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ORIGINAL PAPER

Cancer–work management during active treatment: towards a conceptual framework

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Abstract

Purpose Forward progress in cancer treatment has resulted in fewer adverse consequences of cancer during and after treatment, offering employed cancer patients the possibility of continuing to work during treatment, returning to work after treatment, or implementing a combination of strategies to manage the cancer–work interface. Yet, much of the research on cancer and employment examines return to work as the primary outcome, neglecting to consider the circumstances of survivors who maintain employment *while* engaged in active treatment. We introduce the *Cancer–Work Management Framework* (CWMF), a conceptual framework for understanding the cancer and job demands survivors who continue to work during active treatment experience and how cancer and job resources and strategies could promote cancer–work fit and ultimately optimize employment and health outcomes.

Methods We provide an overview of the research describing the cancer–work management experiences of survivors who maintain employment during active treatment and summarize the theories that informed the CWMF including ecological systems, boundary-spanning, and job demands and resources theories.

Results The paper presents a description of the components of the CWMF which include cancer demands, cancer care resources and strategies, work demands, and workplace resources. We also describe a process—cancer–work fit—that reflects the interplay between demands and resources influence employment and health outcomes.

Conclusions Future research directions for developing knowledge about the cancer–work management process are proposed with suggestions for study of how cancer and job demands influence cancer treatment and employment decisions.

Keywords Cancer · Cancer–work management · Employment · Work · Cancer–work fit · Oncology

Introduction

Advances in early detection and treatment of cancer have resulted in improved cancer survival rates in the United States (USA) [1, 2]. The five-year relative survival rate for period between 2009 and 2015 is 69% for all races and cancer sites, a rate much improved from the periods between 1975 and 1977 (49%) and 1987 and 1989 (55%) [3]. Notably, between 2010 and 2015, almost two-thirds (61%) of all cancer cases (5.25 million) were diagnosed among men and women between the ages of 20 and 69 years, indicating that the majority of cancer cases occur among working-age adults [4]. Forward progress in cancer treatment has resulted in fewer adverse consequences of cancer during and after treatment [5], offering employed cancer patients the possibility of continuing to work during treatment, returning to work after treatment, or implementing a combination of strategies to manage the cancer–work interface [6, 7].

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Employment decisions and cancer treatment behaviors may be influenced by several factors, including the context of patients' employment [7, 8]. Employment context refers to how work processes are structured and managed, including job-level factors such as work schedules, job tasks, social support at work, and job security as well as organizational-level factors that may include paid leave, health insurance, schedule control, and supervisor practices. Employment context influences every aspect of a worker's life on the job [9] as well as the ability to integrate work with non-work responsibilities [10]. Forty-two percent of workers in the USA are employed in jobs that pay less than $15 per hour, with women and minorities overrepresented in these jobs [11]. Such jobs seldom offer employee benefits or workplace supports that enable workers to develop personalized strategies to manage cancer treatment and work responsibilities [12, 13]. Limited paid leave may prevent patients from taking time off following a cancer diagnosis or require them to take unpaid leave, which may cause unexpected financial strain for patients and families [14]. Moreover, pre-existing financial insecurity and financial burdens associated with cancer treatment may further influence employment and cancer treatment decisions among working cancer patients [15, 16].

Much of the research on cancer and employment examines return to work (RTW) as the primary outcome [17, 18]. Several studies underscore the potential adverse consequences of treatment on survivors' job performance and ability to RTW [6, 17–20]. A systematic review of predictors of work and employment among cancer survivors by Van Muijen et al. revealed that chemotherapy and a heavy workload were negatively associated with RTW, whereas less invasive surgery was positively associated with RTW [18]. In another systematic review, Mehnert identified several work factors positively associated with RTW among cancer survivors, including receipt of counseling and rehabilitation services, fewer side effects from treatment, flexible work arrangements, and perceived employment accommodation [17].

Conceptual models developed to understand the complex interplay between cancer and work primarily focus on the influence of cancer on RTW, productivity, and long-term employment [17, 21, 22]. The cancer and work model developed by Feuerstein and colleagues represents the health and functional ability of survivors in relation to work demands, work environment, and other factors that influence survivors' RTW [21]. This clinical model is intended to guide cancer care providers in assessing post-treatment challenges to a survivor's optimal work function and employment outcomes and to assist survivors in managing identified functional challenges that may affect RTW [21].

Informed by the results of a systematic review of the current knowledge about employment among cancer survivors, a second model, developed by Mehnert, "identified independent and mediating factors and outcome criteria that have informed studies on cancer and employment in recent years" (p. 126) [17]. This model offers a detailed description of individual socio-demographic, psychosocial, cancer, and work factors that can serve as a guide for researchers seeking to understand the medium and long-term influences of cancer treatment on employment. Finally, a third model that adapted Feuerstein et al. [21] and Mehnert's [17] conceptual models describes the individual and interpersonal factors, work environment factors, and cancer treatments effects that may influence employment and RTW [22]. This model extends the earlier models by identifying interventions that promote return to work and employment.

Though these three conceptual models are systematically informed by the accumulating research on the influence of cancer on employment and RTW among survivors, their primary focus is on the *post-treatment period* of survival. This perspective overlooks the unique challenges cancer survivors experience when they maintain employment during active treatment. More complete knowledge about the cancer–work management process during active treatment could optimize effectiveness of treatment and help survivors maintain professional identity while reducing the potential economic burden of cancer treatment through continued employment.

