Published in final edited form as:
*Semin Oncol Nurs*. 2008 August ; 24(3): 171–179. doi:10.1016/j.soncn.2008.05.005.

# Nutrition and the Cancer Survivor: Evidence to Guide Oncology Nursing Practice

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## Abstract

**Objectives—**To conduct a systematic review of scientific reports related to diet and cancer survivorship that have been published since the 2006 American Cancer Society's Guide for Informed Choices on Nutrition and Physical Activity During and After Cancer Treatment and to integrate these findings into a consistent message that can be delivered by nurses in hopes of improving the health and well-being of cancer survivors.

**Data Sources—**Journal articles.

**Conclusion—**Cancer survivors represent a growing population at high risk for recurrence and other co-morbidities. Evidence continues to accumulate regarding the importance of weight management, and a healthful diet (plant-based, low saturated fat) in improving the overall health and promoting disease-free and overall survival in this population

**Implications for Nursing Practice—**Cancer survivors are eager for nutrition information and nurses are well-positioned to guide them regarding the importance of weight management and healthy food choices.

Diet has emerged as a promising component in long- term survival planning for patients who are newly diagnosed with cancer, those contending with active treatment, and those who have survived many years beyond their initial diagnosis and cancer treatment. Nurses, who recognize the role that diet and nutritional status play in cancer survival, are positioned to impart sound nutritional guidance that could improve the overall health of their patients. However, the evidence on these topics is continually evolving and can be confusing. First, cancer survivorship is a relatively new concept. In the past, most people who were diagnosed with cancer did not survive it; now, however, due to improvements in early detection and treatment, two-thirds of those diagnosed with cancer will survive at least 5 years.[1] Second, studies related to the impact of diet or nutritional status on survivorship are just starting to accrue and they often yield contradictory results. Third, nutritional research in cancer focuses not only on cancer progression and recurrence, but also on several co-morbid conditions. i.e., cardiovascular disease (CVD), diabetes, osteoporosis, etc.[2] An increased awareness of

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nutritional interventions for these prevalent co-morbid conditions is necessary to deliver comprehensive care to the cancer survivor. Synthesis of the literature on these issues, then, is needed. The time of a cancer diagnosis has been identified as a "teachable moment" when a high proportion of cancer survivors are hungry for nutrition information.[3, 4] It is very important that oncology nurses be apprised of current guidelines, so that they can be ready to facilitate the adoption of healthful lifestyle behaviors among their patients and within their practice.

In 2003, the American Cancer Society (ACS) assembled a group of experts on nutrition, exercise, and cancer survivorship, with the goal of reviewing the extant literature to develop guidelines for lifestyle changes to reduce the risk of cancer recurrence and also to improve the overall health of cancer survivors. This advisory panel subsequently published an initial report entitled, "Nutrition and Physical Activity During and After Cancer Treatment: An American Cancer Society Guide to Informed Choices." [5] Three years later, these guidelines were reviewed again and a subsequent report was published in 2006.[6] This ACS report serves as the foundation for the review presented in our article, where we re-examine the ACS guidelines in detail (see Table 1 for a listing of these guidelines). We also review new research, published during the past two years, and update the ACS guidelines to provide practicing oncology nurses with current information to share with their patients (see Table 2 for a synopsis of newly reported research).[7–18]

## LITERATURE SEARCH METHOD

To update the ACS guidelines with findings from new, original research on diet and cancer survivorship, literature in PubMed was searched for the years 2006–2007. A PubMed keyword search, rather than a MeSH search, was conducted to insure that non-indexed articles were discovered. First sets of keywords were combined: (a) "diet therapy," "food and beverages," "food habits"; (b) "body weight," body mass index," and "weight loss"; (c) "mortality," "survivors," "prognosis," "survival analysis," "recurrence," "local neoplasm recurrence." Then, the three sets of combined searches were joined and searched. The search produced a broad field of approximately 1500 articles, which were then limited to include only human studies reported in English and only those that addressed dietary change after the diagnosis of cancer, thus substantially reducing the number of relevant publications. Thirteen original research papers, that evaluate the association between diet, nutritional status or body weight, and cancer recurrence or survival (disease-free or overall), were identified. In the search for original research, two relevant reviews of body mass index (BMI) and prostate cancer survival were located and are also included within this report.

