Physical Activity Guidelines for Americans

2nd edition

MESSAGE FROM THE SECRETARY

Regular physical activity is one of the most important things people can do to improve their health. Moving more and sitting less have tremendous benefits for everyone, regardless of age, sex, race, ethnicity, or current fitness level. Individuals with a chronic disease or a disability benefit from regular physical activity, as do women who are pregnant. The scientific evidence continues to build—physical activity is linked with even more positive health outcomes than we previously thought. And, even better, benefits can start accumulating with small amounts of, and immediately after doing, physical activity.

Today, about half of all American adults—117 million people—have one or more preventable chronic diseases. Seven of the ten most common chronic diseases are favorably influenced by regular physical activity. Yet nearly 80 percent of adults are not meeting the key guidelines for both aerobic and muscle-strengthening activity, while only about half meet the key guidelines for aerobic physical activity. This lack of physical activity is linked to approximately $117 billion in annual health care costs and about 10 percent of premature mortality.

This new edition of the *Physical Activity Guidelines for Americans* has the potential to change that situation. It is grounded in the most current scientific evidence and informed by the recommendations of the 2018 Physical Activity Guidelines Advisory Committee. This Federal advisory committee, which was composed of prestigious researchers in the fields of physical activity, health, and medicine, conducted a multifaceted, robust analysis of the available scientific literature. Their work culminated in the *2018 Physical Activity Guidelines Advisory Committee Scientific Report*, which provided recommendations to the Federal Government on physical activity, sedentary behavior, and health. Informed by this Scientific Report and by public and Federal agency comments, the new edition provides guidance on the amounts and types of physical activity necessary to maintain or improve overall health and reduce the risk of, or even prevent, chronic disease.

The *Physical Activity Guidelines for Americans* is an essential resource for health professionals and policymakers as they design and implement physical activity programs, policies, and promotion initiatives. It provides information that helps Americans make healthy choices for themselves and their families, and discusses evidence-based, community-level interventions that can make being physically active the easy choice in all the places where people live, learn, work, and play.

Progress to reverse the high rates of inactivity-related chronic diseases and low rates of physical activity will require comprehensive and coordinated strategies. The Physical Activity Guidelines is an important part of a complex and integrated solution to promote health and to reduce the burden of chronic disease in our country. We all have a role to play in this critical effort. I invite you to join me in helping our country be more physically active. If we all move more and sit less today and work toward meeting the Physical Activity Guidelines ourselves, we will be well on our way to creating a healthier Nation and ensuring everyone can live healthier and more active lives.

Alex M. Azar II
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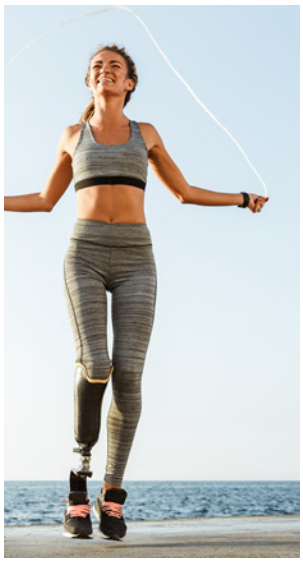
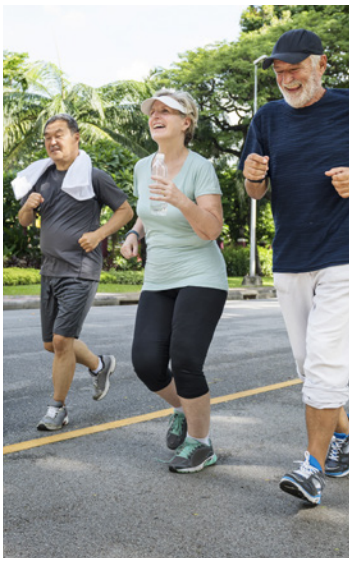




Physical Activity Guidelines for Americans Summary

Being physically active is one of the most important actions that people of all ages can take to improve their health. The evidence reviewed for this second edition of the *Physical Activity Guidelines for Americans* is clear—physical activity fosters normal growth and development and can make people feel better, function better, sleep better, and reduce the risk of a large number of chronic diseases. Health benefits start immediately after exercising, and even short episodes of physical activity are beneficial. Even better, research shows that just about everyone gains benefits: men and women of all races and ethnicities, young children to older adults, women who are pregnant or postpartum (first year after delivery), people living with a chronic condition or a disability, and people who want to reduce their risk of chronic disease. The evidence about the health benefits of regular physical activity is well established, and research continues to provide insight into what works to get people moving, both at the individual and community level. Achieving the benefits of physical activity depends on our personal efforts to increase activity in ourselves, family, friends, patients, and colleagues. Action is also required at the school, workplace, and community levels.

