

# 22

## **Physical Activity and Fitness**

---

Co-Lead Agencies: Centers for Disease Control and Prevention;  
President’s Council on Physical Fitness and Sports

### **Contents**

Goal .....	3
Overview .....	3
Issues and Trends .....	3
Disparities .....	4
Opportunities.....	6
Interim Progress Toward Year 2000 Objectives .....	6
Healthy People 2010—Summary of Objectives .....	7
Healthy People 2010 Objectives .....	8
Physical Activity in Adults .....	8
Muscular Strength/Endurance and Flexibility .....	13
Physical Activity in Children and Adolescents.....	17
Access .....	25
Related Objectives From Other Focus Areas .....	27
Terminology .....	31
References .....	31



## Goal

---

Improve health, fitness, and quality of life through daily physical activity.

## Overview

---

The 1990s brought a historic new perspective to exercise, fitness, and physical activity by shifting the focus from intensive vigorous exercise to a broader range of health-enhancing physical activities. Research has demonstrated that virtually all individuals will benefit from regular physical activity.<sup>1</sup> The *Surgeon General's Report on Physical Activity and Health* concluded that moderate physical activity can reduce substantially the risk of developing or dying from heart disease, diabetes, colon cancer, and high blood pressure.<sup>1</sup> Physical activity also may protect against lower back pain and some forms of cancer (for example, breast cancer), but the evidence is not yet conclusive.<sup>2,3</sup>

## Issues and Trends

On average, physically active people outlive those who are inactive.<sup>4,5,6,7,8</sup> Regular physical activity also helps to maintain the functional independence of older adults and enhances the quality of life for people of all ages.<sup>9,10,11</sup>

The role of physical activity in preventing coronary heart disease (CHD) is of particular importance, given that this disease is the leading cause of death and disability in the United States. Physically inactive people are almost twice as likely to develop CHD as persons who engage in regular physical activity. The risk posed by physical inactivity is almost as high as several well-known risk factors, such as cigarette smoking, high blood pressure, and high blood cholesterol. Physical inactivity, though, is more prevalent than any one of these other risk factors. People with other risk factors for CHD, such as obesity and high blood pressure, may particularly benefit from physical activity.

Regular physical activity is especially important for people who have joint or bone problems and has been shown to improve muscle function, cardiovascular function, and physical performance.<sup>12</sup> However, people with arthritis (20 percent of the adult population) are less active than those without arthritis.<sup>13</sup> People with osteoporosis, a chronic condition affecting more than 25 million people in the United States, may respond positively to regular physical activity, particularly weight-bearing activities—such as walking<sup>14</sup> and especially when combined with appropriate drug therapy and calcium intake. Increased bone mineral density has been positively associated with aerobic fitness, body composition, and muscular strength.<sup>15</sup>

Although vigorous physical activity is recommended for improved cardiorespiratory fitness, increasing evidence suggests that moderate physical activity also can have significant health benefits, including a decreased risk of CHD. For people who are inactive, even small increases in physical activity are associated with measurable health benefits. In addition, moderate physical activity is more readily adopted and maintained than vigorous physical activity.<sup>16</sup> As research continues to illustrate the links between physical activity and selected health outcomes, people will be able to choose physical activity patterns optimally suited to individual preferences, health risks, and physiologic benefits.

For individuals who do not engage in any physical activity during their leisure time, taking the first step toward developing a pattern of regular physical activity is important. Unfortunately, few individuals engage in regular physical activity despite its documented benefits. Only about 11 percent of adults in the United States report regular, vigorous physical activity that involves large muscle groups in dynamic movement for 20 minutes or longer 3 or more days per week. About 23 percent of adults report physical activity for 5 or more days per week for 30 minutes or longer, but another 23 percent do not participate in any regular physical activity.

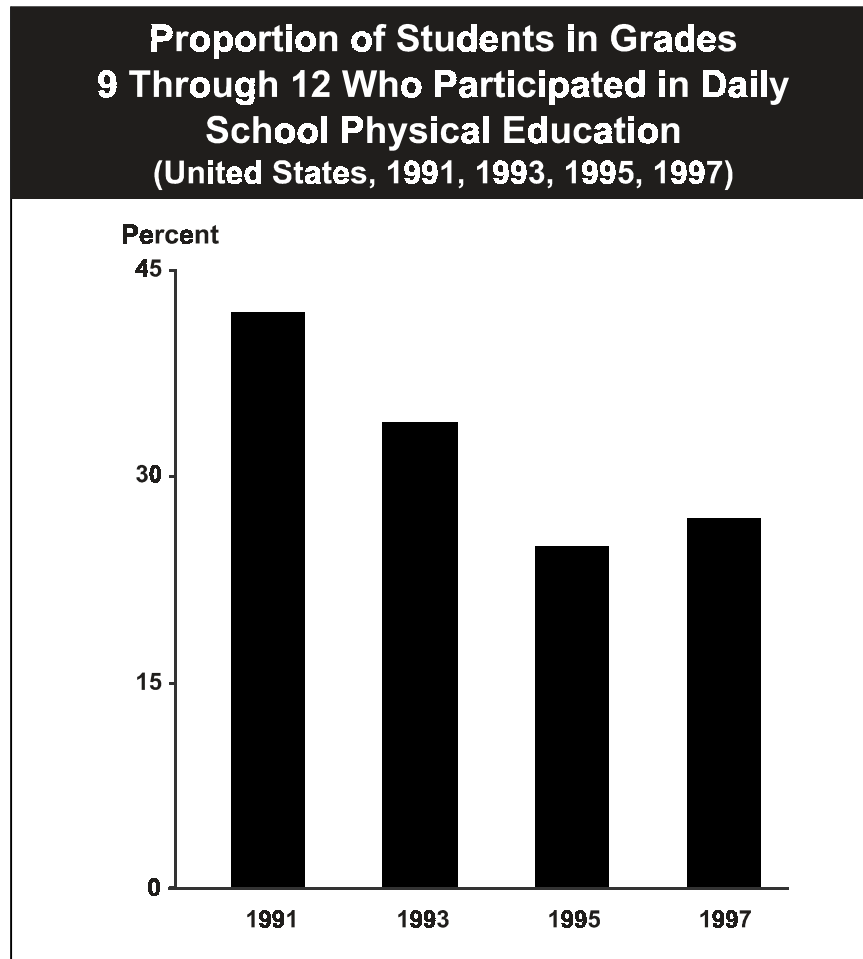
Public education efforts need to address the specific barriers that inhibit the adoption and maintenance of physical activity by different population groups. Older adults, for example, need information about safe walking routes. Persons with foot problems need to learn about proper foot care and footwear in order to reach appropriate activity levels. People with CHD and other chronic conditions must understand the importance of regular physical activity to maintain function. Each person should recognize that starting out slowly with an activity that is enjoyable and gradually increasing the frequency and duration of the activity is central to the adoption and maintenance of physical activity behavior. Along with the public education efforts, public programs in a variety of settings (recreation centers, worksites, health care settings, and schools) need to be developed, evaluated, and shared as potential models. The availability of group activities in the community is important for many.