Managing the cancer–work interface during active treatment

In recent years, a few studies have attempted to assess the experiences of employed cancer survivors who worked during active treatment [7, 23–25]. Across three of these studies, between 30 and 60% of survivors continued to work during treatment [7, 23–25]. Opportunities to work flexibly were associated with employment continuity during treatment as was disclosure of the cancer diagnosis to co-workers [23]. Reasons women with breast cancer continued to work included fear of losing their job if they took leave, fear of losing employer-sponsored health insurance, and a need for income and a sense of normalcy [7]. Although individual and workplace strategies enabled survivors to keep working during active treatment, Pryce and colleagues noted that working during treatment was associated with difficulties managing fatigue [23]. Multiple workplace resources were used to mitigate the negative effects of cancer-related limitations on work [24].

Three critical points emerged from these studies relevant to survivors' employment continuity *during* cancer treatment: (1) many survivors continue to work while receiving treatment, in part, out of economic necessity; (2) individual and workplace strategies are important for employment continuity during treatment; and (3) many survivors leverage individual and workplace strategies to manage

cancer care demands, symptoms of cancer, and employment responsibilities.

Although there are similarities between the RTW literature and the emerging employment continuity literature, research indicates that survivors who continue to work during treatment experience a different set of circumstances, highlighting the need for more research on the cancer and work interface among survivors during active treatment. A comparable model for how employed cancer survivors *manage* employment *during active treatment* and the unique challenges encountered during treatment is needed. To this end, we offer the *Cancer–Work Management Framework* (CWMF; Fig. 1), a conceptual framework that illuminates the cancer–work management process from diagnosis through completion of treatment.

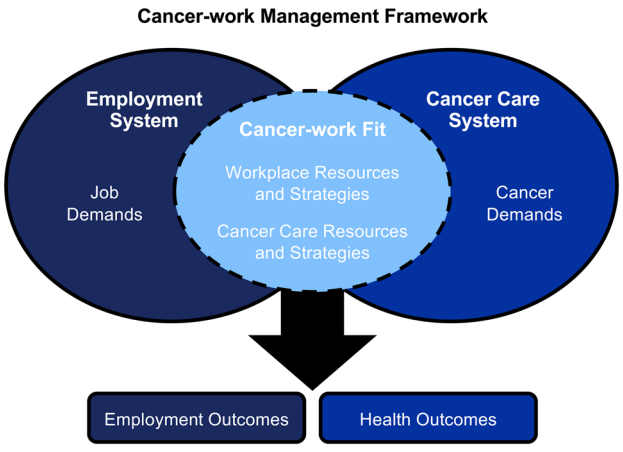

Fig. 1 Managing the cancer–work interface: introducing the cancer–work management framework

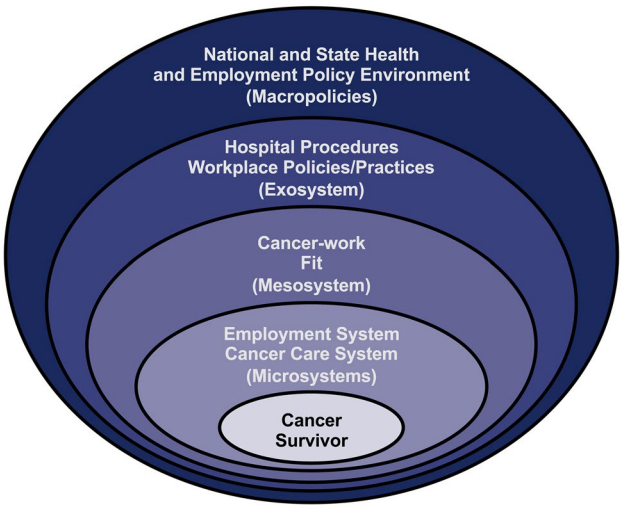

Fig. 2 Factors at multiple levels associated with the cancer–work management process

Theoretical background

Understanding how survivors manage the cancer–work interface during active treatment and beyond requires recognition that a cancer survivor's employment and cancer outcomes are influenced by both the *cancer care and employment systems.* The CWMF is grounded in ecological systems, boundary-spanning, and job demands and resources theories. Herein, we briefly summarize how these theories informed the CWMF.

Ecological systems theory asserts that individuals are embedded within a series of inter-related systems that influence development, behavior, and outcomes [26] (Fig. 2). In the CWMF, the cancer survivor is embedded within two primary microsystems—the employment and the cancer care systems—that influence cancer treatment and employment decisions and outcomes [27, 28]. The cancer survivor is influenced by biological factors, socio-demographics, risk status, comorbidities, attitudes and beliefs, decision-making preferences, and psychological coping [28]. The employment system is comprised of the survivor's role as a worker and fulfillment of the job responsibilities associated with this role. It also includes organizational factors and job task-related factors [27]. The cancer care system is made up of all individuals involved in the care of a cancer survivor and their knowledge, communication skills, cultural competency, and team functioning [28]. It also includes the organization(s) providing care and the features, characteristics and practices of the organization(s), and the embedded nature of the provider and care team within the broader organization. How a survivor manages the cancer–work interface (i.e., cancer–work fit) is influenced by the connections and interactions between these microsystems. These interactions between the microsystems (employment and cancer care system) create the mesosystem. The exosystem level of the ecological model is represented by indirect environments that create context and influence how survivors manage the cancer–work interface. Examples of dimensions of exosystems that may influence a survivor's cancer–work fit include hospital and medical center policies, patient education/navigation services, delivery system design, appointment availability, employment schedules, and work requirements.. Finally, macrosystems are the societal, cultural, and state and national policy contexts (e.g., economic climate, Affordable Care Act, Americans with Disabilities Act (ADA), Family Medical Leave Act (FMLA), other employment policies) that create the larger context that influence the survivor as well as the systems in which the survivor is embedded [16]. Although the CWMF focuses primarily on the micro-,

