

NCCN

Survivorship: Healthy Lifestyles, Version 2.2014

Clinical Practice Guidelines in Oncology

Crystal S. Denlinger, MD; Jennifer A. Ligibel, MD; Madhuri Are, MD; K. Scott Baker, MD, MS; Wendy Demark-Wahnefried, PhD, RD; Don Dizon, MD; Debra L. Friedman, MD, MS; Mindy Goldman, MD; Lee Jones, PhD; Allison King, MD; Grace H. Ku, MD; Elizabeth Kvale, MD; Terry S. Langbaum, MAS; Kristin Leonardi-Warren, RN, ND; Mary S. McCabe, RN, BS, MS; Michelle Melisko, MD; Jose G. Montoya, MD;

Kathi Mooney, RN, PhD; Mary Ann Morgan, PhD, FNP-BC; Javid J. Moslehi, MD; Tracey O'Connor, MD; Linda Overholser, MD, MPH; Electra D. Paskett, PhD; Jeffrey Peppercorn, MD, MPH; Muhammad Raza, MD; M. Alma Rodriguez, MD; Karen L. Syrjala, PhD; Susan G. Urba, MD; Mark T. Wakabayashi, MD, MPH; Phyllis Zee, MD; Nicole R. McMillian, MS; and Deborah A. Freedman-Cass, PhD

Healthy Lifestyles

Healthy lifestyle habits, such as engaging in routine physical activity, maintaining a healthy diet and weight, and avoiding tobacco use, have been associated with improved health outcomes and quality of life. For some cancers, a healthy lifestyle has been associated with a reduced risk of recurrence and death.¹⁻⁶ Therefore, survivors should be encouraged

Abstract

Healthy lifestyle habits have been associated with improved health outcomes and quality of life and, for some cancers, a reduced risk of recurrence and death. The NCCN Guidelines for Survivorship therefore recommend that cancer survivors be encouraged to achieve and maintain a healthy lifestyle, with attention to weight management, physical activity, and dietary habits. This section of the NCCN Guidelines focuses on recommendations regarding physical activity in survivors, including assessment for the risk of exercise-induced adverse events, exercise prescriptions, guidance for resistance training, and considerations for specific populations (eg, survivors with lymphedema, ostomies, peripheral neuropathy). In addition, strategies to encourage health behavioral change in survivors are discussed. (*J Natl Compr Canc Netw* 2014;12:1222-1237)

NCCN Categories of Evidence and Consensus

Category 1: Based upon high-level evidence, there is uniform NCCN consensus that the intervention is appropriate.

Category 2A: Based upon lower-level evidence, there is uniform NCCN consensus that the intervention is appropriate.

Category 2B: Based upon lower-level evidence, there is NCCN consensus that the intervention is appropriate.

Category 3: Based upon any level of evidence, there is major NCCN disagreement that the intervention is appropriate.

All recommendations are category 2A unless otherwise noted.

Clinical trials: NCCN believes that the best management for any cancer patient is in a clinical trial. Participation in clinical trials is especially encouraged.

Please Note

The NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) are a statement of consensus of the authors regarding their views of currently accepted approaches to treatment. Any clinician seeking to apply or consult the NCCN Guidelines® is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment. The National Comprehensive Cancer Network® (NCCN®) makes no representation or warranties of any kind regarding their content, use, or application and disclaims any responsibility for their applications or use in any way. **The full NCCN Guidelines for Survivorship are not printed in this issue of JNCCN but can be accessed online at NCCN.org.**

© National Comprehensive Cancer Network, Inc. 2014, All rights reserved. The NCCN Guidelines and the illustrations herein may not be reproduced in any form without the express written permission of NCCN.

Disclosures for the NCCN Survivorship Panel

At the beginning of each NCCN Guidelines panel meeting, panel members review all potential conflicts of interest. NCCN, in keeping with its commitment to public transparency, publishes these disclosures for panel members, staff, and NCCN itself.

Individual disclosures for the NCCN Survivorship Panel members can be found on page 1237. (The most recent version of these guidelines and accompanying disclosures are available on the NCCN Web site at NCCN.org.)

These guidelines are also available on the Internet. For the latest update, visit NCCN.org.

Journal of the National Comprehensive Cancer Network

to achieve and maintain a healthy lifestyle, including attention to weight management, physical activity, and dietary habits. Survivors should be advised to limit alcohol intake and avoid tobacco products, with emphasis on tobacco cessation if the survivor is a current smoker or user of smokeless tobacco. Clinicians should also advise survivors to practice sun safety habits as appropriate, such as using a broad-spectrum sunscreen, avoiding peak sun hours, and using physical barriers. Finally, survivors should be encouraged to see a primary care physician regularly and adhere to age-appropriate health screenings, preventive measures (eg, immunizations), and cancer screening recommendations.

The NCCN Panel made specific recommendations regarding physical activity, weight manage-

ment, nutrition, and supplement use, which are discussed herein. Although achieving all of these healthy lifestyle goals may be difficult for many survivors, even small reductions in weight among overweight or obese survivors or small increases in physical activity among sedentary individuals are thought to yield meaningful improvements in cancer-specific outcomes and overall health.⁷

Physical Activity

During cancer treatment, many survivors become deconditioned and can develop impaired cardiovascular fitness because of the direct and secondary effects of therapy.⁸ Randomized trials have shown that exercise training is safe, tolerable, and effective for most survivors. Structured aerobic and resistance training programs after treatment can improve car-

Text cont. on page 1232.

NCCN Survivorship Panel Members

*^{a,c}Crystal S. Denlinger, MD/Chair†
Fox Chase Cancer Center

*^{c,d}Jennifer A. Ligibel, MD/Vice Chair†
Dana-Farber/Brigham and Women's Cancer Center

^fMadhuri Are, MD‡
Fred & Pamela Buffett Cancer Center at
The Nebraska Medical Center

^{b,e}K. Scott Baker, MD, MSE‡
Fred Hutchinson Cancer Research Center/
Seattle Cancer Care Alliance

*^cWendy Demark-Wahnefried, PhD, RD‡
University of Alabama at Birmingham
Comprehensive Cancer Center

*^{b,d,g}Don Dizon, MD†
Massachusetts General Hospital Cancer Center

^{b,d}Debra L. Friedman, MD, MSE‡
Vanderbilt-Ingram Cancer Center

*^gMindy Goldman, MDΩ
UCSF Helen Diller Family Comprehensive Cancer Center

*^{c,d}Lee Jones, PhDΠ
Memorial Sloan Kettering Cancer Center

^bAllison King, MD€Ψ‡
Siteman Cancer Center at Barnes-Jewish Hospital and
Washington University School of Medicine

^eGrace H. Ku, MD‡
UC San Diego Moores Cancer Center

*^{b,h}Elizabeth Kvale, MD‡
University of Alabama at Birmingham
Comprehensive Cancer Center

^aTerry S. Langbaum, MAS‡
The Sidney Kimmel Comprehensive Cancer Center at
Johns Hopkins

^gKristin Leonardi-Warren, RN, ND#
University of Colorado Cancer Center

^bMary S. McCabe, RN, BS, MS#
Memorial Sloan Kettering Cancer Center

^{b,c,d,g}Michelle Melisko, MD†
UCSF Helen Diller Family Comprehensive Cancer Center

*^eJose G. Montoya, MDΦ
Stanford Cancer Institute

^{a,d}Kathi Mooney, RN, PhD#
Huntsman Cancer Institute at the University of Utah

^{c,e}Mary Ann Morgan, PhD, FNP-BC#
Moffitt Cancer Center

Javid J. Moslehi, MDλP
Vanderbilt-Ingram Cancer Center

^{d,h}Tracey O'Connor, MD†
Roswell Park Cancer Institute

^lLinda Overholser, MD, MPH‡
University of Colorado Cancer Center

^eElectra D. Paskett, PhD‡
The Ohio State University Comprehensive Cancer Center -
James Cancer Hospital and Solove Research Institute