## **Disparities**

Disparities in levels of physical activity exist among population groups. The percentage of the population reporting no leisure-time physical activity is higher among women than men, among African Americans and Hispanics than whites, among older adults than younger adults, and among the less affluent than the more affluent. Participation in all types of physical activity declines strikingly as age or grade in school increases. In general, persons with lower levels of education and income are least active in their leisure time. Adults in North Central and Western States tend to be more active than those in the Northeastern and Southern States. People with disabilities and certain health conditions are less likely to engage in moderate or vigorous physical activity than are people without disabilities. Health

promotion efforts need to identify barriers to physical activity faced by particular population groups and develop interventions that address these barriers.<sup>1</sup>

Data demonstrate that major decreases in vigorous physical activity occur during grades 9 through 12. This decrease is more profound for girls than for boys, whether the measure is engaging in vigorous physical activity in general or in team sports. The President's Council on Physical Fitness and Sports concluded that because of its physical health and emotional benefits, physical activity has an



**Source:** CDC, NCHS. *Healthy People 2000 Review, 1989–99*, p. 33.

increasingly important role in the lives of girls.<sup>17</sup> Adolescents' interest and participation in physical activity differ by gender.<sup>17</sup> Therefore, strategies to increase the amount of physical activity for boys and girls must address these differences and must begin before the disparities in levels of physical activity manifest themselves. Compared to boys, girls are less likely to participate in team sports but more likely to participate in aerobics or dance. Often girls and boys perceive different benefits from physical activity, with boys viewing such activity as competition and girls as weight management. These factors must be considered in developing programs to address the needs of girls. Since boys are more likely than girls to have higher self-esteem and greater physical strength, programs addressing

the needs of girls should provide instruction and experiences that increase their confidence and their opportunities to participate in activities, as well as social environments that support involvement in a range of physical activities.<sup>17</sup>

## Opportunities

The Healthy People 2010 objectives offer opportunities to ensure that physical activity and fitness become part of regular, healthy behavioral patterns. Encouraging any type or amount of physical activity in leisure time can provide important health benefits, compared to a sedentary lifestyle.

Activities that promote strength and flexibility are important because they may protect against disability, enhance functional independence, and encourage regular physical activity participation. These benefits are particularly important for older people—a good quality of life means being functionally independent and being able to perform the activities of daily living.

Young people are at particular risk for becoming sedentary as they grow older. Therefore, encouraging moderate and vigorous physical activity among youth is important. Because children spend most of their time in school, the type and amount of physical activity encouraged in schools are important components.

The major barriers most people face when trying to increase physical activity are time, access to convenient facilities, and safe environments in which to be active. Counseling by primary care providers about the need to participate in physical activity also is an important way to change behavior. In addition, facilities need to be accessible to people with disabilities.

## Interim Progress Toward Year 2000 Objectives

---

Of the 13 physical activity and fitness objectives, 1 has been met—increasing worksite fitness programs. Four objectives show solid gains, indicating that the message about increased physical activity is reaching some segments of the population. The message that sedentary lifestyle plays a role in both overweight and weight loss needs to be addressed better, as does the role primary care providers can play in counseling individuals to increase their daily activities. Both the quantity and quality of school physical education have slipped. Data to evaluate access and availability of community fitness facilities were not available.

Note: Unless otherwise noted, data are from Centers for Disease Control and Prevention, National Center for Health Statistics, *Healthy People 2000 Review, 1998-99*.

# Healthy People 2010—Summary of Objectives

---

## Physical Activity and Fitness

**Goal:** Improve health, fitness, and quality of life through daily physical activity.

### Number Objective

#### Physical Activity in Adults

- 22-1 No leisure-time physical activity
- 22-2 Moderate physical activity
- 22-3 Vigorous physical activity

#### Muscular Strength/Endurance and Flexibility

- 22-4 Muscular strength and endurance
- 22-5 Flexibility

#### Physical Activity in Children and Adolescents

- 22-6 Moderate physical activity in adolescents
- 22-7 Vigorous physical activity in adolescents
- 22-8 Physical education requirement in schools
- 22-9 Daily physical education in schools
- 22-10 Physical activity in physical education class
- 22-11 Television viewing

#### Access

- 22-12 School physical activity facilities
- 22-13 Worksite physical activity and fitness
- 22-14 Community walking
- 22-15 Community bicycling

## Healthy People 2010 Objectives

---

### Physical Activity in Adults

#### 22-1. Reduce the proportion of adults who engage in no leisure-time physical activity.

**Target:** 20 percent.

**Baseline:** 40 percent of adults aged 18 years and older engaged in no leisure-time physical activity in 1997 (age adjusted to the year 2000 standard population).

**Target setting method:** Better than the best.

**Data source:** National Health Interview Survey (NHIS), CDC, NCHS.

Adults Aged 18 Years and Older, 1997	No Leisure-Time Physical Activity Percent
<b>TOTAL</b>	40
<b>Race and ethnicity</b>	
American Indian or Alaska Native	46
Asian or Pacific Islander	42
Asian	42
Native Hawaiian and other Pacific Islander	41
Black or African American	52
White	38
Hispanic or Latino	54
Not Hispanic or Latino	38
Black or African American	52
White	36
<b>Gender</b>	
Female	43
Male	36



<b>Adults Aged 18 Years and Older, 1997</b>	<b>No Leisure-Time Physical Activity</b> Percent
<b>Age</b>	
18 to 24 years	31
25 to 44 years	34
45 to 64 years	42
65 to 74 years	51
75 years and older	65
<b>Education level (aged 25 years and older)</b>	
Less than 9th grade	73
Grades 9 through 11	59
High school graduate	46
Some college or AA degree	35
College graduate or above	24
<b>Geographic location</b>	
Urban	39
Rural	43
<b>Disability status</b>	
Persons with disabilities	56
Persons without disabilities	36
<b>Select populations</b>	
Persons with arthritis symptoms	43
Persons without arthritis symptoms	38

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.  
Note: Age adjusted to the year 2000 standard population.

**22-2. Increase the proportion of adults who engage regularly, preferably daily, in moderate physical activity for at least 30 minutes per day.**

**Target:** 30 percent.

**Baseline:** 15 percent of adults aged 18 years and older were active for at least 30 minutes 5 or more days per week in 1997 (age adjusted to the year 2000 standard population).

