

**Caring for Today's Cancer Survivors**  
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Appropriate nutrition and physical activity recommendations can enhance their long-term health and quality of life.

Many dietitians likely will work with cancer survivors at some point in their careers.<sup>1,2</sup> As a result of multiple factors, including earlier detection and more effective treatments, 65.8% of cancer survivors today have passed the classic five-year survival marker,<sup>3</sup> and 40% have survived 10 years or more.<sup>2</sup>

These survivors face myriad nutrition-related challenges, including those caused by an increased risk of cancer recurrence or the development of a second cancer, cardiovascular disease (CVD), or other chronic diseases. Many experience long-lasting side effects of the cancer or its treatment or they develop late effects that begin months or years after initial treatment. According to the National Cancer Institute, individuals are considered cancer survivors from the time of diagnosis through the balance of their lives.

This continuing education course focuses on cancer survivors' nutrition-related issues following the conclusion of active cancer treatment. It reviews current diet, weight, and physical activity recommendations for cancer survivors. Nutrition-related challenges and questions survivors face after cancer treatment also are discussed, including how to support long-term health.

**Recommendations for Survivors**

Research on how nutrition, physical activity, and body composition affect cancer recurrence, the development of second primary cancers, and overall survival for cancer survivors still is limited. Nonetheless, evidence has accumulated that supports recommendations to enhance recovery and promote long-term health and quality of life. Among US survivors, approximately 50% had breast, prostate, or colorectal cancer,<sup>1</sup> so these groups have been most widely studied. The attention to breast cancer survivors in this review reflects the availability of applicable research findings.

American Institute for Cancer Research (AICR) recommendations state that after treatment, if possible and unless otherwise advised, survivors should aim to follow the organization's cancer prevention recommendations for diet, physical activity, and healthy weight maintenance.<sup>4,5</sup> As part of the Continuous Update Project, in which the AICR partners with the World Cancer Research Fund, systematic review and evidence-based recommendations for breast cancer survivors are in progress.

The American Cancer Society (ACS) issued guidelines on nutrition and physical activity specific to cancer survivors in 2012. The guidelines address survivors in general, although the journal article in which the guidelines are presented discusses issues unique to specific types of cancer.<sup>6</sup>

An American College of Sports Medicine roundtable of experts developed exercise guidelines for cancer survivors, published in 2010.<sup>7</sup> Based on these guidelines, survivors are encouraged to follow the federal physical activity guidelines for all Americans, though in some cases certain modifications are necessary. All survivors are advised to avoid inactivity.

Sources providing more background on these recommendations and patient education materials to explain them are provided in the resources list created as a companion to this article.

### **Protective Eating Pattern**

Vegetables, fruits, whole grains, and legumes form the core of a diet that reduces the risk of cancer and heart disease. Plant foods that aren't highly processed or refined provide a wide range of nutrients and phytochemicals that may act protectively throughout cancer development, influencing DNA repair, inflammation, cell proliferation, and cancer progression.<sup>4</sup> Diets built around foods low in calorie density are recommended to avoid weight gain and support intentional weight loss.<sup>4,8</sup>

However, neither observational nor interventional studies have demonstrated a strong link between vegetable and fruit consumption and reduced cancer recurrence or mortality.<sup>6</sup> The effects of a diet high in vegetables and fruits likely are influenced by personal characteristics such as hormonal status, genetics, gut microbiota, and medical treatment as well as how the diet is implemented, including the choice and preparation of vegetables and fruits, total calorie intake, and overall diet and lifestyle quality.<sup>9-11</sup> Studies examining the associations of vegetable and fruit consumption with health outcomes generally adjust for BMI, thus addressing benefits beyond a role in weight management.