meso-, and exosystems, some workplace and cancer care resources exist within the respective systems because of public policy intervention. Nonetheless, authors focus primarily on the three aforementioned systems as elements in these systems are potentially modifiable without changes to federal or state policies or mandates. Employers, clinical care teams, occupational health, behavioral, or health advocates may support cancer survivors in making adaptations at the micro-, meso-, or exosystem levels that promote cancer–work fit during treatment. Macrosystem factors require more complex approaches for change over a longer time horizon precluding immediate benefit to a patient managing cancer and work.

Boundary-spanning theory indicates that when boundaries between the cancer care and employment microsystems are flexible and porous, the systems reciprocally influence each other in ways that are beneficial for the survivor [29]. Access to job-related resources or resources provided by the cancer care team creates a fluidity and permeability between an individual's roles as a cancer survivor and employee (Table 2). This permeability between roles, in turn, increases the chances that a survivor can maintain employment throughout active treatment without negatively affecting the effectiveness of cancer care or compromising job security.

Job demands–resources theory (JD-R) proposes that worker behavior is a reflection of the ways in which the individual responds to the job demands within the context of resources available to support the individual in meeting those demands [30]. Job demands are defined as the physical, psychological, social, or organization features of a job that "demand" sustained effort [10, 31]. Thus, job demands are associated with a variety of related physical and/or psychological costs [32, 33]. Workplace resources, in contrast, are defined as those features of a job that are functional to achieving work goals; reducing job demands and associated costs; and/or leading to personal growth, learning, or development [34]. The CWMF extends JD-R principles to include Cancer demands–resources (CD-R) that interact across the cancer and employment systems. CD-R reflect demands and resources present as part of the cancer care system and experiences that require the survivor to make care decisions while balancing potentially competing demands *across* systems within the context of varying types of resources available within those two systems.

Components of the cancer–work management framework

The CWMF proposes that an employed survivor manages the demands of cancer care with his/her job responsibilities. Under this framework, employment and treatment decisions/receipt of treatment (health) are a reflection of the interplay between demands (cancer and job) and available resources (cancer care and workplace) encountered within each system as well as strategies associated with each role and available within each system. Cancer–work fit represents the process that connects the systems and facilitates cancer–work management during active treatment.

We define *cancer demands* as the structural, psychological, cognitive, and/or physical requirements associated with the cancer survivor role and the expectations and ill effects that result from this role [35]. Structural demands are institutional or organization barriers that impede a survivor's access to cancer care. Examples of structural demands external to the cancer care delivery system include proximity of the cancer care facility, access to transportation, and availability of child or elder care. Structural demands that often occur within a cancer delivery system include the time of day that appointments are scheduled as well as the time required to travel to and from [7, 28, 35]. Psychological demands are aspects of cancer care that create emotional and/or psychological reactions in the survivor such as mental health effects associated with receiving a cancer diagnosis, changes in physical appearance or function, worry about prognosis, or financial hardship due to missed work or job loss due to cancer [16, 36]. Cognitive demands are those demands directly related to the intellectual functioning of the survivor which in turn may be impacted by short- and long-term effects of radiation and chemotherapy treatment [37]. Cancer demands may also take the form of physical limitations secondary to treatment (e.g., fatigue, physical impairments), side effects of treatment (e.g., diarrhea, hair loss), or complications of treatment (e.g., surgical infections) [38].

The actual impact these demands place on an employed survivor during treatment is poorly understood, as is the cumulative effect of managing cancer demands with work responsibilities. Access to resources and strategies available through the cancer care system could mitigate potential adverse health consequences of managing the cancer–work interface.

Cancer care resources and strategies are the practical and organizational elements that support survivors navigating the cancer care experience. Access to cancer resources and support can affect the adjustment and wellbeing of cancer survivors [39]. We extend this logic suggesting that use of cancer care resources and supports can facilitate the cancer–work management processes. Adapting Andrykowski and colleagues' framework, we group cancer care resources and strategies into four domains: intrapersonal (characteristics internal to the individual), interpersonal (resources that are provided by another individual), informational, and instrumental/tangible [40]. Table 1 details types of cancer care resources and strategies that could help survivors manage the cancer–work interface. Although operational

Table 1 Cancer care resources and strategies

Domain	Type	Examples
Intrapersonal	Psychological resources	Optimism, spirituality, cognitive behavioral therapy
	Financial resources	Subsidized medications, Medicaid enrollment, payment plans, gas cards, lodging assistance
Interpersonal	Support services	Referral for social work services, support groups, integrative medicine, nutrition counseling, genetic counseling
	Cancer care	Patient–provider communication, patient navigator
Informational	Health and cancer information	Symptoms, diagnosis, treatment, prognosis, what to expect, side effects, managing work responsibilities
	Federal and state employment protection policies	Eligibility criteria and process to apply for protections under the FMLA and ADA
Instrumental	Cancer care	Hours of operation, weekend appointments
	Personal items	Prosthesis, wigs, colostomy bags, related accessories
	Legal services	Discrimination protections (e.g., employment, disability)
	Assistance	Utilities, medication, financial, health insurance, food, housing, and transportation

