Shirley M. Bluethmann, PhD, MPH,
Christopher N. Sciamanna, MD, MPH, Renate M. Winkels, PhD,
Kathleen M. Sturgeon, PhD, MTR, and
Kathryn H. Schmitz, PhD, MPH, FACSM, FTOS

Healthy Living After Cancer Treatment: Considerations for Clinical and Community Practice

Abstract: *As the number of US cancer survivors now reaches almost 16 million, understanding how to care for survivors after cancer treatment has demanded national attention. Increasingly, compelling benefits of lifestyle behaviors for cancer prevention and control have been demonstrated. In particular, physical activity is recommended as a central component of healthy living after cancer treatment. However, survivors struggle to achieve recommended physical activity and other behaviors for reasons that are still not well understood. Further, as greater than 60% of cancer survivors are older than 65 years, there is a unique opportunity to increase engagement of older adults in health programs and clinical trials. This article considers evidence from two reviews: a review on epidemiology studies of lifestyle and cancer and a review on different behavioral intervention strategies to achieve positive behavioral changes in cancer survivors. Both reviews offer important evidence on the role of lifestyle in life after cancer treatment. However, more investigation is needed on the practice of lifestyle medicine for cancer survivors, including ways to extend the reach of health promotion beyond*

cancer clinics, to primary care and community settings.

Keywords: survivorship, healthy aging, cancer, energetics, physical activity

It is widely recognized that lifestyle behaviors, especially physical activity and weight management, are closely

of whom will live 10 or more years beyond cancer diagnosis.⁴ Whereas the oncology team is integral to active cancer treatment and surveillance for recurrent disease, the health needs for survivors extend beyond cancer care. Finding ways to serve the needs of cancer survivors in primary care and community settings is also essential in achieving healthy living across the life span.⁵ In this special issue on lifestyle medicine and cancer, Arem et al⁶ explored the current evidence on

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tied to cancer prevention and control.^{1,2} Owing to earlier detection of cancers and better education about healthy habits, survivors (individuals who have ever been diagnosed with cancer) are a growing population with special care needs.³ In 2017, there were more than 15.5 million US cancer survivors, many

lifestyle behaviors in cancer epidemiology studies, and Amireault et al⁷ reviewed opportunities to change behavior in the clinical setting. This commentary will summarize and critically analyze the insights presented in these 2 articles as well as emphasize the discussion of physical activity as a

DOI: 10.1177/1559827618755681. From the Department of Public Health Sciences (SMB, RMW, KMS, KHS) and Department of Internal Medicine (CNS), The Pennsylvania State University College of Medicine, Hershey, Pennsylvania; and Pennsylvania State Cancer Institute, Hershey, Pennsylvania (SMB, CNS, RMW, KMS, KHS). Address correspondence to: Shirley M. Bluethmann, PhD, MPH, Assistant Professor, Public Health Sciences, The Pennsylvania State University College of Medicine, Department of Public Health Sciences, 500 University Drive, Suite T3424, Hershey, PA 17033; e-mail: szb332@psu.edu.

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central component of healthy living after cancer.

What We Know About Lifestyle and Cancer Risk

In “Cancer Epidemiology: A Survey of Modifiable Risk Factors for Prevention and Survivorship,” Arem et al⁶ describe the burden and behaviors associated with cancer risk, with a focus on the United States and variation by cancer site, gender, and mortality.⁴ Women in the United States are most likely to have breast, lung, colorectal, uterine, or thyroid cancers. Men, by comparison, are most likely to be diagnosed with prostate, lung, colorectal, bladder, and melanoma (skin) cancers.⁴ Arem et al cite that one quarter of all cancer deaths are associated with lung and bronchus cancers. For men and women, lung cancer is the deadliest and perhaps most preventable of all cancers. Yet global authorities, including the World Institute on Cancer Research, suggest that one-third to half of all cancers could be eliminated through changes in lifestyle.⁸ For lung cancer especially, eliminating cigarette smoking is paramount. But for a broader cancer prevention benefit, maintaining a healthy body weight has become a modifiable behavioral risk factor of increasing interest.

