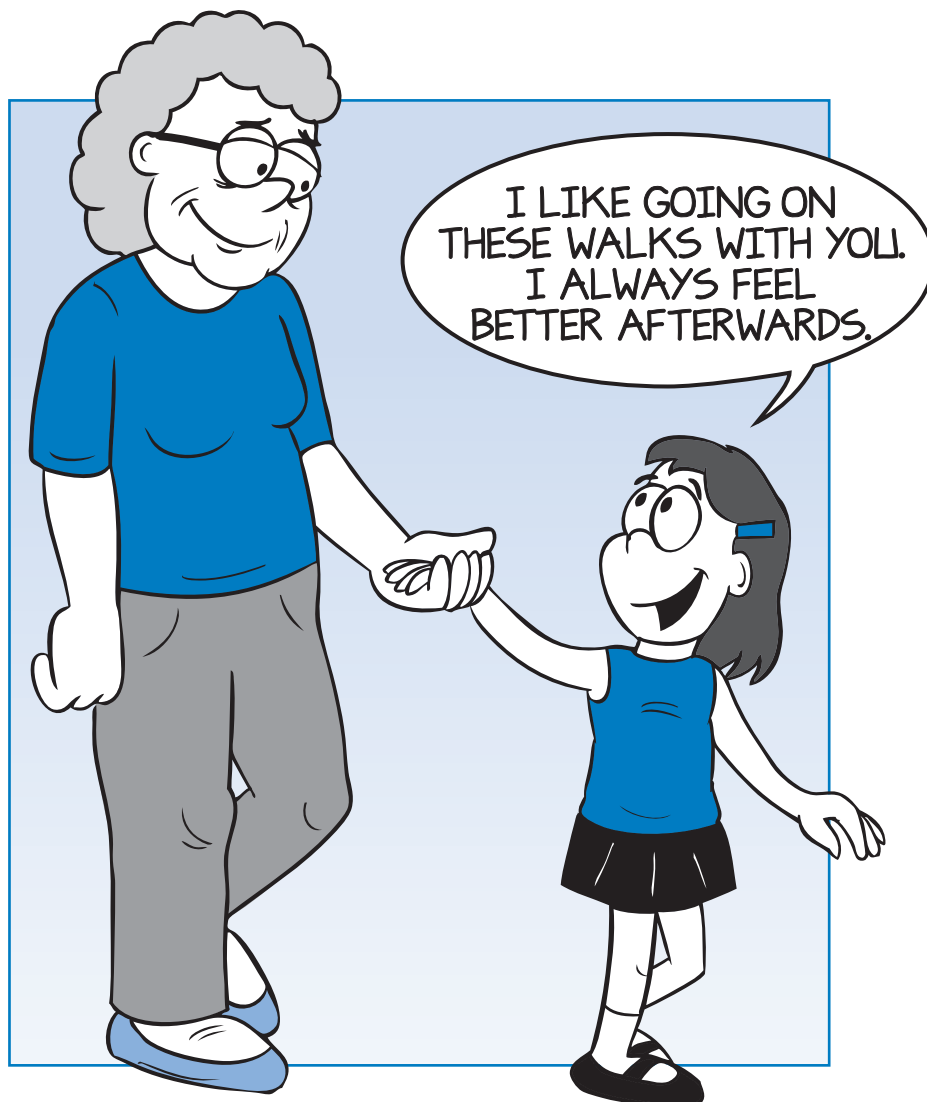


CHAPTER

8

# Promoting Physical Activity Behavior Change: Population Considerations

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In the preceding chapters, you have learned about behavior change from theory to practice, including how to use the many valuable tools and strategies for the successful promotion of physical activity interventions. In this chapter, we discuss the evidence for intervening within targeted groups—children, the elderly, and within chronic disease populations—and provide the tools and resources to tailor the intervention to those you are working with.

## CONCEPT OVERVIEW

Physical activity (PA) has been well documented as an important contributor to overall health and well-being (20,39). However, the latest numbers in the United States suggest that only 48.8% of the population is currently meeting physical activity recommendations of at least 150 minutes of moderate- to vigorous-intensity activity distributed over 3 to 5 days per week (1,7). Moderate-intensity activity is defined as activity producing small increases in breathing and heart rate, and these recommendations of at least 150 minutes of moderate-intensity activity per week are associated with improved overall health outcomes (43). With over one third of the population reporting insufficient levels of activity (37.7%), and 13.5% of the population remaining completely inactive, a total of 51.2% of people in the U.S. are not participating in enough activity to receive the associated health benefits (7). This issue of inactivity becomes even more important when we consider populations that have potentially “more to gain” from being active—or “more to lose” from an inactive lifestyle. Such populations include, but are not limited to, children, the elderly, and those with various medical conditions.

The specific population is essentially the first level of “tailoring” for effective intervening, allowing for the values, traditions, and cultural and demographic norms to be reflected in PA promotion (48). Effective PA promotion at the population level further necessitates tailoring of more specific variables, including the needs of the particular group or individual within the given population, the training of the given fitness instructor or coach, and the content of the PA intervention, including the psychosocial and behavioral components. Consideration of the population is particularly important since varying populations experience different perceptions of, and barriers to, PA (48,26). Given that PA adoption and adherence are so poor in the general population and may be even more pronounced in specific populations, the tailoring of the PA prescription within the intervention needs to specifically examine determinants of, and barriers to, PA, including physiological, psychosocial, and environmental factors (19). Current research strongly advocates for the translation of evidence on the benefits of PA into optimal models of behavior change in which determinants of PA, including exercise preferences and barriers, are incorporated into interventions (11). See also From the Practical Toolbox 8.1.

As a professional in the exercise and fitness industry, it is important to recognize the principles of PA promotion and behavior change and how to apply these principles to different populations and individuals (see Chapters 1 to 5). In each section, we will provide population-specific tips to help improve activity adoption and maintenance.

These suggested techniques can help you promote improved client confidence and self-efficacy (the belief that your client can accomplish the exercise goals he or she has set), and improve the likelihood that your client will adhere to and maintain the exercise recommendations that you provide. As discussed in Chapter 3, we will consider personal factors, behavioral factors, environmental factors, and program-related factors.

The following sections consider the rationale and evidence for intervening with the following populations:

1. Children and youth
2. The elderly
3. Chronic medical conditions, including a spotlight on PA interventions for cancer survivors

## CHILDREN AND YOUTH

### The Evidence

In children, recent numbers indicate very high levels of inactivity, despite the recommended 60 minutes or more of PA each day (see Table 8.1 for recommendations) (7). The U.S. Youth Risk Behavior Surveillance conducted in 2009 showed that among high school students (grade 9–12), only 17.3%–19.5% reported participating in PA for at least 60 minutes 7 days a week, and only 35.2%–38.8% reported participating in PA for at least 60 minutes 5 days a week (6). Between 21.5%–24.8% of high school students reported not participating in at least 60 minutes of PA on any day of the week (6).

PA participation among children and youth has been linked to health benefits associated with development, mental abilities, school behavior, and academic achievement (42). Concern with childhood inactivity is on the rise, and the prevalence of overweight children is increasing rapidly (7,12,40). This associated increase in overweight and other chronic conditions including obesity, heart disease, and musculoskeletal conditions, is now reported at younger ages and is linked to diminished quality of life, premature illness and death, and increased health care costs as these children age (12,32). Since PA levels in children are a strong predictor of PA levels into adulthood, developing successful interventions for children is a necessity to improve health outcomes as well as increase lifelong PA participation (41).

### Recommendations

Children between the ages of 6 and 17 should be getting at least 60 minutes of physical activity each day (7). See Table 8.1.

### Step-by-Step

See Table 8.2 for step-by-step instructions on implementing PA interventions for children and youth, and Table 8.3 for a summary of successful interventions in this population.



## From the Practical Toolbox 8.1

### EXPLORE EXERCISE PREFERENCES

One of the most important predictors of long-term PA adherence is whether or not the exercise program is specifically designed to meet the client's goals, personal preferences, and lifestyle and environmental factors. It is important to first evaluate your client's lifestyle, and exercise preferences before creating a PA program. It is also important to evaluate current barriers to exercises and personal characteristics that will motivate the client to adopt an active lifestyle.

#### The Healthy Physical Activity Participation Questionnaire

This questionnaire evaluates frequency, intensity, and perceived fitness and gives a total "health benefit" score.

<http://www.getactivepenticton.com/gap/assets/thehealthyphysicalactivityparticipationquestionnaire.pdf>

#### The Fantastic Lifestyle Checklist

This is a simple checklist which provides clients with a "health benefit" rating based on various lifestyle habits.