What's New in This Edition?

This second edition of the *Physical Activity Guidelines for Americans* provides science-based guidance to help people ages 3 years and older improve their health through participation in regular physical activity. It reflects the extensive amount of new knowledge gained since the publication of the first *Physical Activity Guidelines for Americans*, released in 2008. This edition of the Guidelines discusses the proven benefits of physical activity and outlines the amounts and types of physical activity recommended for different ages and populations. For example, new aspects include discussions of:

- Additional health benefits related to brain health, additional cancer sites, and fall-related injuries;
- Immediate and longer term benefits for how people feel, function, and sleep;
- Further benefits among older adults and people with additional chronic conditions;
- Risks of sedentary behavior and their relationship with physical activity;
- Guidance for preschool children (ages 3 through 5 years);
- Elimination of the requirement for physical activity of adults to occur in bouts of at least 10 minutes; and
- Tested strategies that can be used to get the population more active.

Developing the Physical Activity Guidelines

The *Physical Activity Guidelines for Americans* is issued by the U.S. Department of Health and Human Services (HHS). It complements the *Dietary Guidelines for Americans*, a joint effort of HHS and the U.S. Department of Agriculture (USDA). Together, the two documents provide guidance for the public on the importance of being physically active and eating a healthy diet to promote good health and reduce the risk of chronic diseases.

The primary audience for the *Physical Activity Guidelines for Americans* is policy makers and health professionals, though it may also be useful to interested members of the public. The main idea behind the Guidelines is that regular physical activity over months and years can produce long-term health benefits.

Learn More

For more information on the terms used in this document, see Glossary.

The development of this edition of the *Physical Activity Guidelines for Americans* started in 2016 when former HHS Secretary Sylvia Mathews Burwell appointed an external scientific advisory committee, the 2018 Physical Activity Guidelines Advisory Committee. The Committee conducted a series of systematic reviews of the scientific literature on physical activity and health and met periodically in public session to discuss their findings. The Committee's work was compiled into a scientific report summarizing the current evidence. The *2018 Physical Activity Guidelines Advisory Committee Scientific Report* and summaries of the Committee's meetings are available at https://www.health.gov/PAGuidelines/.

When writing the Guidelines, HHS used the Advisory Committee's Scientific Report as its primary source but also considered comments from the public and government agencies. The Guidelines will be widely promoted through various communications strategies online and in print, such as the *Move Your Way* campaign materials for professionals and consumers, and partnerships with organizations that promote physical activity.

Key Guidelines

Below are the key guidelines included in the *Physical Activity Guidelines for Americans*. The later chapters provide context and additional information related to these summary statements.

Key Guidelines for Preschool-Aged Children

- Preschool-aged children (ages 3 through 5 years) should be physically active throughout the day to enhance growth and development.
- Adult caregivers of preschool-aged children should encourage active play that includes a variety of activity types.

Key Guidelines for Children and Adolescents

- It is important to provide young people opportunities and encouragement to participate in physical activities that are appropriate for their age, that are enjoyable, and that offer variety.
- Children and adolescents ages 6 through 17 years should do 60 minutes (1 hour) or more of moderate-to-vigorous physical activity daily:
  - **Aerobic:** Most of the 60 minutes or more per day should be either moderate- or vigorous-intensity aerobic physical activity and should include vigorous-intensity physical activity on at least 3 days a week.
  - **Muscle-strengthening:** As part of their 60 minutes or more of daily physical activity, children and adolescents should include muscle-strengthening physical activity on at least 3 days a week.
  - **Bone-strengthening:** As part of their 60 minutes or more of daily physical activity, children and adolescents should include bone-strengthening physical activity on at least 3 days a week.

Key Guidelines for Adults

- Adults should move more and sit less throughout the day. Some physical activity is better than none. Adults who sit less and do any amount of moderate-to-vigorous physical activity gain some health benefits.
- For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.
- Additional health benefits are gained by engaging in physical activity beyond the equivalent of 300 minutes (5 hours) of moderate-intensity physical activity a week.
- Adults should also do muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.

Key Guidelines for Older Adults

The key guidelines for adults also apply to older adults. In addition, the following key guidelines are just for older adults:

- As part of their weekly physical activity, older adults should do multicomponent physical activity that includes balance training as well as aerobic and muscle-strengthening activities.
- Older adults should determine their level of effort for physical activity relative to their level of fitness.
- Older adults with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.
- When older adults cannot do 150 minutes of moderate-intensity aerobic activity a week because of chronic conditions, they should be as physically active as their abilities and conditions allow.