The Women's Healthy Eating & Living Study of early-stage breast cancer survivors found no difference in breast cancer recurrence or death between a control group and an intervention group eating a low-fat diet very high in vegetables and fruits.<sup>12</sup> Within the control group, neither the consumption of five vegetables and fruits daily nor moderate physical activity alone was associated with lower mortality. However, compared with women who met neither standard, those who met both dietary and activity standards experienced almost 50% lower mortality.<sup>13</sup>

A link between higher dietary fat intake and cancer risk once suggested by observational data hasn't held up with closer study,<sup>4</sup> and associations with breast cancer outcomes generally disappear when results are adjusted for calorie intake, weight, or weight change.<sup>14,15</sup>

Limited studies on this topic among men diagnosed with prostate cancer show inconsistent results. Dietary recommendations from the AICR and the ACS don't address fat consumption except to call for avoiding very high levels that contribute to obesity.<sup>4,6</sup> The ACS recommends limiting saturated fat for heart health, noting limited data linking saturated fat with cancer risk or recurrence.<sup>6</sup>

The strongest evidence from observational studies regarding diet relates to the overall dietary patterns of cancer survivors. Among those with stage III colorectal cancer, a more Western diet, characterized by a high intake of meat, fat, refined grains, and desserts, has been linked with more than double the overall mortality and a nearly threefold increase in cancer recurrence or death.<sup>16</sup> Among breast cancer survivors, no link to breast cancer mortality or recurrence was seen, but those with the highest Western or unhealthful diet scores had more than two or three times the mortality from other causes than those with lowest scores.<sup>17,18</sup> In the Nurses' Health Study cohort, the majority of these other deaths were due to other cancers or CVD.<sup>17</sup>

Although a Western diet is associated with worse outcomes among colorectal cancer survivors, a prudent diet, characterized by a high intake of fruits, vegetables, poultry, and fish, hasn't been linked to better cancer-specific outcomes or overall mortality.<sup>16</sup>

Among breast cancer survivors, higher scores for a healthy dietary pattern are inconsistent in association with lower breast cancer recurrence or mortality but are associated with a 28% to 46% reduction in other causes of mortality, which includes deaths from other cancers, CVD, and additional causes.<sup>17-19</sup>

Among a cohort of older female survivors of all cancer types, compared with lower scores, the highest scores for adherence to the dietary portion of the AICR recommendations to reduce cancer risk weren't associated with decreased cancer mortality but were associated with 20% lower all-cause mortality.<sup>20</sup>

### **Weight and Body Composition**

Traditionally, nutritional care for cancer survivors has focused on preventing and treating malnutrition and on regaining lost weight, and that remains true for some of them. However, many survivors today are overweight or obese at the time of their diagnosis and remain so following treatment. This reflects both the increased prevalence of obesity and its association with cancer risk and improvements in treatment and early diagnosis reducing unplanned weight loss.

Mounting evidence indicates that among cancer survivors, prediagnosis obesity increases the risk of cancer recurrence, cancer mortality, and all-cause mortality. These associations are most strongly documented for breast cancer,<sup>21-23</sup> though overweight and obesity also are associated with a worse prognosis for colorectal and prostate cancer survivors.<sup>24-29</sup> Obesity doesn't increase the risk of prostate cancer, but higher BMI and adult weight gain increase the risk of aggressive forms of prostate cancer and related mortality.<sup>30</sup>

Obesity's link to poor prognosis for cancer patients may relate to several mechanisms, including increased inflammation and elevated levels of insulin and growth factors such as IGF-1 that promote cancer cell growth.<sup>24,31,32</sup> Excess body fat increases adipose production of estrogen in postmenopausal women, raising levels that promote the growth of estrogen-sensitive cancers. Obesity also is associated with the risk of developing CVD, the primary cause of death among many cancer survivors.

People at a healthy weight when they're diagnosed with cancer may gain weight during treatment and in the years that follow. Fatigue, depression, and insomnia can lead to

decreased physical activity or increased calorie intake from using food to cope with these problems, which can result in weight gain. Some chemotherapy, hormone, and steroid medications also can cause undesirable weight gain.