Jeffrey Peppercorn, MD, MPH†
Duke Cancer Institute

^{f,h}Muhammad Raza, MD‡
St. Jude Children's Research Hospital/
The University of Tennessee Health Science Center

M. Alma Rodriguez, MD‡
The University of Texas MD Anderson Cancer Center

*^fKaren L. Syrjala, PhDθ
Fred Hutchinson Cancer Research Center/
Seattle Cancer Care Alliance

*^fSusan G. Urba, MD†‡
University of Michigan Comprehensive Cancer Center

^gMark T. Wakabayashi, MD, MPHΩ
City of Hope Comprehensive Cancer Center

*^hPhyllis Zee, MDΨΠ
Robert H. Lurie Comprehensive Cancer Center of
Northwestern University

NCCN Staff: Nicole R. McMillian, MS, and Deborah A. Freedman-Cass, PhD

KEY:

*Writing Committee Member

Subcommittees: ^aAnxiety and Depression; ^bCognitive Function; ^cExercise; ^dFatigue; ^eImmunizations and Infections; ^fPain; ^gSexual Function; ^hSleep Disorders

Specialties: ^ξBone Marrow Transplantation; ^λCardiology; ^εEpidemiology; ^ΠExercise/Physiology; ^ΩGynecology/
Gynecologic Oncology; [‡]Hematology/Hematology Oncology; ^ΦInfectious Diseases; [‡]Internal Medicine; [†]Medical Oncology; ^ΨNeurology/Neuro-Oncology; [#]Nursing; [;]≡Nutrition Science/
Dietician; [¥]Patient Advocacy; [€]Pediatric Oncology; ^θPsychiatry, Psychology, Including Health Behavior; [£]Supportive Care Including Palliative, Pain Management, Pastoral Care, and Oncology Social Work; [¶]Surgery/Surgical Oncology; ^ωUrology

GENERAL PRINCIPLES OF HEALTHY LIFESTYLES

- All survivors should be encouraged to achieve and maintain a healthy lifestyle with attention to weight management (SNWM-2*), physical activity (SPA-1), and healthy dietary habits (SNWM-1*).
- Healthy lifestyle habits have been associated with improved overall health and quality of life. For some cancers, a healthy lifestyle has been associated with a reduced risk of recurrence and death.
- For a healthy lifestyle, all survivors should be encouraged to:
 - ▶ Achieve and maintain a healthy body weight throughout life (SNWM-2*)
 - ◊ Pay attention to calories consumed versus calories expended via diet and exercise
 - ◊ Calculate and monitor body mass index (BMI) (SNWM-A*)
 - ▶ Engage in physical activity regularly (SPA-1)
 - ◊ Avoid inactivity and a sedentary lifestyle
 - ◊ Strive for at least 150 minutes of moderate or 75 minutes of vigorous activity per week, spread out over the course of the week.
 - ▶ Maintain a healthy diet high in fruits, vegetables, and whole grains (SNWM-1*)
 - ▶ Minimize alcohol intake
 - ◊ Limit intake to 1 drink per day for a woman and 2 drinks per day for a man
 - ▶ Avoid tobacco products
 - ◊ Attempt tobacco cessation if currently smoking or using smokeless tobacco
 - ▶ Practice sun safety
 - ◊ Use a sunscreen with an SPF of at least 30 that protects against UVA and UVB rays and is water resistant
 - ◊ Apply generously and reapply every 2 hours or after swimming/excessive sweating
 - ◊ Consider using physical barriers whenever possible (eg, hats, shirts with sleeves, avoidance of direct sun during peak hours)
 - ▶ Follow up with primary care physician regularly
 - ◊ Adhere to age-appropriate health screening, preventive measures (SIMIN-1*), and cancer screening recommendations (See NCCN Guidelines for Detection, Prevention, & Risk-Reduction†)
- Routine use of dietary supplements is not recommended for the purposes of cancer control (SSUP-1*)

*Available online, in these guidelines, at NCCN.org.

†See list of NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines), available online, at NCCN.org.

HL-1

GENERAL PRINCIPLES OF PHYSICAL ACTIVITY

- All survivors should be encouraged to avoid inactivity or a sedentary lifestyle and return to daily activities as soon as possible
- Patients who are able should be encouraged to engage in physical activity^a daily.
- Physical activity and exercise recommendations should be tailored to individual survivor's abilities and preferences
- General recommendations for cancer survivors^b:
 - ▶ Overall volume of weekly activity should be at least 150 minutes of moderate-intensity^c activity or 75 minutes of vigorous-intensity^c activity or equivalent combination
 - ▶ Individuals should engage in 2 to 3 sessions per week of strength training that includes major muscle groups
 - ▶ Major muscle groups should be stretched on the days exercises are performed

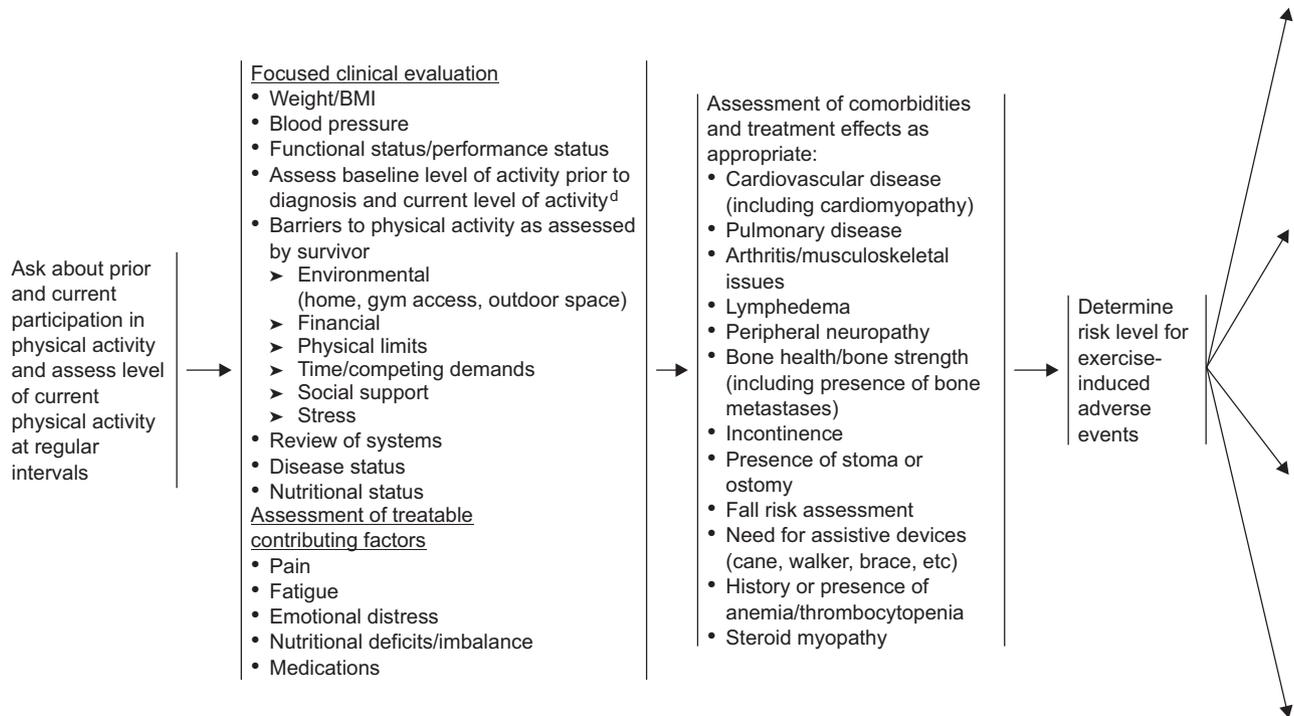
^aPhysical activity includes exercise, daily routine activities, and recreational activities.