After smoking, obesity (ie, body mass index [BMI] ≥ 30 kg/m²) has become a major focus for cancer prevention and control.^{1,9} Obesity is associated with increased risk for colon, postmenopausal breast, endometrial, kidney, and esophageal cancers.¹⁰ Arem et al noted that greater BMI translates into greater mortality risk for the general population. Based on data from a large cohort of US men and women, individuals with a BMI >40 kg/m² had a 52% increase in cancer mortality risk compared with individuals without excess weight. Additionally, obesity may increase the risk of cancer survivors experiencing comorbidities after cancer treatment, including diabetes and cardiovascular disease, which, if left unmanaged, may hinder cancer recovery, impede longevity, and reduce quality of life.¹¹

As the authors note, using BMI to assess obesity is not without its flaws. But BMI is even more complicated to interpret for cancer survivors. Obesity is sometimes protective,¹² especially for cancer survivors, who may experience weight loss and cachexia during treatment that contributes to poor physical function and increased frailty.¹³ Clinicians are discovering that individuals with “normal” BMI may not be as healthy as they seem, at times having very little lean muscle mass or weak bones, leaving these patients vulnerable to injury and functional limitations.¹⁴ Using complementary measures, such as grip strength or body composition, may provide a more complete picture of weight concerns as well as functional capacity and be informative in tailoring lifestyle interventions (ie, weight training) for patient needs.^{15,16}

Physical activity (or lack thereof) remains a valuable predictor of cancer risk, and yet is vastly underutilized. As Arem et al note from Centers for Disease Control and Prevention data, only 20% of US adults are believed to be adherent to the physical activity recommendation of 150 minutes of moderate- to vigorous-intensity activity, 3 to 4 times per week. However, other nationally representative surveys suggest that this may be an underestimate. A comparison of data from multiple sources found that as few as 10% of US adults are currently achieving activity recommended in the 2008 guidelines.¹⁷ It is also worth noting that survivors report similarly low levels of physical activity,¹⁸ for reasons that are still not fully understood. As with other measures of diet and exercise, this physical activity behavior is also encumbered by activity measurement limitations. Researchers still argue about the merits of self-report versus objective assessments to measure physical activity. There does seem to be consensus that survivors, like other American adults, simply are not doing enough exercise to maintain optimal health, and this has been the case for years. Unfortunately, disparities related to sociodemographic factors, including age and race/ethnicity, may intensify barriers to physical activity

and impede potential benefits for cancer protection.

The Unsung Story of Older Survivors

For all the evidence on lifestyle medicine after cancer, the unique burden for older adults persists as a cross-cutting disparity. At present, 62% of all cancer survivors are older than 65 years, yet are underserved and underrepresented, especially in clinical trials.¹⁹ Some studies have reported that whereas adults >65 years old represent 60% or more of the cancer population, they represent only 30% of participants in clinical trials.^{20,21} This has significant implications for what we know about older survivors of all backgrounds and the value and applicability of the lifestyle advice we can provide.

For example, obesity in older adults could potentially compound cancer mortality risk, especially given data on increasing trends in obesity among American women older than 60 years.²² This becomes a nuanced behavioral risk if the older person also exhibits signs of frailty, such as unintentional weight loss or fatigue.²³ Older patients, even those who are obese, may also be more vulnerable to sarcopenia or muscle atrophy. This is a common attribute of aging that may be exacerbated by cancer treatment.²⁴

Another key unknown about treating cancer in the geriatric population is toxicity of chemotherapy and other cancer treatments.²⁵ Chemotherapy is the standard of care, yet causes problematic side effects, including pain and cognitive impairment, that may affect patients for years afterward.²⁶ The majority of clinical trials include few individuals older than 65 years, and those individuals rarely reflect the general patient population (ie, trial participants are usually healthier than the general population because exclusion criteria often eliminate those with multiple illnesses).²⁷