One analysis showed that about 35% of breast cancer survivors experienced a 5% or larger weight gain two years after diagnosis.<sup>33</sup> Yet in a review with a longer time horizon, about 70% gained weight during and after treatment, including those whose weight was stable during treatment.<sup>34</sup> Weight gain now averages 8 to 10 lbs, which is less than in decades past, but larger gains aren't unusual. Weight gain is linked with increased mortality from breast cancer, CVD, and all causes.<sup>33,35</sup> Researchers generally conclude that avoiding weight gain is an appropriate evidence-based goal for all breast cancer survivors.<sup>33,35</sup>

Research is less clear about the value of promoting weight loss in cancer survivors. One study has linked modest weight loss by breast cancer survivors with reduced cancer recurrence,<sup>14</sup> while another trial of breast cancer survivors showed that weight loss of 5% or more decreased insulin and bioavailable estrogen levels.<sup>36</sup> Several studies have linked elevated insulin, insulin resistance, the metabolic syndrome, and abdominal obesity to more aggressive breast cancers and a greater risk of recurrence and death in breast cancer survivors.<sup>37,38</sup>

The ACS guidelines for cancer survivors encourage those who are overweight to achieve and maintain a healthy weight, if only for noncancer health benefits.<sup>6</sup> Despite many reasons for overweight or obese cancer survivors to expect benefits from weight loss, little documentation of outcomes is available. An analysis of four prospective cohort studies of breast cancer survivors showed the lowest mortality rates in those who maintained a steady weight in the first few years following their diagnosis.<sup>33</sup> Although breast cancer mortality wasn't affected by weight gain or loss of 10% or more, overall mortality increased, apparently related to heart attack and stroke.<sup>33</sup>

It's important for the health care team, including RDs, to differentiate between unintentional weight loss caused by deteriorating health or malnutrition vs. intentional, gradual weight loss. In the pooled analysis of breast cancer survivors, increased mortality among overweight and obese subjects with a 10% or greater weight loss was limited to those with a history of smoking and occurred primarily in those with other chronic diseases. The study authors hypothesized that increased mortality was related to substantial loss of lean body mass, which is associated with negative cancer and cardiovascular outcomes.<sup>33</sup>

While RDs await the outcomes of more than two dozen intentional weight-loss intervention studies in cancer survivors now under way, they need to consider overall health and prognosis when assessing the weight and body composition of individual cancer survivors. Evidence supports advising cancer survivors to avoid undesirable weight gain.<sup>4,6</sup> For those already overweight or obese, adopting healthful lifestyle habits to facilitate intentional weight loss after treatment may be a worthwhile goal, if not medically contraindicated and if efforts are made to retain or improve lean body mass through a gradual rate of weight loss and the inclusion of physical activity.<sup>5,6,39</sup> Evidence suggests that beneficial effects on important biomarkers, such as insulin level, insulin resistance, markers of inflammation, and bioavailable estrogen, can be achieved with weight loss of 5% to 10%.<sup>6,40</sup>

## **Physical Activity**

Survivorship care has changed dramatically in its emphasis on physical activity. The strongest evidence involves breast cancer survivors, including several observational studies that link greater postdiagnosis physical activity with reduced all-cause mortality.<sup>41</sup> Most studies find that, compared with less activity, moderate exercise such as brisk walking for 2.5 to six hours per week is linked with 25% to 50% reduced breast cancer mortality and possibly decreased recurrence.<sup>41-43</sup>

Physical activity also is associated with increased progression-free survival and reduced recurrence, cancer mortality, and all-cause mortality in colorectal and prostate cancer survivors.<sup>41,44-46</sup> Among survivors of all types of cancer in the Iowa Women's Health Study cohort, adherence to the AICR's physical activity recommendation was tied to lower all-cause, CVD, and cancer mortality.<sup>20</sup>

Interventions promoting physical activity consistently have demonstrated improved fitness, strength, and quality of life and decreased fatigue and sleep disturbances among survivors of various cancer types.<sup>47,48</sup> An analysis of six interventional trials showed that early-stage cancer survivors who weren't assigned to exercise experienced decreased fitness levels, while those in supervised exercise programs following treatment experienced improvements.<sup>49</sup> Interventional trials of breast cancer survivors have demonstrated increased lean body mass, decreased body fat, and reduced levels of insulin and IGF-1.<sup>50-52</sup> This is important since elevated insulin levels are linked to cell proliferation and cancer risk as well as the metabolic syndrome and cardiovascular risk.