## FINDINGS

This review of the ACS guidelines and new studies of diet/nutrition and cancer survivorship is covered in two sections: (1) "Weight Management" where associations between survival (overall and disease-free) and body weight are discussed; and (2) "Diet Composition and Specific Food Choices," where associations between survival and dietary patterns and food choices (such as fat intake, eating a balanced diet, etc.) are discussed. In both sections, we re-examine the ACS guidelines,' review new studies, and present implications for nursing practice. The 13 new studies, reviewed in the two sections, are summarized in Table 2.[7–18]

### WEIGHT MANAGEMENT

Historically, under-nutrition and cancer-related cachexia were the primary nutritional concerns among cancer patients. While these issues are still important for survivors of gastrointestinal (GI) related-malignancies and head and neck cancers, as well as those with advanced disease, being overweight is fast becoming the more common concern due to earlier stage at diagnosis and the prevalence of obesity-related cancers (e.g., cancers of the breast, prostate and

colorectum). In general, the ACS guidelines and the new research indicate that being overweight is associated with cancer recurrence, cancer mortality, or preventable mortality from other causes. Below, we recapitulate the ACS dietary guidelines for underweight and then overweight cancer survivors.

For patients who are underweight (and often weak, easily fatigued, and suffering from poor quality-of-life), the ACS guide describes the goal of achieving "positive energy balance," (i.e., to consume more energy than that expended to promote weight gain) with the expectation that this will hasten healing and prevent co-morbid medical complications.[6] Changes in taste, smell, and the integrity and function of the oral mucosa that accompany advanced disease and some forms of treatment, can impair appetite and the consumption of adequate energy. Thus for these patients, the ACS guide recommends energy-dense foods that are easy to chew and swallow, and mild in flavor.[6] Aversions to meat and other foods, can pose challenges to adequate consumption of energy and protein; food-related preferences often serve as a moving target. In general, cold foods and reliance on protein sources other than red meat, (i.e., dairy, legumes, poultry, and fish are best-accepted).[6] Also, given that undernourished patients are frequently immunosuppressed, food safety issues are of paramount concern and call for careful food preparation methods. The ACS guidelines strongly suggest the referral of these patients to a registered dietitian, especially those who cannot eat or those who have already tried and failed to gain weight with dietary changes on their own.[6] Readers wanting specific recommendations for underweight patients who are currently receiving cancer treatment or at the end-of-life are referred to the ACS guide.

Although underweight is an acknowledged problem among a defined sector of cancer survivors, a large body of literature has emerged which correlates overweight and obesity with health risk for cancer survival.[14] In the ACS guide, seven studies are reviewed which report associations between overweight or obesity and increased risk of cancer recurrence or mortality.[6] In a prospective study of 900,000 U.S. adults, Calle and colleagues found that overweight and obese individuals diagnosed with cancer had significantly higher rates of mortality from non-Hodgkin's lymphoma, multiple myeloma, and from cancers of the esophagus, colon and rectum, liver, gall bladder, pancreas, kidney than cancer patients of normal weight; significant trends for increased risk also were found for cancers of the breast, uterus, cervix and ovaries in women; and prostate and stomach in men.[19] A recent review by Demark-Wahnefried and Moyad concluded that there is strong evidence to suggest that an increased body mass index (BMI) at the time of diagnosis is associated with poorer prostate cancer outcomes, since eight of nine studies have shown this relationship.[20] In another review of obesity and prostate cancer outcomes, Freedland and Platz report on eight of 10 studies that found significant associations between increased BMI and poorer prostate cancer outcomes, with all nine studies finding a significant association between increased BMI and prostate cancer mortality.[21]

Five of six new studies, located in our search of weight status and cancer recurrence (see Table 2.), use epidemiological methods to investigate the relationship between weight, at the time of cancer diagnosis, and health outcomes.[7, 9–12] In these studies, large populations of cancer survivors were followed for 5 to 11 years to evaluate recurrent cancer, increased cancer mortality, or poorer overall survival. In all five studies, overweight or obesity at the time of cancer diagnosis was significantly associated with poorer cancer or overall health outcomes. Findings from these studies present a fairly consistent picture: (a) increased BMI at the time of breast cancer diagnosis is correlated with poorer cancer outcomes;[7, 9, 10] (b) increased BMI at the time of prostate cancer diagnosis is found to be associated with poorer prostate cancer outcomes;[12] and (c) BMI greater than 35 was strongly associated with recurrent colon cancer and increased colon cancer mortality.[11] In contrast, research related to weight gain after diagnosis has produced mixed results[8] with several studies cited in the ACS guide suggesting

that weight gain has an adverse effect on recurrence and survival (disease-free or overall)[6] and more recent studies (see Table 2) suggesting no associations with disease-specific survival.