**Target setting method:** Better than the best.

**Data source:** National Health Interview Survey (NHIS), CDC, NCHS.

Adults Aged 18 Years and Older, 1997	22-2. 30 Minutes of Activity 5 or More Days per Week	20 Minutes of Activity 3 or More Days per Week*
	Percent	
<b>TOTAL</b>	15	31
<b>Race and ethnicity</b>		
American Indian or Alaska Native	13	25
Asian or Pacific Islander	15	30
Asian	15	30
Native Hawaiian and other Pacific Is- lander	11	31
Black or African American	10	23
White	15	32
Hispanic or Latino	11	23
Not Hispanic or Latino	15	32
Black or African American	10	22
White	16	33
<b>Gender</b>		
Female	13	30
Male	16	31
<b>Age</b>		
18 to 24 years	17	36
25 to 44 years	15	31
45 to 64 years	14	30
65 to 74 years	16	31
75 years and older	12	23
<b>Education level (aged 25 years and older)</b>		
Less than 9th grade	7	13
Grades 9 through 11	11	21
High school graduate	14	28
Some college or AA degree	17	34
College graduate or above	17	38
<b>Geographic location</b>		
Urban	15	31
Rural	15	30

Adults Aged 18 Years and Older, 1997	22-2. 30 Minutes of Activity 5 or More Days per Week	20 Minutes of Activity 3 or More Days per Week*
	Percent	
<b>Disability status</b>		
Persons with disabilities	12	23
Persons without disabilities	16	33
<b>Select populations</b>		
Persons with arthritis symptoms	15	29
Persons without arthritis symptoms	15	32

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

Note: Age adjusted to the year 2000 standard population.

\*Data for 20 minutes of activity 3 or more days per week are displayed to further characterize the issue.

**22-3. Increase the proportion of adults who engage in vigorous physical activity that promotes the development and maintenance of cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion.**

**Target:** 30 percent.

**Baseline:** 23 percent of adults aged 18 years and older engaged in vigorous physical activity 3 or more days per week for 20 or more minutes per occasion in 1997 (age adjusted to the year 2000 standard population).

**Target setting method:** Better than the best.

**Data source:** National Health Interview Survey (NHIS), CDC, NCHS.

Adults Aged 18 Years and Older, 1997	Vigorous Physical Activity Percent
<b>TOTAL</b>	23
<b>Race and ethnicity</b>	
American Indian or Alaska Native	19
Asian or Pacific Islander	17
Asian	16
Native Hawaiian and other Pacific Islander	24
Black or African American	17
White	24

<b>Adults Aged 18 Years and Older, 1997</b>	<b>Vigorous Physical Activity Percent</b>
Hispanic or Latino	16
Not Hispanic or Latino	24
Black or African American	17
White	25
<b>Gender</b>	
Female	20
Male	26
<b>Age</b>	
18 to 24 years	32
25 to 44 years	27
45 to 64 years	21
65 to 74 years	13
75 years and older	6
<b>Education level (aged 25 years and older)</b>	
Less than 9th grade	6
Grades 9 through 11	12
High school graduate	18
Some college or AA degree	24
College graduate and above	32
<b>Geographic location</b>	
Urban	24
Rural	21
<b>Disability status</b>	
Persons with disabilities	13
Persons without disabilities	25
<b>Select populations</b>	
Persons with arthritis symptoms	21
Persons without arthritis symptoms	24

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.  
Note: Age adjusted to the year 2000 standard population.

The adoption and maintenance of regular physical activity represent an important component of any health regime and provide multiple opportunities to improve and maintain health. Because the highest risk of death and disability is found among those who do no regular physical activity, engaging in any amount of physical activity is preferable to none. Physical activity should be encouraged as

part of a daily routine. While moderate physical activity for at least 30 minutes is preferable, intermittent physical activity also increases caloric expenditure and may be important for those who cannot fit 30 minutes of sustained activity into their daily schedules. For even greater health benefits, vigorous physical activity is necessary. For most persons, the greatest opportunity for physical activity is associated with leisure time, because few occupations today provide sufficient vigorous or moderate physical activity to produce health benefits.

Engaging in moderate physical activity for at least 30 minutes per day will help ensure that sufficient calories are used to provide health benefits. A minimum level of intensity (for example, a brisk walk for 30 minutes per day) would, for most persons, result in an energy expenditure of about 600 to 1,100 calories per week.<sup>18</sup> If calorie intake remains constant, this expenditure translates into a weight loss of roughly one-sixth to one-third pound per week. Increases in daily activity to ensure a weekly expenditure of 1,000 calories would have significant individual and public health benefit for CHD prevention and death from all causes, especially for persons who are sedentary. Furthermore, this level of activity is feasible for most persons even though the relative intensity of any activity will vary by age. Starting out slowly and gradually increasing the frequency and duration of physical activity is the key to successful behavior change. In the case of walking, the message becomes, *If you are not used to daily walking, then walk slowly and take short, frequent walks, gradually increasing distance and speed.*@

## **Muscular Strength/Endurance and Flexibility**

### **22-4. Increase the proportion of adults who perform physical activities that enhance and maintain muscular strength and endurance.**

**Target:** 30 percent.

**Baseline:** 19 percent of adults aged 18 years and older performed physical activities that enhance and maintain strength and endurance 2 or more days per week in 1997 (age adjusted to the year 2000 standard population).

**Target setting method:** Better than the best.

**Data source:** National Health Interview Survey (NHIS), CDC, NCHS.

<b>Adults Aged 18 Years or Older, 1997</b>	<b>Strengthening Exercises</b> Percent
<b>TOTAL</b>	19
<b>Race and ethnicity</b>	
American Indian or Alaska Native	17
Asian or Pacific Islander	18
Asian	17
Native Hawaiian and other Pacific Islander	22
Black or African American	17
White	20
Hispanic or Latino	13
Not Hispanic or Latino	20
Black or African American	17
White	21
<b>Gender</b>	
Female	16
Male	23
<b>Age</b>	
18 to 24 years	30
25 to 44 years	22
45 to 64 years	16
65 to 74 years	11
75 years and older	8
<b>Education level (aged 25 years and older)</b>	
Less than 9th grade	5
Grades 9 through 11	9
High school graduate	13
Some college or AA degree	20
College graduate and above	28
<b>Geographic location</b>	
Urban	21
Rural	16
<b>Disability status</b>	
Persons with disabilities	14
Persons without disabilities	20

<b>Adults Aged 18 Years or Older, 1997</b>	<b>Strengthening Exercises</b> Percent
<b>Select populations</b>	
Persons with arthritis symptoms	19
Persons without arthritis symptoms	20

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.  
 Note: Age adjusted to the year 2000 standard population.

## **22-5. Increase the proportion of adults who perform physical activities that enhance and maintain flexibility.**

**Target:** 40 percent.

**Baseline:** 30 percent of adults aged 18 years and older did stretching exercises in the past 2 weeks in 1995 (age adjusted to the year 2000 standard population).

**Target setting method:** Better than the best.

**Data source:** National Health Interview Survey (NHIS), CDC, NCHS.

<b>Adults Aged 18 Years and Older, 1995</b>	<b>Stretching Exercises</b> Percent
<b>TOTAL</b>	30
<b>Race and ethnicity</b>	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	31
Asian	DSU
Native Hawaiian and other Pacific Islander	DSU
Black or African American	28
White	30
<b>Hispanic or Latino</b>	
Hispanic or Latino	25
Not Hispanic or Latino	31
Black or African American	28
White	31
<b>Gender</b>	
Female	31
Male	29

<b>Adults Aged 18 Years and Older, 1995</b>	<b>Stretching Exercises</b> Percent
<b>Age</b>	
18 to 24 years	39
25 to 44 years	34
45 to 64 years	27
65 to 74 years	22
75 years and older	21
<b>Family income level</b>	
Below poverty	24
Near poverty	26
Middle/high income	34
<b>Education level (aged 25 years and older)</b>	
Less than high school	16
High school graduate	25
At least some college	37
<b>Geographic location</b>	
Urban	32
Rural	25
<b>Disability status</b>	
Persons with activity limitations	29
Persons without activity limitations	31
<b>Select populations</b>	
Persons with arthritis symptoms	DNA
Persons without arthritis symptoms	DNA

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.  
Note: Age adjusted to the year 2000 standard population.