^bRock CL, Doyle C, Demark-Wahnefried W, et al. Nutrition and physical activity guidelines for cancer survivors. CA Cancer J Clin 2012;62:242-274, and Schmitz KH, Courneya KS, Matthews C, et al. American College of Sports Medicine roundtable on exercise guidelines for cancer survivors. Med Sci Sports Exerc 2010;42:1409-1426.

^cLight exercise: no noticeable change in breathing pattern; moderate exercise: can talk, but not sing; vigorous exercise: can say a few words without stopping to catch a breath (see Examples of Exercise [SPA-B]).

SPA-1

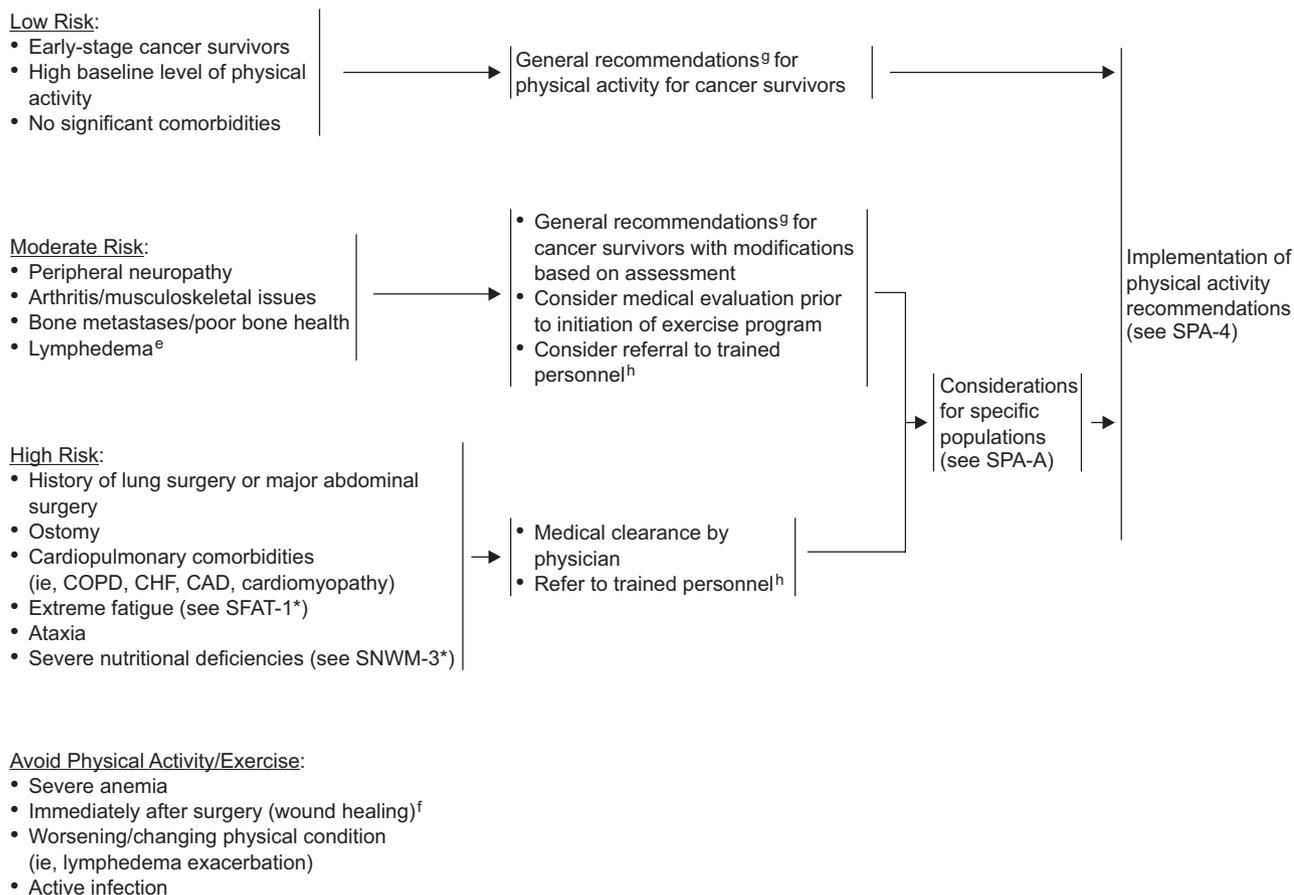
PHYSICAL ACTIVITY ASSESSMENT



^dAsk patient about duration, intensity, and frequency of activity. For example see Godin G, Shepard RJ. Godin Leisure-Time Exercise Questionnaire. Med Sci Sports Exerc 1997;29(Suppl):S36-38.

SPA-2

RISK ASSESSMENT FOR EXERCISE-INDUCED ADVERSE EVENTS



*Available online, in these guidelines, at NCCN.org.

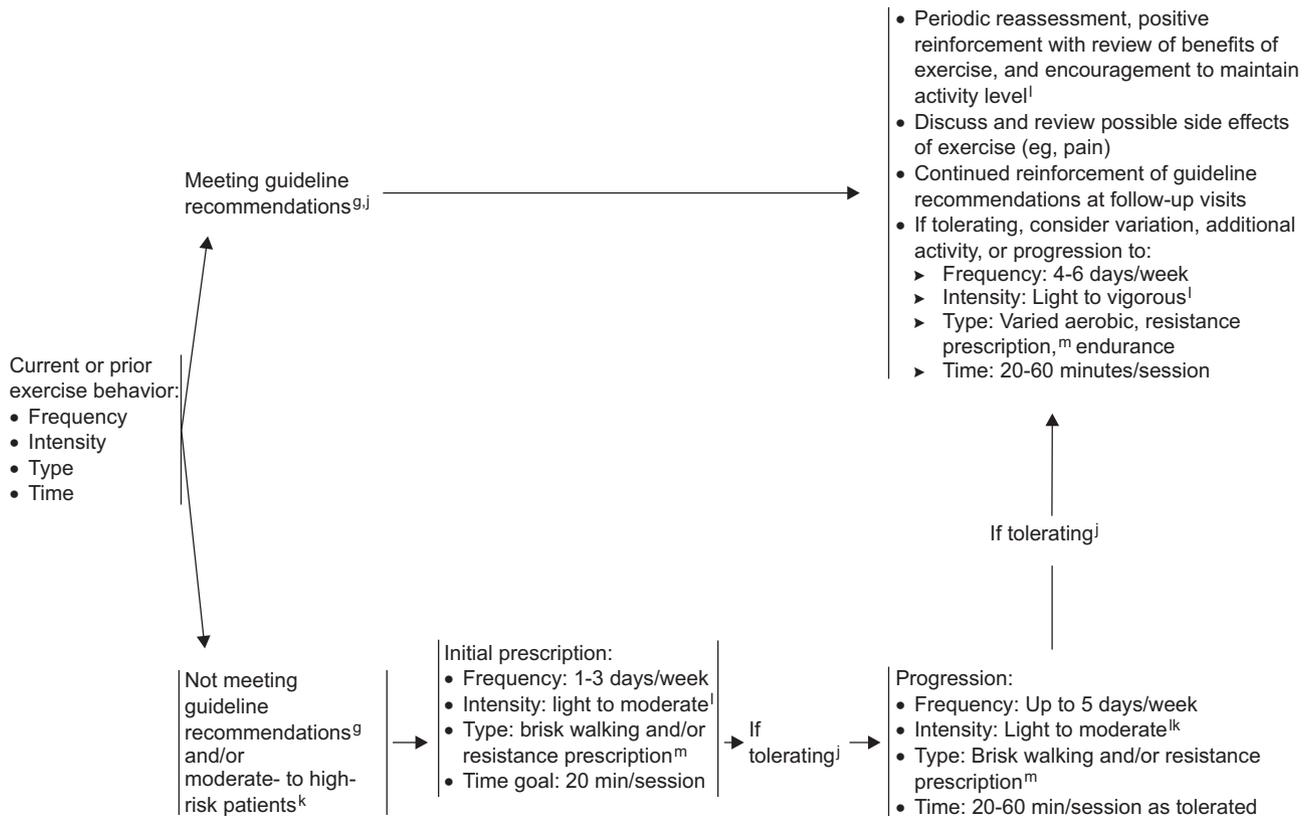
^ePatients with lymphedema are considered high-risk if performing resistance/strength training exercise of the affected limb. They are not considered high-risk if participating in cardiovascular/aerobic exercise or strength training of unaffected limbs. Patient education about the risk of lymphedema is recommended. Consider referral to lymphedema specialist for evaluation prior to starting physical activity program that involves strength or resistance training of the affected limb.