An American College of Sports Medicine roundtable concluded that although physical activity's effects on mortality and cancer recurrence are unclear, cancer survivors still should be advised to avoid inactivity since strong evidence supports benefits to functioning and quality of life.<sup>7</sup> It's within RDs' scope of practice to discuss with patients general steps to increase physical activity if they're medically cleared to exercise.<sup>53</sup> Referral to a certified cancer exercise trainer for detailed plans also can prove helpful.

Exercise goals and plans need to be tailored to each cancer survivor.<sup>54</sup> Some survivors face issues that require modifying the type or amount of exercise that's safe for them, such as anemia, compromised immune function, neuropathy, balance problems, an ostomy or indwelling catheter, cardiac comorbidities, the presence of or risk factors for lymphedema, bone metastases, and decreased bone density as a result of hormonal treatments.<sup>6,7,54</sup>

## **Common Challenges**

### ***Loss of Weight and Lean Body Mass***

Those who have survived cancers of the head, neck, and lung are among those more likely to be malnourished and underweight when diagnosed and at risk of further weight loss. Loss of weight and lean body mass may result from disease, aggressive treatment, and side effects that limit patients' ability to consume adequate calories. For these cancer survivors, nutrition care should aim for positive energy balance and adequate protein to preserve or rebuild lean body mass. Physical activity also is important to increase strength and endurance and, when tailored to individual needs, may help improve eating by enhancing appetite.

Weight alone doesn't adequately reflect changes in lean body mass, which can dramatically decrease with aging and during cancer treatment. Low lean body mass, especially as part of sarcopenic obesity, is associated with poor health outcomes.<sup>55-57</sup> Androgen deprivation therapy for prostate cancer promotes sarcopenic obesity. In one meta-analysis, body fat increased by an average of 7.7% and lean body mass decreased an average of 2.8% in conjunction with this therapy.<sup>58</sup>

Loss of lean body mass often is also seen in survivors of colon, breast, and childhood cancers. In the Health, Eating, Activity & Lifestyle Study of breast cancer survivors, sarcopenia was associated with an almost threefold increase in overall mortality independent of treatment type, comorbidities, waist circumference, and total body fat.<sup>59</sup>

Physical activity, including resistance training, may help protect against the loss of lean body mass.<sup>60</sup> More research is needed to clarify the optimal diet to support lean body mass among cancer survivors. Adequate protein and calories are essential, and research is under way regarding the potential for omega-3 fatty acids to help reduce muscle catabolism and the appropriate choices among protein sources to support muscle growth.<sup>61-63</sup>

### ***Fatigue***

Among the most common and debilitating problems cancer survivors face, cancer-related fatigue is a persistent tiredness not proportional to recent activity that interferes with usual functioning and isn't alleviated with rest. Some survivors experience this fatigue even years after treatment is completed. Although it may appear without a clear cause, cancer-related fatigue can occur because of new or ongoing and potentially treatable medical problems such as thyroid, pulmonary, cardiac, or liver disorders; anemia; depression; poor appetite; and medications. Survivors are urged to discuss fatigue with their physicians.

Family members and friends often urge survivors with cancer-related fatigue to rest more. While adequate sleep and rest are important, research strongly supports engaging in physical activity to reduce cancer-related fatigue, and it's one of the few evidence-based treatments currently available.<sup>64-66</sup> Other research shows that additional, potentially helpful nonpharmaceutical interventions include yoga, cognitive behavioral therapy, counseling, and relaxation techniques.

Nutrition consultation also is included in National Comprehensive Cancer Network clinical practice guidelines for assessing and addressing cancer-related fatigue.<sup>67</sup> The guidelines highlight the management of nutritional deficiencies that developed during cancer treatment, adequate hydration, and electrolyte balance to prevent and treat fatigue.