All adults could benefit from physical activities designed to ensure functional independence throughout life. The specific physical fitness components that provide continued physical function as persons age include muscular strength/endurance and flexibility. Examples of these activities include weight training, resistance activities (using elastic bands or dumbbells), and stretching exercises (such as static stretching, yoga, or T'ai Chi Chuan).

Effective treatment of many chronic diseases and disorders has resulted in more years of life, but many of these extra years are spent with disabling conditions that prevent independent living and reduce the quality of life. Strengthening activities, while important for all age groups, are particularly important for older adults.



Muscle strength declines with age, and there is a demonstrated relationship between muscle strength and physical function.<sup>19</sup> Age-related loss of strength may be lessened by strengthening exercises, enabling an individual to maintain a threshold level of strength necessary to perform basic weight-bearing activities, such as walking.<sup>20, 21</sup> Strength training also has been shown to preserve bone density in postmenopausal women.<sup>22</sup>

Physical activities that improve muscular strength/endurance and flexibility also improve the ability to perform tasks of daily living and may improve balance, thus preventing falls.<sup>1</sup> Activities of daily living have been identified as a scale to measure dependencies in basic self-care and other functions important for independent living and to avoid institutionalization. The performance of routine daily activities is particularly important to maintaining functional independence and social integration in older adults.<sup>11</sup>

Although flexibility may appear to be a minor component of physical fitness, the consequence of rigid joints affects all aspects of life, including walking, stooping, sitting, avoiding falls, and driving a vehicle. Lack of joint flexibility may adversely affect quality of life and will lead to eventual disability.<sup>23</sup> Activities such as static stretching or T'ai Chi Chuan routines, which consist of slow, graceful movements with low impact, have great promise for maintaining flexibility and can be appropriate for adults of any age.<sup>24</sup> Increasing public awareness of all these potential benefits of muscle strengthening and flexibility activities—and developing and making quality programs available and accessible—may encourage the pursuit of activities that promote muscular strength/endurance and flexibility.

## Physical Activity in Children and Adolescents

### **22-6. Increase the proportion of adolescents who engage in moderate physical activity for at least 30 minutes on 5 or more of the previous 7 days.**

**Target:** 30 percent.

**Baseline:** 20 percent of students in grades 9 through 12 engaged in moderate physical activity for at least 30 minutes on 5 or more of the previous 7 days in 1997.

**Target setting method:** Better than the best.

**Data source:** Youth Risk Behavior Survey (YRBS), CDC, NCCDPHP.

Students in Grades 9 Through 12, 1997	Moderate Physical Activity		
	22-6. Both Genders	Females*	Males*
	Percent		
<b>TOTAL</b>	20	20	21
<b>Race and ethnicity</b>			
American Indian or Alaska Native	DSU	DSU	DSU
Asian or Pacific Islander	DSU	DSU	DSU
Asian	DNC	DNC	DNC
Native Hawaiian and other Pacific Islander	DNC	DNC	DNC
Black or African American	DNC	DNC	DNC
White	DNC	DNC	DNC
Hispanic or Latino	27	25	28
Not Hispanic or Latino	DNC	DNC	DNC
Black or African American	28	27	29
White	17	16	18
<b>Grade</b>			
9th grade	28	28	29
10th grade	22	21	24
11th grade	17	17	18
12th grade	15	14	15
<b>Parents' education level</b>			
Less than high school	25	25	24
High school graduate	21	20	21
At least some college	20	19	20

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

\*Data for females and males are displayed to further characterize the issue.

**22-7. Increase the proportion of adolescents who engage in vigorous physical activity that promotes cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion.**

**Target:** 85 percent.

**Baseline:** 64 percent of students in grades 9 through 12 engaged in vigorous physical activity 3 or more days per week for 20 or more minutes per occasion in 1997.

**Target setting method:** Better than the best.

**Data source:** Youth Risk Behavior Survey (YRBS), CDC, NCCDPHP.

Students in Grades 9 Through 12, 1997	Vigorous Physical Activity		
	22-7. Both Genders	Females*	Males*
	Percent		
<b>TOTAL</b>	64	54	72
<b>Race and ethnicity</b>			
American Indian or Alaska Native	DSU	DSU	DSU
Asian or Pacific Islander	DSU	DSU	DSU
Asian	DNC	DNC	DNC
Native Hawaiian and other Pacific Islander	DNC	DNC	DNC
Black or African American	DNC	DNC	DNC
White	DNC	DNC	DNC
Hispanic or Latino	60	50	69
Not Hispanic or Latino	DNC	DNC	DNC
Black or African American	54	41	67
White	67	58	73
<b>Grade</b>			
9th grade	73	66	79
10th grade	66	56	74
11th grade	60	49	69
12th grade	58	44	68

Students in Grades 9 Through 12, 1997	Vigorous Physical Activity		
	22-7. Both Genders	Females*	Males*
	Percent		
<b>Parents' education level</b>			
Less than high school	50	43	60
High school graduate	54	45	62
At least some college	68	57	75

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

\*Data for females and males are displayed to further characterize the issue.

**22-8. Increase the proportion of the Nation's public and private schools that require daily physical education for all students.**

Objective	Increase in Schools Requiring Daily Physical Activity for All Students	1994 Baseline	2010 Target
22-8a	Middle and junior high	17	25
22-8b.	Senior high	2	5

**Target setting method:** 47 percent improvement for middle and junior high schools; 150 percent improvement for senior high schools.

**Data source:** School Health Policies and Programs Study (SHPPS), CDC, NCCDPHP.

**22-9. Increase the proportion of adolescents who participate in daily school physical education.**

**Target:** 50 percent.

**Baseline:** 27 percent of students in grades 9 through 12 participated in daily school physical education in 1997.

**Target setting method:** Better than the best.

**Data source:** Youth Risk Behavior Survey (YRBS), CDC, NCCDPHP.

Students in Grades 9 Through 12, 1997	Daily School Physical Education		
	22-9. Both Genders	Females*	Males*
	Percent		
<b>TOTAL</b>	27	25	30
<b>Race and ethnicity</b>			
American Indian or Alaska Native	DSU	DSU	DSU
Asian or Pacific Islander	DSU	DSU	DSU
Asian	DNC	DNC	DNC
Native Hawaiian and other Pacific Islander	DNC	DNC	DNC
Black or African American	DNC	DNC	DNC
White	DNC	DNC	DNC
Hispanic or Latino	38	37	39
Not Hispanic or Latino	DNC	DNC	DNC
Black or African American	33	28	37
White	24	21	26
<b>Grade</b>			
9th grade	43	42	43
10th grade	31	28	33
11th grade	19	16	23
12th grade	19	14	23
<b>Parents' education level</b>			
Less than high school	29	28	30
High school graduate	24	22	27
At least some college	28	25	30

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

\*Data for females and males are displayed to further characterize the issue.