Key Guidelines for Women During Pregnancy and the Postpartum Period

- Women should do at least 150 minutes (2 hours and 30 minutes) of moderate-intensity aerobic activity a week during pregnancy and the postpartum period. Preferably, aerobic activity should be spread throughout the week.
- Women who habitually engaged in vigorous-intensity aerobic activity or who were physically active before pregnancy can continue these activities during pregnancy and the postpartum period.
- Women who are pregnant should be under the care of a health care provider who can monitor the progress of the pregnancy. Women who are pregnant can consult their health care provider about whether or how to adjust their physical activity during pregnancy and after the baby is born.

Key Guidelines for Adults With Chronic Health Conditions and Adults With Disabilities

- Adults with chronic conditions or disabilities, who are able, should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.
- Adults with chronic conditions or disabilities, who are able, should also do muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.
- When adults with chronic conditions or disabilities are not able to meet the above key guidelines, they should engage in regular physical activity according to their abilities and should avoid inactivity.

- Adults with chronic conditions or symptoms should be under the care of a health care provider. People with chronic conditions can consult a health care professional or physical activity specialist about the types and amounts of activity appropriate for their abilities and chronic conditions.

Key Guidelines for Safe Physical Activity

To do physical activity safely and reduce risk of injuries and other adverse events, people should:

- Understand the risks, yet be confident that physical activity can be safe for almost everyone.
- Choose types of physical activity that are appropriate for their current fitness level and health goals, because some activities are safer than others.
- Increase physical activity gradually over time to meet key guidelines or health goals. Inactive people should "start low and go slow" by starting with lower intensity activities and gradually increasing how often and how long activities are done.
- Protect themselves by using appropriate gear and sports equipment, choosing safe environments, following rules and policies, and making sensible choices about when, where, and how to be active.
- Be under the care of a health care provider if they have chronic conditions or symptoms. People with chronic conditions and symptoms can consult a health care professional or physical activity specialist about the types and amounts of activity appropriate for them.

Implementation of the Physical Activity Guidelines Through **Move Your Way**

The Physical Activity Guidelines is written for professional audiences. Therefore, its translation into actionable consumer messages and resources helps individuals, families, and communities achieve the recommendations in the Guidelines. The *Move Your Way* campaign was created by the Office of Disease Prevention and Health Promotion within the U.S. Department of Health and Human Services to be used by communities, health professionals, educators, and others to communicate to consumers in plain language about the recommendations from the Guidelines, promote the health benefits of meeting the recommendations, and provide tips for how consumers can meet the recommendations.

Campaign resources, including interactive tools, fact sheets, videos, and graphics, are available at https://www.health.gov/PAGuidelines/.

Figure A-1. Move Your Way Adult Dosage

A Roadmap to the Physical Activity Guidelines for Americans

- For an overview of the development of the *Physical Activity Guidelines for Americans* and important background information about physical activity, read Chapter 1. Introducing the Physical Activity Guidelines for Americans.
- To learn about the health benefits of physical activity, read Chapter 2. Physical Activity and Health. This information may help motivate people to become regularly active.

> **Note**
>
> The Guidelines assume that many readers will not read all the chapters, but only what is relevant to them. Important information may therefore be repeated in several chapters.

- To understand how to do physical activity in a manner that meets the Guidelines:
  - For youth ages 3 through 17 years, including youth with disabilities, read Chapter 3. Active Children and Adolescents.
  - For adults ages 18 through 64 years, read Chapter 4. Active Adults.
  - For adults ages 65 years and older, read Chapter 5. Active Older Adults. The Guidelines for older adults are similar to those for adults, but add specific guidance, such as the importance of doing multicomponent physical activities.
- For adults with chronic health conditions or disabilities, read Chapter 4. Active Adults or Chapter 5. Active Older Adults and Chapter 6. Additional Considerations for Some Adults. Chapters 4 and 6 are also relevant for women who are pregnant or postpartum.
- To understand how to reduce the risks of activity-related injury, read Chapter 7. Active and Safe.
- To learn about strategies to promote and support regular physical activity, read Chapter 8. Taking Action: Increasing Physical Activity of Americans.
- For definitions of key terms used in the Guidelines, consult the Glossary.
- To find additional information and relevant resources, consult the Appendices.
  1. Physical Activity Behaviors: Intensity, Bouts, and Steps
  2. Federal Physical Activity Resources

Chapter 1. Introducing the Physical Activity Guidelines for Americans

Being physically active is one of the most important actions that people of all ages can take to improve their health. About $117 billion in annual health care costs and about 10 percent of premature mortality are associated with inadequate physical activity (not meeting the aerobic key guidelines). This second edition of the *Physical Activity Guidelines for Americans* provides science-based guidance to help people ages 3 years and older improve their health through appropriate physical activity. It builds on the 2008 Guidelines by incorporating new evidence about even more health benefits, demonstrating greater flexibility about how to achieve those benefits, and showing the many proven ways to help people be more active and to encourage communities to be more conducive to physical activity.