Few published trials have tested nutrition interventions for cancer-related fatigue, though. Dietary adjustments beyond those in the National Comprehensive Cancer Network guidelines that also may help include consuming five or six mini meals, distributing calories evenly through the day, or consuming larger amounts of calories earlier in the day. Education is vital to reinforce that mini meals aren't snacks but nutritionally balanced meals that provide complex carbohydrates, a small amount of heart-healthy fat, and a protein source.

Although research is lacking, anecdotal data from dietitians working with cancer survivors suggest that high-fiber, whole-food carbohydrate choices distributed throughout the day can

help survivors maintain their energy level and avoid fatigue related to blood sugar swings. These data also are consistent with guidelines to promote overall health.

### **Other Posttreatment Challenges**

Cancer survivors typically recover from the acute effects of their treatment within weeks or months after treatment ends. In some cases, however, side effects of treatment persist, such as taste changes, odynophagia (painful swallowing), dysphagia (difficulty swallowing), xerostomia (dry mouth caused by a lack of saliva), enteritis, diarrhea, constipation, and other concerns that can challenge nutritional status. The websites of the National Cancer Institute ([www.cancer.gov](http://www.cancer.gov)), the ACS ([www.cancer.org](http://www.cancer.org)), the AICR ([www.aicr.org](http://www.aicr.org)), the American Society of Clinical Oncology ([www.cancer.net](http://www.cancer.net)), and the Oncology Nutrition Dietetic Practice Group of the Academy of Nutrition and Dietetics ([www.oncologynutrition.org/erfc](http://www.oncologynutrition.org/erfc)) provide practical tips for handling such problems. In addition, dietitians who are board-certified oncology nutrition specialists (those with the CSO credential) have special expertise in this area and are excellent resources.

### **Questions About Supplement Use**

Supplements are more widely used among cancer survivors than by the general public.<sup>68,69</sup> However, currently there's no consistent evidence indicating that dietary supplements reduce the risk of cancer recurrence or improve a person's odds of survival.<sup>4,6</sup> Nevertheless, supplements can help reduce nutrient inadequacies, though research is identifying U-shaped curves for an increasing number of nutrients, meaning that inadequacy and excess both may pose risks. The risks vary depending on the nutrient but may include increased risk of various cancer types, diabetes, and all-cause mortality.

Emerging data suggest certain supplements may help survivors deal with the side effects of cancer or its treatment. Research in this area is ongoing, though, and updated information is accessible through online sources such as those in the accompanying resources list.

Multivitamin/mineral supplements often have been recommended for cancer patients following treatment as nutritional "insurance." Data now suggest that these supplements can help achieve adequate nutrient intake in survivors whose diets are limited but don't offer support for improving cancer outcomes or preventing mortality.<sup>6,70-72</sup> Some observational evidence raises concerns that high levels of multivitamins may accelerate prostate cancer progression and increase fatality.<sup>72,73</sup>

The following are some supplements of particular interest for cancer survivors:

- **Vitamin D** seems to have antiproliferative effects that may be especially beneficial for decreasing cancer progression and enhancing survival, at least based on animal studies.<sup>72,74</sup> Low circulating 25-hydroxy vitamin D [25(OH)D], the recommended biomarker of vitamin D status, is linked to an increased risk of several cancers.<sup>72,74</sup> Observational studies tie higher 25(OH)D levels to improved outcomes among colorectal cancer survivors<sup>75</sup> and possibly breast cancer survivors.<sup>76,77</sup> But even when low circulating 25(OH)D is associated with worse outcomes in observational studies, it isn't clear whether supplementation changes prognosis.<sup>72,78</sup>

It's unclear whether the Institute of Medicine's 25(OH)D recommendation of 600 to 800 IU daily based on bone health are adequate for bone or overall health among cancer survivors. Some researchers propose targeting serum 25(OH)D levels of at least 30 ng/mL or 40 to 80 ng/mL in the survivor population, with an intake of 1,000 to 2,000 IU of vitamin D commonly recommended to reach those levels but still not established as optimal.<sup>72,74</sup>

Especially a concern among breast and prostate cancer survivors is the risk of osteoporosis secondary to surgical, chemotherapy, or hormonal therapies that decrease estrogen or testosterone levels, respectively, or following long-term corticosteroid use.<sup>79,80</sup> While aiming for bone- and cancer-protective benefits, researchers emphasize that evidence is lacking regarding the safety of high blood levels of vitamin D.