**22-10. Increase the proportion of adolescents who spend at least 50 percent of school physical education class time being physically active.**

**Target:** 50 percent.

**Baseline:** 32 percent of students in grades 9 through 12 were physically active in physical education class more than 20 minutes 3 to 5 days per week in 1997.

**Target setting method:** Better than the best.

**Data source:** Youth Risk Behavior Survey (YRBS), CDC, NCCDPHP.

Students in Grades 9 Through 12, 1997	Physically Active in Physical Education Classes		
	22-10. Both Genders	Females*	Males*
	Percent		
<b>TOTAL</b>	32	27	36
<b>Race and ethnicity</b>			
American Indian or Alaska Na- tive	DSU	DSU	DSU
Asian or Pacific Islander	DNC	DNC	DNC
Asian	DSU	DSU	DSU
Native Hawaiian and other Pacific Islander	DNC	DNC	DNC
Black or African American	DNC	DNC	DNC
White	DNC	DNC	DNC
Hispanic or Latino	36	33	39
Not Hispanic or Latino	DNC	DNC	DNC
Black or African American	31	25	37
White	31	27	35
<b>Grade</b>			
9th grade	47	43	50
10th grade	35	30	40
11th grade	24	17	29
12th grade	24	17	29
<b>Parents' education level</b>			
Less than high school	28	25	32
High school graduate	29	24	35
At least some college	33	27	37

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

\*Data for females and males are displayed to further characterize the issue.

**22-11. Increase the proportion of children and adolescents who view television 2 or fewer hours per day.**

**Target:** 75 percent.

**Baseline:** 60 percent of persons aged 8 to 16 years viewed television 2 or fewer hours per day in 1988-94.

**Target setting method:** Better than the best.

**Data sources:** National Health and Nutrition Examination Survey (NHANES), CDC, NCHS; after 2000, Youth Risk Behavior Survey (YRBS), CDC, NCCDPHP.

<b>Children and Adolescents Aged 8 to 16 Years, 1988-94</b>	<b>Television 2 or Fewer Hours Per Day</b> Percent
<b>TOTAL</b>	60
<b>Race and ethnicity</b>	
American Indian or Alaska Native	DSU
Asian or Pacific Islander	DSU
Asian	DNC
Native Hawaiian and other Pacific Islander	DNC
Black or African American	43
White	63
<b>Hispanic or Latino</b>	
Mexican American	53
Not Hispanic or Latino	DNA
Black or African American	42
White	65
<b>Gender</b>	
Female	64
Male	54
<b>Family income level</b>	
Poor	53
Near poor	54
Middle/high income	64

DNA = Data have not been analyzed. DNC = Data are not collected. DSU = Data are statistically unreliable.

The health benefits of moderate and vigorous physical activity are not limited to adults. Physical activity among children and adolescents is important because of

the related health benefits (cardiorespiratory function, blood pressure control, and weight management) and because a physically active lifestyle adopted early in life may continue into adulthood. Even among children aged 3 to 4 years, those who were less active tended to remain less active than most of their peers after age 3 years.<sup>25</sup> These findings highlight the need for parents, educators, and health care providers to become positive role models and to be involved actively in the promotion of physical activity and fitness in children and adolescents.

Many children are less physically active than recommended, and physical activity declines during adolescence.<sup>26, 27</sup> One study found that one-quarter of U.S. children spend 4 hours or more watching television daily.<sup>28</sup> Schools are an efficient vehicle for providing physical activity and fitness instruction because they reach most children and adolescents. Participation in school physical education ensures a minimum amount of physical activity and provides a forum to teach physical activity strategies and activities that can be continued into adulthood. Findings suggest that the quantity and, in particular, the quality of school physical education programs have a significant positive effect on the health-related fitness of children and adolescents by increasing their participation in moderate to vigorous activities.<sup>29, 30</sup>

Studies have shown that spending 50 percent of physical education class time on physical activity is an ambitious but feasible target. Being active for at least half of physical education class time on at least half of the school days would provide a substantial portion of the physical activity time recommended for adolescents.<sup>31</sup> To achieve the benefits of school-based physical education equitably for all children, daily adaptive physical education programs should be available for children with special needs. School physical education requirements also are recommended for students in preschool and postsecondary programs.<sup>32</sup>

Physical education is the primary source of physical activity and fitness instruction. Health education and other courses, however, can highlight the importance of physical activity as a component of a healthy lifestyle. A well-designed health education curriculum can help students develop the knowledge, attitudes, behavioral skills, and confidence needed to adopt and maintain physically active lifestyles.<sup>32</sup> To maximize classroom time, instruction on physical activity also can be integrated into the lesson plans of other school subjects, such as mathematics, biology, and language arts. Programs that have included classroom instruction in physical activity have been effective in enhancing students' physical activity-related knowledge,<sup>33</sup> attitudes,<sup>34</sup> behavior,<sup>35</sup> and physical fitness.<sup>36</sup> (See Focus Area 7. Educational and Community-based Programs.)



## Access

**22-12. (Developmental) Increase the proportion of the Nation's public and private schools that provide access to their physical activity spaces and facilities for all persons outside of normal school hours (that is, before and after the school day, on weekends, and during summer and other vacations).**

**Potential data source:** School Health Policies and Programs Study (SHPPS), CDC, NCCDPHP.

**22-13. Increase the proportion of worksites offering employer-sponsored physical activity and fitness programs.**

**Target:** 75 percent.

**Baseline:** In 1998-99:

Worksite Size	Worksite	Health Plan	Worksite or Health Plan
		Percent	
<50 employees		<b>Developmental</b>	
50 to 99 employees	24	21	38
100 to 249 employees	31	20	42
250 to 749 employees	44	25	56
750+ employees	61	27	68
Total (50+)	36	22	46

**Target setting method:** Better than the best.

**Data source:** 1999 National Worksite Health Promotion Survey, Association for Worksite Health Promotion (AWHP).

Participation in regular physical activity depends, in part, on the availability and proximity of community facilities and on environments conducive to physical activity. Studies of adult participation in physical activity have found that use generally decreases as facility distance from a person's residence increases.<sup>37</sup> People are unlikely to use community resources located more than a few miles away by car or more than a few minutes away by biking or walking.

One of the major barriers to youth participation in sports is lack of enough sports facilities.<sup>38</sup> Increased access to community physical activity facilities would, therefore, help facilitate increases in youth physical activity. The availability of school facilities for physical activity programs also may be beneficial for crime and violence prevention and other social programs,<sup>38</sup> because most juvenile crime is committed between 3 and 8 p.m.