The *Physical Activity Guidelines for Americans* is issued by the U.S. Department of Health and Human Services (HHS). It complements the *Dietary Guidelines for Americans*, a joint effort of HHS and the U.S. Department of Agriculture (USDA). Together, the two documents provide guidance for the U.S. population on the importance of being physically active and eating a healthy diet to promote good health and reduce the risk of chronic diseases.

This chapter provides background information about the rationale and process for developing the Guidelines. It then discusses several issues that provide the framework for understanding the Guidelines. The chapter also explains how the Guidelines fits in with other published physical activity recommendations and how it should be used in practice.

New Evidence of Physical Activity Benefits

Evidence for the benefits of physical activity has continued to grow since the 2008 Guidelines were published. Here are just a few of the recently identified benefits:

- ✓ Improved bone health and weight status for children ages 3 through 5 years.
- ✓ Improved cognitive function for youth ages 6 to 13 years.
- ✓ Reduced risk of cancer at a greater number of sites.
- ✓ Brain health benefits, including possible improved cognitive function, reduced anxiety and depression risk, and improved sleep and quality of life.
- ✓ For pregnant women, reduced risk of excessive weight gain, gestational diabetes, and postpartum depression.
- ✓ For older adults, reduced risk of fall-related injuries.
- ✓ For people with various chronic medical conditions, reduced risk of all-cause and disease-specific mortality, improved physical function, and improved quality of life.

Why and How the Physical Activity Guidelines for Americans Was Developed

The Rationale for Physical Activity Guidelines

Extensive scientific evidence supports the importance of recommending that all Americans should engage in regular physical activity to improve overall health and to reduce the risk of many health problems. Physical activity is a leading example of how lifestyle choices have a profound effect on health. The choices people make about other lifestyle factors, such as diet, smoking, and alcohol use, also have important and independent effects on their health.

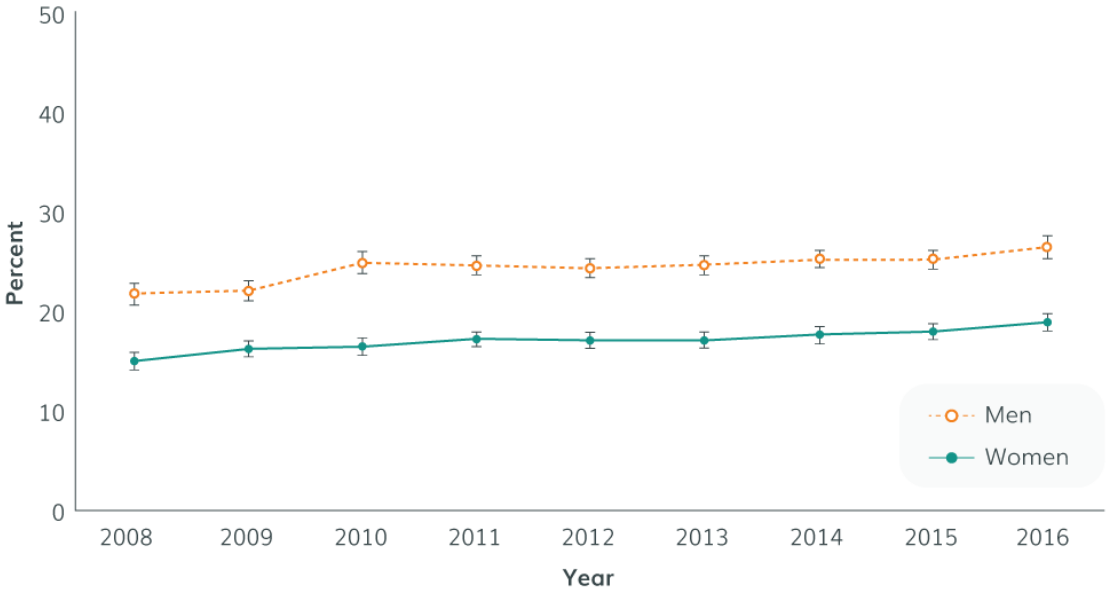
Learn More

See Chapter 2. Physical Activity and Health for more information on the many health benefits of physical activity.