- **Glutamine** is an essential amino acid of interest for its potential to aid mouth sores and other symptoms of mucositis and to improve peripheral neuropathy that develops as a side effect of chemotherapy.<sup>74</sup> It supports gastrointestinal cell growth and regeneration, and it may reduce the production of inflammatory cytokines. Significant side effects are uncommon with oral glutamine supplementation. More research on its use is needed, but caution is advised among patients with hepatic or renal insufficiency because, since it's an amino acid, the liver and kidneys must metabolize glutamine. In patients with liver or renal insufficiency on protein restriction, glutamine supplementation should be avoided so as not to burden these organs.

Glutamine is used in clinical practice as a powder mixed into oral solution, generally "swished" before swallowing for mucositis benefit.

- **Melatonin**, a hormone secreted by the pineal gland, holds dual interest for cancer survivors. For those who have difficulty falling asleep, doses of 0.5 to 3 mg at bedtime may be helpful.<sup>74,81</sup> Emerging evidence suggests that melatonin may provide cancer-protective effects by upregulating antioxidant enzymes and suppressing factors that promote cancer development. Limited data show some improvement in mortality rates when used at higher doses as an accompaniment to conventional cancer therapy.<sup>74,81,82</sup>

Since melatonin can alter estrogen levels and may interact with drugs metabolized through certain pathways, those considering use should consult their physicians.<sup>81</sup>

## Moving Into Survivorship Living

### ***Survivorship in the Big Picture***

Even after successful cancer treatment, some cancer cells may persist and ultimately develop into a detectable cancer recurrence. Cancer survivors also face a modestly increased risk of developing a second primary cancer independent of the first, though for some cancers that risk is roughly double.<sup>1</sup> Increased risk of second primary cancers reflects several factors, including late effects of radiation or other cancer treatments, genetic susceptibility, and lifestyle risk factors (eg, tobacco, excessive alcohol intake, obesity, inactivity).<sup>83</sup>

Although cancer survivors may worry most about cancer recurrence, for some of the most common cancers, heart disease is the predominant cause of death. This reflects shared risk factors and cardiotoxic effects of certain chemotherapies and radiation cancer treatments,



which may begin immediately or many years later.<sup>84,85</sup> Most common is heart muscle damage causing heart failure, but ischemia, hypertension, arrhythmias, and other cardiac events also may occur. Cardiovascular deconditioning and weight gain, common during some cancer treatments and often not reversed later, also elevate risk.

Therefore, as cancer survivors move beyond treatment, research supports health professionals in encouraging survivors to create lifestyles that help them maintain long-term health, including steps aimed to decrease the risk of recurrent or new cancers and the risk of heart disease.

### **Addressing Common Questions**

- **Is soy safe for breast cancer survivors?** The classification of soy's isoflavone compounds as phytoestrogens often raises questions about soy and breast cancer risk, especially for women who had estrogen receptor–positive cancer. However, animal studies suggesting such a risk don't accurately represent human metabolism of isoflavones. Multiple population studies now have concluded that among estrogen receptor–positive breast cancer survivors (with or without tamoxifen use), there's either no effect, a decreased recurrence, or decreased deaths related to moderate soyfood consumption.<sup>86-91</sup>

Observational studies have reported a modestly lower risk of breast cancer in women who consume moderate amounts of soy starting early in life, and moderate consumption does appear safe for survivors.<sup>6</sup> A moderate amount is considered to be one to two standard servings of soyfoods daily (eg, 1/2 cup of tofu or edamame or 1 cup of soymilk as one serving). The safety of amounts above three servings daily is unclear, and evidence isn't available regarding the effects of isoflavone supplements.