Schools need to work with community coalitions and community-based physical activity programs to take maximum advantage of school facilities for the benefit of children and adolescents and the community as a whole. The needs of all community members, including senior citizens and persons with disabilities, need to be considered.

Worksite physical activity and fitness programs provide a mechanism for reaching large numbers of adults and have at least short-term effectiveness in increasing the physical activity and fitness of program participants.<sup>39</sup> Such programs should be provided in a culturally and linguistically competent manner. Evidence that worksite programs are cost-effective is growing. Such programs may even reduce employer costs for insurance premiums, disability benefits, and medical expenses.<sup>40</sup> Additional benefits for employers include increased productivity, reduced absenteeism, reduced employee turnover, improved morale, enhanced company image, and enhanced recruitment. Including family members and retirees in worksite programs can further increase benefits to employers and the community.<sup>41</sup>

As purchasers of group health and life insurance plans, employers can design employee benefit packages that include coverage for fitness club membership fees and community-based fitness classes. Employers also can offer reduced insurance premiums and rebates for employees who participate regularly in worksite fitness programs or who can document regular physical activity.

## **22-14. Increase the proportion of trips made by walking.**

### **Target and baseline:**

<b>Objective</b>	<b>Increase in Trips Made by Walking</b>	<b>Activity</b>	<b>1995</b>	<b>2010</b>
			<b>Baseline</b>	<b>Target</b>
			Percent	
<b>22-14a.</b>	Adults aged 18 years and older	Trips less than 1 mile	16	25
<b>22-14b.</b>	Children and adolescents aged 5 to 15 years	Trips to school less than 1 mile	28	50

**Target setting method:** Better than the best will be used when data are available.

**Data source:** National Personal Transportation Survey (NPTS), U.S. Department of Transportation.

**Data for population groups currently not collected.**

Walking is a very popular form of physical activity in the United States; however, people need the opportunity to walk safely. Over 75 percent of all trips less than 1 mile were made by automobile in 1995.<sup>41</sup> In addition, the number of walking trips as a percentage of all trips taken (of any distance) has declined over the years.

Walking trips made by adults walking dropped from 9.3 percent in 1977 to 7.2 percent in 1990 and again to 5.4 percent in 1995. Walking has declined even more sharply for children.<sup>42</sup> These declines have wide implications for the health of adults and children.

## 22-15. Increase the proportion of trips made by bicycling.

**Target and baseline:**

Objective	Increase in Trips Made by Bicycling	Activity	1995	2010
			Baseline	Target
			Percent	
22-15a.	Adults aged 18 years and older	Trips less than 5 miles	0.6	2.0
22-15b.	Children and adolescents aged 5 to 15 years	Trips to school less than 2 miles	2.2	5.0

**Target setting method:** Better than the best will be used when data are available.

**Data source:** National Personal Transportation Survey (NPTS), U.S. Department of Transportation.

**Data for population groups currently not collected.**

Bicycling is another form of transportation that may be used by both children and adults to cover distances that may not be feasible by walking. If the environment does not provide safe opportunities for physical activities such as walking and bicycling, adults and children likely will spend more time doing sedentary activities indoors. (See Focus Area 8. Environmental Health.) Sedentary activities, such as watching television, playing video games, and using personal computers, have contributed to increases in the cases of overweight individuals.<sup>28</sup>

## Related Objectives From Other Focus Areas

---

### 1. Access to Quality Health Services

- 1-2. Health insurance coverage for clinical preventive services
- 1-3. Counseling about health behaviors

### 2. Arthritis, Osteoporosis, and Chronic Back Conditions

- 2-2. Activity limitations due to arthritis
- 2-3. Personal care limitations
- 2-8. Arthritis education
- 2-9. Cases of osteoporosis
- 2-11. Activity limitations due to chronic back conditions

### **3. Cancer**

- 3-5. Colorectal cancer deaths
- 3-7. Prostate cancer deaths
- 3-9. Sun exposure
- 3-10. Provider counseling about preventive measures

### **4. Chronic Kidney Disease**

- 4-8. Medical therapy for persons with diabetes and proteinuria

### **5. Diabetes**

- 5-1. Diabetes education
- 5-2. Prevent diabetes
- 5-3. Reduce diabetes
- 5-4. Diagnosis of diabetes
- 5-5. Diabetes deaths
- 5-6. Diabetes-related deaths
- 5-7. Cardiovascular deaths in persons with diabetes

### **6. Disability and Secondary Conditions**

- 6-2. Feelings and depression among children with disabilities
- 6-3. Feelings and depression interfering with activities among adults with disabilities
- 6-4. Social participation among adults with disabilities
- 6-9. Children and youth with disabilities included in regular education programs
- 6-10. Accessibility of health and wellness programs
- 6-12. Environmental barriers affecting participation
- 6-13. Surveillance and health promotion programs

### **7. Educational and Community-Based Programs**

- 7-2. School health education
- 7-3. Health-risk behavior information for college and university students
- 7-5. Worksite health promotion programs
- 7-6. Participation in employee-sponsored health promotion activities
- 7-7. Patient and family education
- 7-9. Health care organization sponsorship of community health promotion activities
- 7-10. Community health promotion programs
- 7-11. Culturally appropriate community health promotion programs
- 7-12. Older adult participation in community health promotion activities

### **8. Environmental Health**

- 8-1. Harmful air pollutants
- 8-2. Alternative modes of transportation
- 8-9. Beach closings
- 8-20. School policies to protect against environmental hazards

### **9. Family Planning**

- 9-11. Pregnancy prevention education

**11. Health Communication**

- 11-1. Households with Internet access
- 11-4. Quality of Internet health information sources

**12. Heart Disease and Stroke**

- 12-1. Coronary heart disease (CHD) deaths
- 12-7. Stroke deaths
- 12-9. High blood pressure
- 12-10. High blood pressure control
- 12-11. Action to help control blood pressure
- 12-13. Mean total cholesterol levels
- 12-14. High blood cholesterol levels
- 12-16. LDL-cholesterol level in CHD patients

**15. Injury and Violence Prevention**

- 15-1. Nonfatal head injuries
- 15-2. Nonfatal spinal cord injuries
- 15-13. Deaths from unintentional injuries
- 15-14. Nonfatal unintentional injuries
- 15-16. Pedestrian deaths
- 15-18. Nonfatal pedestrian injuries
- 15-21. Motorcycle helmet use
- 15-23. Bicycle helmet use
- 15-24. Bicycle helmet laws
- 15-27. Deaths from falls
- 15-28. Hip fractures
- 15-28. Drownings
- 15-31. Injury protection in school sports

**16. Maternal, Infant, and Child Health**

- 16-3. Adolescent and young adult deaths
- 16-12. Weight gain during pregnancy

**17. Medical Product Safety**

- 17-2. Linked, automated information systems
- 17-3. Provider review of medications taken by patients
- 17-5. Receipt of oral counseling from prescribers and dispensers

**18. Mental Health and Mental Disorders**

- 18-4. Treatment for children with mental health needs
- 18-5. Treatment for adults with mental illnesses
- 18-14. Eating disorder relapses