The *Physical Activity Guidelines for Americans* is designed to provide information and guidance on the types and amounts of physical activity that provide substantial health benefits. The primary audience is policy makers and health professionals, though this information may also be useful to interested members of the public. The main idea behind the Guidelines is that regular physical activity over months and years can produce long-term health benefits.

The information in the Guidelines is necessary because of the importance of physical activity to the health of Americans, whose current inactivity puts them at unnecessary risk. *Healthy People 2020* set objectives for increasing the level of physical activity in Americans over the decade from 2010 to 2020. Although the latest information shows some improvements in physical activity levels among American adults, only 26 percent of men, 19 percent of women, and 20 percent of adolescents report sufficient activity to meet the relevant aerobic and muscle-strengthening guidelines (see Figures 1-1 and 1-2).

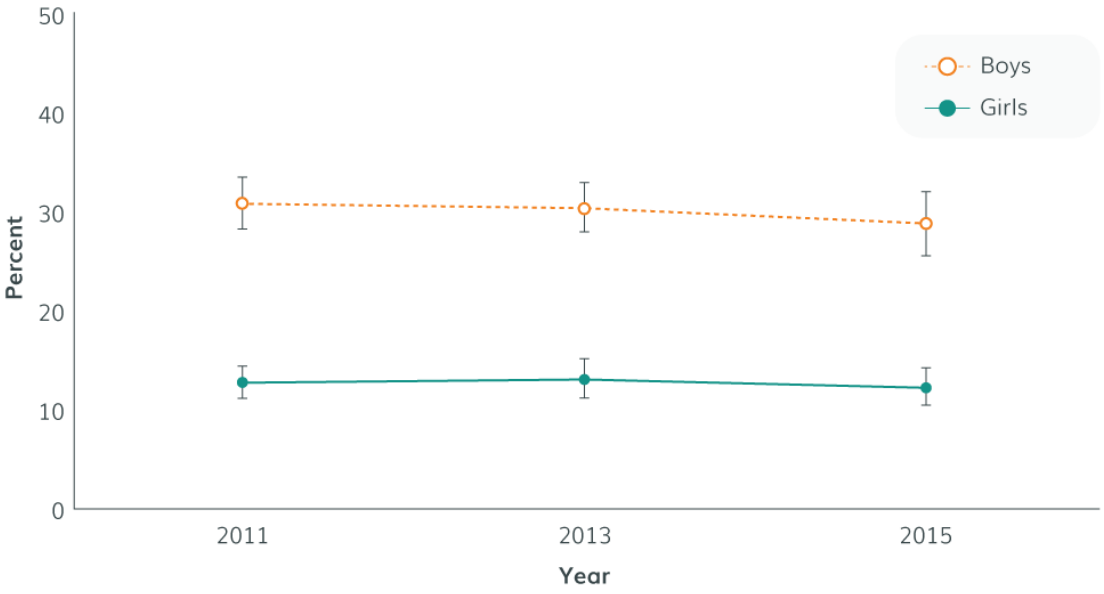
Figure 1-1. Percentage of U.S. Adults Ages 18 Years or Older Who Met the Aerobic and Muscle-Strengthening Guidelines, 2008–2016



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey (NHIS).

Notes: Estimates are age-adjusted to the 2000 U.S. standard population using five age groups: 18–24 years, 25–34 years, 35–44 years, 45–64 years, and 65+ years. NHIS questions ask about frequency and duration of light-intensity to moderate-intensity and vigorous-intensity leisure-time physical activities, as well as the frequency of muscle-strengthening activities. Meeting the aerobic component of the *2008 Physical Activity Guidelines for Americans* is defined as reporting at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic physical activity a week, or an equivalent combination. Meeting the muscle-strengthening component is defined as reporting muscle-strengthening activities at least 2 days per week. Error bars represent upper and lower bounds of the 95% confidence interval.

Figure 1-2. Percentage of U.S. High School Students Who Met the Aerobic Physical Activity and Muscle-Strengthening Guidelines, 2011–2015



Source: Centers for Disease Control and Prevention, Youth Risk Behavior Surveillance System.

Notes: Meeting the aerobic component of the *2008 Physical Activity Guidelines for Americans* is defined as reporting at least 60 minutes of "any kind of physical activity that increases your heart rate and makes you breathe hard some of the time" on all days during the 7 days before the survey. Meeting the muscle-strengthening component is defined as reporting at least 3 days of "exercises to strengthen or tone your muscles" during the 7 days before the survey. Error bars represent upper and lower bounds of the 95% confidence interval.