[http://hk.humankinetics.com/AdvancedFitnessAssessmentandExercisePrescription/IG/App\\_A5.pdf](http://hk.humankinetics.com/AdvancedFitnessAssessmentandExercisePrescription/IG/App_A5.pdf)

**TABLE 8.1 PA Recommendations for Children and Youth (1,7,43)**

Activity Type	Recommended Weekly Frequency, Intensity, and Time	Examples
Aerobic	Moderate Intensity Activity should make up the majority of the recommended minimum 60 minutes per day.	<ul style="list-style-type: none"> <li>Activities like brisk walking, cycling, hiking, rollerblading, skateboarding.</li> <li>Games like baseball and golf</li> </ul>
	Vigorous Intensity Activity: Include at least 3 days per week.	<ul style="list-style-type: none"> <li>Activities that include running, cycling, jumping, dancing, skiing</li> <li>Games like hockey, basketball, swimming, soccer</li> </ul>
Strength Training	At least 3 days per week as a part of the minimum 60 minutes per day.	<ul style="list-style-type: none"> <li>Activities that include pulling or pushing, supporting bodyweight</li> <li>Games like tree climbing, swinging on playground equipment, or playing tug-of-war</li> <li>Resistance exercises using body weight or resistance bands may be performed</li> </ul>
Bone Strengthening	At least 3 days per week as a part of the minimum 60 minutes per day.	<ul style="list-style-type: none"> <li>Activities that include hopping, skipping, and jumping</li> <li>Games like jump rope, and hopscotch</li> <li>Running</li> </ul>

Source: *Physical Activity Guidelines for Americans*, U.S. Department of Health and Human Services, 2008; *Physical Activity for Everyone*, CDC, 2011; American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.

**TABLE 8.2 Implementing PA Programs for Children and Youth (1)**

Steps	Recommendation	Considerations	Tools
1. Screen for safety.	<ul style="list-style-type: none"> <li>Assess for safety and whether clearance is needed from physician (<i>i.e.</i>, if current signs of illness, injury, or advanced deconditioning).</li> </ul>	<ul style="list-style-type: none"> <li>Make sure to discuss participation in activities that are fun for the individual and group.</li> </ul>	
2. Explore and educate: Discuss motivations and goals, health beliefs, and preferences.	<ul style="list-style-type: none"> <li>Discuss health beliefs and provide education on the importance of PA.</li> </ul>	<ul style="list-style-type: none"> <li>PA participation must be meaningful to children.</li> </ul>	<ul style="list-style-type: none"> <li>Decisional balance sheets (see Ch. 3)</li> <li>Stages of Change (see Ch. 4)</li> <li>Goal setting worksheet and exercise contract (see Ch. 3)</li> <li>Physical Activity Calendar (see From the Practical Toolbox 8.2)</li> </ul>
3. Test.	<ul style="list-style-type: none"> <li>Utilize tests with established normative data.</li> </ul>	<ul style="list-style-type: none"> <li>Generally, standard adult testing applies to children, however response to testing will differ.</li> <li>Children may also require additional support and guidance during testing.</li> </ul>	<ul style="list-style-type: none"> <li>See From the Practical Toolbox 8.3 and ACSM's Guidelines for Exercise Testing and Prescription.</li> </ul>
4. Prescribe exercise and implement the plan.	<ul style="list-style-type: none"> <li>Implement PA intervention and use appropriate tools for adherence.</li> <li>Provide continuous feedback and encouragement</li> </ul>	<ul style="list-style-type: none"> <li>Promote activities that are fun, interactive and encourage longitudinal participation in PA.</li> <li>Make efforts to decrease sedentary activities.</li> <li>Children and youth should exercise in thermoneutral environments and be properly hydrated.</li> <li>Activity should be promoted as something positive, and not used for punishment.</li> </ul>	<ul style="list-style-type: none"> <li>PA Journals (see From the Practical Toolbox 8.4)</li> <li>For older children, online PA logs may be appropriate. (See From the Practical Toolbox 8.4.)</li> </ul>
5. Actively evaluate and progress.	<ul style="list-style-type: none"> <li>Follow up with individual or group.</li> <li>Assess for enjoyment.</li> <li>Progress.</li> </ul>	<ul style="list-style-type: none"> <li>Children who are overweight or new to activity will need to progress at a slower rate than active children.</li> <li>Many children &amp; youth sports have built in progression.</li> </ul>	

Source: American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.

**TABLE 8.3 Successful Interventions and Strategies: PA Interventions for Children and Youth**

Intervention	Methods	Outcomes	Practical Strategies
The VERB Campaign, 2002–2004—A marketing campaign addressed to children ages 9 to 13 years living in the U.S. (22)	<ul style="list-style-type: none"> <li>Developed the VERB brand to market PA as cool, fun, and a chance to have a good time with friends.</li> <li>Advertised on television, the radio, in print, and through promotion on the Internet, in schools and greater community.</li> </ul>	<ul style="list-style-type: none"> <li>Measurements after 2 years indicated a dose response with regard to the number of VERB messages viewed and PA behaviors and associated positive attitude.</li> <li>After 2 years, 81% of U.S. children reported seeing the VERB campaign and were engaging in at least one session of PA per week.</li> </ul>	<ul style="list-style-type: none"> <li>Market PA as cool, fun, and a chance to have a good time with friends.</li> <li>If possible, implement marketing strategies over popular media or at schools and in the greater community.</li> <li>Create a “brand” for PA that children will recognize.</li> </ul>
The Sports, Play, and Active Recreation for Kids (SPARK) program (35)	<ul style="list-style-type: none"> <li>Compared three physical education class conditions.               <ol style="list-style-type: none"> <li>Certified Physical Education specialists implemented the program.</li> <li>Classroom teachers were trained to implement the intervention.</li> <li>Usual physical education class. The intervention groups focus on promoting regular physical activity outside of school.</li> </ol> </li> </ul>	<ul style="list-style-type: none"> <li>Students in specialist-led classes spent more minutes per week being physically active (40 mins) than the teacher-led classes (33 mins), and both were significantly higher than the regular PA class (18 mins).</li> <li>The increased number of minutes of activity in the intervention classes translated into increased fitness level 2 years post-intervention.</li> </ul>	<ul style="list-style-type: none"> <li>Provide training for physical education teachers to help them implement effective strategies to promote increased exercise minutes in the classroom.</li> </ul>
Promoting Lifestyle Activity for Youth (PLAY) (31)	<ol style="list-style-type: none"> <li>Taught children healthy lifestyle habits and encouraged 30–60 minutes of moderate to vigorous PA daily.</li> <li>Techniques included 12-minute activity breaks during the school day to teach new PA concepts, and self-monitoring of total PA participation.</li> </ol>	<ul style="list-style-type: none"> <li>PA participation in children increased with the PLAY intervention.</li> </ul>	<ul style="list-style-type: none"> <li>Promote attitudes and behaviors in children that will translate into a lifetime of PA participation.</li> <li>Encourage children to record PA on a calendar or to schedule activity with their friends and family.</li> </ul>

## From the Practical Toolbox 8.2



### PHYSICAL ACTIVITY CALENDAR

Planning and scheduling PA is a great way to increase PA participation. Using a calendar to plan activities for the next month is a simple yet effective way to start recording activity. See the following calendar for an example.

#### Let's Move! Healthy Family Calendar

Day of the Week		Type of Activity	What Time of the Day	Who Will Participate	Did We Do It?
(For Example) Monday	Your Fun Activity	<i>Walk 15 minutes</i>	<i>7 a.m. and 5 p.m.</i>	<i>Mom and Sally</i>	*
	Your Healthy Food	<i>Fruit</i>	<i>Lunch</i>	<i>Sally and John</i>	*
Monday	Your Fun Activity				
	Your Healthy Food				
Tuesday	Your Fun Activity				
	Your Healthy Food				
Wednesday	Your Fun Activity				
	Your Healthy Food				
Thursday	Your Fun Activity				
	Your Healthy Food				
Friday	Your Fun Activity				
	Your Healthy Food				
Saturday	Your Fun Activity				
	Your Healthy Food				
Sunday	Your Fun Activity				
	Your Healthy Food				
How many stars did you give yourself?					

(Adapted from [http://www.letsmove.gov/sites/letsmove.gov/files/Family\\_Calendar.pdf](http://www.letsmove.gov/sites/letsmove.gov/files/Family_Calendar.pdf))



## From the Practical Toolbox 8.3

### FITNESS TESTING

Fitness testing must be adapted to suit the population and individual you are working with.

#### ACSM's Guidelines for Exercise Testing and Prescription

This resource offers a clear and specific approach to exercise testing. More fitness testing resources can be found at <http://www.acsm.org/>.

#### Rated Perceived Exertion Scale

Before beginning fitness testing, it is important to teach clients about the Rated Perceived Exertion Scale so they are able to clearly communicate their level of exercise intensity throughout testing and future physical activity participation. The Borg Rated Perceived Exertion Scale can be found at <http://www.cdc.gov/physicalactivity/everyone/measuring/exertion.html>.

### Barriers

Current barriers to PA participation include lack of time due to other obligations, lack of interest or motivation, body-related barriers (*e.g.*, body self-consciousness), social barriers, and environmental barriers (*e.g.*, no equipment, unsuitable weather) (49).