**19. Nutrition and Overweight**

- 19-1. Healthy weight in adults
- 19-2. Obesity in adults

- 19-3. Overweight or obesity in children and adolescents
- 19-16. Worksite promotion of nutrition education and weight management

#### **20. Occupational Safety and Health**

- 20-1. Work-related injury deaths
- 20-2. Work-related injuries
- 20-3. Overextension or repetitive motion
- 20-10. Worksite stress reduction programs

#### **23. Public Health Infrastructure**

- 23-2. Public access to information and surveillance data
- 23-5. Data for Leading Health Indicators, Health Status Indicators, and Priority Data Needs at Tribal, State, and local levels
- 23-16. Prevention research

#### **24. Respiratory Diseases**

- 24-1. Deaths from asthma
- 24-2. Hospitalizations for asthma
- 24-3. Hospital emergency department visits for asthma
- 24-4. Activity limitations
- 24-5. School or work days lost
- 24-6. Patient education
- 24-7. Appropriate asthma care

#### **25. Sexually Transmitted Diseases**

- 25-11. Responsible adolescent sexual behavior
- 25-12. Responsible sexual behavior messages on television

#### **26. Substance Abuse**

- 26-9. Substance-free youth
- 26-14. Steroid use among adolescents
- 26-17. Perception of risk associated with substance abuse
- 26-23. Community partnerships and coalitions

#### **27. Tobacco Use**

- 27-1. Adult tobacco use
- 27-2. Adolescent tobacco use
- 27-3. Initiation of tobacco use
- 27-4. Age at first use of tobacco
- 27-5. Smoking cessation by adults
- 27-7. Smoking cessation by adolescents

#### **28. Vision and Hearing**

- 28-9. Protective eyewear

## Terminology

---

(A listing of all abbreviations and acronyms used in this publication appears in Appendix K.)

**Aerobic:** Conditions or processes that occur in the presence of, or requiring, oxygen.<sup>43</sup>

**Energy expenditure:** The energy cost to the body of physical activity, usually measured in kilocalories.<sup>43</sup>

**Functional independence:** The ability to perform successfully and safely activities related to a daily routine with sufficient energy, strength/endurance, flexibility, and coordination.

**Physical activity:** Bodily movement that is produced by the contraction of skeletal muscle and that substantially increases energy expenditure.<sup>1</sup>

**Moderate physical activity:** Activities that use large muscle groups and are at least equivalent to brisk walking. In addition to walking, activities may include swimming, cycling, dancing, gardening and yardwork, and various domestic and occupational activities.

**Vigorous physical activity:** Rhythmic, repetitive physical activities that use large muscle groups at 70 percent or more of maximum heart rate for age. An exercise heart rate of 70 percent of maximum heart rate for age is

about 60 percent of maximal cardiorespiratory capacity and is sufficient for cardiorespiratory conditioning.

Maximum heart rate equals roughly 220 beats per minute minus age. Examples of vigorous physical activities include jogging/running, lap swimming, cycling, aerobic dancing, skating, rowing, jumping rope, cross-country skiing, hiking/backpacking, racquet sports, and competitive group sports (for example, soccer and basketball).

**Physical fitness:** A set of attributes that persons have or achieve that relates to the ability to perform physical activity.<sup>1</sup> Performance-related components of fitness include agility, balance, coordination, power, and speed.<sup>44</sup> Health-related components of physical fitness include body composition, cardiorespiratory function, flexibility, and muscular strength/endurance.<sup>43</sup>

**Agility:** Ability to start, stop, and move the body quickly and in different directions.

**Balance:** Ability to maintain a certain posture or to move without falling.

**Body composition:** The relative amount of body weight that is fat and nonfat.

**Cardiorespiratory function:** A health-related component of physical fitness that relates to the ability of the

circulatory and respiratory systems to supply oxygen during physical activity.

**Coordination:** Ability to do a task integrating movements of the body and different parts of the body.

**Exercise (exercise training):** Planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness.

**Flexibility:** The ability to move a joint through the full range of motion without discomfort or pain.

**Muscular strength:** The ability of the muscle to generate the maximum amount of force.

**Muscular endurance:** The ability of the muscle to perform repetitive contractions over a prolonged period of time.

**Power:** Ability to exert muscular strength quickly.

**Speed:** Ability to move the whole body quickly.

**Sedentary:** A person who is relatively inactive and has a lifestyle characterized by a lot of sitting.<sup>43</sup>

## References

---

1. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for

Chronic Disease Prevention and Health Promotion, 1996.

2. Frost, H.; Moffett, J.A.K.; Moser, J.S.; and Fairbank, J.C.T. Randomized controlled trial for evaluation of fitness programme for pa-

tients with chronic low back pain. *British Medical Journal* 310:151-154, 1995.