The Development of the Physical Activity Guidelines

In 2008, HHS released the first edition of the *Physical Activity Guidelines for Americans*. It served as the first benchmark and primary, authoritative voice of the Federal Government for providing science-based guidance on physical activity, fitness, and health for Americans. The Guidelines provides a foundation for Federal recommendations and education for physical activity programs for Americans, including those at risk of chronic disease. Since 2008, HHS has reaffirmed the health benefits of physical activity in several publications.

In 2013, 5 years after the Guidelines was released, HHS developed the *Physical Activity Guidelines for Americans Midcourse Report: Strategies to Increase Physical Activity Among Youth*. This report built on the 2008 Guidelines for Americans by focusing on strategies to help youth achieve the recommended 60 minutes of daily physical activity in a variety of settings, including school, preschool and childcare, community, family and home, and primary care.

In 2015, HHS released *Step It Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities*. The Call to Action seeks to increase walking across the United States by calling for improved access to safe and convenient places to walk and wheelchair roll and to create a culture that supports these activities for people of all ages and abilities.

Because the evidence for the health benefits of a physically active lifestyle continued to grow rapidly, HHS began the process of developing a second edition of the *Physical Activity Guidelines for Americans* in December 2015. HHS called for nominations to the 2018 Physical Activity Guidelines Advisory Committee and followed a similar development process to those used for the *2008 Physical Activity Guidelines for Americans* and the *2015-2020 Dietary Guidelines for Americans*. In 2016, former HHS Secretary Sylvia Mathews Burwell appointed 17 members to the 2018 Physical Activity Guidelines Advisory Committee, an external scientific advisory committee chartered under the Federal Advisory Committee Act, as amended (Public Law 92-463, 5 U.S.C. App.). The Committee conducted an extensive analysis of the scientific information on physical activity and health and met periodically in public session to discuss their findings.

The Committee graded the evidence based on consistency and quality of the research literature. Evidence graded as strong or moderate was used as the basis for the Guidelines. The *2018 Physical Activity Guidelines Advisory Committee Scientific Report* and summaries of the Committee's public meetings are available at https://www.health.gov/PAGuidelines/.

When writing the Guidelines, HHS used the Advisory Committee's Scientific Report as its primary source but also considered comments from the public and government agencies. The Guidelines will be widely promoted through various communications strategies online and in print, such as the *Move Your Way* campaign materials for professionals and consumers, and partnerships with organizations that promote physical activity.

The Framework for the Physical Activity Guidelines for Americans

The *2018 Physical Activity Guidelines Advisory Committee Scientific Report* provided the content and conceptual underpinning for the Guidelines. Key elements of this framework are described in the following sections.

Disease Prevention and Health Promotion

The 2008 Advisory Committee Report and the 2008 Guidelines focused primarily on the disease prevention benefits of physical activity. The 2018 Scientific Report demonstrates that, in addition to disease prevention benefits, regular physical activity provides a variety of other benefits, including helping people sleep better, feel better, and perform daily tasks more easily. The 2018 Scientific Report also notes immediate benefits of physical activity in addition to those related to regular physical activity over months or years. This broader focus on both disease prevention and health promotion is embedded in the key guidelines for amounts and types of physical activity that are provided for three age groups (children and adolescents, adults, and older adults), for women who are pregnant or postpartum, and for adults with chronic diseases or adults with disabilities.

Learn More

See Chapter 2. Physical Activity and Health for more information on the many health benefits of physical activity.

Strong evidence demonstrates that moderate-to-vigorous physical activity improves the quality of sleep in adults. It does so by reducing the length of time it takes to go to sleep and reducing the time one is awake after going to sleep and before rising in the morning. It also can increase the time in deep sleep and reduce daytime sleepiness.

Strong evidence from adults demonstrates that perceived quality of life is improved by regular physical activity. The Guidelines focuses on selected aspects of health-related quality of life, including both physical and mental or emotional health. It does not include other aspects of quality of life, such as those related to finances, relationships, or occupations.

Physical activity improves physical function among individuals of all ages, enabling them to conduct their daily lives with energy and without undue fatigue. This is true for older adults, for whom improved physical function reduces risk of falls and fall-related injuries and contributes to their ability to maintain independence. It is also true for young and middle-aged adults, as improved physical function helps them more easily accomplish the tasks of daily living, such as climbing stairs or carrying groceries.

In addition to improving physical function, physical activity may improve cognitive function among youth and adults. Aspects of cognitive function that may be improved include memory, attention, executive function (the ability to plan and organize; monitor, inhibit, or facilitate behaviors; initiate tasks; and control emotions), and academic performance among youth.