There are three important implications for nursing practice that emanate from the ACS guidelines and the newer literature on body weight and cancer survival. First, nurses should recognize that roughly two thirds of U.S. adults are classified as overweight or obese.[22] Second, nurses should consider the concept of "body mass index-years," to conceive of the cumulative risk of years lived overweight (much as they already consider cigarette smoking "pack years").[21] Most importantly, oncology nurses should educate their patients that being overweight may increase the risks of cancer recurrence and cancer mortality, and is certainly a risk factor for prevalent co-morbidities among survivors that contribute to overall mortality. In addition to providing this important message, nurses should be ready to point patients to appropriate resources, i.e., registered dietitians and approved weight management programs, and also practice weight management themselves, so they can lead their patients by example.

For patients that recognize the need to lose weight, the ACS guidelines spell-out three weight loss strategies. First, patients should consult with their oncologist before starting any diet or exercise program.[6] Second, patients should be guided toward sound weight management strategies, i.e., well balanced, lower calorie diet that promotes a weight loss of no more than two pounds per week (this rate assures that patients avoid nutritional deficiencies from over-rapid weight loss and also maximizes the proportional loss of fat as opposed to lean tissue).[6] And finally, though not a nutritional recommendation *per se*, nurses should encourage patients to exercise as a key component in weight management and practice appropriate behavioral management skills to achieve dietary and exercise change.[6] In summary, for overweight and obese cancer survivors, a thoughtful plan for weight reduction will likely reduce prevalent co-morbidities within this population and may ultimately impact cancer recurrence and mortality.

## DIET COMPOSITION AND SPECIFIC FOOD CHOICES

The idea that food choices (i.e., learning to avoid some foods or to increase the consumption of others) could improve cancer prognosis has been a hope and a research goal for some time. It is well-known that cancer survivors are at increased risk for chronic illnesses, such as diabetes and heart disease; it is also well-known, and repeatedly emphasized in the ACS report, that a healthy, well-balanced diet can prevent or at least reduce the severity of these chronic conditions.[6] However, as stated previously, because cancer survivorship is a fairly new concept, only a few studies have been undertaken in this area and the data are minimal and tend to be unstable. To date, most studies have been observational in nature; however two major randomized control trials (RCTs) were undertaken in breast cancer survivors to test the potential benefit of a low fat diet and a diet very high in fruits and vegetables in combination with dietary fat restriction. These results were released just recently, (after the ACS report) and we have assimilated these findings into the following discussion. While the consumption of specific foods is of interest in relation to disease, it should be recognized that dietary patterns (i.e., the global nature of the diet) may have more importance.[23]

A key study cited in the ACS report was one by Kroenke and colleagues[24] on breast cancer survivors identified in the Nurse's Health Study cohort which found that a well-balanced diet (i.e., a low fat, plant-based diet), was significantly associated with overall survival, but not cancer-free survival. A more recent study by Meyerhardt et al. of 1009 stage III colon cancer survivors found that those who consumed a "Western" diet (increased amounts of red meat and regular dairy products and decreased fruits, vegetables and whole grains) had a higher recurrence of colon cancer and an increased colon cancer mortality than those who consumed a "Prudent Diet" (increased fruits, vegetables, whole grains and low fat dairy products and less red meat).[16] Recent findings reported by McEligot et al.[17] and Fink et al.[18] are inconsistent. McEligot et al determined that less fatty diets were associated with decreased overall

mortality[17] while Fink et al found no correlation between diet and survival.[18] Another study of low fat, high fruit and vegetable diets in lung cancer survival revealed no significant associations between the diet and survival, though the sample used in this study was relatively small.[13]

In addition to this new, epidemiological research, eagerly anticipated results from two randomized clinical trials of diet composition and cancer survival were published since the ACS report. The first of these was the Women's Intervention Nutrition Study (WINS) in which, cancer recurrence was studied in a group of 2437 early stage, postmenopausal breast cancer patients receiving conventional cancer treatment and who were randomly assigned to an intervention arm (n=975), that received individual and group class instruction to reduce dietary fat to 15% of total calories or to a control arm (n=1462), that received counseling to consume a well-balanced diet. Study participants were followed an average of 5 years.[25] Patients who received the dietary intervention, versus those in the control arm, experienced a 24% reduction cancer recurrence (P=.034), an effect which was significantly stronger among patients diagnosed with estrogen-receptor negative (ER−) disease, as compared to those who were ER +. [25] It should be noted that study participants in the low fat arm experienced a mean weight loss of six pounds and it is unknown whether the benefit observed in this trial was linked more to the low fat diet or to the loss in body weight.