### Adherence and Maintenance Considerations

Improving parental, school, and community support, and providing access to environments that promote PA, are helpful at improving adherence. Table 8.4 highlights important PA adherence and maintenance techniques for children and youth. Enhancing children's knowledge of PA benefits, improving motivation and time management skills, and offering

**TABLE 8.4 Techniques to Improve Children's PA Adherence and Maintenance**

Factor	Techniques for Adherence/Maintenance
Personal	<ul style="list-style-type: none"> <li>• Always consider PA history, personal abilities, preferences, and personal resources.</li> </ul>
Behavioral	<ul style="list-style-type: none"> <li>• Encourage children to set realistic and achievable PA goals.</li> <li>• Plan for rewards once activity goals are reached.</li> <li>• Ensure PA is used as a reward, and not as a punishment (<i>i.e.</i>, going for a family walk vs. having to run laps for punishment).</li> <li>• Encourage children to practice self-monitoring techniques (<i>i.e.</i>, journaling).</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>• Promote activity that is safe, accessible, and affordable.</li> </ul>
Program	<ul style="list-style-type: none"> <li>• Encourage children to try different types of activities to prevent boredom and improve overall fitness skills.</li> </ul>



## From the Practical Toolbox 8.4



### ADHERING TO EXERCISE: PHYSICAL ACTIVITY JOURNAL

While interventions, when well-designed, can clearly provide numerous positive physical and psychosocial benefits to the target population, our greater concern is the “next step.” Specifically, what must be done to ensure that individuals maintain activity after the completion of a formal PA intervention?

A journal can help to evaluate the frequency of exercise, intensity, duration, and type of activity. Journals can be “paper and pencil” or can be kept electronically on one of the many online lifestyle recording Web sites.

- A sample journal and tracking log can be found in From the Practical Toolbox 3.6.
- An example of an online tracking Web site is: <http://www.mypyramidtracker.gov/>.
- Check out the Center for Disease Control’s online PA tracking tool: [http://www.bam.gov/sub\\_physicalactivity/physicalactivity\\_activitycalendar.html](http://www.bam.gov/sub_physicalactivity/physicalactivity_activitycalendar.html).

For more on setting and maintaining exercise goals, refer to Chapters 2 and 3.

a variety of exercise opportunities are all useful strategies (30). Further strategies to overcome these barriers are important and research into effective interventions is ongoing (see Table 8.3).

### Useful Links

Refer to the following Web sites on this topic for more information:

- Active Healthy Kids Canada: <http://www.activehealthykids.ca/>
- American Academy of Pediatrics: <http://www.healthychildren.org/English/healthy-living/Pages/default.aspx>
- Center for Disease Control and Prevention: Physical Activity for Everyone: <http://www.cdc.gov/physicalactivity/everyone/guidelines/children.html>



v.s. anandhakrishna/  
Shutterstock.com

### Case Scenario 8.1

**Name:** Steven Johnston

**Age:** 15

**Presentation:** Steven and his mom visit a local fitness center in search of an exercise program that will help Steven feel more comfortable participating in physical education class at school. His mom is worried because Steven’s teacher reports very poor participation and lack of attendance in class. Steven says that if he could keep up with the other children in class, he would be more likely to actively participate.

*continued*

## Case Scenario 8.1 *continued*

### Case Scenario 8.1 Step-by-Step

Screen	Evaluate and Educate	Test	Implement	Progress
Steven does not report any physical symptoms that would indicate exercise to be unsafe. Therefore, move on to evaluate goals and motivations for PA participation.	Steven is frustrated because he finds it difficult to keep up with his friends in the schoolyard. He reports decreased motivation for PA participation due to a lack of skill in common sports. Steven's goal is to be able to participate in activities with children his own age and to avoid feeling uncomfortable or inadequate.	General assessment of ability. Formal fitness testing determined to be not necessary.	Prescription: <ul style="list-style-type: none"> <li>• Two days/week with trainer to work on basic aerobic endurance, muscular strength, and agility.</li> <li>• Practice catching, throwing, and running activities with family members twice/week.</li> <li>• Register for a soccer class with kids at his ability level.</li> <li>• Steven will practice planning weekly PA on a calendar, which will be placed on his fridge at home.</li> <li>• Steven will record his activity in an online log.</li> </ul>	<ul style="list-style-type: none"> <li>• Steven will hand in journal log to trainer each week and reflect on overall enjoyment, difficulty, and progress.</li> <li>• Once Steven has established adherence, training sessions can decrease to once per week to encourage Steven to become an independent exerciser.</li> <li>• Program will be progressed accordingly to continue to produce overload.</li> </ul>

### TAKE-HOME MESSAGE

Both the physical and psychological health benefits of PA for children and youth are well documented, but with activity participation levels remaining low, improving ways to effectively promote PA is crucial (40,42). Decreasing perceived barriers to PA participation and improving PA accessibility is our responsibility as parents, teachers, coaches, personal trainers, and policy makers. As indicated earlier in Table 8.3, successful interventions focus on increasing PA participation minutes during regularly scheduled physical education class (the SPARK campaign) (35), utilizing marketing techniques so as to brand PA as “cool” and “fun” (the VERB campaign), and promoting lifestyle PA adoption (PLAY campaign) (31). Utilizing these tools to help improve children and youth's perception of PA, accessibility to sport and active playtime, and to effectively adopt active lifestyles will provide meaningful benefits to children and effectively encourage lifelong PA participation.

## OLDER ADULTS

### The Evidence

The 150 weekly minutes of moderate-intensity activity for older adults (65 years plus) is not currently met by over 60% of older adults in the U.S. (1,7) (see Table 8.5 for complete recommendations). While there is a decline in activity as a natural part of aging, the literature clearly supports that promotion of activity can be successful in older adults and lessen many of the negative side-effects associated with aging, including decreased health and functional independence (24). Participation in regular PA also improves cardiovascular function in older adults, reduces risk factors associated with disease states, improves body composition and bone health, improves quality of life and cognition, and extends life expectancy (10). Table 8.6 outlines key steps necessary to the implementation of a successful PA program for older adults.

A second reason for promoting PA interventions in older adults comes from the increase in our aging population. Older adults are the least physically active of any age group and yet are the most rapidly growing age group, with this population expected to double by 2030 (13). Creating mass interventions that promote moderate-intensity aerobic activity, muscular strengthening, flexibility, balance, and risk management is meaningful for a large portion of this population.

### Recommendations

Adults aged 65 years and older are recommended to participate in 150–300 minutes of moderate-intensity activity every week (1). Alternatively, older adults can accumulate 75–100 minutes of vigorous intensity activity every week (1). In addition to this aerobic exercise, 2 or more days of muscle strengthening activities are recommended. (See Table 8.5.)

### Step-by-Step

See Table 8.6 for steps for implementing physical activity programs for older adults, and Table 8.7 references effective interventions and practical, evidence-based behavior change strategies.

### Barriers

Barriers to PA participation among older adults may include, but are not restricted to, a past inactive lifestyle and decreased understanding of PA benefits, physical frailty and/or health issues that may restrict mobility, fear of injury or falling, lack of guidance, and the cost of transport or access to exercise facilities (5,9). Furthermore, if older adults are residing in long-term care facilities, they may face increased barriers to PA, including limited access to exercise space or equipment (9).

### Adherence and Maintenance Considerations

Strategies to increase PA options for the elderly can be seen in Table 8.8.

**TABLE 8.5 PA Recommendations for Older Adults (1,3,10)**

Activity Type	Recommended Weekly Frequency, Intensity, and Time	Type Examples
Aerobic	Moderate Intensity Activity: at least 5 days per week for 30–60 minutes per day, totaling 150–300 minutes per week.	<ul style="list-style-type: none"> <li>Activities like walking, golf, cycling, gardening, house cleaning</li> </ul>
	Vigorous Intensity Activity: for at least 3 days per week for at least 20 to 30 minutes per day, totaling 75–100 minutes per week.	<ul style="list-style-type: none"> <li>Activities that include jogging, dancing, aerobics or water aerobics, swimming, cycling</li> <li>Games like tennis</li> </ul>
Strength Training	At least 2 days per week at moderate intensity (60%–70% 1RM) or low intensity (40%–50% 1RM) for older adults beginning a resistance training program.	<ul style="list-style-type: none"> <li>Activities that include pulling or pushing, supporting bodyweight</li> <li>Exercises using hand weights, weight machines, resistance bands</li> <li>Resistance exercises using body weight or calisthenics-type exercises</li> <li>Activities of daily living including carrying groceries, getting up and down from a chair or the floor</li> </ul>
Balance Exercises	At least 3 days per week as a part of the minimum 60 minutes per day.	<ul style="list-style-type: none"> <li>Exercises that progressively reduce the base of support, dynamic movements that challenge the center of gravity, exercises that stress postural muscles, or exercises that reduce sensory input (<i>i.e.</i>, stand or balance with eyes closed)</li> <li>Balance on one leg, balance on toes or heels</li> <li>Activities such as walking backward or in circles</li> <li>Activities such as yoga or tai chi</li> </ul>
Flexibility	At least 2 days per week	<ul style="list-style-type: none"> <li>Performing static stretches from a prone, seated, or standing position</li> <li>Holding stretches for at least 30–60 seconds and maintaining stretch below point of discomfort</li> </ul>

Source: American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014; ACSM's *Exercise Management for Persons with Chronic Diseases and Disabilities*, 3rd edition, 2009 (3); Chodzko-Zajko et al., 2009 (10).

