DISCUSSION PAPER

Moving Research Into Practice
Physical Activity, Nutrition, and Weight Management for Cancer Patients and Survivors

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During and after treatment, cancer patients and survivors suffer from a range of symptoms and side effects, chief among them fatigue and declines in physical functioning. In addition, cancer and its treatment accelerate the aging process, potentially increasing inflammation, taxing major organ systems, and contributing to comorbidities such as cardiovascular disease, diabetes, and/or osteopenia [1-4]. As we celebrate successes in cancer treatment, we also must address the needs of survivors who experience the deleterious consequences of these treatments.

Fatigue and decline in physical functioning are two of the most commonly experienced long-term effects of cancer. During treatment, patients often become deconditioned, possibly because of increased sedentary time, reduced physical activity, and changes in diet or weight. It is common for survivors to lose skeletal muscle mass during treatment because of these decreases in physical activity and/or insufficient consumption (or absorption) of dietary protein and other nutrients needed to sustain or build muscle and bone, leading to declines in physical functioning and increases in osteopenia/osteoporosis that interfere with their ability to perform and enjoy activities they value.

Loss of lean mass may not be apparent from monitoring weight since even when weight is stable, survivors can be replacing muscle mass with fat mass (sarcopenic obesity). Although loss of muscle mass can happen during and after cancer treatment, its effects are exacerbated when patients gain additional weight. Weight loss is not necessarily the answer for many survivors, since weight loss without exercise and adequate dietary protein can contribute to further loss of muscle mass. Cancer survivors with sarcopenic obesity, those with high body fat and low lean mass, are at the highest risk for mortality [5,6].

Physical activity, high diet quality, and weight management may ameliorate many of the problems experienced by cancer patients and survivors. Substantial evidence from randomized trials supports the potential for physical activity, diet, and weight management interventions to reduce cancer-related symptoms and improve quality of life, including functional health outcomes [7-13]. Exercise interventions have been shown to reduce fatigue both in cancer patients under active treatment and post-treatment survivors [14]. Weight loss interventions that encourage a high-quality diet and physical activity have been shown to improve

physical functioning, even in older cancer survivors [9]. Furthermore, observational studies indicate that insufficient physical activity, poor-quality diet, and obesity are associated with disease-related outcomes, including recurrence risk, death from cancer, and overall mortality, as well as the risk of subsequent malignancies [15-29].

Given growing evidence suggesting the benefits of physical activity, high diet quality, and weight management (referred to collectively as lifestyle behaviors) for cancer patients and survivors, a number of national organizations, including the American Cancer Society, the National Comprehensive Cancer Network, the American College of Sports Medicine, and the World Cancer Research Fund/American Institute for Cancer Research have published guidelines on nutrition and physical activity for cancer survivors [30-33]. These guidelines highlight the importance of maintaining a healthy weight, engaging in aerobic activity of at least moderate intensity for 150 minutes per week and strength-building exercise twice a week, and eating a high-quality diet high in vegetables, fruits, and whole grains, and low in red and processed meat. Many survivors have limited awareness of these guidelines, and most do not achieve the recommended lifestyle goals [34-40]. Clinicians in both oncology and primary care have limited knowledge of the guidelines and are frequently unprepared to counsel patients in these areas [41]. Further, in the United States, effective programs and services to help survivors adopt recommended behaviors are not widely available in survivorship care settings or the community. Despite irrefutable evidence of their health benefits, these interventions for cancer survivors are rarely covered by health insurance.

How do we translate these guidelines into practice? We propose six action steps to increase the availability and uptake of weight management, physical activity, and nutrition interventions for cancer patients and survivors, summarized below and in *Figure 1.*