Physical activity is a special challenge in older survivors. Many older survivors struggle to find ways to build activity into their daily lives, hindered by chronic health conditions, transportation options,

limited access to parks and recreation areas outfitted to accommodate the needs of older users, and lack of guidance for overcoming barriers (eg, multimorbidity) to exercise.²⁸ Though rarely discussed, the exercise paradox (ie, reluctance to use exercise to manage symptoms, though helpful for this purpose) is especially true for older adults, who may be initially intimidated by the idea of strength training and aerobic activity.²⁹ Paradoxically, exercise is recommended and deemed beneficial for common cancer treatment symptoms.³⁰ In some studies, strength training has been shown to be of great interest to older adults.³¹ Guidance on how to apply what is recommended to an active lifestyle still needs consideration for the oldest among us.

Despite all we know about the importance of physical activity for human health, understanding the short- and long-term needs of older survivors, and other older adults, is still an area for which research is desperately needed, especially given the maturation of the US population.

Applying What We Know to Behavioral Interventions

Lifestyle plays a critical role in cancer recovery, yet is possibly underutilized in the clinical setting. Therefore, a key step in moving the conversation forward is identifying efficacious methods for advising patients about changing lifestyle behaviors for the better and maintaining those positive habits. This was the focus of the article by Amireault et al, "Promoting Healthy Eating and Physical Activity Behaviors: A Systematic Review of Multiple Health Behavior Change Interventions Among Cancer Survivors."⁷

Amireault et al tackle some of the elusive questions on behavioral intervention planning. The authors review a growing body of literature on behavior change interventions for cancer survivors focused on understanding the effectiveness of interventions designed to change diet and/or physical activity. A second question assessed differences in

effectiveness for simultaneous intervention on both physical activity and dietary behaviors, or sequential intervention on a single behavior at one time, a looming question in behavioral research. A strength of this review is that it assessed use of behavioral theory in intervention studies, a well-accepted criterion in designing effective behavior change interventions.³² Unfortunately, about half of the interventions included in the review did not report using a theoretical framework.

In a systematic search, they identified 27 intervention studies, 93% of which were designed to simultaneously change both diet and physical activity. Insufficient data were presented to compare a sequential versus simultaneous approach, leaving that question open to study.

The authors observed wide variability in how interventions were planned but observed very few new insights into the optimal strategy for changing these behaviors, without great commitment of resources and time. The authors conclude that longer interventions (>17 weeks) had the largest effect, but in fact, the results reported in the review show that shorter interventions (13 weeks or less) had a larger effect size. Only 9 of the studies reviewed assessed maintenance of physical activity, and those that did, found insubstantial effects on physical activity behavior based on standardized mean differences (SMD = 0.13).

Perhaps what was even more revealing were differences by training of the interventionists; studies that used exercise specialists had the greatest effect on physical activity (SMD = 1.11), but this effect came from only 4 studies that were all <13 weeks long. Similar interventions led by nurses or dieticians had moderate effect sizes on physical activity (SMD = 0.52). The authors note that all but 4 of the 27 studies had evidence of high attrition bias, casting doubt on the validity of the study effects.

It is worth noting that some of the high-intensity interventions took place in countries with universal health care systems (eg, Australia, Canada), so even

successful models may be difficult to replicate in other countries with less access to lifestyle specialists.

The question of whether successfully changing one behavior will motivate a patient to change another behavior was not resolved in this review. In survivorship research, there is extensive evidence that social cognitive theory constructs (including self-efficacy, goal setting/planning, self-monitoring) can be applied to motivate survivors to make healthy changes.³³ The question about the potential "spillover" effects for other behaviors, proposed in the Amireault et al review, requires further investigation.