^fAvoid unsupervised physical activity for approximately 6 weeks. However, supervised physical activity with early mobilization and referral to a trained therapist is strongly encouraged.

^gSee General Principles of Physical Activity (SPA-1).

^hTrained personal can include physical therapists, certified trainers, cancer rehabilitation specialists, pulmonary or cardiac rehabilitation specialist, or exercise specialists. Specialized training in cancer exercise is available through the American College of Sports Medicine (ACSM) (<http://www.acsm.org/get-certified>). Patients should be encouraged to use an ACSM-certified trainer when available.

SPA-3

IMPLEMENTATION OF RECOMMENDATIONS^j

^gSee General Principles of Physical Activity (SPA-1).

^lReproduced and adapted as shown in Jones L, Eves ND, Pepperorn J. Pre-exercise screening and prescription guidelines for cancer patients. *Lancet Oncol* 2010;11:914-916 with permission from Metkus TS Jr, Baughman KL, Thompson PD, et al. Exercise prescription and primary prevention of cardiovascular disease. *Circulation* 2010;121:2601-2604.

^jIf tolerating minimum guideline recommendations, consider encouragement of variation within exercise program or physical activities.

^kModerate to high-risk patients may need additional evaluation before doing more rigorous activity.

^lSee Examples of Exercise, Strategies to Increase Physical Activity (SPA-B).

^mSee Guidance For Resistance Training Recommendations (SPA-C).

SPA-4

CONSIDERATIONS FOR SPECIFIC POPULATIONS¹

- Lymphedema:
 - ▶ Survivors with lymphedema should use compression garments when engaging in exercise
 - ▶ Work with trained exercise professional if considering weight training or resistance training
 - ▶ Undergo baseline and periodic evaluation for development or exacerbation of lymphedema
 - ▶ Initiate strength training exercise involving affected body part only if lymphedema stable:
 - ◊ No need for lymphedema therapy within past 3 months
 - ◊ No recent limb infections requiring antibiotics
 - ◊ No change in limb circumference >10%
 - ◊ No change in ability to perform activities of daily living
 - ▶ Resistance training/weight lifting: gradually increase resistance by smallest increment possible with monitoring
 - ▶ Stop exercise and refer to lymphedema specialist if exacerbation of lymphedema occurs
 - ▶ Continued full use of the extremity and range-of-motion exercises are encouraged to maintain strength and range of motion even in the presence of lymphedema
- Stem cell transplant:
 - ▶ Initiate physical activity as tolerated, with clearance by transplant provider
 - ▶ Survivors with indwelling catheters should avoid swimming until catheter is removed.
 - ▶ Avoid hot tubs for 1 year after transplant
 - ▶ Public gym use should not be discouraged because the benefits of exercise outweigh the risk of exposure
- Ostomy:
 - ▶ Empty ostomy bag before engaging in exercise
 - ▶ Weight lifting/resistance exercises should start with low resistance and progress slowly under the guidance of trained exercise professionals
 - ▶ Avoid contact sports and exercises that result in excessive intra-abdominal pressure
 - ▶ Infection precautions recommended
- Peripheral neuropathy:
 - ▶ Stability, balance, and gait should be assessed before engaging in exercise
 - ▶ Consider alternative aerobic exercise (stationary biking, water aerobics) rather than walking if neuropathy affects stability
 - ▶ Monitor discomfort in hands when using hand-held weights. Consider using dumbbells with soft/rubber coating, and/or wear padded gloves (eg, cycling gloves)
- Bone loss/bone metastases:
 - ▶ Survivors with osteoporosis or bone metastases should have fracture risk and/or bone density assessed before initiation of exercise program as clinically indicated

¹When possible, survivors in these populations should initiate exercise program under supervision by trained personnel. Trained personal can include physical therapists, certified trainers, cancer rehabilitation specialists, or exercise specialists. Specialized training in cancer exercise is available through the American College of Sports Medicine (ACSM) (<http://www.acsm.org/get-certified>). Patients should be encouraged to use an ACSM-certified trainer when available.

SPA-A

EXAMPLES OF PHYSICAL ACTIVITY

<u>Light Exercise¹</u> (No noticeable change in breathing pattern)	<u>Moderate Exercise²</u> (Can talk, but not sing)	<u>Vigorous Exercise²</u> (Can say a few words without stopping to catch a breath)
<ul style="list-style-type: none"> • Leisurely biking at 5 miles/hour or less • Activity-promoting video game • Light housework (light sweeping, dusting) • Bowling • Playing catch • Slow walking • Garage work • Child care • Yoga • Tai chi 	<ul style="list-style-type: none"> • Ballroom/line dancing • Biking on level ground or with few hills • General gardening • Baseball, softball, volleyball • Doubles tennis • Using a manual wheelchair • Using hand cyclers (ergometers) • Brisk walking • Water aerobics • Yoga 	<ul style="list-style-type: none"> • Aerobic/Fast dancing • Biking faster than 10 miles/hour • Heavy gardening • Hiking uphill • Jumping rope • Martial arts • Race walking, jogging, running • Running sports (basketball, hockey, soccer) • Swimming (fast pace or laps) • Singles tennis • Stair climbing • High-intensity yoga

STRATEGIES TO INCREASE PHYSICAL ACTIVITY

- Physician and/or fitness expert recommendation
- Supervised exercise program or classes
- Telephone counseling
- Motivational counseling
- Evaluate readiness to change, importance of change, self-efficacy
- Cancer survivor-specific print materials (see SURV-B 2 of 2*)
- Set short- and long-term goals

*Available online, in these guidelines, at NCCN.org.

¹From the National Heart, Lung, and Blood Institute (http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/phy_act.htm) and the Compendium of Physical Activities (<https://sites.google.com/site/compendiumofphysicalactivities>).

²Reproduced and adapted from U.S. Department of Health & Human Services. Be Active Your Way: A Fact Sheet for Adults. Washington, DC: U.S. Department of Health and Human Services. Available at: <http://www.health.gov/PAGuidelines/factSheetAdults.aspx>. Accessed February 22, 2013.