**TABLE 8.6** Implementing PA Programs for Older Adults (7)

Steps	Recommendation	Considerations	Tools
1. Screen for safety.	<ul style="list-style-type: none"> <li>Assess for safety and whether clearance is needed from physician (<i>i.e.</i>, if current signs of illness, injury, or advanced deconditioning).</li> </ul>	<ul style="list-style-type: none"> <li>Current health status: Existing disability? Presence or signs of cardiovascular, pulmonary or metabolic disease? Use of walking aids?</li> <li>History of health condition or injury?</li> <li>Explore contraindications for exercise.</li> </ul>	<ul style="list-style-type: none"> <li>PAR-Q (see Ch. 2)</li> <li>PARmed-X (see Ch. 2)</li> <li>AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire (see Ch. 2)</li> <li>Informed Consent (see Ch. 2)</li> </ul>
2. Explore and Educate: Discuss motivations and goals, health beliefs, and preferences.	<ul style="list-style-type: none"> <li>Discuss health beliefs and provide education on the importance of PA for older adults.</li> </ul>	<ul style="list-style-type: none"> <li>PA participation must be meaningful, accessible, and modifiable depending on contraindications.</li> </ul>	<ul style="list-style-type: none"> <li>Decisional balance sheets (see Ch. 3)</li> <li>Stages of Change (see Ch. 4)</li> <li>Goal setting worksheet and exercise contract with strategies to overcome barriers (see Ch. 3)</li> <li>PA Calendar (see From the Practical Toolbox 8.2)</li> </ul>
3. Test.	<ul style="list-style-type: none"> <li>Most older adults do not require exercise testing before beginning a moderate-intensity exercise program.</li> <li>For people with known risk factors, a clinical exercise test is recommended.</li> <li>Utilize tests with established normative data.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure the testing environment is safe and necessary assistance is provided.</li> <li>Handrails on treadmill may be required.</li> <li>A cycle ergometer test may be recommended for those with poor balance.</li> <li>Adjust workload accordingly.</li> </ul>	<ul style="list-style-type: none"> <li>See From the Practical Toolbox 8.3 and ACSM's Guidelines for Exercise Testing and Prescription.</li> </ul>

*continued*

TABLE 8.6 Implementing PA Programs for Older Adults (7) (Continued)			
Steps	Recommendation	Considerations	Tools
4. Prescribe exercise and implement the plan.	<ul style="list-style-type: none"><li>Establish safe exercise environment</li><li>Implement the PA intervention and use appropriate tools for adherence</li></ul>	<ul style="list-style-type: none"><li>Make efforts to decrease sedentary activities.</li><li>Plan for activities that are accessible and offer the necessary support and guidance.</li><li>For highly deconditioned older adults, intensity and duration should be low at the beginning.</li><li>Supervise initial strength training sessions for safety.</li></ul>	<ul style="list-style-type: none"><li>PA Journals (see From the Practical Toolbox 8.4)</li><li>Online PA logs may be appropriate if client has access to a computer. (see From the Practical Toolbox 8.4)</li><li>Encourage social support.</li><li>Promote self-efficacy.</li></ul>
	5. Actively evaluate and progress.	<ul style="list-style-type: none"><li>Follow-up with individual or group.</li><li>Assess for enjoyment.</li><li>Progress when necessary.</li><li>Provide continued encouragement and feedback.</li></ul>	<ul style="list-style-type: none"><li>May progress at a slower rate due to contraindications and limited mobility.</li><li>Progression should always be individualized and should meet satisfaction of client.</li></ul>

Source: American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.

**TABLE 8.7 Successful Interventions and Strategies: PA Interventions for Older Adults**

Intervention	Methods	Outcomes	Practical Strategies
Long-Term Follow-up of PA Behavior in Older Adults (27)	<ul style="list-style-type: none"> <li>Following a six-month randomized, controlled PA trial, participants were evaluated at 2 and 5 years postintervention.</li> <li>The primary outcome was to evaluate PA levels over time.</li> <li>Researchers examined previous behavior, self-efficacy and effect, and evaluated how these factors impacted future PA participation.</li> </ul>	<ul style="list-style-type: none"> <li>PA at two years was a strong predictor of PA at five years.</li> <li>Self-efficacy and affect at two years was also associated with PA at 5 years.</li> </ul>	<ul style="list-style-type: none"> <li>Implement strategies that promote self-efficacy and positive self-affect.</li> <li>Educate clients on the importance of adherence, and that adherence can promote future PA participation.</li> </ul>
Interventions to Promote PA by Older Adults (24)		<ul style="list-style-type: none"> <li>Studies indicate the importance of environmental interventions to promote PA and adherence. It is reported that environments that are accessible, attractive, safe, and low cost are the best at promoting PA adherence.</li> </ul>	<ul style="list-style-type: none"> <li>Help to put signs and information promoting PA in accessible work environments.</li> <li>Provide easy-to-use maps for people who want to cycle or walk along trails.</li> </ul>

**TABLE 8.8 Techniques to Improve Older Adults' PA Adherence and Maintenance**

Factor	Techniques for Adherence/Maintenance
Personal	<ul style="list-style-type: none"> <li>Always consider PA history, personal abilities, medical conditions, preferences, and personal resources.</li> <li>The older adult should feel safe and well monitored during exercise.</li> </ul>
Behavioral	<ul style="list-style-type: none"> <li>Encourage older adults to set realistic and achievable PA goals.</li> <li>Plan for rewards once activity goals are reached.</li> <li>Encourage older adults to practice self-monitoring techniques (<i>i.e.</i>, journaling, keeping a calendar).</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>Promote activity that is safe, accessible, and affordable.</li> <li>Encourage group-based activities since the social aspect may improve accountability and enjoyment.</li> </ul>
Program	<ul style="list-style-type: none"> <li>Encourage older adults to try different types of activities to prevent boredom and improve overall fitness.</li> </ul>

## Useful Links

Refer to the following Web sites on this topic for more information:

- Active Aging Partnership: <http://www.agingblueprint.org/partnership.cfm>
- Center for Disease Control and Prevention: Physical Activity for Everyone: <http://www.cdc.gov/physicalactivity/everyone/guidelines/olderadults.html>
- Elder Gym: <http://www.eldergym.com/exercises.html>
- Elderly Activities: <http://www.elderlyactivities.co.uk/>
- Senior Exercise and Fitness Tips: [http://www.helpguide.org/life/senior\\_fitness\\_sports.htm](http://www.helpguide.org/life/senior_fitness_sports.htm)



## Case Scenario 8.2

**Name:** Ellie Jones

**Age:** 72

**Presentation:** Ellie is a 72-year-old widower, living independently. She enjoys social activities with friends, but currently does not participate in any regular physical activity. Her doctor has recommended beginning an exercise program, in part to deal with her osteoporosis and weight gain issues. However, Ellie does not know where to begin!

### Case Scenario 8.2 Step-by-Step

Screen	Evaluate and Educate	Test	Implement	Progress
Ellie's doctor completes the PARmed-X. Osteoporosis and being currently inactive necessitate a gentle progression for both weight-bearing and aerobic activities.	Ellie is educated on the goal of including body-resistance activities (prior to the implementation of further weights or resistance) in her daily lifestyle. The importance of being active with friends is highlighted and a network of active ladies and walking opportunities is developed. Barriers to staying active are discussed and plans for overcoming barriers are realized.	Initial screening (ACSM exercise testing for older adults) is performed. Results indicate Ellie is okay to begin with a mild exercise program, with gradual progression. Consideration should be given to balance-based activities, thereby reducing the likelihood of future falls.	Gentle, weight-bearing, and aerobic activities are recommended. A progressive walking program, with a home journal for record keeping, is implemented. Prescription: 2d/week for resistance; 3–5 d/week for aerobic	Ellie sets weekly and monthly goals, and a weekly journal is used to track activity and results (energy levels, feeling states). Progress is monitored and evaluated every 2 weeks, with readjustment of weekly PA levels as necessary.



## TAKE-HOME MESSAGE

Older adults have much to gain from participating in regular PA, including maintaining current physical functioning, managing current chronic disease and preventing further medical conditions, and enhancing quality of life (29). Unfortunately, older adults are at a high risk for living sedentary lifestyles (24). Significant predictors of long-term adherence to active lifestyles in older adults include more positive affect and higher self-efficacy (27). Overall, interventions designed to promote PA among older adults have been promising, confirming many health benefits for participants who engage in an active lifestyle long term (24).

Increased health concerns in an aging population make the necessity of intervening with older adults a priority. Initiatives must consider how to make active living part of the natural aging process. Consideration of personal barriers including health and mobility, motivation, as well as social support and environmental barriers such as accessibility to safe exercise environments is essential.

## OVERVIEW OF COMMON CHRONIC CONDITIONS

Numerous chronic diseases may be managed effectively with PA interventions. While it is outside the scope of the current chapter to provide details on PA interventions for all conditions, this section of the chapter provides a brief overview of chronic conditions that have substantial evidence for the role of PA in disease management. In addition, with recent advancements in our understanding of the benefits of PA for cancer survivors, we chose to highlight this condition in greater depth.

With all chronic conditions, it is extremely important to engage the appropriate health care professionals to ensure the safety and appropriateness of the intervention for the particular population. Simple screening tools, such as the Par-MEDX (see Chapter 2) should be employed to ensure physician clearance prior to the start of the PA program. Additional tools for screening, evaluation, and feedback should be utilized as specific to the chronic conditions as possible. See the From the Practical Toolbox features in this chapter and other chapters of this book for examples of these resources.