In a second RCT, entitled WHEL (Women's Healthy Eating and Living) study, 3088 pre- and – post-menopausal breast cancer survivors within 4-years of diagnosis of stage I-IIIA disease who received standard cancer care were randomly assigned to: (a) an intervention arm (n=1537) that received a dietary intervention (telephone counseling, cooking classes, and a newsletter) to consume a daily diet of 5+ vegetable servings, 3+ fruit servings, 16 oz of vegetable juice, 30 grams of fiber, and a reduction in fat to 15–20% of total Calories; (b) a control arm (n=1551) who received print material only about basic nutrition.[26] While WHEL participants in the intervention arm achieved the stringent dietary goals promoted in the study; no significant benefit in breast cancer outcomes was observed. Intuitively, one would have expected the WHEL diet to have resulted in weight loss for intervention subjects. It did not. In an editorial that accompanied the WHEL main outcomes paper, Gapstur and Khan discuss the somewhat conflicting findings of the WINS and WHEL studies.[27] They suggest that the absence of weight loss in the WHEL intervention, in contrast to that observed in WINS, may explain the absence of benefit.[27] Other reasons may be that a high proportion of women enrolled in the WHEL study were already following a diet which included ample servings of fruits and vegetables and which was low in fat, thus no effect may have been possible. Gapstur and Khan conclude that the "high level of obesity, weight gain or both after diagnosis is adversely associated with breast cancer disease-free survival and overall survival."[27] This may be an overriding factor. Of interest, in another study by Pierce et al. that was conducted solely on the women participating in the control arm of WHEL, the strongest association between breast cancer outcomes and lifestyle factors existed for physical activity, an association that was independent of body weight status or fruit and vegetable consumption[15]. That said, it is of paramount importance for nurses to appreciate that with more and more cancer patients surviving their cancer, it is not only cancer-specific outcomes that are important, but those related to overall health. Thus, the recommendations put forth in the ACS report (see Table 1), are instrumental in informing nursing practice aimed at improving the overall health of cancer patients

To help patients identify the right balance of foods, the ACS guide identifies three elements in food choice behavior. One, the guidelines state that fat should be restricted to 20%–35% of total dietary intake.[6] Specifically, the ACS guidelines stress that saturated fat should be restricted to less than 10% of calories and trans-fatty acids should be limited to less than 3% of calories. The ACS dietary guidelines emphasize protein intake for survivor health and promote a diet that derives 10%–35% of calories from protein, or about 0.8g/kg body weight.

[6] For most US cancer survivors, the under-consumption of protein is not an issue; instead and more relevant is the substitution of healthier sources of protein, such as fish, poultry, beans and low fat dairy products to take the place of more commonly consumed high fat dairy products, and meats that are fatty and/or processed. Third, a variety of carbohydrates should make-up 45%–65% of total daily caloric intake.[6] Nutrient dense carbohydrates, such as vegetables, fruits and whole grains, are encouraged (see Table 1).

## CONCLUSION

Cancer survivors currently comprise 3%–4% of the US population and their numbers are steadily rising.[28] Although improvements in cure rates are cause for great celebration, cancer survivors are at increased risk for recurrence, as well as several co-morbid conditions. Oncology nurses are optimally positioned to deliver support and guidance which can favorably influence overall health; nurses also are in a key position to refer patients to registered dietitians and licensed nutritionists, as well as to other existing resources (Table 3). Appropriate dietary guidance is an important component of self-care. Research to date suggests that overweight and obesity increase the risk of cancer recurrence and mortality (cancer-related and overall). In addition, although there are mixed findings with regard to diet composition and specific food choices, evidence well supports the consumption of plant-based, low saturated fat diets to promote overall health and survival. Oncology nurses should share this information with patients and encourage the importance of weight management, and the consumption of diets that parallel guidelines set forth in the ACS guide.