SPA-B

GUIDANCE FOR RESISTANCE TRAINING RECOMMENDATIONS

- Health benefits of resistance training include improvement in muscle strength and endurance, improvements in functional status, and maintenance/improvement in bone density
- Multijoint exercises are recommended over exercises focused on a single joint
- All major muscle groups (chest, shoulders, arms, back, abdomen, and legs) should be incorporated into a resistance training program
- Larger muscle groups (legs, back, and chest) should be worked before smaller muscle groups (arms and shoulders)
- Resistance training prescription
 - Frequency: 2-3 times/week
 - Intensity: 2-3 sets of 10-15 repetitions per set
 - Time: 20 min per session
 - Rest: 2-3 min rest period between sets and exercises
- For survivors who do not currently do resistance training: start with one set of each exercise and progress up to 2-3 sets as tolerated
- Use weight amount that would allow for performance of 10-15 repetitions
- Survivors at risk for or with lymphedema should use compression garments when engaging in resistance training

SPA-C

Text cont. from page 1223.

diovascular fitness and strength and can have positive effects on balance, body composition, and quality of life.⁹⁻¹⁷ The effectiveness of exercise training is especially well studied in women with early-stage breast cancer. Survivors of breast cancer who exercise have improved cardiovascular fitness and therefore an increased capacity to perform daily life functions, resulting in a better quality of life.¹⁶⁻²⁰

In addition, observational studies have consistently found that physical activity is linked to decreased cancer incidence and recurrence, and increased survival for certain tumor types.^{13,21-29} For example, one meta-analysis of 6 studies including more than 12,000 survivors of breast cancer found that postdiagnosis physical activity reduced all-cause mortality by 41% ($P < .00001$) and disease recurrence by 24% ($P = .00001$).²³ Data from other meta-analyses primarily consisting of observational studies of survivors of colorectal, ovarian, non-small cell lung, brain, prostate, and breast cancers show that physical activity is associated with both decreased all-cause mortality and/or cancer-specific mortality.^{21,24,28,30} In fact, analyses of data from 986 survivors of breast cancer from the National Runners' and Walkers' Health Studies found that mortality decreased with increased rates of energy expenditure.²⁹ Evidence in other disease sites is less robust, but also suggests survival benefits associated with exercise in survivors after treatment.³⁰

Data also support the idea that inactivity/sedentary behavior is a risk factor for cancer incidence and mortality, and impacts mood and quality of life in survivors, independent of the level of an individual's recreational or occupational physical activity.^{1,31,32} For example, in a cohort of more than 2000 survivors of nonmetastatic colorectal cancer, those who spent more leisure time sitting had a higher mortality than those who spent more time in recreational activity.¹

Evaluation and Assessment for Physical Activity:

Survivors should be asked about readiness for participation and their current level of physical activity at regular intervals. The Godin Leisure-Time Exercise Questionnaire is one tool that can be used to assess a survivor's exercise behavior, with a modified version also able to assess daily time in moderate-to-vigorous activity.^{33,34}

For survivors who are not meeting the guideline recommendations (see later discussion), barriers to physical activity should be discussed and addressed,

if possible. Common barriers include not having enough time to exercise, not having access to an acceptable exercise environment, uncertainty about safety of exercise posttreatment, lack of knowledge regarding appropriate activities, and physical limitations.³⁵ In addition, alleviation of pain, fatigue, distress, or nutritional deficits can facilitate the initiation of an exercise program.

Risk Assessment for Exercise-Induced Adverse Events:

Exercise is considered safe for most survivors.^{16,17,36} However, a significant portion of survivors may have comorbid conditions or risk factors that make them unable to safely exercise without trained supervision.³⁷ Therefore, a risk assessment is required for all survivors before prescribing a specific exercise program.^{16,38} The type of cancer, treatment modalities received, and the number and severity of comorbidities determine risk levels.³⁶ Thus, disease and treatment history, late and long-term effects, and comorbidities should be assessed. Exercise is typically contraindicated in survivors immediately (≈ 30 days) after surgery (except for supervised physical activity with early mobilization and referral to a trained therapist) and in those with severe anemia, a worsening condition, or active infection.^{16,38} A standardized preparticipation screening questionnaire, such as the The Physical Activity Readiness Questionnaire for Everyone (PAR-Q+),³⁹ can also be considered to identify patients for whom unsupervised physical activity is likely safe versus those for whom it may pose undue risk.

Survivors with myeloma, peripheral neuropathy, bone metastases, poor bone health, arthritis, or musculoskeletal issues are considered at moderate risk for exercise-induced adverse events. Stability, balance, and gait should be assessed in survivors with peripheral neuropathy before they engage in exercise, and exercise choice should be made based on the results (ie, stationary bike or water aerobics for survivors with poor balance). Survivors with osteoporosis, myeloma, or bone metastases should have fracture risk and/or bone density assessed as clinically indicated before initiating an exercise program. Moderate-risk survivors can often follow the general recommendations for physical activity; however, medical clearance and/or referrals to trained personnel, such as a physical therapist, certified trainer, cancer rehabilitation specialist, pulmonary or cardiac rehabilitation specialist, or exercise specialist, can also be consid-

ered. Specialized training in cancer exercise is available through the American College of Sports Medicine (ACSM; <http://www.acsm.org/get-certified>). Survivors should be encouraged to use an ACSM-certified trainer when available.

Survivors at high-risk for exercise-associated adverse events include those with a history of lung surgery or major abdominal surgery, an ostomy, cardiopulmonary comorbidities (eg, chronic obstructive pulmonary disease, chronic heart failure, coronary artery disease cardiomyopathy), ataxia, severe nutritional deficiencies, or extreme fatigue. These survivors should receive medical clearance and referral to trained personnel for a supervised exercise program.³⁶ In general, exercise should be individualized to the participant based on current exercise level and medical factors, and should be progressed in terms of intensity, duration, and frequency as tolerated.

Survivors with lymphedema are considered at moderate risk if they are performing resistance/strength-training exercise of the affected limb, but at low risk if they are participating in cardiovascular/aerobic exercise or strength training of unaffected limbs.⁴⁰⁻⁴⁵ Resistance training in survivors with or at risk for lymphedema is discussed in more detail in the section “Resistance and Strength Training,” opposite column.

Physical Activity Recommendations for Survivors:

Both the American Cancer Society and the ACSM have made physical activity recommendations for cancer survivors.^{15,16} The panel supports these recommendations and has adapted them as follows:

- All survivors should be encouraged to avoid inactivity or a sedentary lifestyle and return to daily activities as soon as possible.
- Survivors who are able should be encouraged to engage in daily physical activity, including exercise, routine activities, and recreational activities.
- Physical activity and exercise recommendations should be tailored to individual survivors’ abilities and preferences.
- General recommendations for cancer survivors:
 - Overall volume of weekly activity should be at least 150 minutes of moderate-intensity activity or 75 minutes of vigorous-intensity activity, or an equivalent combination
 - Individuals should engage in 2 to 3 sessions per week of strength training (see next sec-

tion on “Resistance and Strength Training”) that includes major muscle groups

- Major muscle groups should be stretched on the days exercises are performed.

The panel acknowledges that most survivors do not meet these exercise recommendations, and a significant portion report that they perform no leisure-time activity.^{46,47} However, the evidence suggests that even light-intensity physical activity can improve physical functioning in survivors.⁴⁸ For survivors who are inactive, clinicians must not advise the immediate initiation of a high-intensity, high-frequency program.⁴⁹ Instead, the panel suggests that clinicians provide sufficient information to encourage survivors to avoid inactivity.³⁸ The panel recommends starting inactive survivors with 1 to 3 light/moderate-intensity sessions of 20 minutes or more per week, with progression based on tolerance, as outlined in the guidelines.⁴⁹ For survivors tolerating the minimum guideline recommendations, clinicians should consider encouraging variation within the exercise program or increasing the amount of time engaged in physical activities/exercise modalities. Walking and using a stationary bike are safe for virtually all survivors.