Behavioral strategies to promote PA adoption, adherence, and maintenance are extremely important for people with chronic conditions. These individuals may be apprehensive about starting a new PA program or addressing activity levels following changes in health status. These issues highlight the need for tailored PA interventions that include effective behavior change strategies.

## Adherence and Maintenance Considerations

Table 8.9 highlights key behavior change strategies when working with people with varying chronic conditions. These strategies can be further tailored to the individual's condition and tailored based on health history, need, interests, and preferences.

## COMMON CHRONIC CONDITIONS

### Overweight and Obesity

Worldwide obesity rates are reported to be at epidemic proportions, with over 1.5 billion adults considered overweight, and of these, 500 million considered obese (47). Obesity is

**TABLE 8.9 Techniques to Improve PA Adherence and Maintenance**

Factor	Techniques for Adherence/Maintenance
Personal	<ul style="list-style-type: none"> <li>Consider PA history, personal abilities, other medical conditions, preferences, and personal resources.</li> <li>The person should feel safe and be well monitored during exercise.</li> <li>The medical team should be aware and grant permission for the person to participate in activity and promote exercise adherence and maintenance. This can be promoted through personal fitness reports generated by the fitness professional for the medical team.</li> </ul>
Behavioral	<ul style="list-style-type: none"> <li>Encourage people to set realistic and achievable PA goals.</li> <li>Remind people currently being treated for their condition to adjust total activity minutes and intensity based on treatment side-effects.</li> <li>Encourage people to practice self-monitoring techniques (<i>i.e.</i>, journaling, keeping a calendar).</li> <li>Plan for rewards once activity goals are reached.</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>Promote activity that is safe, accessible, affordable, and lead by exercise practitioners with specific experience in the necessary field.</li> <li>Encourage group-based activities as the social aspect may improve accountability, enjoyment, and support.</li> </ul>
Program	<ul style="list-style-type: none"> <li>Disease-specific programs may provide increased peace of mind for individuals.</li> <li>People can start slowly in activities like yoga, and increase total activity minutes and intensity from there.</li> </ul>

linked to a multitude of lifelong physical and psychological health complications, yet PA holds significant value in terms of an effective treatment option in helping to burn calories and manage energy imbalances (18). PA also plays a key role in psychological well-being, cardiovascular fitness, and maintaining weight loss (18). See Table 8.10 for recommendations and considerations for overweight and obese individuals and populations.

## Cardiovascular Disease

Cardiovascular disease remains the leading cause of death and disability among adult men and women in the United States, and physical inactivity is well defined as an independent risk factor for this disease (8,44). The benefits of PA extend beyond prevention and management of heart disease, aiding weight management, the prevention of further disability, and reducing depression and anxiety—all of which are closely associated with cardiovascular disease (46,50). See Table 8.11 for recommendations and considerations for individuals and populations with cardiovascular disease.

## Cancer: The Role of Physical Activity for Cancer Survivors

### EVIDENCE

The rapidly accumulating research clearly indicates a beneficial role of PA for cancer survivors, both during and after treatment (21,36,37). PA improves a variety of physical, psychosocial, and health outcomes in cancer survivors, both during and after cancer treatment,

**TABLE 8.10 PA Recommendations and Considerations for Overweight and Obese Individuals and Populations (1,7,14)**

Recommendations	<ul style="list-style-type: none"> <li>• Exercising at least 5 days per week</li> <li>• At least 150 minutes per week progressing to at least 300 minutes per week of moderate-intensity activity, or 150 minutes of vigorous-intensity activity per week.</li> <li>• Intensity: Moderate to vigorous-intensity physical activity should be encouraged.</li> <li>• Focus should be on aerobic activity that utilizes large muscle groups. Resistance training at least 2 days per week should be included.</li> </ul>
Barriers	<ul style="list-style-type: none"> <li>• Feelings of insecurity and discomfort when exercising</li> <li>• Tiredness</li> <li>• Fear of injury</li> <li>• Low self-esteem, diminished self-efficacy for being active</li> <li>• Diminished self-worth and decreased perceived control</li> <li>• Higher prevalence of comorbidities</li> </ul>
Interventions	<ul style="list-style-type: none"> <li>• Weight loss of at least 5% to 10% of initial body weight over a three- to six-month period will provide significant health benefits.</li> <li>• For adequate weight loss, energy intake must be addressed. Patient should consult with dietitian and together with exercise programming, a deficit of 500 to 1000 kcal / day should be achieved.</li> <li>• Reference Table 8.9 for effective behavior change techniques.</li> </ul>
Take-Home Message	<ul style="list-style-type: none"> <li>• Helping someone who struggles with excessive weight to adopt a more active lifestyle can help to significantly improve physical and psychological well-being as well as decrease the risk for comorbidities (18).</li> <li>• Creating a safe exercise environment for someone who may have body image issues, comorbidities, and fear of injury is extremely important and can directly affect long-term adherence (34).</li> </ul>
Web links	<ul style="list-style-type: none"> <li>• World Health Organization: <a href="http://www.who.int/dietphysicalactivity/childhood/en/">http://www.who.int/dietphysicalactivity/childhood/en/</a></li> <li>• Centers for Disease Control and Prevention: Physical Activity for a Healthy Weight: <a href="http://www.cdc.gov/healthyweight/physical_activity/index.html">http://www.cdc.gov/healthyweight/physical_activity/index.html</a></li> <li>• Scope-Healthy Choices: Physical Activity: <a href="http://www.childhood-obesity-prevention.org/live5210/resources/healthy-choices-physical-activity/">http://www.childhood-obesity-prevention.org/live5210/resources/healthy-choices-physical-activity/</a></li> <li>• How to Begin an Exercise Routine for Overweight People, The Livestrong Foundation: <a href="http://www.livestrong.com/article/16350-begin-exercise-routine-overweight-people/">http://www.livestrong.com/article/16350-begin-exercise-routine-overweight-people/</a></li> </ul>

Source: American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.

**TABLE 8.11 Recommendations and Considerations for Individuals and Populations with Cardiovascular Disease (1,4)**

Recommendations	<ul style="list-style-type: none"> <li>• Exercising between three to seven times per week for 20 to 60 minutes per session. Following a cardiac event, 1- to 10-minute sessions are recommended, followed by progression in duration.</li> <li>• Exercise sessions can be split up into multiple shorter sessions per day to accommodate patients with limited exercise capacity.</li> <li>• Intensity between 11 and 16 on a 6 to 20 RPE scale.</li> <li>• Activities that include large muscle groups with an emphasis on caloric expenditure are encouraged. These may include use of the arm ergometer, cycle ergometer, elliptical, rower, or treadmill for walking.</li> </ul>
Barriers	<ul style="list-style-type: none"> <li>• Lack of time to exercise</li> <li>• Lack of motivation</li> <li>• Poor health</li> <li>• Fear of injury</li> </ul>
Interventions	<ul style="list-style-type: none"> <li>• Patients should participate in a medically supervised Cardiac Rehabilitation Program to ensure safety and promote lifestyle change adherence.</li> <li>• Promote independent exercise once patient reports stable or absent cardiac symptoms, appropriate physiological response to exercise, demonstrates a knowledge and confidence with exercise principles, and demonstrates motivation to continue exercise.</li> <li>• Light resistance training programs should be introduced with slow progression.</li> <li>• For return to work, implement exercise training aimed at improving necessary energy systems used for occupational tasks.</li> <li>• Reference Table 8.9 for effective behavior change techniques</li> </ul>
Take-Home Message	<ul style="list-style-type: none"> <li>• PA is a well-established factor in the prevention and management of heart disease (44).</li> <li>• People with cardiovascular disease should be appropriately cleared for exercise and be assigned to an individualized program that is progressive in nature.</li> <li>• There is a very important need to promote PA among adults who may be at risk for cardiovascular disease or who may be in the early stages of the disease. Beginning a progressive PA program can help to prevent the disease and manage related risk factors.</li> </ul>
Web links	<ul style="list-style-type: none"> <li>• The Heart and Stroke Foundation: <a href="http://www.heartandstroke.on.ca/site/c.pvl3leNWJwE/b.5264885/k.F930/Position_Statements__Physical_Activity_Heart_Disease_and_Stroke.htm">http://www.heartandstroke.on.ca/site/c.pvl3leNWJwE/b.5264885/k.F930/Position_Statements__Physical_Activity_Heart_Disease_and_Stroke.htm</a></li> <li>• The American Heart Association: <a href="http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/Physical-Activity_UCM_001080_SubHomePage.jsp">http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/Physical-Activity_UCM_001080_SubHomePage.jsp</a></li> </ul>

Source: Booth, Bauman, Owen, Core, 2007 (4); American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.

including the management of the potential negative long-term effects of treatment (25,38). Research indicates that the sooner cancer survivors reestablish or improve upon prediagnosis PA levels, the more likely they are to report both physical and psychosocial benefits. These individuals may also exhibit fewer symptoms, less comorbidities, and decreased all-cause mortality (17,23).

## BARRIERS

Despite the evidence mentioned earlier, there is a notable decrease in PA across the cancer continuum (11). This decreased PA may be associated with increased perceived barriers to participation, both similar to those seen in the general population (*e.g.*, lack of motivation and time, limited access) as well as health-related barriers such as pain and stiffness from surgery, treatment-related side-effects such as fatigue and nausea, self-consciousness related to surgery (*e.g.*, mastectomies), and a fear of overdoing it without proper direction (45). Offering cancer survivors an individualized exercise program in a supportive environment can alleviate many of these potential barriers. See Table 8.9 for additional behavior change techniques.