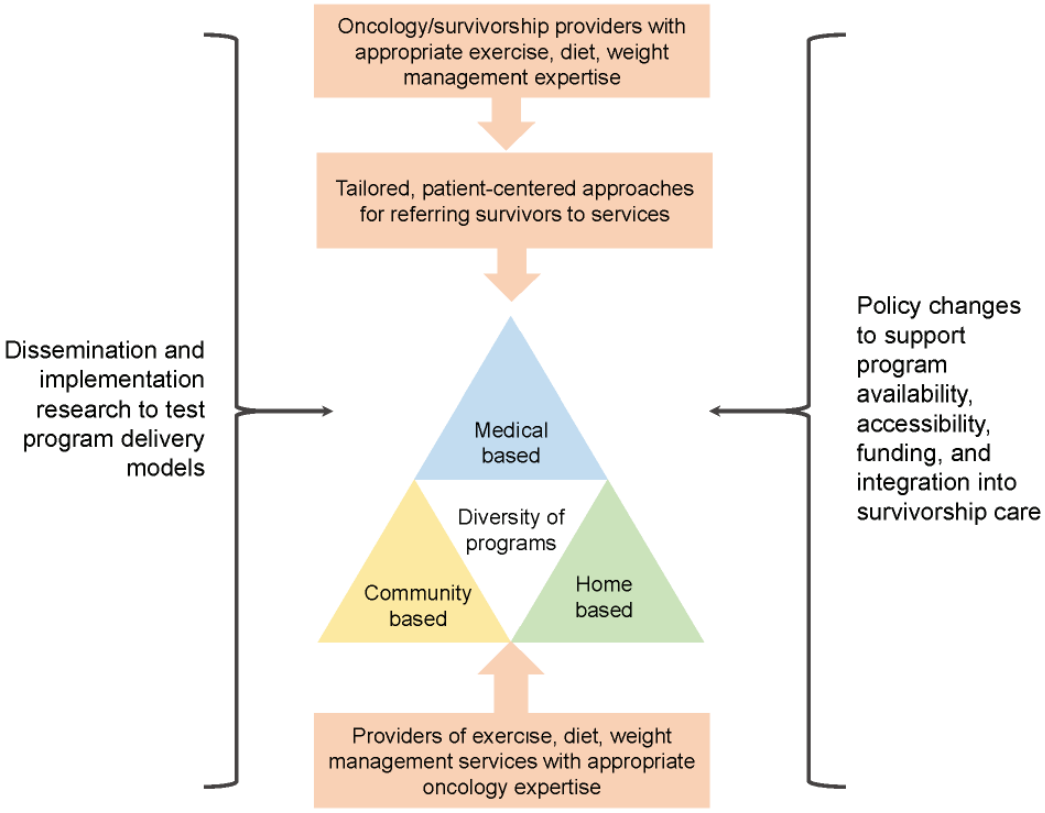

Figure 1 | Summary of Action Steps Needed to Increase the Availability and Uptake of Weight Management, Physical Activity, and Nutrition Interventions for Cancer Patients and Survivors
SOURCE: Basen-Engquist, K. et al. 2017. Agenda for Translating Physical Activity, Nutrition, and Weight Management Interventions for Cancer Survivors into Clinical and Community Practice. Obesity (Silver Spring): November 25, Supplement 2:S9-S22. Reprinted with permission.

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1. Expand the availability of a range of evidence-based options for weight management, nutrition counseling, and physical activity programs for cancer patients and survivors.

Cancer survivors approach changes in lifestyle behavior with a range of motivations, experiences, resources, and needs. Programs to support them in making changes need to be equally diverse and appropriately tailored to survivors' preferences, available resources, and characteristics to increase the chances of successful adoption and effect on health. Programs may be facility or home-based, vary in their level of supervision/guidance, and be cancer specific or geared toward the general population. At least initially, many cancer survivors will likely be more comfortable with cancer-specific programs with guidance that is geared toward their needs. As cancer survivors feel more confident in performing physical activity, they may not require supervision or guidance and may prefer to use home-based and/or community-based programs. What is important is that programs be safe and evidence based. The evidence may vary among programs. Some programs may be designed to improve cancer outcomes, others may reduce the risk for or treat comorbid conditions such as diabetes and cardiovascular disease, and still others may be designed to address symptoms such as fatigue.

Lack of availability of evidence-based programming for cancer survivors is a major concern, and hinders the dissemination of interventions to the wider population of survivors. Clinic- or facility-based programs, especially cancer-specific programs, are often unavailable outside of major metropolitan areas, and patient access may be limited by cost and transportation requirements. Community-based programs need program standards to ensure quality and give providers more confidence in making referrals. Finally, research is needed to help evaluate which types of programs are effective for whom, and to evaluate effective and sustainable models of program delivery.

