Overview of the Quality Health Outcomes Model

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Introduction

Twenty years ago, the release of the Quality Health Outcomes Model (QHOM) (Mitchell et al. 1998) by the Quality Healthcare Expert Panel of the American Academy of Nursing proved incredibly timely. Shortly after the QHOM release, the Institute of Medicine [IOM, now the National Academy of Medicine (NAM)] published *To Err is Human: Building a Better Health System* (2000), which revealed that healthcare errors were a leading cause of death in the USA. The report estimated up to 98,000 preventable deaths each year and hundreds of thousands of nonfatal injuries. Further, the IOM recommended a paradigm shift of making evidence-based changes at the systems level to improve quality and safety. At about the same time, the American Nurses Association established the National Database of Nursing Quality Indicators® (NDNQI®), which contains nursing-sensitive structure, process (intervention), and outcome measures for monitoring how nursing care affects outcomes (Press Ganey n.d.). NDNQI quickly became a mechanism for nurses to understand and address care delivery problems that endangered hospitalized patients' outcomes. Although progress has been made, today, the healthcare industry still faces significant and compelling challenges related to patient safety. In a 2016 analysis for the *BMJ*, Makary and Daniel (2016) found that the mean number of deaths from preventable medical errors was about 250,000 per year in the USA and, therefore, it was the third leading cause of death.

The healthcare environment in which nurses and other healthcare professionals practice is complex and rapidly changing. The need for evidence about which factors contribute to improved safety and quality has never been greater. Nurses play a

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significant role in the delivery and coordination of care activities within and across healthcare teams. Consequently, few healthcare elements do not pass through nurses' hands and few outcomes are not influenced by nursing care.

The QHOM and its four primary constructs—system, client, interventions, and outcomes—organize quality and safety components within a nursing framework. Using the QHOM, nurses and other healthcare professionals can conceptualize and measure quality and safety components simultaneously at a single level or multiple levels, such as individual, family, community, and population levels (Mitchell et al. 1998; Mitchell and Shortell 1997). The flexibility of the QHOM makes it an ideal framework for solving some of today's compelling quality and safety challenges.

Background of the Quality Health Outcomes Model

Up to the late 1990s, researchers investigating factors contributing to quality healthcare and better patient outcomes primarily used Donabedian's (1966, 1988) linear structure, process, outcomes (S-P-O) framework. Structures of care were defined as setting attributes where patient care takes place, including provider characteristics, technology, specialty mix, patient volume, and financing. Processes of care were provider-client interactions and how episodes of illness are managed. Outcomes of care were the results of care—typically the "Five Ds" of death, disability, dissatisfaction, disease, and discomfort (Lohr 1988). In the traditional S-P-O framework, nursing structure components typically were buried in nonspecific features of organizational structure. Further, nursing processes were almost nonexistent, which did not advance the understanding of the nursing system and process factors that interacted with client factors to achieve optimal client outcomes (Michell et al. 1997a). Research that explicitly addressed the interactive effects of organizational and process factors in care delivery and client outcomes was lacking.

In the mid-1990s, the American Academy of Nursing's (AAN) Quality Healthcare Expert Panel (QEP) recognized a need for a more interactive conceptual framework for nursing and health services research. A taskforce within QEP developed the QHOM, incorporating dynamic and reciprocal interactions among system, client, process or interventions, and outcomes (Mitchell et al. 1998; Mitchell and Lang 2004). Interventions acted on the system or client, which in turn affected outcomes. The QHOM was derived from literature, QEP members' research, and expert opinion.

Developers of the QHOM also garnered input by hosting two invitational conferences in 1996 and 2002 sponsored by the Agency for Healthcare Research and Quality (AHRQ, formerly the Agency for Health Care Policy and Research), with additional support from a variety of other organizations. Both conferences brought together nurse scientists, health services researchers, healthcare purchasers, and policymakers. The 1996 conference, *Outcomes Measures and Care Delivery Systems* (see *Medical Care,* 1997, Vol. 35, November NS supplement for complete details on the conference and its outcomes), focused on (a) identifying outcome indicators shown to be sensitive to elements of nursing care delivery systems, (b)

identifying promising indicators for measure development or incorporation into studies of care delivery systems, and (c) developing research and policy recommendations regarding measure development for incorporation into existing data sources (Michell et al. 1997a). The 2002 conference, *Measuring and Improving Healthcare Quality* (see *Medical Care,* 2004, Vol. 42, Number 2 supplement for complete details on the conference and its outcomes), built on the 1996 conference and focused on (a) linkages of nursing processes (interventions) and outcomes; (b) linkages of health outcomes, quality of nursing care, and nurse staffing; and (c) methodologies and challenges of quality indicators measured within large databases (Lang et al. 2004). The resultant QHOM was then published in 1998 in *Image: Journal of Nursing Scholarship* (Mitchell et al. 1998) and updated after the 2002 conference (Mitchell and Lang 2004).