## RECOMMENDATIONS

The recent ACSM roundtable on Exercise Guidelines for Cancer Survivors concluded that exercise is both safe and potentially beneficial during and after cancer treatments (36). Current recommendations from ACSM can be seen in Tables 8.12 through 8.14. These guidelines should be implemented within tailored exercise programs, based on the individual's current health and treatment status. Table 8.15 outlines effective interventions and evidence-based strategies for PA adoption among cancer survivors.

In addition, the research suggests that the timing of the exercise intervention is important. It is suggested that while regular exercise may improve outcomes during treatment, it may provide greater noticeable benefits to the survivor when performed post-treatment (11). This may be a reflection of patients' treatment completion and the removal of barriers (*i.e.*, medical demands, time, and fatigue). ACSM roundtable guidelines suggest that cancer survivors, regardless of where they are in the treatment continuum, should avoid inactivity and that any level of PA carries with it some benefit (36). It has been further suggested that interventions should include multiple options based on participant preferences (33).

## Useful Links

Refer to the following Web sites on this topic for more information:

- ACS Guidelines on Nutrition and Physical Activity for Cancer Prevention: <http://www.cancer.org/Healthy/EatHealthyGetActive/ACSGuidelinesonNutritionPhysicalActivityforCancerPrevention/nupa-guidelines-toc>
- Canadian Society of Exercise Physiology: Older Adult Cancer Survivors and Exercise: <http://www.csep.ca/english/view.asp?x=724 & id=181>
- The National Cancer Institute: Physical Activity and Cancer <http://www.cancer.gov/cancertopics/factsheet/prevention/physicalactivity>

**TABLE 8.12** ACSM Guidelines for PA Levels for Cancer Survivors: Preexercise medical assessments and exercise testing

Cancer Site	Adult			
	Breast	Prostate	Colon	Hematologic (No HSCT) Adult HSCT Gynecologic
General medical recommended before exercise	Recommend evaluation for peripheral neuropathies and musculoskeletal morbidities secondary to treatment regardless of time since treatment. If there has been hormonal therapy, recommend evaluation of fracture risk. Individuals with known metastatic disease to the bone will require evaluation to discern what is safe before starting exercise. Individuals with known cardiac conditions (secondary to cancer or not) require medical assessment of the safety of exercise before starting. There is always a risk that metastasis to the bone or cardiac toxicity secondary to cancer treatments will be undetected. This risk will vary widely across the population of survivors. Fitness professionals may want to consult with the patient's medical team to discern this likelihood. However, requiring medical assessment for metastatic disease and cardiotoxicity for all survivors before exercise is not recommended because this would create an unnecessary barrier to obtaining the well-established health benefits of exercise for the majority of survivors, for whom metastasis and cardiotoxicity are unlikely to occur.			
Cancer site-specific medical assessments recommended before starting an exercise program	Recommend evaluation for arm/shoulder morbidity before upper body exercise.	Evaluation of muscle strength and wasting.	Patient should be evaluated as having established consistent and proactive infection prevention behaviors for an existing ostomy before engaging in exercise training more vigorous than a walking program.	None  None  Morbidly obese patients may require additional medical assessment for the safety of activity beyond cancer-specific risk. Recommend evaluation for lower extremity lymphedema before vigorous aerobic exercise or resistance training.
Exercise testing recommended	No exercise testing required before walking, flexibility, or resistance training. Follow ACSM guidelines for exercise testing before moderate to vigorous aerobic exercise training. One-repetition maximum testing has been demonstrated to be safe in breast cancer survivors with and at risk for lymphedema.			
Exercise testing mode and intensity considerations	As per outcome of medical assessments and following ACSM guidelines for exercise testing.			
Contraindications to exercise testing and reasons to stop exercise testing	Follow ACSM guidelines for exercise testing.			

Reprinted with permission from Schmitz et al., 2010 (36), see also American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.

**TABLE 8.13** ACSM Guidelines for PA Levels for Cancer Survivors: Exercise Prescription for Cancer Survivors

	Breast	Prostate	Colon	Adult	
				Hematologic (No HSCT)	Adult HSCT
Objectives/goals of exercise prescription					Gynecologic
	<ol style="list-style-type: none"> <li>1. To regain and improve physical function, aerobic capacity, strength, and flexibility.</li> <li>2. To improve body image and QOL.</li> <li>3. To improve body composition.</li> <li>4. To improve cardiorespiratory, endocrine, neurological, muscular, cognitive, and psychosocial outcomes.</li> <li>5. Potentially, to reduce or delay recurrence or a second primary cancer.</li> <li>6. To improve the ability to physically and psychologically withstand the ongoing anxiety regarding recurrence or a second primary cancer.</li> <li>7. To reduce, attenuate, and prevent long-term and late effects of cancer treatment.</li> <li>8. To improve the physiologic and psychological ability to withstand any current or future cancer treatments.</li> </ol> <p>These goals will vary according to where the survivor is in the continuum of cancer experience.</p>				
General contraindications for starting an exercise program common across all cancer sites	<p>Allow adequate time to heal after surgery. The number of weeks required for surgical recovery may be as high as 8. Do not exercise individuals who are experiencing extreme fatigue, anemia, or ataxia. Follow ACSM guidelines for exercise prescription concerning cardiovascular and pulmonary contraindications for starting an exercise program. However, the potential for an adverse cardiopulmonary event might be higher among cancer survivors than age-matched comparisons given the toxicity of radiotherapy and chemotherapy and long-term/late effects of cancer surgery.</p>				
Cancer-specific contraindications for starting an exercise program	Women with immediate arm or shoulder problems secondary to breast cancer treatment should seek medical care to resolve those issues before exercise training with the upper body.	None	Physician permission recommended for patients with an ostomy before participation in contact sports (risk of blow) and weight training (risk of hernia).	None	Women with swelling or inflammation in the abdomen, groin, or lower extremity should seek medical care to resolve these issues before exercise training with the lower body.
Cancer-specific reasons for stopping an exercise program. (Note: General ACSM guidelines for stopping exercise remain in place for this population.)	Changes in arm/shoulder symptoms or swelling should result in reductions or avoidance of upper body exercise until after appropriate medical evaluation and treatment resolves the issue.	None	Hernia, ostomy-related systemic infection.	None	Changes in swelling or inflammation of the abdomen, groin, or lower extremities should result in reductions or avoidance of lower body exercise until after appropriate medical evaluation and treatment resolves the issue.

*continued*



**TABLE 8.13** ACSM Guidelines for PA Levels for Cancer Survivors: Exercise Prescription for Cancer Survivors (Continued)

	Breast	Prostate	Colon	Adult	
				Hematologic (No HSCT)	Adult HSCT
General injury risk issues in common across cancer sites					Gynecologic
	Patients with bone metastases may need to alter their exercise program concerning intensity, duration, and mode given increased risk for skeletal fractures. Infection risk is higher for patients who are currently undergoing chemotherapy or radiation treatment or have compromised immune function after treatment. Care should be taken to reduce infection risk in fitness centers frequented by cancer survivors. Exercise tolerance of patients currently in treatment and immediately after treatment may vary from exercise session-to-exercise session about exercise tolerance, depending on their treatment schedule. Individuals with known metastatic disease to the bone will require modifications and increased supervision to avoid fractures. Individuals with cardiac conditions (secondary to cancer or not) will require modifications and may require increased supervision for safety.				
Cancer-specific risk of injury and emergency procedures	The arms/shoulders should be exercised, but proactive injury prevention approaches are encouraged, given the high incidence of arm/shoulder morbidity in breast cancer survivors. Women with lymphedema should wear a well-fitting compression garment during exercise. Be aware of risk for fracture among those treated with hormonal therapy, a diagnosis of osteoporosis, or bony metastases.	Be aware of risk for fracture among patients treated with ADT, a diagnosis of osteoporosis or bony metastases	Advisable to avoid excessive intra-abdominal pressures for patients with an ostomy.	Multiple myeloma patients should be treated as if they have osteoporosis.	None
					The lower body should be exercised, but proactive injury prevention approaches are encouraged, given the potential for lower extremity swelling or inflammation in this population. Women with lymphedema should wear a well-fitting compression garment during exercise. Be aware of risk for fractures among those treated with hormonal therapies, with diagnosed osteoporosis, or with bony metastases.

Reprinted with permission from Schmitz et al., 2010 (36), see also American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.