- **Does sugar “feed” cancer?** All the cells in the body use sugar for fuel, and cancer cells seem to take up blood sugar more rapidly than do healthy cells. However, dietary sugar, other carbohydrate, and gluconeogenesis from protein all produce blood sugar. Both the AICR and the ACS have concluded that the current evidence is too sparse and inconsistent to support a link between sugar intake and the risk or progression of cancer.<sup>4,6</sup> Hyperinsulinemia may promote cancer cell growth, though.<sup>92</sup>

For cancer protection, research supports maintaining healthy blood sugar and insulin levels with weight control, regular exercise, a high-fiber diet, and avoiding large loads of refined carbohydrate. Limiting foods and beverages high in added sugar is recommended, but that's because of their general lack of nutrients and substantial calorie load that promotes weight gain, which is linked with worse cancer outcomes.

- **Is an alkaline diet cancer protective?** Survivors may ask about claims that an acidic body pH promotes cancer cell growth, while an alkaline environment is protective. However, no solid research supports such claims.<sup>93,94</sup>

There's no single measure of so-called body pH. Food choices may affect urine pH, though research isn't consistent on that. Intricate body systems maintain pH within a relatively narrow range. The alkaline diet is plant based, so it does offer protective nutrients, phytochemicals, and fiber. However, it imposes unfounded restrictions, discouraging not

only processed foods, white sugar, white flour, caffeine, and meat but also fish, poultry, and dairy products.

### ***Optimizing Survivorship Care***

The Institute of Medicine identifies four essential components of cancer survivorship care and recommends that every cancer patient receive an individualized survivorship care plan for monitoring and maintaining health.<sup>95</sup>

A growing number of cancer treatment centers and hospitals are establishing survivorship programs. Sometimes called cancer prehabilitation (pretreatment care) and rehabilitation programs, these may include pain management, smoking cessation, exercise, and nutrition components.<sup>96</sup> Programs often offer support groups and cognitive-behavioral therapy targeting stress management, relaxation training, and coping skills.

For a successful survivorship program, all stakeholders should participate in planning, which should be based on evidence-based effectiveness, program sustainability, and identified outcomes for program evaluation.<sup>97</sup>

### **The Bottom Line**

Cancer survivors stand to benefit in many ways from a healthful lifestyle. Unfortunately, for some, a cancer diagnosis doesn't always lead to health-protective changes.<sup>20,98,99</sup> In a cross-sectional study of adult cancer survivors, most did meet the recommendation to avoid smoking, but only 30% to 47% met the physical activity recommendation, and about 15% to 19% met the five-a-day minimum vegetable and fruit target.<sup>98</sup>

Dietitians play a vital role in enhancing cancer survivors' health and quality of life. Assessing survivors' nutritional status and dietary intake can identify areas in which they're nutritionally lacking and also areas of potential excess. Guidance can help survivors meet nutritional needs and improve outcomes relevant to cancer, cardiovascular, and bone health. Survivors have wide-ranging needs for help in evaluating information from many sources and making evidence-based behavior changes that support recovery and long-term health, and dietitians can assist them in addressing these needs.

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### **[Reducing Cancer Risk Handout](#)**

### **[Caring for Today's Cancer Survivors: Resources for Nutrition Professionals](#)**

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## Examination

**1. Approximately what percentage of Americans diagnosed with cancer currently live more than five years?**

- A. 25
- B. 45
- C. 65
- D. 85

**2. Based on recommendations from the American Institute for Cancer Research (AICR) and the American Cancer Society (ACS) regarding physical activity, cancer survivors should do which of the following?**

- A. Talk with their physicians or a fitness professional trained to work with cancer survivors about how to safely incorporate strength training to restore or minimize the loss of lean body mass.
- B. Attempt to return to the level of exercise in which they engaged before their cancer diagnosis, since cancer treatment doesn't affect the choice of physical activity upon completion.
- C. Engage in gentle exercise such as walking, but avoid strength training because of cardiac and lymphedema risks.
- D. Engage in physical activity every day or nearly every day, though it will likely improve only sleep patterns and quality of life.