Timing of Benefits

A single session of moderate-to-vigorous physical activity can reduce blood pressure, improve insulin sensitivity, improve sleep, reduce anxiety symptoms, and improve some aspects of cognition on the day that it is performed. Most of these improvements become even larger with the regular performance of moderate-to-vigorous physical activity. Other benefits, such as disease risk reduction and improved physical function, accrue within days to weeks after consistently being more physically active.

Physical Activity Intensity

The Guidelines consider the intensity with which people do physical activity. Some activities are a higher intensity than others because they require more energy to do. For example, a person expends more energy walking briskly than slowly strolling.

Absolute rates of energy expenditure during physical activity are commonly described as light, moderate, or vigorous intensity. Energy expenditure is expressed by multiples of the metabolic equivalent of task (MET), where 1 MET is the rate of energy expenditure while sitting at rest.

- **Light-intensity activity** is non-sedentary waking behavior (see sidebar) that requires less than 3.0 METs; examples include walking at a slow or leisurely pace (2 mph or less), cooking activities, or light household chores.
- **Moderate-intensity activity** requires 3.0 to less than 6.0 METs; examples include walking briskly (2.5 to 4 mph), playing doubles tennis, or raking the yard.
- **Vigorous-intensity activity** requires 6.0 or more METs; examples include jogging, running, carrying heavy groceries or other loads upstairs, shoveling snow, or participating in a strenuous fitness class. Many adults do no vigorous-intensity physical activity.

Learn More

Appendix 1 provides a detailed explanation of MET-minutes, a unit useful for describing the energy expenditure of a specific physical activity.

Levels of Physical Activity

Throughout the Guidelines, reference is made to four levels of aerobic physical activity: inactive, insufficiently active, active, and highly active. This classification for adults is useful because these categories are related to how much health benefit a person obtains at a given level and how to become more active. The focus on aerobic physical activity for the levels should not be interpreted to suggest that other types of activity, such as muscle strengthening, are less important.

- **Inactive** is not getting any moderate- or vigorous-intensity physical activity beyond basic movement from daily life activities.

- **Insufficiently active** is doing some moderate- or vigorous-intensity physical activity but less than 150 minutes of moderate-intensity physical activity a week or 75 minutes of vigorous-intensity physical activity or the equivalent combination. This level is less than the target range for meeting the key guidelines for adults.
- **Active** is doing the equivalent of 150 minutes to 300 minutes of moderate-intensity physical activity a week. This level meets the key guideline target range for adults.
- **Highly active** is doing the equivalent of more than 300 minutes of moderate-intensity physical activity a week. This level exceeds the key guideline target range for adults.

The Relationship Between Sedentary Behavior and Physical Activity

Research on the health effects of sedentary behavior is a relatively new area. Therefore, it was not addressed in 2008. Sedentary behavior has received an increasing amount of attention as a public health problem because it appears to have health risks, and it is a highly prevalent behavior in the U.S. population. Data collected by devices in the U.S. National Health and Nutrition Examination Survey (NHANES) indicate that children and adults spend approximately 7.7 hours per day (55% of their monitored waking time) being sedentary. Thus, the potential population health impact of sedentary behavior is substantial.