Table 2 Cancer and job demands, resources, and boundary-spanning strategies [7, 14, 17–21, 24, 40]

Cancer	Job
Within domain demands	
Time for medical appointments	Number of paid work hours
Time for treatment	Overtime requirements
Time for recovery of treatment	Work schedule
Psychological demands	Physical job demands
Cognitive limitations	Psychological job demands
Physical limitations	Job insecurity
	Worry may be forced to quit/retire
	Worry not fulfilling job requirements
Within domain resources	
Patient–provider communication about cancer–work management	Social support at work
Cancer provider support for job-related decisions	Job autonomy
Offer medical/treatment appointments during evening and weekends	Meaningful work
Boundary-spanning resources	
Assistance with cancer–work management	Flexible work schedule
Scheduling of treatment during non-work hours	Schedule control
Provider team supportive of employment responsibilities and job demands	Work from home
Provider communicates about treatment effects on work	Reduction of work hours
Provider team culture that values works and supports survivor work role	Paid sick leave/family medical leave
Boundary-spanning strategies	
Cancer care plan with minimal time demands	Reduce work hours/overtime hours
Cancer care plan with fewer negative side effects	Job task modification/reduce physical demands
Consider work requirements within context of cancer care plan	Modify work schedule to fit with cancer treatment and side effects
	Modify work responsibilities
	Reduce travel requirements
	Work through treatment
	Take breaks

procedures vary among medical centers and cancer care teams, cancer patients generally are able to access the types of cancer care resources and strategies outlined in Table 1 from cancer patient navigators, oncology social workers, and other members of their treatment team who may incorporate employment issues into patient care plans [6, 14, 40, 41].

Job demands refer to those objective or perceived physical, psychosocial, or organizational aspects of employment to which workers must respond or adapt with physical, cognitive, and emotional effort and/or skill [10, 31]. Physical job demands pertain to the level of physical exertion required by job tasks [42]. In contrast, psychological work demands refer to those aspects of the job that requires sustained psychological, cognitive, or emotional effort (e.g., time pressure, heavy workload, job autonomy and control, work hours) [32, 33]. The nature of job demands may influence a cancer survivor's decision to continue working during and/or after treatment [17, 43]. Research indicates that manual work and non-sedentary work are associated with unemployment among cancer survivors [44–46], as is physical workload [20]. This is especially true when cancer survivors have poor physical and mental health and experience physical exhaustion [47–49]. These same job demands that influence survivors' post-treatment work disposition may also influence the cancer–work management processes during active treatment, including employment decisions. Accessing work or cancer care resources and/or adopting strategies may help mitigate potential adverse effects of cancer treatment on employment outcomes during treatment.

Workplace resources and strategies are those physical, psychological, social, and organizational aspects of the job that allow workers to achieve work goals, manage job demands that may contribute to physiological and psychological costs, and contribute to personal growth and development [34]. Workplace resources that may aid survivors' continuity of work post-treatment include flexible work hours, modification of job duties, paid time off for medical appointments, and a reduction in standard work hours without penalty [50, 51]. Control over job tasks and work hours, reduction of physical job demands [52, 53], and social support at work [7, 20, 51, 54] yield positive employment outcomes for cancer survivors. Although federal and state polices (e.g., ADA, FMLA) protect some workers, ultimately the cancer survivor is responsible for negotiating access to formal and informal workplace policies that can assist with managing cancer–work interface [7]. The survivor must determine whether or not to disclose his/her diagnosis at work, whom to tell (e.g., human resources representative, supervisor, co-worker), and then ultimately decide what type of resources and supports are needed to successfully manage cancer treatment [7].

Table 2 details the types of job and cancer demands and resources that survivors may experience and the boundary-spanning resources and strategies that promote cancer–work fit.

C*ancer–work fit* is the linking mechanism between cancer care and employment systems, the demands required of each role (cancer survivor and worker), resources accessed within both domains, and the employment and health outcomes of survivors employed at diagnosis. Thus, overall health and employment outcomes are a consequence of cancer–work fit [7]. Cancer–work fit is a form of inter-role congruence in which resources associated with the worker role and the cancer survivor role are sufficient to meet the demands of cancer care such that participation in cancer treatment can be effective and workers continue to maintain employment [10]. Cancer–work fit optimization enables survivors to more effectively manage employment as desired while receiving recommended cancer treatment [7, 24]. Less than optimal cancer or employment outcomes may occur when the demands of the cancer or work environment exceed the resources available to assist with management of those demands [7].

Employment continuity during active treatment requires multiple strategies at the individual and work levels [7, 24]. Individual-level strategies are approaches used by patients to coordinate care within the context of work, such as planning treatments around work schedule, considering treatment side effects when coordinating work schedule with employer, and modifying schedule to attend medical appointments [7]. Workplace-level strategies involve the utilization of formal and informal workplace policies and practices (resources) (Table 2). Cancer–work management strategies may evolve over the course of treatment according to impact of treatment on survivor's physical, cognitive, and psychological health [23].

Although individuals employed at the time of diagnosis may prefer to keep working throughout treatment, the interplay between cancer-related factors and job demands influences the trajectory of a survivor's employment decisions during treatment [7, 55]. Figure 3 illustrates possible pathways of employment decisions. Upon diagnosis, employed survivors must decide whether to continue or discontinue working. Survivors maintaining employment during treatment may encounter additional employment decisions. Some survivors may continue working with limited or no time off; others may take intermittent leave or take a leave of absence. At any of these critical employment decision points, cancer survivors may decide to resign from their job altogether. Survivors' cancer care and employment decisions may be subject to change as care proceeds.