**3. What does current research say about overweight and obesity in cancer survivors?**

- A. Among cancer survivors today, overweight and obesity are more common than underweight.
- B. Most people who were obese when diagnosed with cancer are normal weight or underweight by the time they complete treatment.
- C. Prediagnosis obesity is associated with a greater risk of cancer but is unrelated to cancer outcomes.
- D. Research hasn't identified any mechanisms connecting obesity with cancer outcomes, so any link seen likely is due to a mutual association with lifestyle habits.

**4. Which of the following statements best describes the issue of lean body mass loss for cancer survivors?**

- A. Loss of lean body mass occurs as a later stage of excess weight loss.
- B. Loss of lean body mass primarily is seen in association with mouth, esophageal, and lung cancers.
- C. Loss of lean body mass frequently is seen in survivors of colon, breast, and childhood cancers.
- D. Androgen deprivation therapy generally protects against the loss of lean body mass often seen in prostate cancer.

**5. What advice for overweight or obese cancer survivors is best supported by overall current research?**

- A. Aim for modest weight loss through changes in eating and physical activity after confirming with your health care provider that you have no medical contraindications, including low lean body mass.
- B. Since cancer survivors have an increased risk of developing a second cancer and heart disease, both of which increase with obesity, shed excess weight as soon as possible.
- C. Especially if there's excess weight around the abdomen, aim for at least a 10% weight loss by reducing calorie intake, but don't chance the cardiovascular risk of increased physical activity.
- D. Avoid weight gain, but don't attempt to lose weight because mortality data suggest doing so poses significant risk.

**6. Evidence-based dietary recommendations suggest that cancer survivors should do which of the following?**

- A. Focus on plant foods providing nutrients and compounds that can influence DNA repair, inflammation, cell proliferation, and cancer progression.
- B. Aim for no more than 20% of calories from fat.
- C. Include red meat at least once per day to provide bioavailable iron that can thwart survivors' tendency to develop anemia.
- D. Exclude refined grains and all forms of sugar from their diet so as not to promote the growth of any remaining micrometastases.

**7. Which of these statements about cancer survivors' soyfood consumption is best supported by current research?**

- A. Women who start consuming soyfoods after a breast cancer diagnosis can reduce the risk of recurrence.
- B. Consuming one or two standard servings of soyfoods daily appears safe for cancer survivors.
- C. Daily soyfood consumption is safe for most cancer survivors, but those who had estrogen receptor–positive breast cancers should avoid it.
- D. Soyfoods contain phytoestrogens called isoflavones that increase the risk of breast, uterine, and prostate cancers.

**8. Which of the following statements about vitamin D and cancer survivors is best supported by current evidence?**

- A. Laboratory studies show that vitamin D may play a role in slowing down the early stages of cancer development, but it's unlikely to affect progression or survival.
- B. Observational studies have linked higher vitamin D status with better outcomes in colorectal cancer survivors and possibly breast cancer survivors.
- C. Current evidence shows a straight-line relationship in which the higher cancer survivors' blood levels of vitamin D, the lower their risk of mortality.
- D. Because of an increased need for vitamin D among cancer survivors, an intake of 5,000 IU/day now is recommended for survivors unless there are medical contraindications.

**9. When working with cancer survivors who suffer from cancer-related fatigue, RDs should do which of the following?**

- A. Encourage them to rest more and cut back on activities.
- B. Suggest saving the majority of their calorie intake for evenings, when there's more time and energy to prepare a balanced meal.
- C. Help them plan mini meals that provide high-fiber carbohydrate, protein, and healthful fat yet require minimal energy for preparation.
- D. Suggest they consult a psychologist or mental health counselor since the fatigue likely reflects depression.

**10. Which of the following best meets published recommendations for cancer survivorship programs?**

- A. Activities begin either as soon as treatment ends or in later months when a survivor feels ready.
- B. Each survivor is plugged into one of a few generic survivorship care templates that meet the needs of most survivors.
- C. Programs focus mostly on decreasing risk of cancer recurrence, since for most survivors that poses the greatest threat to quality of life and mortality.
- D. Dietitians play a vital role in helping survivors improve outcomes related to cancer, cardiovascular, and bone health.