The Quality Health Outcomes Model

The QHOM (Fig. 1.1) is a nonlinear model depicting interrelationships among the nursing metaparadigm constructs of person (client), environment (system), health (outcomes), and nursing care (interventions) (Mitchell et al. 1998; Mitchell and Lang 2004). The QHOM reimagines Donabedian's (1966) long-standing linear S-P-O framework to assess the quality of care by realigning the constructs to incorporate multiple, dynamic feedback loops among the healthcare delivery system, interventions, client, and outcomes, allowing more sensitivity to nursing care. The

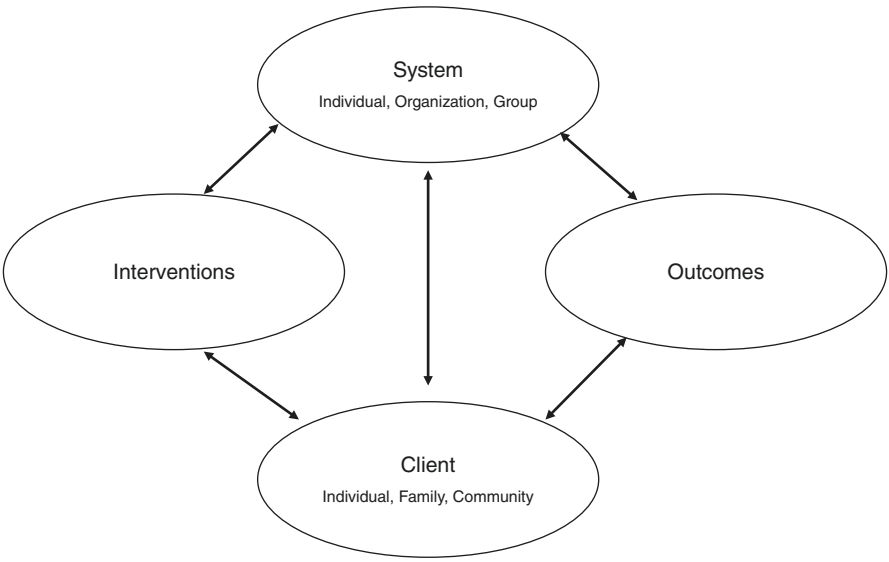

Fig. 1.1 Quality Health Outcomes Model (source: Mitchell, P.H., Ferketich, S., & Jennings, B.M. (1998). Quality Health Outcomes Model. Image: Journal of Nursing Scholarship, 30(1), 43–46. Reproduced with permission from Wiley)

QHOM contains no direct link between interventions and outcomes. Instead, an intervention's effect is mediated or moderated by client and system characteristics, rather than having independent effects on outcomes (Mitchell and Lang 2004). Although the QHOM includes nursing metaparadigm constructs (person, environment, health, and nursing care), it is intended for use in all health services research and quality improvement activities.

Components of the QHOM

System

The QHOM includes the S-P-O framework's traditional structure variables (Mitchell et al. 1998). For healthcare organizations these include attributes such as size, ownership, technology, population served, case mix index, and location. Additionally, specific nurse work environment characteristics (organizational or unit level) can be included to determine their effect on outcomes. Examples of nurse work environment characteristics are transformational leadership, practice autonomy, professional relationships, empowerment, shared decision-making, patient-centered culture, appropriate staffing structures, and professional development (Kramer et al. 2010).

Client

The client can be an individual, a group such as a family, a community, or a population. Client characteristics are broad and include differing states of client health, demographics (e.g., age, gender, income), disease risk factors, health habits, and preferences (Mitchell et al. 1998). The client can also be framed beyond the traditional patient. Clients can be nurses or other healthcare providers, a single organization, or a healthcare system.

Interventions

Interventions, in general terms, are the *activities of care* and *clinical processes*. These clinical care processes directly or indirectly target patients, families, and communities to achieve desired health outcomes. Interventions are the *mechanisms* through which clinicians impact health; thus, they are the key *active ingredients* of quality healthcare. Nursing surveillance, implementation of prevention protocols, and nurse cognitive processes are nursing intervention examples. Mutual exchange of time, expertise, and resources among the multiple health professions is an example of an interdisciplinary intervention (Mitchell and Shortell 1997).

Interventions can also be targeted at organizations or clinicians as a client. Two organizational intervention programs with demonstrated outcomes (e.g., improved nurse satisfaction, better retention of nursing staff and nursing leaders, higher quality interprofessional teamwork and nursing practice, better fiscal outcomes) are the Magnet Recognition Program® (ANCC n.d.-a) and the Pathway to Excellence (PWE) Recognition Program (ANCC n.d.-b). An example intervention targeted at clinicians is a training program to improve interprofessional collaboration.

Outcomes

To capture nursing's effect (individual, unit/group, or organization) on outcomes, Mitchell et al. (1998) added five client outcomes to the usual "Five Ds" (death, disability, dissatisfaction, disease, and discomfort.). These added outcomes incorporated psychosocial, physical, functional, and physiologic elements thought to be more directly related to client functioning in everyday life, capacity for self-care, and engagement in health-promoting behaviors, as well as client' perceptions of care. The five added outcomes are *achievement of appropriate self-care, demonstration of health-promoting behaviors, health-related quality of life, client's perception of being well cared for*, and *symptom management.* See Table 1.1 for descriptions of QHOM added outcomes.