The consequences of cancer treatment on a survivor's *health* is well documented. However, less is known about the *health* consequences of managing the cancer–work interface during active cancer treatment. Working during treatment is associated with higher levels of fatigue in comparison to not working, and RTW is associated with higher levels of cancer–work management stress [23]. Relatedly, extant evidence suggests that employment conditions may influence cancer care. The 2008 National Health Interview Survey found an association between paid sick leave and health care visits; workers with paid work leave benefits were more

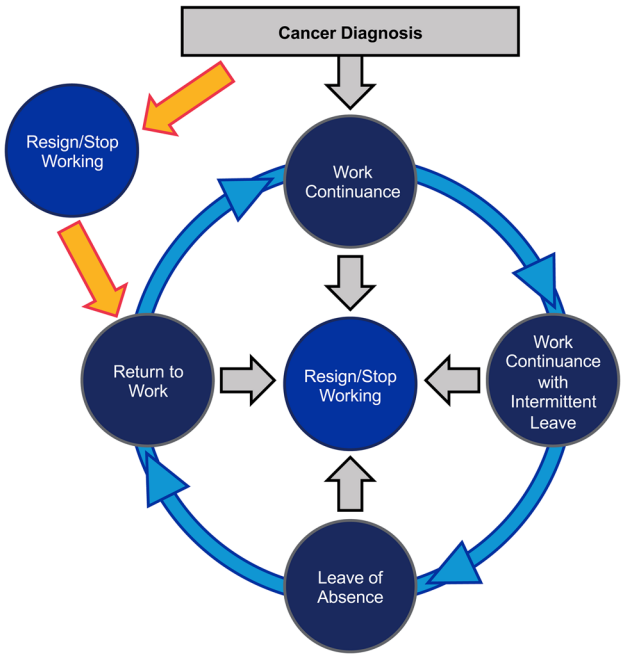

Fig. 3 Cancer–work management: employment decision process

likely to participate in preventative health care visits and visit a health care provider (e.g., mammography) [56]. Similarly, a narrative review of the oncology literature that evaluated the influence of employment on treatment decisions discovered survivors: (1) missed treatment appointments to avoid job termination and maintain employment [6, 57], (2) maintained employment to preserve employer-provided health insurance [6, 58], (3) discontined treatment due to job interference [6, 58], and (4) postponed/missed scheduled treatment due to conflicts with a work responsibilities [6, 59]. Further evidence suggests that survivors with high job stress are more likely to miss treatment due to work than survivors with minimal job stress [59]. Delaying or forgoing cancer treatment can diminish treatment effectiveness and shorten survival [60, 61].

Conclusions and directions for future research

Maintaining employment during active treatment concerns many working-age cancer survivors. This article presents the conceptual CWMF to describe cancer care and employment characteristics that facilitate or hinder cancer–work fit, thereby influencing employment, cancer treatment decisions, and receipt of recommended treatment. We believe this is the first framework on the cancer–work management process among employed survivors from diagnosis through completion of active treatment.

The CWMF provides a structure to guide researchers and practitioners in understanding the nuanced interactions between the cancer care and employment systems that influence employed survivors' treatment decisions, receipt of treatment, and employment decisions. We argue these outcomes are influenced by an employed survivors' cancer and job demands, the relationship between these demands, and the types of resources and strategies available and then leveraged by survivors. Ultimately, cancer care will be enhanced when survivors optimize the fit between cancer care needs and job responsibilities by accessing available resources. Yet, oncology providers may not fully appreciate the potential impact of employment on cancer care decisions and treatment. Recent analyses of 2014 Health Information National Trends Survey confirm this suspicion [62]; results indicate a majority of cancer survivors employed at diagnosis never discussed employment with a health care provider [62]. When asked about employment concerns by cancer patient navigators, financial barriers, work and treatment conflict, taking unpaid leave for cancer treatment, and working through cancer treatment were common concerns for their patients [41]. Navigators identified employment, employment protections, and financial resources as important topics that would help survivors manage cancer–work fit and optimize positive cancer and work outcomes [41]. Similarly, supervisors and managers may not be well informed about the implications of a cancer diagnosis [63] or strategies that could promote cancer–work fit, beyond what is required by law such as flexible work arrangements, modifying work hours, job task modification, and supervisor support.

We recommend future research to advance the understanding of the cancer–work management process. First, descriptive research and surveillance will be important to understand the following: (1) the prevalence of employment continuity and the trajectory of this decision throughout treatment, (2) the prevalence of care teams that systematically discuss cancer–work management with survivors, (3) the resources offered by cancer care systems and the variation of these resources by cancer type and stage of diagnosis, and (4) the types of resources available at the workplace. It is also necessary to understand variation by patient sociodemographic characteristics across all four of these areas. Moreover, it is necessary to understand how variation in employer size and industry across all of four of these areas influence the cancer–work management process.

Second, identification of cancer care and job factors that support or undermine treatment decisions, receipt of recommended cancer treatment, and employment is needed. The CWMF proposes factors that may independently or in combination influence these outcomes. More complete knowledge about the cancer–work management process will allow cancer care teams to better prepare survivors to

optimize cancer treatment and possibly increase employment continuity and will provide researchers more information from which to draw hypotheses about relationships between elements of the framework.