2. Improve screening and referral of patients and survivors to exercise, nutrition, and weight management services.

To connect patients and survivors with the right type of programming, a patient-centered, tailored approach is needed to identify the appropriate lifestyle behavior change/rehabilitative services needed for a particular patient or survivor based on his or her goals, motivations, and health limitations (cancer and non-cancer related). However, extensive medical clearance processes and highly supervised programs are costly in terms of both financial requirements and patient time and effort. Requiring all patients/survivors to undergo medical clearance before increasing physical activity or eating a more healthful diet, or to attend supervised cancer-specific programs, can create barriers to participation [42]. Thus the level of screening, and the structure and supervision level of the program, should be tailored to the survivor to optimize efficiency and maximize uptake. For example, an otherwise healthy cancer survivor with few cancer-related limitations should be able to start a moderate-intensity walking or other aerobic exercise program without needing medical clearance or guidance. *Figure 2* provides a schematic of a patient-centered process for integrating patient/survivor preferences with information about functional impairments and comorbidities to screen and refer patients to lifestyle programs. Implementation of screening strategies using this approach can help connect patients and survivors with services tailored to their physical needs and personal goals, without producing additional barriers (e.g., needing to attend a specific program at a designated time and place) that might limit participation.

3. Improve health care providers' capability of screening/assessing and referring survivors to weight management, nutrition, and exercise information, programs, and services.

Cancer patients and survivors express a strong preference for receiving information about physical activity, diet, and weight management from their oncology providers [43], and studies indicate that such discussions can be influential [44,45] and are associated with increased physical activity among cancer survivors [46,47]. The American Society of Clinical Oncology (ASCO) has published a statement supporting the practice of oncology providers addressing lifestyle behaviors with patients [48]. However, patients are largely not receiving information about physical activity, nutrition, and weight management from providers. Health care providers often report they do not have the time or appropriate expertise and training to screen patients for services and refer them appropriately, and that their expertise related to physical activity, diet, and weight management is limited [49]. Resources are available to assist providers, including information on addressing obesity in oncology from the ASCO [48], and a comprehensive evidence-based guide to obesity