**TABLE 8.14** ACSM Guidelines for PA Levels for Cancer Survivors: Review of US DHHS PAG for Americans and Alterations Needed for Cancer Survivors

	Breast	Prostate	Colon	Adult Hematologic (No HSCT)	Adult HSCT	Gynecologic
General statement	Avoid inactivity; return to normal daily activities as quickly as possible after surgery. Continue normal daily activities and exercise as much as possible during and after nonsurgical treatments. Individuals with known metastatic bone disease will require modifications to avoid fractures. Individuals with cardiac conditions (secondary to cancer or not) may require modifications and may require greater supervision for safety.					
Aerobic exercise training (volume, intensity, and progression)	Recommendations are the same as age-appropriate guidelines from the PAG for Americans.				Ok to exercise every-day: lighter intensity and lower progression of intensity recommended.	Recommendations are the same as age-appropriate guidelines from the PAG for Americans. Morbidly obese women may require additional supervision and altered programming.
Cancer site-specific comments on aerobic exercise training prescriptions	Be aware of fracture risk.	Be aware of increased potential for fracture.	Physician recommended for patients with an ostomy before participation in contact sports (risk of blow).	None	Care should be taken to avoid overtraining given immune effects of vigorous exercise.	If peripheral neuropathy is present, a stationary bike might be preferable over weight bearing exercise.
Resistance training (volume, intensity, and progression)	Altered recommendations. See below.		Recommendations are the same as age-appropriate PAG.	Altered recommendations. See below.	Recommendations are the same as age-appropriate PAG.	Altered recommendations. See below.

*continued*

**TABLE 8.14** ACSM Guidelines for PA Levels for Cancer Survivors: Review of US DHHS PAG for Americans and Alterations Needed for Cancer Survivors (*Continued*)

	Adult Hematologic (No HSCT)				
	Breast	Prostate	Colon	Adult HSCT	Gynecologic
Cancer site-specific comments on resistance training prescription	Start with a supervised program of at least 16 sessions and very low resistance; progress resistance at small increments. No upper limit on the amount of weight to which survivors can progress. Watch for arm/shoulder symptoms, including lymphedema, and reduce resistance or stop specific exercises according to symptom response. If a break is taken, back off the level of resistance by 2 wk worth for every week of no exercise (e.g., a 2-wk exercise vacation = back off to resistance used 4 wk ago). Be aware of risk for fracture in this population.	Add pelvic floor exercises for those who undergo radical prostatectomy. Be aware of risk for fracture.	Recommendations are the same as age-appropriate PAG. For patients with a stoma, start with low resistance and progress resistance slowly to avoid herniation at the stoma.	Resistance training might be more important than aerobic exercise in bone marrow transplant patients. See text for further discussion on this point.	There are no data on the safety of resistance training in women with lower limb lymphedema secondary to gynecologic cancer. This condition is very complex to manage. It may not be possible to extrapolate from the findings on upper limb lymphedema. Proceed with caution if the patient has had lymph node removal and/or radiation to lymph nodes in the groin.

Flexibility training (volume, intensity, and progression)	Recommendations are the same as age-appropriate PAG for Americans	Recommendations are the same as age-appropriate PAG for Americans	Recommendations are the same as age-appropriate PAG for Americans
Exercises with special considerations (e.g., yoga, organized sports, and Pilates)	Yoga seems safe as long as arm and shoulder morbidities are taken into consideration. Dragon boat racing not empirically tested, but the volume of participants provides face validity of safety for this activity. No evidence on organized sport or Pilates.	Research gap	Research gap
	If an ostomy is present, modifications will be needed for swimming or contact sports. Research gap.	Research gap	Research gap

Reprinted with permission from Schmitz et al., 2010 (36), see also American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.

**TABLE 8.15 Successful Interventions and Strategies: PA Interventions for Cancer Survivors**

Intervention	Methods	Practical Strategies
PA and nutrition guidelines and recommendations for cancer survivors (15)	<ul style="list-style-type: none"> <li>Overview of the literature in nutrition and PA interventions; provides recommendations</li> </ul>	<ul style="list-style-type: none"> <li>ACS guidelines for nutrition and PA cancer prevention also recommended in survivorship</li> <li>Precautions/contraindications to exercise provided</li> </ul>
Rationale and strategies for promoting PA within the medical system (23)	<ul style="list-style-type: none"> <li>Provides rationale for PA interventions and approaches to promote successful adoption and maintenance of PA</li> </ul>	<ul style="list-style-type: none"> <li>Give PA counseling during treatment, by health care providers (HCPs), and oncologists in particular.</li> <li>Tailor exercise programs—start (during or after treatment); group versus alone; home versus supervised; delivery options (mail, phone, Web-based).</li> <li>Increase oncologist knowledge and discussion of PA for cancer survivors.</li> <li>Increase insurance coverage.</li> <li>Increase number of certified fitness professionals to counsel/exercise cancer survivors.</li> </ul>



### Case Scenario 8.3

**Name:** Michael Johnson

**Age:** 45

**Presentation:** Michael was diagnosed with a carcinoma on the base of his tongue 3 months ago, and finished chemotherapy and radiation treatments

3 weeks ago. Michael reports extreme fatigue, a lack of energy, and a total weight loss of 45 lbs. He notices large deficits in his muscular strength and endurance and says that he even struggles to get up from a chair due to the great muscle wasting in his legs. His pain management is improving, but he struggles with frequent dry mouth due to treatment-related salivary gland damage. Michael wants to increase his strength and energy, but is concerned that he will increase his fatigue with exercise and produce more stiffness in his neck.

**Case Scenario 8.3** *continued***Case Scenario 8.3 Step-by-Step**

Screen	Evaluate and Educate	Test	Implement	Progress
Michael has been cleared by a physician to participate in progressive exercise. He brought a signed and completed PARmed-X form to his initial assessment. Therefore, move on to evaluate goals and motivations for PA participation.	Michael's goal is to increase his energy levels, manage his fatigue, and improve his muscular strength and endurance so he can return to work. He is provided with education pertaining to safe exercise for cancer survivors and is told that much of the weight he lost was muscle, and with commitment, he can regain his strength and improve his energy levels.	Michael has general anthropometric measurements taken, and his muscular strength and endurance is evaluated using a handgrip dynamometer and a 30-second sit-to-stand test. Michael's predictive aerobic capacity is measured with a 6-minute walk test.	<p>Prescription:</p> <ul style="list-style-type: none"> <li>Michael will begin with a progressive strength training and stretching program to help him rebuild wasted muscle and regain range of motion in his neck and shoulders.</li> <li>Michael begins with a trainer two times per week and does his strength training and stretching once/week at home.</li> <li>Michael will record activity in an online log.</li> <li>He is encouraged to bring water to exercise to prevent excessive dry mouth.</li> </ul>	<ul style="list-style-type: none"> <li>Michael will hand in journal log to trainer each week.</li> <li>Program will be</li> </ul>

## TAKE-HOME MESSAGE

The research on PA for cancer survivors clearly indicates both physical and psychosocial benefits. The majority of the evidence supports the role of PA for after treatment completion. However, during-treatment programs of low to moderate intensity may be beneficial in mitigating many of the detrimental treatment-related side-effects. Exercise practitioners are highly encouraged to work within a multidisciplinary health care team when delivering PA interventions to cancer survivors.

## ADDITIONAL POPULATION CONSIDERATIONS— SOCIAL INFLUENCES ON EXERCISE

Numerous social influences, from social support and the role of influential others to the role of social norms, may impact individuals' PA behavior, including both the initiation and maintenance of PA. At the individual level, the role of social support on PA behavior should be considered when tailoring an intervention. Specifically, the social support needs and preferences for an individual (*e.g.*, working out with others or alone; having instrumental support for getting started) should be considered. Second, consideration should be given to the role of influential others for the targeted population. For example, peers are an important source of significant others for children. For older adults as well as for individuals with chronic disease, health care professionals can play an influential role in both prescribing and advocating for PA. Third, at a population level, cultural norms are an important consideration when planning PA interventions. The cultural norm, or what is considered acceptable behavior for a population, along with group customs and values, can greatly impact PA participation rates. Different cultures may also require translation services, or access to programming within a culture's geographic environment (*i.e.*, delivery of a PA program for Hispanic seniors in a Spanish Cultural Center). When working with specific cultural populations, it is important to take these values and societal norms into consideration in order to develop the most appropriate intervention. Finally, the social environment, including the role of the PA leader and the cohesiveness within a group exercise environment, can be important considerations when delivering population-based PA interventions. Well-trained leaders, with expertise/certification in working with a specific population and utilizing positive and socially supportive leadership styles, will positively impact PA adherence.

## CONCLUSIONS

Every population will experience different barriers to PA participation, but it is important to remember that many barriers are modifiable. An exercise specialist can help to tailor a PA program so it is manageable, safe, and tolerated, and help clients create strategies to overcome perceived barriers.

Due to the well-documented benefits of PA for various populations, future interventions focused on strategies that promote PA maintenance are required to help people adopt long-term active lifestyles, therefore improving quality of life, decreasing disease-related risk factors, and benefiting from the associated cost-effectiveness of a long-term physically active lifestyle (16,28).