Just as clients and interventions can be conceptualized beyond the patient, outcomes can be conceptualized for clinicians and organizations. Examples of clinician outcomes are engagement, job satisfaction, burnout, and retention or turnover. Examples of organizational outcomes are fiscal and reputational status.

Theoretical and Analytic Advantages of the QHOM

The four QHOM constructs can be conceptualized and measured simultaneously at a single level or multiple levels, such as individual, family, community, and population levels (Mitchell et al. 1998; Mitchell and Shortell 1997). Another way to stratify levels is through the lens of micro, meso, and macro factors (Serpa and Ferreira 2019). Microlevel factors are at the level of the individual (patient, clinician). These might include patient chronicity (Chap. 8) and health literacy (Chap. 7). For clinicians, microlevel factors might be job satisfaction (Chap. 13). Meso-level factors

Table 1.1 QHOM outcome definitions

Concept	Definition
Achievement of appropriate self-care	The capacity and performance of self-care appropriate to current health status, where both capacity and performance are necessary dimensions (Henry and Holzemer 1997). *Capacity* is the maximum potential for actions. *Performance* is the actual activity. Achievement of appropriate self-care is considered the best proxy measure for the effectiveness of nursing care (Michell et al. 1997b)
Demonstration of health-promoting behaviors	A wide-ranging array of behaviors that promote health such as exercise and smoking cessation (Mitchell and Lang 2004)
Health-related quality of life	An individual or group's perceived health status, such as physical, mental, functional, or social aspects or health or illness, or general quality of life (Michell et al. 1997b; Mitchell et al. 1998)
Patient's perception of being well cared for	Patient perceptions in assessing healthcare delivery systems—a broader construct than patient reports of satisfaction (Michell et al. 1997b)
Symptom management	Patient-defined outcomes of managing specific symptoms, for example pain or nausea (Mitchell and Lang 2004)

span from the unit and team level to the organizational level. These might include an organization's nurse work environment (Chap. 4) or the level of interprofessional practice (Chap. 10). Macro-level factors work at the regulatory, societal, and political levels (Chaps. 2 and 3). Examples include licensure requirements and regulations, accreditation requirements for the Magnet or Pathway to Excellence Programs or Joint Commission accreditation, federal hospital payment systems, and staffing regulations.

The QHOM allows for research and quality improvement aims to be constructed at the appropriate level. For example, because variations exist in organizational structures, processes, and outcomes among units in the same hospital, aims may need to be addressed at the unit level rather than the hospital as a whole. If aims are about primary care, home healthcare, and other out-of-hospital settings, the focus unit can be the individual clinic or home healthcare unit, rather than the entire health system or corporation. Simultaneously other aims can address the hospital or corporate level.

The QHOM directs the inclusion of intervention (process) variables in quality assessment and improvement initiatives. The QHOM does not, however, define or prescribe specific interventions for quality assessment. Instead, the selection of intervention variables is purpose driven and context dependent. For example, the selection might depend on the aspect of care evaluated (e.g., primary care vs. acute care), the discipline evaluated (e.g., nursing vs. pharmacy), and the outcome of care evaluated (e.g., patient satisfaction vs. morbidity or mortality). Moreover, the QHOM directs the concurrent measurement of relevant variables from all constructs. Assessment of any single construct in isolation does not provide a complete quality assessment and does not provide direction for improvement. Consequently, a measure's relevance is based on its relationship to other variables in the measure set. Characteristics of an ideal measure set for quality assessment and improvement initiatives include the following: (1) they provide a complete, evidence-based model of the intervention of interest; (2) they address the full continuum of outcomes expected to be influenced by the intervention of interest; and (3) they include measures that are sensitive to change in the care being evaluated (Donabedian 2003; Jones 2016; Needleman et al. 2007).

The QHOM also allows for flexibility in the specification of levels included in data analysis. One example is accounting for organizational structures common in healthcare. Nurses and other clinicians are nested in units or workgroups, units and workgroups are nested in organizations, organizations are often nested in corporate systems, and so forth. As individual nurses and clinicians in workgroups and organizations are exposed to common features, events, and processes over time, they may develop consensual views of the workgroup and organization through interacting and sharing (Kozlowski and Klein 2000). Consensual views of safety culture and morale are examples. Multilevel modeling and data analysis can account for these consensual views.

On the other hand, there is variation in individual-level (micro) performance by nurses and other healthcare professionals that is to be expected (Yakusheva

et al. 2020). The QHOM allows for linking individual clinicians to individual patients under the clinician's care—and then studying, for example, variations in care and patient outcomes. The elegance of the QHOM allows for modeling that includes system factors' (e.g., staffing, professional autonomy) effect on individual variations in care and subsequent outcomes.