## Acknowledgements

Supported in part by Duke University School of Nursing (MT); the National Cancer Institute (R01-CA106919, R01-CA81191, R21-CA122143) (WDW) and the American Institute for Cancer Research (WDW)

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**TABLE 1**

American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention

Maintain a healthy weight throughout life.
- Balance caloric intake with physical activity.
- Avoid excessive weight gain throughout the lifecycle.
- Achieve and maintain a healthy weight if currently overweight or obese.

Adopt a physically active lifestyle.
- Adults: engage in at least 30 minutes of moderate-to-vigorous physical activity, above usual activities, on 5 or more days of the week. Forty-five to 60 minutes of intentional physical activity are preferable.
- Children and adolescents: engage in at least 60 minutes per day of moderate-to-vigorous physical activity at least 5 days per week.

Consume a healthy diet, with an emphasis on plant sources.
- Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
- Eat five or more servings of a variety of vegetables and fruits each day.
- Choose whole grains in preference to processed [refined] grains.
- Limit consumption of processed and red meats.

If you drink alcoholic beverages, limit consumption.
- Drink no more than one drink per day for women or two per day for men.

Taken from: Nutrition and Physical Activity During and After Cancer Treatment: An American Cancer Society Guide for Informed Choices. CA: A Cancer Journal for Clinicians 56: 323-353, 2006. Reprinted with Permission from the American Cancer Society

**Table 2**

Original reports published between January 2006 and September 2007 that document associations between diet/nutrition and cancer recurrence and survival (disease-free and overall)

| Research Team | Sample size/source | Sample Characteristics | Follow-up | Findings |
|---|---|---|---|---|
| Reeves *et al.* [7] | 533 cases from multiple institutions (Study of Osteoporotic Fractures) | Incident breast cancer cases enrolled in a study cohort | Mean = 8.1 years | Significant associations found between increased BMI and breast cancer mortality for women age 65 or younger, for BMI of ≥ 27.3 [(HR=1.40; 95% CI: 1.03–2.01), and for BMI >34 (HR=2.40; 95% CI: 1.07–5.45)], but not among women at age 85 or older [(BMI ≥ 27.3 (HR=0.81 95% CI: 0.65–1.01); BMI >34 (HR=0.61 95% CI: 0.36–1.02)]. |
| Caan *et al.* [8] | 3215 cases from multiple institutions (Life After Cancer Epidemiological Study and control arm participants in the Women's Healthy Eating and Living Study) | Breast cancer cases diagnosed within 48 months of enrollment | Mean = 9 years | No significant associations between weight gain post-diagnosis and cancer recurrence found for moderate weight gain (HR=0.8; 95%CI: 0.6–1.1) or large weight gain (HR=0.9; 95%CI: 0.7–1.2). |
| Tao *et al.* [9] | 1455 cases from multiple institutions (Shanghai Breast Cancer Study) | Newly diagnosed breast cancer patients | Mean = 5.1 years | The adjusted hazard ratios associated with a BMI greater than or equal to 25 were 1.3 (95 % CI: 1.0, 1.8) and 1.3 (95 % CI: 1.0, 1.7) for overall and disease-free survival, respectively, in comparison with subjects of normal weight (BMI < 23.0). |
| Abrahamson *et al.* [10] | 1254 patients from a population-based sample in Atlanta and New Jersey | Breast cancer patients that diagnosed within 48 months of enrollment | Mean = 9 years | Significant associations found between breast cancer recurrence and BMI > 30 (HR=1.48; 95% CI: 1.09–2.01) or waste hip ratio >0.80 (HR=1.52 95% CI: 1.05–2.19). Strong associations found between cancer mortality and obesity at age 20 (HR=2.49 95% CI: 1.15–5.37). |
| Dignam *et al.* [11] | 4288 cases from multiple institutions (National Surgical Adjuvant Breast and Bowel Project) | Colon cancer patients enrolled in a cooperative group RCT | Mean = 11.2 years | Significant associations found between BMI > 35 at diagnosis and colon cancer recurrence (HR= 1.38; 95% CI: 1.10–1.73) and mortality (HR=1.28; 95% CI: 1.04–1.57). |
| Wright *et al.* [12] | 9986 patients from a population based sample (NIH-AARP Diet and Health Study) | Incident prostate cancer cases identified within a study cohort | Mean = 6 years | Significant associations found between increased BMI at diagnosis and prostate cancer mortality (BMI 25–29.5, RR=1.25 CI: 0.87–1.80); 30–34.9 RR=1.46 CI: 0.92–2.33; >35, RR=2.12 CI: 0.1.08–4.15). |
| Skuladottir *et al.* [13] | 353 patients from a Danish population-based study (Diet, Cancer and Health) | Incident lung cancer cases identified within a study cohort. | Mean = 5 years | No significant associations found between a favorable lung cancer prognosis and a diet high in fruit and vegetables (HR=0.84; 95% CI: 0.59–1.21) versus a diet low in fruit and vegetables (HR= 0.81; 95% CI: 0.58–1.15). |
| Chlebowski *et al.* [14] | 2437 post-menopausal early stage breast cancer survivors enrolled in a | Participants were randomized to a low fat diet (<15% of energy) or to a control arm | Median = 5 years | Overall, patients assigned to the low fat diet had significant reductions in |