## REFERENCES

1. American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 9th ed. Baltimore (MD): Lippincott Williams and Wilkins; 2014.
2. Baranowski T, Bouchard C, Baror O, et al. Assessment, prevalence, and cardiovascular benefits of physical activity and fitness in youth. *Medicine & Science in Sports & Exercise*. 1992;24:237–47.
3. Bayles CM, Chan S, Robare J. Frailty. In: Durstine JL, Moore GE, Painter PL, Roberts SO, editors. *ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities*. 3rd ed. Champaign (IL): Human Kinetics; 2009. p. 201–8.
4. Booth M, Bauman A, Owen N, Core C. Physical activity preferences, preferred sources of assistance, and perceived barriers to increased activity among physically inactive Australians. *Preventative Medicine*. 1997;26:131–7.
5. Borschmann K, Moore K, Russell M, Ledgerwood K, Renahan E, Lin X. Overcoming barriers to physical activity among culturally and linguistically diverse older adults: a randomized controlled trial. *Australasian Journal on Aging*. 2010 Jun;29(2):77–80.
6. Centers for Disease Control and Prevention. *Youth Risk Behavior Surveillance—United States, 2009*. Department of Health and Human Services, Centers for Disease Control and Prevention, 2010. 26 p. Available from: <http://www.cdc.gov/mmwr/pdf/ss/ss5905.pdf>.
7. Centers for Disease Control and Prevention Web site [Internet]. Atlanta (GA): Centers for Disease Control and Prevention; [cited 2011 August 15]. Available from: <http://www.cdc.gov/physicalactivity/everyone/guidelines/index.html>.
8. Ibid.
9. Chen YM. Perceived barriers to physical activity among older adults residing in long-term care institutions. *Journal of Clinical Nursing*. 2010; 19: 432–9.
10. Chodzko-Zajko WJ, Proctor DN, Singh, MAF, et al. Exercise and physical activity for older adults. *Medicine & Science in Sports & Exercise*. July 2009;41(7):1510–30.
11. Courneya KS, Friedenreich CM. Physical activity and cancer control. *Seminars in Oncology Nursing*. 2007;23(4):242–52.
12. De Onis M, Blossner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. *American Journal of Clinical Nutrition*. 2010;92:1257–64.
13. Department of Health and Human Services Web site [Internet]. Washington (D.C.): Administration on Aging; [cited 2011 August 10]. Available from: [http://www.aoa.gov/AoARoot/Aging\\_Statistics/index.aspx](http://www.aoa.gov/AoARoot/Aging_Statistics/index.aspx).
14. Donnelly JE, Blair SN, Jakicic JM, Manore MM, Rankin JW, Smith BK. Appropriate physical activity intervention strategies for weight loss and prevention of weight regain for adults. *Medicine & Science in Sports & Exercise February*. 2009;41(2):459–71.
15. Doyle C, Kushi L, Byers T, Courneya K, et al. Nutrition and physical activity during and after cancer treatment: An American Cancer Society guide for informed choices. *CA Cancer J Clin*. 2006;56:323–53.
16. Fjeldsoe B, Neuhaus M, Winkler E, Eakin E. Systematic review of maintenance of behavior change following physical activity and dietary interventions. *Health Psychology*. 2011;30(1):99–109.
17. Gillison FB, Skevington SM, Sato A, Standage M, Evangelidou S. The effects of exercise interventions on quality of life in clinical and healthy populations: A meta-analysis. *Soc Sci Med*. 2009;68(9):1700–10.
18. Gurlan MJ, Trouilloud DO, Sarrazin PG. Interventions promoting physical activity among obese populations: A meta-analysis considering global effect, long-term maintenance, physical activity indicators and dose characteristics. *Obesity Reviews*. 2011;12: e633–45.
19. Hacker E. Exercise and quality of life: Strengthening the connections. *Clin J Oncol Nurs*. 2009 Feb;13(1):31–9.
20. Haskell WL, Lee IM, Pate RR, et al. Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Med Sci Sports Exercise*. 2007;39(8):1423–34.
21. Hayes SC, Spence RR, Galvao, Newton, RU. Australian Association for Exercise and Sport Science position stand: Optimising cancer outcomes through exercise. *J Sci Med Sport*. 2009;12(4):428–34.
22. Huhman M, Potter L, Duke J, Judkins D, Heitzler C, Wong F. Evaluation of a national physical activity intervention for children: VERB campaign, 2002–2004. *American Journal of Preventative Medicine*. 2007;32:38–43.
23. Irwin ML. Physical activity interventions for cancer survivors. *Br J Sports Med*. 2009 Jan;43(1):32–38.
24. King A. Interventions to promote physical activity by older adults. *Journal of Gerontology*. 2001;58A:36–46.
25. Knobf MT, Musanti R, Dorward J. Exercise and quality of life outcomes in patients with cancer. *Semin Oncol Nurs*. 2007 Nov;23(4):285–96.
26. Kumanyika S. Obesity treatment in minorities. In: Wadden TA, Stunkard AJ, editors. *Obesity: Theory and Therapy*. 3rd ed. New York: Guilford Publications, Inc.; 2002. p. xiii–377.
27. McAuley E, Morris K, Motl R, Hu L, Konopack J, Elvasky S. Long-term follow-up of physical activity behavior in older adults. *Health Psychology*. 2007;26:375–80.
28. Muller-Riemenschneider F, Reinhold T, Willich SN. Cost-effectiveness of interventions promoting physical activity. *British Journal of Sports Medicine*. 2009;43:70–6.
29. Nelson ME, Rejeski WJ, Blair SN, et al. Physical activity and public health in older adults: recommendations from the American college of sports medicine and the American heart

- association. *Medicine & Science in Sports & Exercise*. 2007;39(8):1435–45.
30. O'dea JA. Why do kids eat healthful food? Perceived benefits of and barriers to healthful eating and physical activity among children and adolescents. *Journal of the American Dietetic Association*. 2003;103(4):497–500.
31. Pangrazi R, Beighle A, Vehige T, Vack C. Impact of promoting lifestyle activity for youth (PLAY) on children's physical activity. *Journal of School Health*. 2003;73:317–21.
32. Pate R, Pfeiffer K, Trost S, Ziegler P, Dowda M. Physical activity among children attending preschools. *Pediatrics*. 2004;114:1258–63.
33. Rogers LQ, Markwell SJ, Verhulst S, McAuley E, Courneya KS. Rural breast cancer survivors: Exercise preferences and their determinants. *Psychooncology*. 2009 Apr;18(4):412–21.
34. Sallinen J, Leinonen R, Hirvensalo M, Lyyra TM, Heikkinen E, Rantanen T. Perceived constraints on physical exercise among obese and non-obese older people. *Preventative Medicine*. 2009;49:506–10.
35. Sallis JF, McKenzie TL, Alcaraz JE, Kolody B, Faucette N, Hovell MF. The effects of a 2-year physical education program (SPARK) on physical activity and fitness I elementary school students. *American Journal of Public Health*. 1997;87:1328–34.
36. Schmitz KH, Courneya KS, Matthews C, et al. American College of Sports Medicine roundtable on exercise guidelines for cancer survivors. *Med Sci Sports Exercise*. 2010 Jul;42(7):1409–26.
37. Speck RM, Courneya KS, Masse LC, Duval S, Schmitz KH. An update of controlled physical activity trials in cancer survivors: A systematic review and meta-analysis. *Journal of Cancer Survivorship*. 2010;4(2):87–100.
38. Speed-Andrews AE, Courneya KS. Effects of exercise on quality of life and prognosis in cancer survivors. *Curr Sports Med Rep*. 2009 Jul–Aug;8(4):176–81.
39. Stone W. Physical activity and health: Becoming mainstream. *Complementary Health Practice Review*. 2004;9:118–28.
40. Strauss RS, Pollack HA. Epidemic increase in childhood overweight, 1986–1998. *Journal of the American Medical Association*. 2001;286(22):2845–48.
41. Telama R, Yang X, Laakso L, Vikari J. Physical activity in childhood and adolescence as predictor of physical activity in young adulthood. *American Journal of Preventative Medicine*. 1997;13:317–23.
42. Tomporowski P, Lambourne K, Okumura M. Physical activity interventions and children's mental function: An introduction and overview. *Preventative Medicine*. 2001;32:S3–S9.
43. U.S. Department of Health and Human Service Web site [Internet]. Washington (D.C.): 2008 Physical Activity Guidelines For Americans; [cited 2011 August 15]. ODPHP Publication No. U0036. Available from: [www.health.gov/paguidelines/](http://www.health.gov/paguidelines/).
44. Wang G, Pratt M, Macera CA, Zheng XJ, Heath G. Physical activity, cardiovascular disease, and medical expenditures in U.S. adults. *Ann Behav Med*. 2004;28(2):88–94.
45. Whitehead S, Lavelle K. Older breast cancer survivors' views and preferences for physical activity. *Qualitative Health Research*. 2009;19:894–906.
46. Williams MA, Haskell WL, Ades PA, et al. Resistance exercise in individuals with and without cardiovascular disease: 2007 update: A scientific statement from the American heart association council on clinical cardiology and council on nutrition, physical activity, and metabolism. *Circulation*. 2007;116:572–84.
47. World Health Organization Web site [Internet]. Geneva (Switzerland): Obesity and Overweight: Fact sheet number 311; [cited 2011 August 15]. Available from: <http://www.who.int/mediacentre/factsheets/fs311/en/index.html>.
48. Yancey A, Ory M, Davis S. Dissemination of physical activity promotion interventions in underserved populations. *American Journal of Preventative Medicine*. 2006;31:82–91.
49. Zabinski MF, Saelens BE, Stein RI, Hayden-Wade HA, Wilfley DE. Overweight children's barriers to and support for physical activity. *Obesity Research*. 2003;11:238–56.
50. Zoeller RE. Physical activity: Depression, anxiety, physical activity and cardiovascular disease: What's the connection? *American Journal of Lifestyle Medicine*. 2007;1:175–80.