Use of the QHOM in the Literature

Since its development in the mid-1990s the QHOM has inspired the development of related models and served as a theoretical framework for studies and projects. A literature review spanning 1996–2003 (Mitchell and Lang 2004) found that the model had guided a handful of studies in different settings from labor and delivery to oncology inpatient care. More importantly, the QHOM had served as an impetus for developing other models that linked organizational features and outcomes and developing measures for the system, client characteristics, interventions, and quality outcomes, and has been used in national and international datasets.

A review of published literature from 2002 to 2018 was undertaken to determine if the QHOM remains valuable as a theoretical guideline for studies and projects. PubMed, Web of Science, CINAHL, and other EBSCO databases were searched using the keywords "quality health outcomes model." Also, manual searches of critical articles' references were done. The search revealed 25 citations, where 6 were reviews or discussion papers, and of the remaining 19, 1 was a DNP project and 3 were dissertation studies.

From the six review or discussion papers, some papers discussed frameworks or conceptual models. Brewer and colleagues (Brewer et al. 2008) adapted the QHOM to develop a System Research Organization Model (SROM) to guide evidence-based healthcare design. Another article evaluated frameworks pertinent to research on isolation precaution effectiveness and recommended the QHOM because of its reciprocal relationships and multilevel analyses (Cohen and Shang 2015). In a third paper, the QHOM was used to plan simulations for training aimed at increasing patient safety (Lassche and Wilson 2016). Finally, Swan and Boruch (2004) used the QHOM to identify gaps in the evidence base in nursing and presented recommendations for practice, research, and policy to increase nursing's contribution to quality healthcare. The last two papers were reviews that focused on acute care psychiatric patients and are included in the review of studies below.

Of the 19 studies, reviews, and projects, 1 study used the QHOM to examine current issues related to quality measures (Baernholdt et al. 2017) by conducting focus groups with developers, regulators/endorsers, data collectors, and consumers. The QHOM guided both the questions and later the analyses. Only one study took place outside of the USA, namely in China (Shang et al. 2014). The studies and projects took place in various healthcare continuum settings, including specific patient groups and interventions. Not all studies included all four of the QHOM constructs. For example, intervention was the least discussed construct.

System

The most common system studied was hospitals or nursing units (Altares 2015; Badger 2017; Effken et al. 2005; Gerolamo 2004, 2006; Gilmartin and Sousa 2016; Gilmartin et al. 2016; Hilleren-Listerud 2014; Jost 2016.; Lake et al. 2012; Malley et al. 2018; Mark and Harless 2009; McAlister et al. 2013; Rowland 2005; Shang et al. 2014; Wilson et al. 2010). Specialized nursing units included intensive care units (ICU) (Gilmartin and Sousa 2016; Gilmartin et al. 2016), neonatal intensive care units (NICU) (Hallowell et al. 2016; Lake et al. 2012), and inpatient psychiatric units (Gerolamo 2004, 2006). One study took place in a clinic (Berry et al. 2018), another in hospice (both inpatient units and at home) (Baernholdt et al. 2015), while two studies occurred in the community (Borglund 2008; Sin et al. 2005).

Client

There were several client and family groups included across studies. Surgical patients were the focus of four studies (Altares 2015; Badger 2017; Hilleren-Listerud 2014; Mark and Harless 2009), two studies focused on ICU patients (Gilmartin and Sousa 2016; Gilmartin et al. 2016), and two reviews focused on acute care psychiatric patients (Gerolamo 2004, 2006). Pregnant women were included in three studies (McAlister et al. 2013; Rowland 2005; Wilson et al. 2010) as were low-birth-weight infants (Hallowell et al. 2016; Lake et al. 2012; McAlister et al. 2013). On the other end of clients' life span, one study included hospice patients and their families (Baernholdt et al. 2015). Patients with specific diseases or procedures were the focus of two studies: patients with gastrointestinal cancer (Berry et al. 2018) and older adults with multiple chronic conditions hospitalized for elective hip or knee replacement and their caregivers (Malley et al. 2018). Community-dwelling adults were included in two studies: adults with a disability (Borglund 2008) and older Korean American adults (Sin et al. 2005). Finally, staff nurses were the client in one study (Jost 2016).

Interventions

The interventions targeted three broad categories: work environment and processes, patient and family, and pregnant women and new mothers. The studied work environment categories included hospitals recognized for nursing excellence (Lake et al. 2012), registered nurse (RN) skill mix (Altares 2015; Mark and Harless 2009) and education (Hallowell et al. 2016), and use of contract nurses (Shang et al. 2014). Three studies described health information technology interventions. One implemented a patient acuity software system that generated patient acuity scores, which then were used to guide staffing decisions (Badger 2017). The second study used virtual units to model fluctuations in patient complexity and staffing, including

education and experience, to educate managers about potential nursing unit interventions to improve care quality (Effken et al. 2005). The third study described a clinical decision support system implementation (Jost 2016). Another four papers included processes for improving care such as comparing case management types (Borglund 2008), implementing a central line bundle intervention (Gilmartin and Sousa 2016; Gilmartin et al. 2016), and a daily delirium screening by RNs (Hilleren-Listerud 2014).