Resistance and Strength Training: The health benefits of resistance training include improvement in muscle strength and endurance, improvements in functional status, and maintenance/improvement in bone density. Studies in survivors have shown improvements in lean body mass, muscular function, and upper body strength.⁵⁰⁻⁵³ A recent systematic review of 15 studies of resistance training interventions during and/or after cancer treatment concluded that meaningful improvements in physiologic and quality-of-life outcomes can be achieved.⁵¹ A similar review of 11 randomized controlled trials came to similar conclusions.⁵³

Multijoint exercises (eg, chest press, shoulder press, squats, lunges, pushups) are recommended over exercises focused on a single joint, and all major muscle groups (chest, shoulders, arms, back, abdomen, and legs) should be incorporated into a resistance training program. For survivors who do not currently engage in resistance training, clinicians should recommend that they start with 1 set of each exercise and progress up to 2 to 3 sets as tolerated. A weight that would allow the performance of 10 to 15 repetitions is recommended; however, individu-

alizing recommendations for resistance and strength training is important.

Strength training has been shown to be safe for survivors at risk for or with lymphedema, and may even improve lymphedema symptoms.^{40–44} Still, caution is advised in this population,⁴⁵ and referral to a lymphedema specialist for evaluation before starting a physical activity program that involves strength or resistance training of the affected limb should be considered. The panel lists special considerations for strength training in this population of survivors in the guidelines, including the use of compression garments, working with a professional trainer, slow progression as tolerated, and baseline and periodic evaluation of lymphedema. The National Lymphedema Network has published a position statement with additional guidance for exercise in individuals with lymphedema.⁵⁴

Interventions to Increase Physical Activity: Dozens of studies have looked at the efficacy of a variety of behavioral interventions for increasing exercise behavior in cancer survivors.¹⁶ However, data comparing different interventions are limited, and there is currently no “best” physical activity program for cancer survivors.^{55–58} Several studies have examined the physical activity and counseling preferences of survivors, with the goal of informing possible strategies to best encourage increased activity in this population.^{59–61}

The panel suggests several strategies to help increase physical activity. These strategies include a simple recommendation from a physician, physical therapist, and/or certified exercise physiologist.^{62–64} In addition, participation in supervised exercise programs or classes or use of a pedometer may be helpful for survivors.^{65–68} Print materials, telephone counseling, motivational counseling, and theory-based behavioral approaches (discussed in the next section) are other strategies that may be effective for increasing physical activity in the survivor population.^{66,68–72}

Health Behavioral Change

Lifestyle behaviors are one area cancer survivors can control if they are encouraged to change and are aware of resources to help them. Ambivalence about changing behavior is common in the general population, but among cancer survivors levels of motivation are often heightened, especially close to the time of diagnosis.^{10,62,73}

Some data suggest that recommendations from the oncologist can carry significant weight for patients with cancer, yet many providers do not discuss healthy lifestyle changes with survivors.^{62–64} Print materials and telephone counseling are other strategies that may be effective for improving healthy behavior in the survivor population, and several trials show support for these strategies.^{66,68,71,72} In fact, a recent trial showed that telephone-based health behavior coaching had a positive effect on physical activity, diet, and body mass index in survivors of colorectal cancer.⁷¹ Moreover, results of the recently completed Reach Out to Enhance Wellness (RENEW) trial showed that an intervention of telephone counseling and mailed materials in 641 older, obese, and overweight survivors of breast, prostate, and colorectal cancers not only resulted in improved diet quality, weight loss, and physical activity but also had a long-lasting effect that was sustained a year after the intervention was complete.

Another strategy, motivational counseling, may be an effective technique for increasing physical activity and other healthy behaviors in cancer survivors.^{69,70} Motivational counseling focuses on exploring the survivor’s thoughts, wants, and feelings and is directed at moving through ambivalence so survivors choose to change their behavior.⁷⁴ Other behavioral strategies may also be useful, such as improving self-efficacy (ie, the belief that one can perform the actions of new activity and maintain this practice by addressing barriers and planning for behavior change) and self-monitoring.^{75,76}

References

1. Campbell PT, Patel AV, Newton CC, et al. Associations of recreational physical activity and leisure time spent sitting with colorectal cancer survival. *J Clin Oncol* 2013;31:876–885.
2. Dignam JJ, Polite BN, Yothers G, et al. Body mass index and outcomes in patients who receive adjuvant chemotherapy for colon cancer. *J Natl Cancer Inst* 2006;98:1647–1654.
3. Inoue-Choi M, Lazovich D, Prizment AE, Robien K. Adherence to the World Cancer Research Fund/American Institute for Cancer Research recommendations for cancer prevention is associated with better health-related quality of life among elderly female cancer survivors. *J Clin Oncol* 2013;31:1758–1766.
4. Lee IM, Wolin KY, Freeman SE, et al. Physical activity and survival after cancer diagnosis in men. *J Phys Act Health* 2014;11:85–90.
5. Sinicrope FA, Foster NR, Yoon HH, et al. Association of obesity with DNA mismatch repair status and clinical outcome in patients with stage II or III colon carcinoma participating in NCCTG and NSABP adjuvant chemotherapy trials. *J Clin Oncol* 2012;30:406–412.
6. Wyszynski A, Tanyos SA, Rees JR, et al. Body mass and smoking are modifiable risk factors for recurrent bladder cancer. *Cancer* 2014;120:408–414.