Moving Forward With Lifestyle Recommendations in Clinical Practice: The Case of Physical Activity

So, what now? If we have decades of evidence that physical activity is important for cardiovascular health and compelling evidence about benefits for cancer prevention and control, how do we finally take the next step from what we know to how we live, and what we recommend for survivors?

As a first step, practitioners need to ensure that cancer survivors are aware of health promotion recommendations, including the importance of physical activity (during and after cancer treatment and on an ongoing basis). The recommendation for at least 30 minutes of moderate- to vigorous-intensity activity, 3 to 5 times per week, and strength training sessions ≥ 2 times weekly for cancer survivors is endorsed by the American College of Sports Medicine, The American Cancer Society, and others.^{2,34,35} Clinicians can reassure survivors that physical activity is safe and beneficial for cancer recovery and for symptom management (taking into consideration any individual limitations) and may also be critical in reducing recurrence risk and controlling weight (see previous discussion on obesity).³⁶ In fact, as part of the new Biden Cancer Moonshot Program, the National

Institutes of Health has prioritized cancer symptom management, including exercise-based strategies, to improve common symptoms following cancer treatment.³⁷ Studies on integration of exercise to optimize the effectiveness of cancer treatment is also an emerging area of research.

Next, patients need to feel empowered to be active. This means that multiple levels of influence may increase the effectiveness of a behavioral intervention. This can start with the recommendation to exercise from a trusted source (eg, primary care provider), in addition to ready access to resources, in the community or online, to access convenient and low-cost physical activity and recreation opportunities. Many patients have the misconception that physical activity must take place in commercial gyms. Simply walking on a regular basis can be a low-barrier method of exercise to achieve health benefits and has been found to be one of the preferred activity types among cancer survivors. We must also challenge outdated assumptions about activities that may be enjoyable to cancer survivors, especially older survivors. Unconventional recreational activities, such as pickleball, an easy sport that combines elements of table tennis and badminton, are growing in popularity among people of all ages. The US Pickleball Association estimates that there are 40 000 to 50 000 players of the sport, playing everywhere from parks to retirement communities (<https://www.usapa.org/>). These and other recreational activities offer a valuable, fun way to build social support networks to encourage ongoing activity and connect with family, friends, and other survivors.

If patients still feel unsure about planning exercise or the best exercise techniques for their particular situation, exercise specialists are a potent resource. As Amireault et al found, customized exercise plans under the supervision of an exercise specialist were effective in producing short-term changes in physical activity behavior. Similar self-administered planning tools are also

available through the internet to support uptake of physical activity guidelines (eg, health.gov/paguidelines/resources/). However, how to sustain those changes continues to elude behavioral researchers and program planners alike. Additionally, access to exercise specialists may not be straightforward. Not all exercise specialists receive the same training or receive training specific to the needs of survivors. Cancer rehabilitation may be an option to help survivors overcome barriers as they transition to an active lifestyle, but this is also not intended as a long-term strategy or substitute for an individual commitment to an active lifestyle.

Fundamentally, even after starting an exercise program or seeking advice from an exercise trainer, cancer survivors and other patients must choose to make active living a priority. The intrinsic motivation to be active must come from individual values and perceived benefits of choosing to be active. This motivation must be continually stoked to be relevant to healthy behavior goals. The “teachable moment” for survivors and others is not, in fact, one moment but a lifetime of moments during which motivation to exercise must be continually reignited.^{38,39}

As a final note of encouragement for providers with little experience treating cancer survivors, we must throw away our reluctance to recommend exercise. Research has shown that it is more costly not to recommend exercise because persistent inactivity and related chronic disease burden has contributed significantly to US health care expenditures.⁴⁰ The American College of Sports Medicine and other experts have embraced “exercise as medicine” (and cautioned against inactivity) and that includes survivors.⁴¹ As advocates of healthy living, we must also embrace this premise.

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