Interventions targeting patients and families encompassed information about patient's condition and emotional support (Baernholdt et al. 2015), an app as an adjunct to usual patient education regarding cancer symptoms and medication management (Berry et al. 2018), and an exercise program (Sin et al. 2005). Four studies included interventions targeting pregnant women and new mothers. Preventive and supportive services during pregnancy (Rowland 2005), elective induction or cesarean delivery (McAlister et al. 2013), and induction (Wilson et al. 2010) were the focus of three studies, whereas breastfeeding support (Hallowell et al. 2016) was included in one study.

Outcomes

As with the previous QHOM constructs, a wide variety of outcomes were included in the studies spanning patient safety, organization, patient-reported outcomes, pregnancy, and nursing process. Patient safety was the focus of seven studies and two reviews. Patient safety outcomes in surgical patients included mortality and failure to rescue (Altares 2015), and other complications such as pneumonia, septicemia, urinary tract infection, thrombophlebitis, fluid overload, and decubitus ulcer (Malley et al. 2018; Mark and Harless 2009). NICU mortality and nosocomial infections (Lake et al. 2012) and central line-associated bloodstream infections (CLABSIs) (Gilmartin and Sousa 2016; Gilmartin et al. 2016) were specific intensive care outcomes studied. Suicide and self-injury and physical restraint episodes in psychiatric units (Gerolamo 2004, 2006) and falls and medication errors across populations (Effken et al. 2005) were studied in other settings. Three organizational outcomes were addressed. Length of stay and patients' discharge disposition were included in two studies (Badger 2017; Malley et al. 2018) and readmission rates in another two (Gerolamo 2004; Malley et al. 2018). Patient-reported outcomes were included in six studies. These outcomes included patient satisfaction (Baernholdt et al. 2015; Effken et al. 2005; Gerolamo 2004; Shang et al. 2014), quality of life (Borglund 2008), and symptom management, including pain and functional improvement (i.e., ability for self-care, muscle strength, agility/balance) (Baernholdt et al. 2015; Effken et al. 2005; Gerolamo 2004; Sin et al. 2005). One study reported patients' acceptability and utilization rate of an app (Berry et al. 2018). Specific pregnancy outcomes included cesarean (Wilson et al. 2010) and early-term birth rates (McAlister et al. 2013). For the newborns, NICU admission rate (McAlister et al. 2013) and rate of low-birth-weight infants discharged home

on human milk were studied (Hallowell et al. 2016). Three papers included nursing practice outcomes. One study examined specific elements of nursing practice such as communication, sharing of information, and workflow (Jost 2016); another one focused on clinician's acceptability working with a patient app (Berry et al. 2018); and another examined the implementation of multidisciplinary delirium intervention in a surgical unit (Hilleren-Listerud 2014).

The literature review provides evidence that the QHOM model remains relevant after more than 20 years. Since the QOM was last reviewed in 2004, the model has been used widely to inform theoretical papers, policy and review papers, and studies across the care continuum focused on a wide variety of clients, interventions, and outcomes. Thus, nurses' contribution to quality healthcare has been and can continue to be depicted using the QHOM.

How This Book Is Organized

This book provides a comprehensive exploration of the QHOM. The four primary QHOM constructs—system, client, interventions, and outcomes—are examined and expanded using a wide variety of contemporary nursing and healthcare topics. The importance of two contextual factors that influence the QHOM—healthcare policy and nurse workforce supply and demand—is explored. The topics covered in this book are those essential for nurses to be effective practitioners and leaders in quality healthcare. Chapter topics can be explored individually or as a whole in connection with all book topics. Topics were assigned to the most germane QHOM construct, recognizing that each topic has components of all four QHOM constructs. For example, health literacy was once thought only to affect individual clients. However, health literacy is also an essential component of the nursing profession and healthcare systems. Sections, specific chapters, and chapter content are provided in Table 1.2.

Summary

This book provides an outstanding in-depth resource for understanding how to use the QHOM in nursing research and quality improvement. The QHOM is a contemporary and essential mechanism for organizing quality and safety components within a nursing framework. The book is intended for use to guide education, research, and practice. The QHOM allows nurses and other healthcare professionals to use their best thinking and collaboration to meet the current quality and safety challenges. See Chap. 15 for future directions for the QHOM.