Additional information about cancer care and employment factors that promote cancer–work fit is an another area of research that is needed to understand the influence of these factors on treatment decisions and receipt of recommended care. For instance, identification of the types, quality, and content of patient–provider communication about work, and results of this communication on survivors' cancer–work management is a necessary first step towards developing interventions that will optimize cancer outcomes. From a work perspective, a systematic inquiry into the treatment effects of survivors' cancer disclosure decisions at work is overdue. DeMoor et al. found a notable proportion of survivors never discuss the potential impact of cancer diagnosis on work, but survivors who receive a treatment summary are significantly more likely to discuss the impact on employment [62]. Considered together, one area for future research would be to evaluate the extent to which cancer survivorship plans can be used as a tool to facilitate patient–provider communication about management of the cancer–work interface.

Finally, the development of new knowledge about how working survivors make treatment and employment decisions across the course of treatment is suitable for longitudinal research. This type of study design allows researchers to examine how domains in the CWMF influence other areas, in real-time and throughout the course of treatment, and to observe the ways in which an interaction between cancer care and employment influences a decision and possibly an outcome. Future longitudinal studies also offer the opportunity to more fully characterize how elements of the CWMF influence decision-making and outcomes and to identify how features of the framework positively and negatively influence cancer and employment outcomes.

Given the formative nature of the CWMF, the authors acknowledge its limitations. Due to the dearth of research on cancer and work management during active treatment, the development of this model relied on theory and related research rather than a systematic literature review. Consequently, our ability to comment on the direction of influence among and across features of the framework is limited. Available research on the topic were primarily small, cross-sectional studies. Authors acknowledge factors other than those identified in the model that may influence the cancer–work management process. Resources and demands associated with survivors' other life roles (e.g., caregiver, family, or community member), comorbid conditions, other forms of social supports (e.g., family, friends), and/or geographic proximity to a medical facility could affect how a survivor manages cancer and work, as could knowledge about and access to federal employment protections such as ADA and FMLA. Moreover, employer resources and demands vary significantly by employer size, industry, and job type. As future research refines our understanding of the cancer–work management process, the CWMF may also need further refinement.

When faced with a cancer diagnosis, employed survivors must consider their mortality along with the complexity of treatment, related side effects, associated financial expenses, and the time-sensitivity and time-intensity of receiving appropriate care while simultaneously taking into account their work situation and related responsibilities. The CWMF is available to researchers, healthcare providers, and employers to identify and ease the strain associated with co-managing cancer care and employment and ultimately optimize employment and cancer care outcomes.

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References

1. Cronin KA, Lake AJ, Scott S et al (2018) Annual report to the nation on the status of cancer, part I: national cancer statistics. Cancer 124:2785–2800. https://doi.org/10.1002/cncr.31551
2. Siegel R, Miller K, Jemal A (2019) Cancer statistics, 2019. CA Cancer J Clin 69:7–34
3. American Cancer Society (2020) Cancer facts and figures 2020. American Cancer Society. https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2020/cancer-facts-and-figures-2020.pdf. Accessed 9 Feb 2020
4. U.S. Cancer Statistics Working Group (2020) U.S. cancer statistics data visualizations tool, based on November 2018 submission data (1999–2016). U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. www.cdc.gov/cancer/dataviz. Accessed 9 Feb 2020
5. Ganz PA (2001) Late effects of cancer and its treatments. Semin Oncol Nurs 17:241–248. https://doi.org/10.1053/sonu.2001.27914
6. Vanderpool RC, Swanberg JE, Chambers MD (2013) A narrative review of the confluence of breast cancer and low-wage employment and its impact on receipt of guideline-recommended treatment. Glob Adv Health Med 2:75–85. https://doi.org/10.7453/gahmj.2013.046
7. Swanberg JE, Nichols HM, Ko JJ et al (2017) Managing cancer and employment: decisions and strategies used by breast cancer survivors employed in low-wage jobs. J Psychosoc Oncol 35:180–201. https://doi.org/10.1080/07347332.2016.1276503
8. Tracy JK, Falk D, Thompson RJ et al (2018) Managing the cancer–work interface: the effect of cancer survivorship on unemployment. Cancer Manag Res 10:6479–6487. https://doi.org/10.2147/CMAR.S180649
9. Sauter SL, Brightwell WS, Colligan MJ et al (2002) The changing organization of work and the safety and health of working people. National Institute for Occupational Safety and Health, Cincinnati
10. Voydanoff P (2005) Work demand and work-to-family and family-to-work conflict: direct and indirect relationships. J Fam Issues 26:707–726. https://doi.org/10.1177/0192513X05277516

