and in the degree of internalization of the legislation in the two countries (Van Raak et al. 2005).

Conclusion, Discussion, and Recommendations

The taxonomy of work disability theories that are rooted in the social sciences and applied in research shows a wide variety. Differences between the theories are found on different dimensions:

1. *Scientific paradigm*. There is a difference between theories (models) that aim to explain and theories (set of strongly related assumptions) that aim to understand.
2. *Focus*. Particularly for the theories that aim to explain, a difference can be made between those theories that explain why employees become disabled and theories that explain how work disability can be ended (or continue). This distinction is not always clear for the theories that aim at understanding work disability.
3. *Scientific discipline*. This is illustrated in Table A.2. Even though the primary focus was theories from the social sciences, the variety is large, which limits the opportunity for exchange of new insights between work disability professionals working in different scientific disciplines. Even though, psychological theories (on stress, decision-making, and, recently, illness perceptions) are dominant in work disability research.
4. *Amount of empirical studies using the theory*. Even though this was not a systematic review, it became clear that the theories related to the unhealthy workplace are dominant in work disability research.
5. *Type of explanation*. There are theories that focus on the environment (exposure, social context), theories that focus on individual behavior, or both.

The taxonomy offers some points for discussion. Given the variety in theories, several authors advocate for combining different theories (Kristensen 1991; Veerman 1993; Høgelund 2001; Young et al. 2005). In terms of explained variance, combining might be advantageous. Young et al. (2005) assume that a more comprehensive model may enable discoveries beyond those that can be achieved with the use of less comprehensive models. However, such models would be cumbersome to test empirically (and in fact no integrated tests of the combined models are found) and many concepts could be misinterpreted. The various theories include different explanatory mechanisms. Combining contains the risk of blurring interpretations of the study's outcomes. It might be that a combined model is more advantageous as a framework for practice and for the development of interventions (Young et al. 2005) than for empirical research.

The focus on psychological theories might reflect the "age of psychology," which takes the individual as starting point. This focus might be misleading in conceptualizing work disability for two reasons. The emphasis on rational behavior and conscious decision-making might lead to underemphasizing the uncertainty, vulnerability, confusion, and invisibility that people with a work disability (and sometimes also their stakeholders) might experience. Second, the psychological theories ignore the wider sociopolitical context of the individual. Psychological theories are obviously regarded as attractive because of their link to interventions at the local and individual level. They also seem easier to implement than changes in organizations or the labor market.

Regarding empirical studies, it is striking that many of the stress theories are tested incompletely. It is hardly tested whether the stressors actually lead to health problems. This points at a major gap in work disability research and also hampers the translation of the results to interventions, particularly at the level of secondary and

Table A.2 Theories in relation to scientific discipline

Group of theories	Developed and used within	Also used/adapted within
Explaining becoming work disabled		
Theories explaining poor health, not work-related	Health science, biomedical science	–
Theories regarding physical working conditions	Health science, biomedical science	–
Theories stemming from the work stress paradigm	Work and organizational psychology and health sciences	–
Theories derived from the work stress paradigm	Work and organizational psychology, work and health psychology, and health sciences	–
Personality of employee	Clinical and health psychology and medicine	–
Decisional theories	Social psychology	Work and organizational psychology, management studies, and health science
Combination: work stress and behavioral theory	Sociology, work and organizational psychology, work and health psychology, and health sciences	–
Explaining duration of work disability/RTW		
Health-related approach	Health psychology	Organizational psychology and health science
Phase models	Health psychology	Organizational psychology and health science
Work stress approach	Work and organizational psychology, work and health psychology, and health sciences	–
Decisional theories	Social psychology	Health science, work and organizational psychology
Disability policy	Sociology, political science, and health science	–
Understanding work disability		
Theories related individual's direct social context	Medical sociology	Health science
Theories related to the organizational context	Philosophy, sociology, management studies, and health science	–
Local stakeholder theories	Sociology, political science, and health science	–
Theories related to institutional context/society	Sociology, political science, and health science	–

tertiary prevention. It is obvious that work stressors are important risk factors for work disability. But the question how the relationship can be explained is hardly addressed.