Table 1.2 Chapter contents

Chapters	Chapter content
Section I. Introduction	
Chapter 1: *Overview of the QHOM* Diane K. Boyle Marianne Baernholdt	Chapter 1 describes the constructs of the QHOM: system, client, interventions, and outcomes. Theoretic and analytic advantages of the QHOM are considered. Uses of the QHOM in previous research are reviewed. An overview of the book content is provided
Section II. Context	
Chapter 2: *Healthcare Policy* Lauryn S. Walker Deborah E. Trautman	Chapter 2 discusses how healthcare policy influences the constructs of the QHOM through legislation, regulation, professional standards of care, health insurance policy, or payment mechanisms
Chapter 3: *The Nurse Workforce* Sean P. Clarke	Chapter 3 focuses on workforce issues within the QHOM. Two forces at the heart of workforce analysis, supply and demand, are examined in various nursing practice areas. Ongoing and emerging trends influencing the nurse workforce are discussed
Section III. System	
Chapter 4: *The Nurse Work Environment* Shelly A. Fischer Diane K. Boyle	Chapter 4 places the system concept of the nurse work environment (NWE) within the context of the QHOM and explores the essential structures of NWEs. Four specific components of NWE are discussed: joy in work and clinician well-being, safety culture, incivility and bullying, and staffing. Two interventions to improve NWEs, the Magnet Recognition Program® and the Pathway to Excellence Recognition Program, are considered
Chapter 5: *Workflow, Turbulence, and Cognitive Complexity* Bonnie Mowinski Jennings	Chapter 5 focuses on the system characteristics of nursing workflow and turbulence. Extensive discussion is provided on how poor workflow and high turbulence tend to increase nurses' cognitive complexity and how poor workflow, high turbulence, and elevated cognitive complexity can contribute to work stress and cognitive failure, thereby adversely affecting patient safety and quality care
Chapter 6: *Health Information Technology and Electronic Health Records* Susan McBride Mari Tietze	Chapter 6 views health information technology (health IT) through the lens of the QHOM. The environmental context that propelled the rapid expansion of health IT is reviewed. The impact of health IT changes on clinical processes and outcomes is discussed. The QHOM model is used to describe methods to address the negatives and optimize technology by using fundamental quality improvement tools and methods. Advances in health IT competencies needed by healthcare professionals are discussed
Section IV. Client	
Chapter 7: *Health Literacy and the Social Determinants of Health* Terri Ann Parnell	Chapter 7 discusses health literacy's association with the social determinants of health and explores their essential relationship to the QHOM. Although health literacy was once thought only to affect individuals, the chapter depicts how health literacy is essential to the nursing profession and healthcare systems. Health literacy interventions are also reviewed

(continued)

Table 1.2 (continued)

Chapters	Chapter content
Chapter 8: *Chronicity* Amy J. Barton	Chapter 8 places the concept of client chronicity within the context of the QHOM and explores its relevance to nursing care and research. Four evidence-based models are described within the context of the QHOM: The Chronic Care Model, Innovative Care for Chronic Conditions, The Chronic Disease Self-Management Program, and The Transitional Care Model. Also, the co-occurrence of multiple chronic conditions or multimorbidity is discussed within the context of complex adaptive care
Section V. Interventions	
Chapter 9: *Nursing Care Processes/ Interventions* Terry L. Jones	Chapter 9 examines the complex nature of nursing processes known as nursing care interventions in the QHOM. Specifically, nursing interventions at the client and the system level are addressed, and two specific nursing interventions, nurse surveillance and symptom management, are examined as exemplars
Chapter 10: *Interprofessional Practice and Education* Alan W. Dow Deborah DiazGranados Marianne Baernholdt	Chapter 10 discusses how the QHOM helps understand the phenomenon of interprofessional practice (IPP) and interprofessional education (IPE) as interventions to improve outcomes in healthcare's complex environment. The chapter discusses what characteristics are essential for IPP at the micro, meso, and macro levels, focusing on organizational culture. IPP interventions are described, followed by an example of an IPP intervention in one healthcare system
Chapter 11: *Care Coordination* Beth Ann Swan	Chapter 11 explores the essential relationship of care coordination within the QHOM. Specifically, one key component is the significant role of registered nurses (RNs) in providing care coordination as an intervention for individuals, families, communities, and populations
Section VI. Outcomes	
Chapter 12: *Client and Family Outcomes: Experiences of Care* Stefanie Bachnick Michael Simon	Chapter 12 examines client and family experiences of care, i.e., person-centered care (PCC). By embedding PCC into the QHOM, characteristics and interventions influencing PCC outcomes are explored at the micro and macro levels. How client and family characteristics, as well as system characteristics, influence and affect outcomes are described. Finally, the chapter provides suggestions for tackling measurement and methodological challenges to improve PCC as one key element of quality of care
Chapter 13: *Nurse Outcomes: Burnout, Engagement, and Job Satisfaction* Peter Van Bogaert Erik Franck	Chapter 13 uses the QHOM to explain how nurses can be empowered to deal with the continuous challenges and healthcare organization changes. Empowerment interventions aimed at the system and the individual nurse levels are described. Nurse outcomes, such as engagement and job satisfaction, are discussed
Chapter 14: *Organizational Outcomes: Financial and Quality Measures* Nancy Dunton Amenda Fisher	Chapter 14 examines organizational outcomes through the lens of the QHOM. Financial and quality measures outcomes are discussed. Elements influencing organizational outcomes are considered, such as the healthcare environment, characteristics of the healthcare organization, and interventions designed to promote healthcare quality