11. Tung I, Sonn P, Lathrop Y (2015) The growing movement for $15. Natl Employ Law Project. https://www.nelp.org/publication/growing-movement-15/. Accessed 10 May 2019
12. Bureau of Labor Statistics (2011) Employee benefits in the United States-March 2011. BLS News Release. https://www.bls.gov/ncs/ebs/sp/ebnr0017.pdf. Accessed 15 May 2019.
13. Harrington E, Mcinturff B (2017) Key findings—National Surveys of cancer patients, survivors, and caregivers. Public opinion strategies. https://www.fightcancer.org/sites/default/files/ACS%20CAN%20Paid%20Leave%20Surveys%20Key%20Findings%20Press%20Memo%20FINAL.pdf. Accessed 19 May 2019
14. Vanderpool R, Swanberg J, Webster M, Coomer N (2012) Navigating breast cancer treatment and recovery among low-wage workers: first hand experiences. In: National cancer conference centers for disease control and prevention
15. National Cancer Institute (2019) Financial toxicity and cancer treatment (PDQ®)-health professional version. National Cancer Institute. https://www.cancer.gov/about-cancer/managing-care/track-care-costs/financial-toxicity-hp-pdq. Accessed 10 Feb 2019
16. Yabroff KR, Zhao J, Zheng Z et al (2018) Survivors in the United States: what do wwe know? What do we need to know? Cancer Epidemiol Biomark 27:1389–1397. https://doi.org/10.1158/1055-9965.EPI-18-0617
17. Mehnert A (2011) Employment and work-related issues in cancer survivors. Crit Rev Oncol Hematol 77:109–130. https://doi.org/10.1016/j.critrevonc.2010.01.004
18. Muijen PV, Weevers N, Snels I et al (2013) Predictors of return to work and employment in cancer survivors: a systematic review. Eur J Cancer Care 22:144–160. https://doi.org/10.1111/ecc.12033
19. Nitkin P, Parkinson M, Schultz IZ (2011) Cancer and work: a canadian perspective. Canadian Association of Psychosocial Oncology. https://web.archive.org/web/20150413061126/http://www.capo.ca/pdf/CancerandWork-ACanadianPerspective.pdf. Accessed 16 May 2019
20. Taskila T, Lindbohm ML (2007) Factors affecting cancer survivors' employment and work ability. Acta Oncol 46:446–451
21. Feuerstein M, Todd BL, Moskowitz MC et al (2010) Work in cancer survivors: a model for practice and research. J Cancer Surviv Res Pract 4:415–437. https://doi.org/10.1007/s11764-010-0154-6
22. Mehnert A, Boer AD, Feuerstein M (2013) Employment challenges for cancer survivors. Cancer 11:2151–2159. https://doi.org/10.1002/cncr.28067
23. Pryce J, Munir F, Haslam C (2007) Cancer survivorship and work: symptoms, supervisor response, co-worker and disclosure and work adjustment. J Occup Rehabil 17:83–92. https://doi.org/10.1007/s10926-006-9040-5
24. Sandberg JC, Strom C, Arcury TA (2014) Strategies used by breast cancer survivors to address work-related limitations during and after treatment. Womens Health Issues 24:e197–204. https://doi.org/10.1016/j.whi.2013.12.007
25. Short PF, Vargo MM (2006) Responding to employment concerns of cancer survivors. J Clin Oncol 24:5138–5141. https://doi.org/10.1200/JCO.2006.06.6316
26. Bronfenbrenner U (1996) The ecology of human development: experiments by nature and design. Harvard University Press, Cambridge
27. Landsbergis PA, Grzywacz JG, LaMontagne AD (2012) Work organization, job insecurity, and occupational health disparities. Am J Ind Med 57:495–515. https://doi.org/10.1002/ajim.22126
28. Taplin SH, Price RA, Edwards HM et al (2012) Introduction: understanding and influencing multilevel factors across the cancer care continuum. J Natl Cancer Inst Monogr 44:2–10. https://doi.org/10.1093/jncimonographs/lgs008
29. Aldrich H, Herker D (1977) Spanning roles and organization structure. Acad Manage Rev 2:217–230. https://doi.org/10.5465/amr.1977.4409044
30. Bakker A, Demerouti E (2014) Job demands—resources theory. In: Chen PY, Cooper CL (eds) Work and wellbeing: a complete reference guide, 3rd edn. Wiley, New York, pp 37–64
31. Demerouti E, Bakker AB (2011) The Job demands-resources model: challenges for future research. SA J Ind Psychol. https://doi.org/10.4102/sajip.v37i2.974
32. Clausen T, Burr H, Borg V (2014) Do psychosocial job demands and job resources predict long-term sickness absence? An analysis of register-based outcomes using pooled data on 39,408 individuals in four occupational groups. Int Arch Occup Environ Health 87:909–917. https://doi.org/10.1007/s00420-014-0936-7
33. Karasek R, Brisson C, Kawakami N et al (1998) The job content questionnaire (JCQ): an instrument for internationally comparative assesments of psychosocial job characteristics. J Occup Health Psychol 3:322–355. https://doi.org/10.1037/1076-8998.3.4.322
34. Demerouti E, Bakker AB, Nachreiner F, Schaufeli WB (2001) The job demands—resources model of burnout. J Appl Psychol 86:499–512. https://doi.org/10.1037/0021-9010.86.3.499
35. Carrillo EJ, Carrillo VA, Perez HR et al (2011) Defining and targeting health care access barriers. J Health Care Poor Underserved 22:562–575. https://doi.org/10.1353/hpu.2011.0037
36. Brown KW, Levy AR, Rosberger Z, Edgar L (2003) Psychological distress and cancer survival: a follow-up 10 years after diagnosis. Psychosom Med 65:636–643. https://doi.org/10.1097/01.psy.0000077503.96903.a6
37. Ahles TA, Root JC, Ryan EL (2012) Cancer and cancer treatment associated cognitive change: an update on the state of the science. J Clin Oncol 30:3675–3686. https://doi.org/10.1200/JCO.2012.43.0116
38. Harrington C, Moskowitz M, Feuerstein M (2010) It's not over when it's over: long-term symptoms in cancer survivors: a systematic review. Int J Psychiatry Med 40:163–181. https://doi.org/10.2190/PM.40.2.c
39. Hong Y, Peña-Purcell NC, Ory MG (2012) Outcomes of online support and resources for cancer survivors: a systematic literature review. Patient Educ Couns 86:288–296. https://doi.org/10.1016/j.pec.2011.06.014
40. Andrykowski MA, Lykins E, Floyd A (2008) Psychological health in cancer survivors. Semin Oncol Nurs 24:193–201. https://doi.org/10.1016/j.soncn.2008.05.007
41. Vanderpool R, Nichols R, Hoeffler E et al (2015) Cancer and employment issues: perspectives from cancer patient navigators. J Cancer Educ 32:460–466. https://doi.org/10.1007/s13187-015-0956-3
42. Winwood PC, Lushington K (2006) Disentangling the effects of psychological and physical work demands on sleep, recover and maladaptive chronic stress outocmes within a large sample of Australian nurses. J Adv Nurs 56:679–689. https://doi.org/10.1111/j.1365-2648.2006.04055.x
43. Cooper AF, Hankins M, Rixon L et al (2013) Distinct work-related, clinical and psychological factors predict return to work following treatment in four different cancer types. Psychooncology 22:659–667. https://doi.org/10.1002/pon.3049
44. Carlsen K, Dalton SO, Diderichsen F et al (1990) (2008) Risk for unemployment of cancer survivors: a Danish cohort study. Eur J Cancer Oxf Engl 44:1866–1874. https://doi.org/10.1016/j.ejca.2008.05.020
45. Choi KS, Kim E-J, Lim J-H et al (2007) Job loss and reemployment after a cancer diagnosis in Koreans: a prospective cohort study. Psychooncology 16:205–213. https://doi.org/10.1002/pon.1054
46. Drolet M, Maunsell E, Mondor M et al (2005) Work absence after breast cancer diagnosis: a population-based study. CMAJ 173:765–771. https://doi.org/10.1503/cmaj.050178