Survivorship: Healthy Lifestyles, Version 2.2014

7. Hudis CA, Jones L. Promoting exercise after a cancer diagnosis: easier said than done. *Br J Cancer* 2014;110:829–830.
8. Lakoski SG, Eves ND, Douglas PS, Jones LW. Exercise rehabilitation in patients with cancer. *Nat Rev Clin Oncol* 2012;9:288–296.
9. Brown JC, Huedo-Medina TB, Pescatello LS, et al. Efficacy of exercise interventions in modulating cancer-related fatigue among adult cancer survivors: a meta-analysis. *Cancer Epidemiol Biomarkers Prev* 2011;20:123–133.
10. Demark-Wahnefried W, Jones LW. Promoting a healthy lifestyle among cancer survivors. *Hematol Oncol Clin North Am* 2008;22:319–342.
11. Ferrer RA, Huedo-Medina TB, Johnson BT, et al. Exercise interventions for cancer survivors: a meta-analysis of quality of life outcomes. *Ann Behav Med* 2011;41:32–47.
12. Fong DY, Ho JW, Hui BP, et al. Physical activity for cancer survivors: meta-analysis of randomised controlled trials. *BMJ* 2012;344:e70.
13. Jones LW, Alfano CM. Exercise-oncology research: past, present, and future. *Acta Oncol* 2013;52:195–215.
14. Mishra SI, Scherer RW, Geigle PM, et al. Exercise interventions on health-related quality of life for cancer survivors. *Cochrane Database Syst Rev* 2012;8:CD007566.
15. Rock CL, Doyle C, Demark-Wahnefried W, et al. Nutrition and physical activity guidelines for cancer survivors. *CA Cancer J Clin* 2012;62:242–274.
16. Schmitz KH, Courneya KS, Matthews C, et al. American College of Sports Medicine roundtable on exercise guidelines for cancer survivors. *Med Sci Sports Exerc* 2010;42:1409–1426.
17. Speck RM, Courneya KS, Masse LC, et al. An update of controlled physical activity trials in cancer survivors: a systematic review and meta-analysis. *J Cancer Surviv* 2010;4:87–100.
18. Courneya KS, Mackey JR, Bell GJ, et al. Randomized controlled trial of exercise training in postmenopausal breast cancer survivors: cardiopulmonary and quality of life outcomes. *J Clin Oncol* 2003;21:1660–1668.
19. Markes M, Brockow T, Resch KL. Exercise for women receiving adjuvant therapy for breast cancer. *Cochrane Database Syst Rev* 2006:CD005001.
20. McNeely ML, Campbell KL, Rowe BH, et al. Effects of exercise on breast cancer patients and survivors: a systematic review and meta-analysis. *CMAJ* 2006;175:34–41.
21. Betof AS, Dewhirst MW, Jones LW. Effects and potential mechanisms of exercise training on cancer progression: a translational perspective. *Brain Behav Immun* 2013;30:S75–87.
22. Courneya KS, Sellar CM, Stevinson C, et al. Randomized controlled trial of the effects of aerobic exercise on physical functioning and quality of life in lymphoma patients. *J Clin Oncol* 2009;27:4605–4612.
23. Ibrahim EM, Al-Homaidh A. Physical activity and survival after breast cancer diagnosis: meta-analysis of published studies. *Med Oncol* 2011;28:753–765.
24. Kenfield SA, Stampfer MJ, Giovannucci E, Chan JM. Physical activity and survival after prostate cancer diagnosis in the Health Professionals Follow-Up Study. *J Clin Oncol* 2011;29:726–732.
25. Ligibel J. Lifestyle factors in cancer survivorship. *J Clin Oncol* 2012;30:3697–3704.
26. Meyerhardt JA, Heseltine D, Niedzwiecki D, et al. Impact of physical activity on cancer recurrence and survival in patients with stage III colon cancer: findings from CALGB 89803. *J Clin Oncol* 2006;24:3535–3541.
27. Meyerhardt JA, Ma J, Courneya KS. Energetics in colorectal and prostate cancer. *J Clin Oncol* 2010;28:4066–4073.
28. Schmid D, Leitzmann MF. Association between physical activity and mortality among breast cancer and colorectal cancer survivors: a systematic review and meta-analysis. *Ann Oncol* 2014;25:1293–1311.
29. Williams PT. Significantly greater reduction in breast cancer mortality from post-diagnosis running than walking. *Int J Cancer* 2014;135:1195–1202.
30. Ballard-Barbash R, Friedenreich CM, Courneya KS, et al. Physical activity, biomarkers, and disease outcomes in cancer survivors: a systematic review. *J Natl Cancer Inst* 2012;104:815–840.
31. Ariza-García A, Galiano-Castillo N, Cantarero-Villanueva I, et al. Influence of physical inactivity in psychophysiological state of breast cancer survivors. *Eur J Cancer Care (Engl)* 2013;22:738–745.
32. George SM, Alfano CM, Groves J, et al. Objectively measured sedentary time is related to quality of life among cancer survivors. *PLoS One* 2014;9:e87937.
33. DuBose KD, Robinson TS, Rowe DA, Mahar MT. Validation of a modified version of the Godin-Shephard Leisure-Time Exercise Questionnaire [abstract]. *Med Sci Sport Exercise* 2006;38:Abstract 2883.
34. Godin G, Shephard RJ. Godin Leisure-Time Exercise Questionnaire. *Med Sci Sports Exerc* 1997;29(Suppl):S36–38.
35. Blaney JM, Lowe-Strong A, Rankin-Watt J, et al. Cancer survivors' exercise barriers, facilitators and preferences in the context of fatigue, quality of life and physical activity participation: a questionnaire-survey. *Psychooncology* 2013;22:186–194.
36. Jones LW. Evidence-based risk assessment and recommendations for physical activity clearance: cancer. *Appl Physiol Nutr Metab* 2011;36(Suppl 1):S101–112.
37. Brown JC, Schmitz KH. The prescription or proscription of exercise in colorectal cancer care. *Med Sci Sports*, in press.
38. Wolin KY, Schwartz AL, Matthews CE, et al. Implementing the exercise guidelines for cancer survivors. *J Support Oncol* 2012;10:171–177.
39. Bredin SS, Gledhill N, Jamnik VK, Warburton DE. PAR-Q+ and ePARmed-X+: new risk stratification and physical activity clearance strategy for physicians and patients alike. *Can Fam Physician* 2013;59:273–277.
40. Brown JC, John GM, Segal S, et al. Physical activity and lower limb lymphedema among uterine cancer survivors. *Med Sci Sports Exerc* 2013;45:2091–2097.
41. Courneya KS, Segal RJ, Mackey JR, et al. Effects of aerobic and resistance exercise in breast cancer patients receiving adjuvant chemotherapy: a multicenter randomized controlled trial. *J Clin Oncol* 2007;25:4396–4404.
42. Hayes SC, Speck RM, Reimet E, et al. Does the effect of weight lifting on lymphedema following breast cancer differ by diagnostic method: results from a randomized controlled trial. *Breast Cancer Res Treat* 2011;130:227–234.
43. Schmitz KH, Ahmed RL, Troxel A, et al. Weight lifting in women with breast-cancer-related lymphedema. *N Engl J Med* 2009;361:664–673.
44. Schmitz KH, Ahmed RL, Troxel AB, et al. Weight lifting for women at risk for breast cancer-related lymphedema: a randomized trial. *JAMA* 2010;304:2699–2705.
45. Brown JC, Troxel AB, Schmitz KH. Safety of weightlifting among women with or at risk for breast cancer-related lymphedema: musculoskeletal injuries and health care use in a weightlifting rehabilitation trial. *Oncologist* 2012;17:1120–1128.
46. Blanchard CM, Courneya KS, Stein K. Cancer survivors' adherence to lifestyle behavior recommendations and associations with health-related quality of life: results from the American Cancer Society's SCS-II. *J Clin Oncol* 2008;26:2198–2204.
47. Underwood JM, Townsend JS, Stewart SL, et al. Surveillance of demographic characteristics and health behaviors among adult cancer survivors—Behavioral Risk Factor Surveillance System, United States, 2009. *MMWR Surveill Summ* 2012;61:1–23.
48. Blair CK, Morey MC, Desmond RA, et al. Light-intensity activity attenuates functional decline in older cancer survivors. *Med Sci Sports Exerc* 2014;46:1375–1383.
49. Jones LW, Eves ND, Peppercorn J. Pre-exercise screening and prescription guidelines for cancer patients. *Lancet Oncol* 2010;11:914–916.
50. Battaglini CL, Mills RC, Phillips BL, et al. Twenty-five years of research on the effects of exercise training in breast cancer survivors: a systematic review of the literature. *World J Clin Oncol* 2014;5:177–190.
51. Focht BC, Clinton SK, Devor ST, et al. Resistance exercise interventions during and following cancer treatment: a systematic review. *J Support Oncol* 2013;11:45–60.
52. Lonbro S. The effect of progressive resistance training on lean body mass in post-treatment cancer patients: a systematic review. *Radiother Oncol* 2014;110:71–80.
53. Strasser B, Steindorf K, Wiskemann J, Ulrich CM. Impact of resistance training in cancer survivors: a meta-analysis. *Med Sci Sports Exerc* 2013;45:2080–2090.
54. National Lymphedema Network. Position Statement of the National Lymphedema Network. Available at: <http://www.lymphnet.org/pdfDocs/nlnexercise.pdf>. Accessed February 7, 2013.