Table 1.2 (continued)

Chapters	Chapter content
Section VII. Closing	
Chapter 15: *The Way Forward* Marianne Baernholdt Diane K. Boyle	The quality and safety reports guiding healthcare policy and practice since the late 1990s when the Quality Health Outcomes Model (QHOM) was developed are revisited, including reports focused on nurses. Aspects of these reports covered in this book's chapters, framed within the four constructs of the QHOM and the healthcare context, are highlighted. Finally, future directions are discussed

References

Altares SD (2015) The impact of nursing skill mix on the outcomes of hospitalized adult surgical patients. http://repository.upenn.edu/edissertations/1990

American Nurses Credentialing Center (n.d.-a) ANCC magnet recognition program. https://www.nursingworld.org/organizational-programs/magnet/

American Nurses Credentialing Center (n.d.-b) ANCC pathway to excellence program. https://www.nursingworld.org/organizational-programs/pathway/

Badger MK (2017) Patient acuity as a predictor of length of hospital stay and discharge disposition after open colorectal surgery. Doctoral Dissertation

Baernholdt M, Campbell CL, Hinton ID, Yan G, Lewis E (2015) Quality of hospice care: comparison between rural and urban residents. J Nurs Care Qual 30(3):247–253. https://doi.org/10.1097/NCQ.0000000000000108

Baernholdt M, Dunton N, Hughes RG, Stone PW, White KM (2017) Quality measures. J Nurs Care Qual 33(2):149–156. https://doi.org/10.1097/NCQ.0000000000000292

Berry D, Blonquist T, Nayak M, Grenon N, Momani T, McCleary N (2018) Self-care support for patients with gastrointestinal cancer: iCancerHealth. App Clin Informat 09(04):833–840. https://doi.org/10.1055/s-0038-1675810

Borglund ST (2008) Case management quality-of-life outcomes for adults with a disability. Rehabili Nurs 33(6):260–267. https://doi.org/10.1002/j.2048-7940.2008.tb00238.x

Brewer BB, Verran JA, Stichler JF (2008) The systems research organizing model: a conceptual perspective for facilities design. HERD 1(4):7–19. https://doi.org/10.1177/193758670800100402

Cohen CC, Shang J (2015) Evaluation of conceptual frameworks applicable to the study of isolation precautions effectiveness. J Adv Nurs 71(10):2279–2292. https://doi.org/10.1111/jan.12718

Donabedian A (1966) Evaluating the quality of medical care. Milbank Memorial Fund Quart 44(part 2):166–206

Donabedian A (1988) The quality of care: how can it be assessed? JAMA 260:1743–1748. https://doi.org/10.1001/jama.1988.03410120089033

Donabedian A (2003) An introduction to quality assessment in health care. Oxford University Press, New York, NY

Effken JA, Brewer BB, Patil A, Lamb GS, Verran JA, Carley K (2005) Using OrgAhead, a computational modeling program, to improve patient care unit safety and quality outcomes. Int J Med Inform 74(7–8):605–613. https://doi.org/10.1016/j.ijmedinf.2005.02.003

Gerolamo AM (2004) State of the science: outcomes of acute inpatient psychiatric care. Arch Psychiatr Nurs 18(6):203–214. https://doi.org/10.1016/j.apnu.2004.09.003

Gerolamo AM (2006) The conceptualization of physical restraint as a nursing-sensitive adverse outcome in acute care psychiatric treatment settings. Arch Psychiatr Nurs 20(4):175–185. https://doi.org/10.1016/j.apnu.2005.12.005

Gilmartin HM, Sousa KH (2016) Testing the quality health outcomes model applied to infection prevention in hospitals. Qual Manag Health Care 25(3):149–161. https://doi.org/10.1097/QMH.0000000000000102

Gilmartin HM, Sousa KH, Battaglia C (2016) Capturing the central line bundle infection prevention interventions. Nurs Res 65(5):397–407. https://doi.org/10.1097/NNR.0000000000000168

Hallowell SG, Rogowski JA, Spatz DL, Hanlon AL, Kenny M, Lake ET (2016) The associations between the work environment, nursing care and human milk use for very low birth weight infants discharged from NICUs. Nurs Res 65(2):E66–E67. https://doi.org/10.1016/j.ijnurstu.2015.09.016

Henry SB, Holzemer WL (1997) Achievement of appropriate self-care: does care delivery system make a difference? Med Care 35(11 suppl):NS33–NS40. https://doi.org/10.1097/00005650-199711001-00004

Hilleren-Listerud A (2014) Reducing postoperative delirium. Doctoral dissertation

Institute of Medicine (2000) To err is human: building a safer health system. The National Academies Press, Washington, DC

Jones TL (2016) What nurses do when time is scarce—and why. J Nurs Adm 46(9):449–454. https://doi.org/10.1097/NNA.0000000000000374