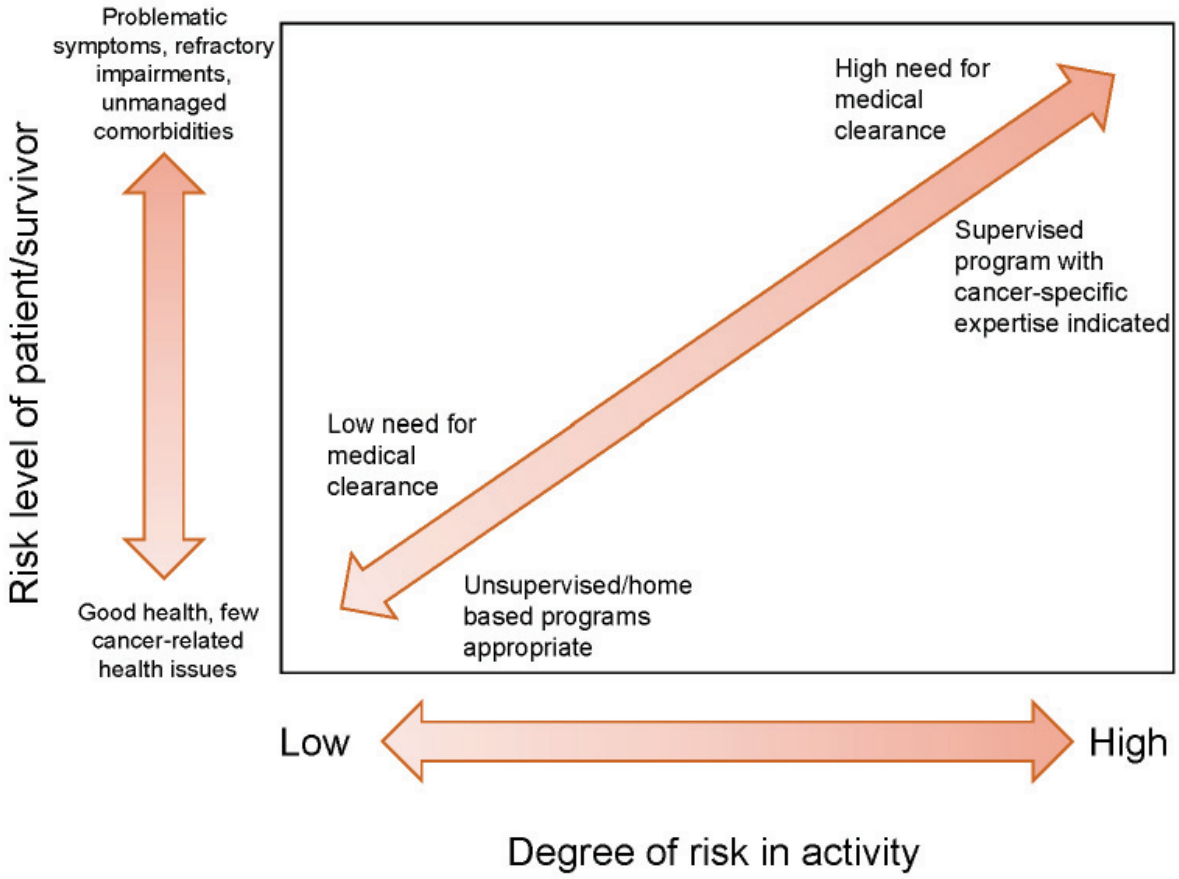

Figure 2 | A Patient-Centered, Tailored Approach to Identify the Appropriate Lifestyle Behavior Change/ Rehabilitative Services Needed for a Particular Patient or Survivor that Integrates Information about Patient Goals and Health and Functioning Limitations.
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treatment for the general population has been published by the Obesity Society, the American Heart Association, and the American College of Cardiology [50] that can be useful to oncology care providers as well.

4. Increase and support the oncology-specific training and certification of dietitians, exercise professionals, physical therapists, and physiatrists to increase the competency of the workforce needed to optimally deliver services to cancer survivors.

With over 15 million cancer survivors in the United States, and projections that this number will expand to 20 million by 2026 [51], there is a growing need for exercise and nutrition professionals with appropriate training to provide assistance to the rapidly expanding population of cancer survivors. The Academy of Nutrition and Dietetics maintains a certification specialty in oncology nutrition, and the American College of Sports Medicine has a specialty certification for Cancer Exercise Trainer, but the number of professionals certified by these programs is insufficient to meet the needs of the growing cancer patient/survivor population. The American Physical Therapy Association is creating a specialty board certification in oncology. Although there are more than 10,000 board-certified physiatrists in the United States, few are fellowship trained in or practice cancer rehabilitation. The American Academy of Physical Medicine and Rehabilitation is working with cancer rehabilitation physiatrists to develop cancer-specific training, education, and research programs, but no specialty certification is currently available.

Wellness professions need to expand oncology-specific training to ensure a sufficient workforce to provide lifestyle behavior interventions to meet the needs of cancer patients and survivors. Additionally, other types of health professionals could provide lifestyle behavioral support and information with appropriate training. For example, there is a role for patient navigators, health educators, health coaches, and community health workers to help motivate survivors to access recommended services and reinforce messages about leading a healthful lifestyle.

5. Expand dissemination and implementation research to test models for service delivery of evidence-based interventions.

Effective implementation of programs, as well as screening and referral methods, will require dissemination and implementation (D & I) research to develop effective and efficient delivery models and ensure accessibility to patients and survivors who need these services. A recent portfolio review of National Cancer Institute grants on lifestyle interventions in cancer survivors indicates very little ongoing D & I research [52]. Clearly, increased D & I research on existing evidence-based interventions is needed. Additionally, researchers planning new studies on lifestyle behavior among cancer survivors should consider external validity, dissemination, and the potential for sustainability, working toward developing programs that can be generalized to a broader cancer patient and survivor population, particularly those who receive their care outside of major tertiary care centers. There is value to more deeply exploring the context of community oncology clinics and of survivorship care provided in primary care settings, to better understand how programs can be implemented and sustained in these practice settings. Finally, D & I research needs to take patient and survivor preferences for lifestyle interventions into account to maximize uptake, address barriers to implementation, and aid in sustainability of community-based programs.