| Research Team | Sample size/source | Sample Characteristics | Follow-up | Findings |
|---|---|---|---|---|
| | randomized, controlled trial (RCT)(Women's Intervention Nutrition Study) | receiving a nutritionally adequate diet (n=975/1462) | | recurrence (HR= 0.76; 95% CI: 0.6–0.98); though this effect was limited to patients who had ER- receptor disease HR=0.58; 95% CI: 0.37–0.91); and not patients with ER+ disease (HR=0.85; 95% CI: 0.63–1.14). |
| Pierce *et al.* [15] | 3088 early stage breast cancer survivors enrolled in a RCT (Women's Healthy Eating and Living Randomized Trial) | Participants were randomized to an intervention arm that consumed a very high fruit and vegetable, low fat diet vs. as usual care arm (n=1537/1551) | Mean =7.3 years | No significant differences in rates of breast cancer recurrence found between study arms (HR=.96 95% CI: 0.8–1.14). |
| Meyerhardt *et al.* [16] | 1009 cases in a prospective observational study. (Patients enrolled in a RCT adjuvant chemotherapy trial | Stage III colon cancer patients completed a diet questionnaire before and 6-months after the chemotherapy trial. | Mean = 5.3 years | In comparison to patients eating "Prudent diets" (high in fruits, vegetables, fish and poultry), patients consuming "Western diets" (high in meat, fat and processed grains) had an increased risk of colon cancer recurrence (HR=2.85; 95% CI: 1.75–4.63) and mortality (HR=2.32 95% CI: 1.36–3.96) |
| McEligot *et al.* [17] | 516 cases in an Orange Country California population-based sample | Post menopausal breast cancer patients identified within one year of diagnosis | Mean = 6.7 years | Significant associations found between overall survival and low fat diets (HR=3.12; 95% CI: 1.79–5.44); non-significant trends observed for increased intakes of fruit, vegetables and fiber |
| Fink *et al.* [18] | 1235 cases from a population-based sample (Long Island Breast Cancer Study Project) | Newly diagnosed breast cancer patients completed a diet questionnaire | Mean = 5 years | No significant associations were between overall and disease free survival and a diet high in fruit (HR=0.68; 95% CI: 0.42–1.09) and vegetables (HR=0.72; 95% CI: 0.41–1.24). |

**Table 3**

Nutrition and Cancer Resources for Referral

| Organization | Contact Information/Resources available |
|---|---|
| American Cancer Society | 1-800-ACS-2345 or http://www.cancer.org to obtain Guide for Informed Choices on Nutrition and Physical Activity During and After Cancer Treatment, brochures and other information |
| American Dietetic Association | 1-800/877-1600 or http://www.eatright.org to obtain information and order brochures http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/home_4874_ENU_HTML.htm to locate registered dietitians within specific regions. |
| American Institute for Cancer Research | 1-800-843-8114 or http://www.aicr.org to obtain information and order brochures |
| Cancer Information Service | 1-800-4-CANCER or http://cis.nci.nih.gov to obtain information and order brochures |
| Centers of Disease Control | http://www.cdc.gov/HealthyLiving to obtain information |
| National Cancer Institute | National Cancer Institute's Cancer Information Service; http://www.cancer.gov; http://www.cancer.gov/cancertopics/treatment/cam Also see Office of Cancer Complementary and Alternative Medicine – http://www.cancer.gov/cam to obtain information |
| National Center for Complementary & Alternative Medicine | nccam.nih.gov; info@nccam.nih.gov to obtain information |
| World Health Organization | http://www.who.int/dietphysicalactivity/publications to obtain information |