3. McTiernan, A.; Stanford, J.L.; Weiss, N.S.; Daling, J.R.; and Voight, L.F. Occurrence of breast cancer in

- relation to recreational exercise in women age 50-64 years. *Epidemiology* 7(6):598-604, 1996.
4. Kujala, U.M.; Kaprio, J.; Sarna, S.; and Koskenvuo, M. Relationship of leisure-time physical activity and mortality: The Finnish twin cohort. *Journal of the American Medical Association* 279(6):440-444, 1998.
  5. Paffenbarger, R.S.; Hyde, R.T.; Wing, A.L.; Lee, I.M.; et al. The association of changes in physical-activity level and other lifestyle characteristics with mortality among men. *New England Journal of Medicine* 328(8):538-545, 1993.
  6. Sherman, S.E.; D'Agostino, R.B.; Cobb, J.L.; and Kannel, W.B. Physical activity and mortality in women in the Framingham Heart Study. *American Heart Journal* 128(5):879-884, 1994.
  7. Kaplan, G.A.; Strawbridge, W.J.; Cohen, R.D.; and Hungerford, L.R. Natural history of leisure-time physical activity and its correlates: Associations with mortality from all causes and cardiovascular disease over 28 years. *American Journal of Epidemiology* 144(8):793-797, 1996.
  8. Kushi, L.H.; Fee, R.M.; Folsom, A.R.; Mink, P.J.; et al. Physical activity and mortality in postmenopausal women. *Journal of the American Medical Association* 277:1287-1292, 1997.
  9. Nelson, M.E.; Fiatarone, M.A.; Morganti, C.M.; Trice, I.; Greenberg, R.A.; and Evans, W.J. Effects of high-intensity strength training on multiple risk factors for osteoporotic fractures: A Randomized Controlled Trial. *Journal of the American Medical Association* 272(24):1909-1914, 1994.
  10. LaCroix, A.Z.; Guralnik, J.M.; Berkman, L.F.; Wallace, R.B.; and Satterfield, S. Maintaining mobility in late life. II. Smoking, alcohol consumption, physical activity, and body mass index. *American Journal of Epidemiology* 137(8):858-869, 1993.
  11. Buchner, D.M. Preserving mobility in older adults. *Western Journal of Medicine* 167(4):258-264, 1997.
  12. Stenstrom, C.H. Home exercise in rheumatoid arthritis functional class II: Goal setting versus pain attention. *Journal of Rheumatology* 21(4):627-634, 1994.
  13. Centers for Disease Control and Prevention (CDC). Prevalence of leisure-time physical activity among persons with arthritis and other rheumatic conditions—United States, 1990-91. *Morbidity and Mortality Weekly Report* 46(18):389-393, 1997.
  14. National Institutes of Health. Optimal Calcium Intake. *NIH Consensus Statement* 12(4):1-31, June 6-8, 1994.
  15. Snow-Harter, C.; Shaw, J.M.; and Matkin, C.C. Physical activity and risk of osteoporosis. In: Marcus, R.; Feldman, D.; and Kelsey, J. (eds.). *Osteoporosis*. San Diego, CA: Academic Press, 1996, 511-528.
  16. Pate, R.R.; Pratt, M.; Blair, S.N.; Haskell, W.L.; Macera, C.A.; Bouchard, C.; et al. Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Journal of the American Medical Association* 273(5):402-407, 1995.
  17. President's Council on Physical Fitness and Sports. *Physical Activity & Sport in the Lives of Girls*. Washington, DC: The President's Council on Physical Fitness and Sports, May 1997.
  18. Stefan, J.R.; DiPietro, L.; Davis, D.; Kohl, H.W.; et al. Physical activity patterns associated with cardiorespiratory fitness and reduced mortality: The Aerobics Center Longitudinal Study. *American Journal of Public Health* 88(12):1807-1813, 1998.
  19. Brown, M.; Sinacore, D.R.; and Host, H.H. The relationship of strength to function in the older adult. *Journal of Gerontology* 50A:55-59, 1995.
  20. Tseng, B.S.; Marsh, D.R.; Hamilton, M.T.; and Booth, F.W. Strength and aerobic training attenuate muscle wasting and improve resistance to the development of disability with aging. *Journal of Gerontology* 50A:113-119, 1995.
  21. Evans, W.J. Effects of exercise on body composition and functional capacity of the elderly. *Journal of Gerontology* 50A:147-150, 1995.
  22. Nelson, M.E.; Fiatarone, M.A.; Morganti, C.M.; Trice, I.; Greenberg, R.A.; and Evans, W.J. Effects of high-intensity strength training on multiple risk factors for osteoporotic fractures: A Randomized Controlled Trial. *Journal of the American Medical Association* 272(24):1909-1914, 1994.
  23. Cunningham, D.A.; Paterson, D.H.; Hinmann, J.E.; and Rechnitzer, P.A. Determinants of independence in the elderly. *Canadian Journal of Applied Physiology* 18(3):243-254, 1993.
  24. Lan, C.; Lai, J.S.; Chen, S.Y.; and Wong, M.K. 12-month Tai Chi training in the elderly: Its effect on health fitness. *Medicine and Science in Sports and Exercise* 30(3):345-351, 1997.



25. Pate, R.R.; Baranowski, T.; Dowda, M.; and Trost, S.G. Tracking of physical activity in young children. *Medicine and Science in Sports and Exercise* 28(1):92-96, 1996.
26. Pate, R.R.; Long, B.J.; and Heath, G. Descriptive epidemiology of physical activity in adolescents. *Pediatric Exercise Science* 6:434-447, 1994.
27. CDC. Youth risk behavior surveillance—United States, 1997. *Morbidity and Mortality Weekly Report* 47(55-3):1-89, 1998.
28. Anderson, R.E.; Crespo, C.J.; Bartlett, S.J.; Cheskin, L.J.; and Pratt M. Relationship of physical activity and television watching with body weight and level of fatness among children: Results from the Third National Health and Nutrition Examination Survey. *Journal of the American Medical Association* 279:938-942, 1998.
29. McKenzie, T.L.; Nader, P.R.; Strikmiller, P.K.; Yang, M.; Stone, E.J.; Perry, C.L.; Taylor, W.C.; Epping, J.M.; Feldman, H.A.; Luepker, R.V.; and Kelder, S.H. School physical education: Effect of the child and adolescent trial for cardiovascular health. *Preventive Medicine* 25(4):423-431, 1996.
30. Sallis, J.F.; McKenzie, T.L.; Alcaraz, J.E.; Kolody, B.; Faucette, N.; and Hovell, M.F. The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. *American Journal of Public Health* 87(8):1328-1334, 1997.
31. Sallis, J.F., and Patrick, K. Physical activity guidelines for adolescents: Consensus statement. *Pediatric Exercise Science* 6:302-314, 1994.
32. CDC. Guidelines for school and community programs to promote lifelong physical activity among young people. *Morbidity and Mortality Weekly Report* 46(RR-6):1-36, 1997.
33. Killen, J.D.; Telch, M.J.; Robinson, T.N.; et al. Cardiovascular disease risk reduction for tenth graders: A multiple-factor school-based approach. *Journal of the American Medical Association* 260(12):1728-1733, 1988.
34. Prokhorov, A.V.; Perry, C.L.; Kelder, S.H.; et al. Lifestyle values of adolescents: Results from Minnesota Heart Health Youth Program. *Adolescence* 28(111):637-647, 1993.
35. Kelder, S.H.; Perry, C.L.; and Klepp, K.I. Community-wide youth exercise promotion: Long-term outcomes of the Minnesota Heart Health Program and the Class of 1989 study. *Journal of School Health* 63(5):218-223, 1993.
36. Arbeit, M.L.; Johnson, C.C.; and Mott, D.S. The Heart Smart Cardiovascular School Health Promotion: Behavior correlates of risk factor change. *Preventive Medicine* 21(1):18-32, 1992.
37. Sallis, J.F.; Hovell, M.F.; Hofstetter, C.R.; et al. Distance between homes and exercise facilities related to frequency of exercise among San Diego residents. *Public Health Reports* 105(2):179-185, 1990.
38. Carnegie Council on Adolescent Development. *A Matter of Time: Risk and Opportunity in the Out-of-School Hours. Recommendations for Strengthening Community Programs for Youth*. New York, NY: Carnegie Corporation of New York, 1994.
39. Cole, G.; Leonard, B.; Hammond, S.; and Fridinger, F. Using 4 stages of behavioral change constructs to measure the short-term effects of a worksite-based intervention to increase moderate physical activity. *Psychological Reports* 82(2):615-618, 1998.
40. Shephard, R.J. Employee health and fitness—state of the art. *Preventive Medicine* 12(5):644-653, 1983.
41. *Summary of Travel Trends: 1995. Nationwide Personal Transportation Survey*. (<http://www.cta.ornl.gov/npts/1995/>)
42. *National Bicycling and Walking Study: Transportation choices for a changing America*. Publication FH10A PD 94-023. Washington, DC: U.S. Department of Transportation. Federal Highway Administration, 1994.
43. Kent, M. *The Oxford Dictionary of Sport's Science and Medicine*. Oxford, England: Oxford University Press, 1994.
44. Howley, E.T., and Franks, B.O. *Health Fitness Instructors Handbook*. 3rd ed. IL: Human Kinetics, 1997.