6. Advocate for and leverage health care policy changes that support availability, access, affordability, and uptake of services.

Public policy has a large effect on the affordability of, access to, and use of evidence-based nutrition, physical activity, and weight management programs and services for cancer patients and survivors. The most prominent influence of policy is regarding payment for these services. Currently, coverage for such services and programs is limited. For individuals with documented need, coverage for rehabilitative services, which can include exercise to improve physical conditioning and address specific functioning deficits, is required under the Essential Health Benefit regulations of the Affordable Care Act (ACA). However, despite required coverage, access to rehabilitative services can still be limited by cost in the form of co-payments or short-term or grandfathered plans not required to cover this service. There is no coverage requirement for oncology nutrition services in the ACA. These services are available to patients at some institutions that offer them freely and reimburse the provider through the cancer center's overhead or as part of a bundled payment or contract with a third-party organization that provides funding for oncology nutrition services. However, most cancer survivors do not have access to nutrition support unless they are able to pay for the service out-of-pocket. Given that many cancer patients already experience financial concerns related to their treatment [53], they may not be able to pay for nutrition services.

Diet and physical activity services outside of the clinical setting are not typically covered by private health insurance or Medicare, although some cancer centers and community organizations provide exercise programs for cancer patients and survivors at low or no cost (e.g., Livestrong at the YMCA). However, the area of diabetes prevention provides a potential exemplar or precedent for supportive cancer care. The independent Office of the Actuary in Centers for Medicare & Medicaid Services (CMS) certified that expansion of the Diabetes Prevention Program, a model funded through the Centers for Medicare and Medicaid Innovation, would reduce net Medicare spending and improve patient care [54]. Thus, in 2018, Medicare began reimbursing for providing the Diabetes Prevention Program to all eligible beneficiaries. Several private insurers also cover the program offered by community-based providers such as the YMCA or other in-person or online providers meeting certain standards for effectiveness established by the Centers for Disease Control and Prevention.

There are several opportunities to increase access to programs for cancer patients and survivors. Payment models are moving from traditional fee-for-service payment systems toward systems that focus on value-driven care, which rewards improved care quality and reduced costs. These models may incentivize the delivery of physical activity, nutrition, and weight management services to patients as a way of improving their fitness, nutritional status, quality of life, health,

and other outcomes. Additionally, quality measures used to justify value should be expanded to include measures focused on nutritional status, physical functioning, and weight status outcomes that could help to monitor progress and incentivize providers to offer or refer to evidence-based behavioral interventions to improve lifestyle behaviors.

Additional research is needed to increase the evidence base about the effectiveness and cost-effectiveness of various lifestyle-change programs and services for cancer survivors, including discerning which programs and services are most effective for whom, how these services affect the value equation, and how insurance coverage and employer provision of programs and services affects usage and outcomes. Engagement of payers is needed in the formulation of research questions so that research results can better inform their decisions about benefit design and coverage.

Conclusion

Cancer patient and survivors' access to affordable, evidence-based lifestyle-change programs and services, with sustainable funding provided by third-party payers, should be a long-term goal. In the interim, existing innovative service delivery and payment models implemented by cancer centers, employers, and community-based organizations to provide affordable, effective, and personalized lifestyle-change programs to cancer survivors is needed. Scaling programs for broader reach to a larger number of cancer survivors is an additional programming and research goal. Research gaps must be addressed with added D & I research, with the goal of optimizing care and health outcomes for the full population of cancer survivors. A critical component of assuring access to high-quality lifestyle behavior support is the need to train health care providers and to develop programs and systems to accommodate the routine delivery of this care. Patient and survivor preferences around the components, frequency, method of delivery, and setting of lifestyle-change programs should also be studied and taken into account for optimal uptake of such services. In addition, patient, provider, and system-level barriers to delivery and uptake need to be addressed. All stakeholders must play a role in ensuring that cancer patients and survivors have the support they need to engage in healthful dietary, physically active, and weight management behaviors on a long-term basis to improve their functioning, quality of life, and health.

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