Jost SG (2016) Nurses as knowledge work agents: measuring the impact of a clinical decision support system on nurses' perceptions of their practice and the work environment. Doctoral dissertation

Kozlowski SWJ, Klein KJ (2000) A multilevel approach to theory and research in organizations: contextual, temporal, and emergent processes. Jossey-Bass, San Francisco

Kramer M, Schmalenberg C, Maguire P (2010) Nine structures and leadership practices essential for a magnetic (healthy) work environment. Nurs Adm Q 34(1):4–17. https://doi.org/10.1097/NAQ.0b013e3181c95ef4

Lake ET, Staiger D, Horbar J, Cheung R, Kenny MJ, Patrick T, Rogowski JA (2012) Association between hospital recognition for nursing excellence and outcomes of very low-birth-weight infants. JAMA 307(16):1709–1716. https://doi.org/10.1001/jama.2012.504

Lang NM, Mitchell PH, Hinshaw AS, Jennings BM, Lamb GS, Mark BA, Moritz P (2004) Measuring and improving healthcare quality. Med Care 42(2 Suppl):II-1–II-3

Lassche M, Wilson B (2016) Transcending competency testing in hospital-based simulation. AACN Adv Crit Care 27(1):96–102. https://doi.org/10.4037/aacnacc2016952

Lohr KN (1988) Outcomes measurement: concepts and questions. Inquiry 25(1):37–50

Makary MA, Daniel M (2016) Medical error—The third leading cause of death in the US. BMJ 353:i2139. https://doi.org/10.1136/bmj.i2139

Malley AM, Bourbonniere M, Naylor M (2018) A qualitative study of older adults' and family caregivers' perspectives regarding their preoperative care transitions. J Clin Nurs 27(15–16):2953–2962. https://doi.org/10.1111/jocn.14377

Mark BA, Harless DW (2009) Nurse staffing and post-surgical complications using the present on admission indicator. Res Nurs Health 33(1):35–47. https://doi.org/10.1002/nur.20361

McAlister BS, Tietze M, Northam S (2013) Early term birth. West J Nurs Res 35(8):1026–1042. https://doi.org/10.1177/0193945913484390

Michell PH, Heinrich J, Moritz P, Hinshaw AS (1997a) Outcome measures and care delivery systems: introduction and purposes of conference. Med Care 35(11 suppl):NS1–NS5

Michell PH, Heinrich J, Moritz P, Hinshaw AS (1997b) Measurement to practice: summary and recommendations. Med Care 35(11 suppl):NS124–NS127

Mitchell PH, Lang NM (2004) Framing the problem of measuring and improving healthcare quality: has the Quality Health Outcomes Model been useful? Med Care 42(2 suppl):II-4–II-11

Mitchell PH, Shortell SM (1997) Adverse outcomes and variations in organization of care delivery. Med Care 35(11 suppl):NS19–NS32

Mitchell PH, Ferketich S, Jennings BM (1998) Quality health outcomes model. Image J Nurs Scholar 30(1):43–46. https://doi.org/10.1111/j.1547-5069.1998.tb01234.x

Needleman J, Kurtzman ET, Kizer KW (2007) Performance measurement of nursing care. State of the science and the current consensus. Med Care Res Rev 64(2):10S–43S. https://doi.org/10.1177/1077558707299260

Press-Ganey (n.d.) Turn nursing quality insights into improved patient experiences. https://www.pressganey.com/docs/default-source/default-document-library/clinicalexcellence_ndnqi_solution-summary.pdf?sfvrsn=0

Rowland C (2005) An exploration of variations in birth outcomes using PRAMS data guided by the quality health outcomes model. Doctoral dissertation

Serpa S, Ferreira CM (2019) Micro, meso, and macro levels of social analysis. Int J Soc Stud 7(3):120–124. https://doi.org/10.11114/ijsss.v7i3.4223

Shang J, You L, Ma C, Altares D, Sloane DM, Aiken LH (2014) Nurse employment contracts in Chinese hospitals: impact of inequitable benefit structures on nurse and patient satisfaction. Hum Resour Health 12(1):1–10. https://doi.org/10.1186/1478-4491-12-1

Sin MK, Belza B, LoGerfo J, Cunningham S (2005) Evaluation of a community-based exercise program for elderly Korean immigrants. Public Health Nurs 22(5):407–413. https://doi.org/10.1111/j.0737-1209.2005.220505.x

Swan BA, Boruch RF (2004) Quality of evidence. Med Care 42(Suppl):II-12–II–20. https://doi.org/10.1097/01.mlr.0000109123.10875.5c

Wilson BL, Effken J, Butler RJ (2010) The relationship between Cesarean section and labor induction. J Nurs Scholarsh 42(2):130–138. https://doi.org/10.1111/j.1547-5069.2010.01346.x

Yakusheva O, Needleman J, Bettencourt AP, Buerhaus P (2020) Is it time to peak under the hood of system-level approaches to safety and quality? Nurs Outlook 68:141–144. https://doi.org/10.1016/j.outlook.2019.11.004