There is a sharp difference between theories and interventions: the effectiveness of interventions can be proven while theories cannot be proven (Harrison and Martocchio 1998). Practitioners who translate a theory to a practical intervention and apply this believing that they work evidence-based but in fact have no knowledge (yet) on the effectiveness are a well-known problem that is not related to the theories themselves (Hurrelmann et al. 1987). Some of the theories presented here are linked to interventions, and intervention studies have been performed, but it is far too early to extent the current taxonomy with a link to interventions. Work stress theories have always been linked to changes in working conditions (by employers) and dealing with stressors (by stress management training for employees) (Koh and Baker 2009). Phase

models are linked to different interventions in different stages (Franche and Krause 2002; Young et al. 2005). Bambra (2011) recently introduced an interesting framework that links different types of interventions to the different theories for employee health that focus on factors at the level of policy, exposure from the workplace, and at the level of the individual. Also, the model of Shaw et al. (2006) is particularly interesting because the model characterizes employees not only in psychological terms but also regarding their labor market position and health condition and presents a clear link to interventions. Conceptually, this model is also a nice example of a theory that has achieved comprehension at a higher and more conceptual level rather than cumulating determinants in a (too) complex model.

It seemed too early to include theories on presenteeism in the taxonomy. Presenteeism is clearly linked to health risks and health conditions (Schultz and Edington 2007; Johns 2009), but "research (…) concerning presenteeism have been markedly a-theoretical" (Hansen and Andersen 2008, p. 531). It seems that the focus in presenteeism research is on the costs of lost productivity rather than on theory development and testing (Brooks et al. 2010; Pauly et al. 2008). Johns (2009) has presented a model with some of the key variables that might be incorporated into a theory for presenteeism. He has modeled presenteeism as a decision that is made after a specific health event (acute, episodic, or chronic) occurs. He further assumes that in the less extreme medical cases, context will come into play. Contextual constraints on both presenteeism and absenteeism will affect the decision. Johns (2009) further presents five prescriptions or requirements for a theory (or theories) on presenteeism. He takes a behavioral perspective on presenteeism: a theory on presenteeism should recognize the subjectivity of health, incorporate work attitudes and experiences, and incorporate personality. Hansen and Andersen (2008) for example demonstrated that work-related factors seem to be slightly more important than personal circumstances or attitude in determining the decision to go ill to work. Also, Johns (2009) would like to formulate a theory on the relationship between absenteeism and presenteeism. He states that the research on presenteeism has made very scant use of theories for absenteeism. Only low associations between absenteeism and presenteeism are found, and associations at individual level might differ from those at organizational level. Finally, he asserts that a theory on presenteeism should address the relationship between job insecurity and presenteeism (Johns 2009).

Finally, some practical recommendations for researchers are presented. How could they make a selective choice before starting their research? The question to start with should be: What do I want to do with the information I will collect? What is the study's objective? If the study has an important scientific aim, does it contribute to a new theory development, to testing a theory, or to reproduce a pattern? If the study will have practical implications, three questions need to be asked:

1. What do you want to change (reporting sick, sickness absence duration)?
2. Who is sponsoring the research? What type of information do they want?
3. At which level should the intervention take place? Is it at the macro level (e.g., state, labor market structures, and organization of work), the meso level (community, organizations, and family), or the individual level (changing perceptions, decisions, etc.)?

Next, the researcher should consider the theories that fit with that aim. The choice further depends on the researcher's preference for qualitative or quantitative research. Once the theory is chosen, decisions need to be made on the research methods that are in line with the theory regarding design, sample, measures, and analysis. Study outcomes need to be first interpreted from the perspective of the theory chosen. Only after a thorough interpretation exercise is conducted, other theories that might explain the results (better) can be brought into the discussion (Polit and Beck 2004; Punch 1998).

Given the large variety of work disability theories, many researchers and practitioners were inspired primarily by theories that pertained to their own scientific or disciplinary background and/or their own preferences. The present taxonomy offers

a wider choice and allows the reader to identify the most appropriate theory for understanding observations and literature, do research, and eventually develop and evaluate an intervention—the essential steps of research and development (Polit and Beck 2004).

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P. Loisel and J.R. Anema (eds.), *Handbook of Work Disability: Prevention and Management*,
DOI 10.1007/978-1-4614-6214-9, © Springer Science+Business Media New York 2013