Survivorship: Healthy Lifestyles, Version 2.2014

55. Bourke L, Homer KE, Thaha MA, et al. Interventions for promoting habitual exercise in people living with and beyond cancer. *Cochrane Database Syst Rev* 2013;9:CD010192.
56. Bourke L, Homer KE, Thaha MA, et al. Interventions to improve exercise behaviour in sedentary people living with and beyond cancer: a systematic review. *Br J Cancer* 2014;110:831–841.
57. Pinto BM, Ciccolo JT. Physical activity motivation and cancer survivorship. *Recent Results Cancer Res* 2011;186:367–387.
58. White SM, McAuley E, Estabrooks PA, Courneya KS. Translating physical activity interventions for breast cancer survivors into practice: an evaluation of randomized controlled trials. *Ann Behav Med* 2009;37:10–19.
59. Belanger LJ, Plotnikoff RC, Clark A, Courneya KS. A survey of physical activity programming and counseling preferences in young-adult cancer survivors. *Cancer Nurs* 2012;35:48–54.
60. Jones LW, Courneya KS. Exercise counseling and programming preferences of cancer survivors. *Cancer Pract* 2002;10:208–215.
61. Stevinson C, Capstick V, Schepansky A, et al. Physical activity preferences of ovarian cancer survivors. *Psychooncology* 2009;18:422–428.
62. Demark-Wahnefried W, Aziz NM, Rowland JH, Pinto BM. Riding the crest of the teachable moment: promoting long-term health after the diagnosis of cancer. *J Clin Oncol* 2005;23:5814–5830.
63. Jones LW, Courneya KS, Fairey AS, Mackey JR. Effects of an oncologist's recommendation to exercise on self-reported exercise behavior in newly diagnosed breast cancer survivors: a single-blind, randomized controlled trial. *Ann Behav Med* 2004;28:105–113.
64. Sabatino SA, Coates RJ, Uhler RJ, et al. Provider counseling about health behaviors among cancer survivors in the United States. *J Clin Oncol* 2007;25:2100–2106.
65. Demark-Wahnefried W, Clipp EC, Lipkus IM, et al. Main outcomes of the FRESH START trial: a sequentially tailored, diet and exercise mailed print intervention among breast and prostate cancer survivors. *J Clin Oncol* 2007;25:2709–2718.
66. Demark-Wahnefried W, Morey MC, Sloane R, et al. Reach out to enhance wellness home-based diet-exercise intervention promotes reproducible and sustainable long-term improvements in health behaviors, body weight, and physical functioning in older, overweight/obese cancer survivors. *J Clin Oncol* 2012;30:2354–2361.
67. Rajotte EJ, Yi JC, Baker KS, et al. Community-based exercise program effectiveness and safety for cancer survivors. *J Cancer Surviv* 2012;6:219–228.
68. Vallance JKH, Courneya KS, Plotnikoff RC, et al. Randomized controlled trial of the effects of print materials and step pedometers on physical activity and quality of life in breast cancer survivors. *J Clin Oncol* 2007;25:2352–2359.
69. Bennett JA, Lyons KS, Winters-Stone K, et al. Motivational interviewing to increase physical activity in long-term cancer survivors: a randomized controlled trial. *Nurs Res* 2007;56:18–27.
70. Britt E, Hudson SM, Blampied NM. Motivational interviewing in health settings: a review. *Patient Educ Couns* 2004;53:147–155.
71. Hawkes AL, Chambers SK, Pakenham KI, et al. Effects of a telephone-delivered multiple health behavior change intervention (CanChange) on health and behavioral outcomes in survivors of colorectal cancer: a randomized controlled trial. *J Clin Oncol* 2013;31:2313–2321.
72. Pinto BM, Frierson GM, Rabin C, et al. Home-based physical activity intervention for breast cancer patients. *J Clin Oncol* 2005;23:3577–3587.
73. Satia JA, Campbell MK, Galanko JA, et al. Longitudinal changes in lifestyle behaviors and health status in colon cancer survivors. *Cancer Epidemiol Biomarkers Prev* 2004;13:1022–1031.
74. Burke BL, Arkowitz H, Menchola M. The efficacy of motivational interviewing: a meta-analysis of controlled clinical trials. *J Consult Clin Psychol* 2003;71:843–861.
75. Bandura A. Health promotion by social cognitive means. *Health Educ Behav* 2004;31:143–164.
76. Short CE, James EL, Plotnikoff RC. How Social Cognitive Theory can help oncology-based health professionals promote physical activity among breast cancer survivors. *Eur J Oncol Nurs* 2012;17:482–489.

Survivorship: Healthy Lifestyles, Version 2.2014

Individual Disclosures for the NCCN Survivorship Panel					
Panel Member	Clinical Research Support/Data Safety Monitoring Board	Advisory Boards, Speakers Bureau, Expert Witness, or Consultant	Patent, Equity, or Royalty	Other	Date Completed
Madhuri Are, MD	None	None	None	None	5/15/13
K. Scott Baker, MD, MS	None	None	None	None	11/22/13
Wendy Demark-Wahnefried, PhD, RD	National Cancer Institute; American Cancer Society; Harvest for Health Gardening Project for Breast Cancer Survivors; and Nutrigenomic Link between Alpha-Linolenic Acid and Aggressive Prostate Cancer	American Society of Clinical Oncology	None	American Society of Preventive Oncology	7/13/14
Crystal S. Denlinger, MD	Bayer HealthCare; ImClone Systems Incorporated; MedImmune Inc.; OncoMed Pharmaceuticals; Astex Pharmaceuticals; Merrimack Pharmaceuticals; and Pfizer Inc.	Eli Lilly and Company	None	None	1/9/14
Don Dizon, MD	None	None	None	American Journal of Clinical Oncology; ASCO; UpToDate	4/4/14
Debra L. Friedman, MD, MS	None	None	None	None	7/31/14
Mindy Goldman, MD	None	None	None	Lumetra	8/23/14
Lee W. Jones, PhD	None	None	Exercise by Science, Inc.	None	8/21/14
Allison King, MD	None	None	None	None	8/12/13
Grace H. Ku, MD	None	Seattle Genetics, Inc.	None	None	5/6/14
Elizabeth Kvale, MD	None	None	None	None	10/7/13
Terry S. Langbaum, MAS	None	None	None	None	8/22/14
Kristin Leonardi-Warren, RN, ND	None	None	None	None	1/6/14
Jennifer A. Ligibel, MD	None	None	None	None	10/3/13
Mary S. McCabe, RN, BS, MS	None	National Cancer Institute	None	None	5/6/14
Michelle Melisko, MD	Genentech, Inc.; Celldex Therapeutics; and Galena Biopharma	Agendia BV	None	None	8/19/14
Jose G. Montoya, MD	None	None	None	None	12/6/13
Kathi Mooney, RN, PhD	University of Utah	None	None	None	7/15/14
Mary Ann Morgan, PhD, FNP-BC	None	None	None	None	5/5/14
Javid J. Mosehi, MD	None	ARIAD Pharmaceuticals, Inc.; Millennium Pharmaceuticals, Inc.; Novartis Pharmaceuticals Corporation; and Pfizer Inc.	None	None	1/27/14
Tracey O'Connor, MD	None	None	None	None	6/13/13
Linda Overholser, MD, MPH	None	Antigenics Inc.; and Colorado Central Cancer Registry Care Plan Project	None	None	10/10/13
Electra D. Paskett, PhD	Merck & Co., Inc.	None	Pfizer Inc.	None	5/7/14
Jeffrey Peppercorn, MD, MPH					Pending
Muhammad Raza, MD	None	None	None	None	8/23/12
M. Alma Rodriguez, MD	Amgen Inc.; and Ortho Biotech Products, L.P.	None	None	None	8/5/14
Karen L. Syrjala, PhD	None	None	None	None	5/1/14
Susan G. Urba, MD	None	Eisai Inc.	None	None	8/21/14
Mark T. Wakabayashi, MD, MPH	None	None	None	None	6/19/13
Phyllis Zee, MD	Philips/Respironics	Merck & Co., Inc.; Jazz Pharmaceuticals; Vanda Pharmaceuticals; and Purdue Pharma LP	None	None	3/26/14

The NCCN Guidelines Staff have no conflicts to disclose.