47. Bradley CJ, Bednarek HL (2002) Employment patterns of long-term cancer survivors. Psychooncology 11:188–198. https://doi.org/10.1002/pon.544
48. Bouknight RR, Bradley CJ, Luo Z (2006) Correlates of return to work for breast cancer survivors. J Clin Oncol 24:345–353. https://doi.org/10.1200/JCO.2004.00.4929
49. Johnsson A, Fornander T, Olsson M et al (2007) Factors associated with return to work after breast cancer treatment. Acta Oncol 46:90–96. https://doi.org/10.1080/02841860600857318
50. Nowrouzi B, Lightfoot N, Cote K, Watson R (2009) Workplace support for employees with cancer. Curr Oncol 16:15–22. https://doi.org/10.3747/co.v16i5.381
51. Spelten ER, Sprangers MAG, Verbeek JHAM (2002) Factors reported to influence the return to work of cancer survivors: a literature review. Psychooncology 11:124–131. https://doi.org/10.1002/pon.585
52. Amir Z, Neary D, Luker K (2008) Cancer survivors' views of work 3 years post diagnosis: a UK perspective. Eur J Oncol Nurs 12:190–197. https://doi.org/10.1016/j.ejon.2008.01.006
53. Taskila T, de Boer AGEM, van Dijk FJH, Verbeek JHAM (2011) Fatigue and its correlates in cancer patients who had returned to work: a cohort study. Psychooncology 20:1236–1241. https://doi.org/10.1002/pon.1843
54. Hakanen J, Lindbohm ML (2008) Work engagement among breast cancer survivors and the referents: the importantce of optimism and social resources at work. J Cancer Surviv 2:283–295. https://doi.org/10.1007/s11764-008-0071-0
55. Short PF, Vasey JJ, Tunceli K (2005) Employment pathways in a large cohort of adult cancer survivors. Cancer 103:1292–1301. https://doi.org/10.1002/cncr.20912
56. Peipins LA, Soman A, Berkowitz Z, White MC (2012) The lack of paid sick leave as a barrier to cancer screening and medical care-seeking: results from the national health interview survey. BMC Public Health 12:520–529. https://doi.org/10.1186/1471-2458-12-520
57. Ashing-Giwa KT, Padilla G, Tejero J et al (2004) Understand the breast cancer experience of women: a qualitative study of African American, Asian American, Latina and Caucasian cancer survivors. Psychooncology 13:408–428. https://doi.org/10.1002/pon.750
58. Bradley CJ, Neumark D, Luo Z, Bednarek HL (2007) Employment-contingent health insurance, illness, and labor supply of women: evidence from married women with breast cancer. Health Econ 16:719–737. https://doi.org/10.1002/hec.1191
59. Fleishman-Hillard Research, National Coalition for Cancer Survivorship, The Wellness Community Breakaway from Cancer (2006) 2006 National survey of cancer patients/survivors and caregivers. Fleishman-Hillard Research. Accessed 8 Jan 2019
60. Wagner L, Lacey MD (2004) The hidden costs of cancer care: an overview with implications and referral resources for oncology nurses. Clin J Oncol Nurs 8:279–286. https://doi.org/10.1188/04.CJON.279-287
61. Shelton RC, Goldman RE, Emmons KM et al (2011) An investigation into the social context of low-income, urban Black and Latina women: implications for adherence to recommended health behaviors. Health Educ Behav 38:471–481. https://doi.org/10.1177/1090198110382502
62. DeMoor J, Coa K, Kent E et al (2018) Patient and provider communication about employment following cancer diagnosis. J Cancer Surviv 12:813–820. https://doi.org/10.1007/s11764-018-0718-4
63. Nobel J, Pickering L, Sasser E (2016) Employers and cancer care quality: a closer look. Northeast Business Group on Health. https://nebgh.org/wp-content/uploads/2016/04/NEBGH_CancerRoundtable-FINAL-flat.pdf. Accessed 15 Dec 2018