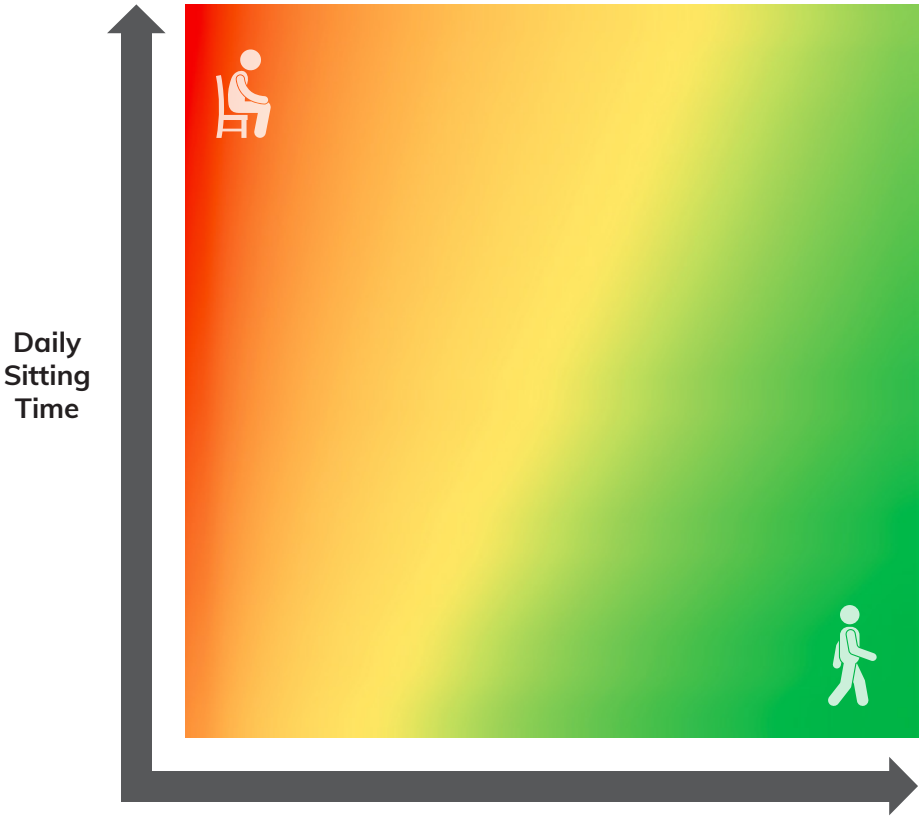
The 2018 Advisory Committee found a strong relationship between time in sedentary behavior and the risk of all-cause mortality and cardiovascular disease mortality in adults. However, the literature was insufficient to recommend a specific target for adults or youth for how many times during the day sedentary time should be interrupted with physical activity. Furthermore, a specific healthy target for total sedentary behavior time could not be determined. This was because the risk related to sedentary behavior was dependent upon the amount of moderate-to-vigorous physical activity performed. This relationship is illustrated in Figure 1-3.

What Is Sedentary Behavior?

In general, *sedentary behavior* refers to any waking behavior characterized by a low level of energy expenditure (less than or equal to 1.5 METs) while sitting, reclining, or lying. The Guidelines operationalizes the definition of sedentary behavior to include self-reported sitting (leisure-time, occupational, and total), television (TV) viewing or screen time, and low levels of movement measured by devices that assess movement or posture. Standing is another activity with low energy expenditure, but it is distinct from sedentary behavior in how it affects health.

The figure shows moderate-to-vigorous physical activity in minutes on the horizontal axis and daily sitting time in hours on the vertical axis. Red represents higher risk of all-cause mortality, and green represents lower risk of all-cause mortality. Orange and yellow represent transitional decreases in risk of all-cause mortality.

Figure 1-3. Relationship Among Moderate-to-Vigorous Physical Activity, Sitting Time, and Risk of All-Cause Mortality in Adults



Risk of all-cause mortality decreases as one moves from red to green.

Source: This heat map is adapted from data found in Ekelund U, Steene-Johannessen J, Brown WJ. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonized meta-analysis of data from more than 1 million men and women. Lancet. 2016;388:1302-1310. doi:10.1016/S0140-6736(16)30370-1.

At the greatest time spent sitting (the top), the risk of all-cause mortality begins to decrease (color becomes orange) even with small additions of moderate-to-vigorous physical activity. At the greatest volume of moderate-to-vigorous physical activity, the risk is low even for those who sit the most (upper right corner). The best currently available estimate of this volume is about 60 to 75 minutes per day of moderate-intensity activities, or 30 to 40 minutes per day of vigorous-intensity activities. This high volume of moderate-to-vigorous physical activity is achieved by a very small proportion of the population.

At the lowest volume of moderate-to-vigorous physical activity (the left side of the figure), the risk of all-cause mortality increases as time spent sitting increases. This suggests that for inactive adults, replacing sitting time with light-intensity physical activities reduces the risk of all-cause mortality. Although the risk of all-cause mortality is reduced as the time spent in sedentary behavior is reduced, even adults who sit the least have an

elevated risk if they perform no moderate-to-vigorous physical activity (lower left corner).

The figure illustrates three main conclusions:

- High volumes of moderate-to-vigorous physical activity appear to remove the excess risk of all-cause mortality that is associated with high volumes of sitting.
- Very low time spent sitting reduces, but does not eliminate, the risk of no moderate-to-vigorous physical activity.
- Given the high levels of sitting and low levels of physical activity in the population, most people would benefit from both increasing moderate-to-vigorous physical activity and reducing time spent sitting.

Progressing Toward and Beyond the Physical Activity Target

The 2008 Advisory Committee reported that inactive people can achieve substantial health gains by increasing their activity level even if they do not reach the target range. Since 2008, substantially more information documents the value of reducing inactivity even if youth or adults do not achieve the recommended target range.

Bouts, or episodes, of moderate-to-vigorous physical activity of any duration may be included in the daily accumulated total volume of physical activity. The *2008 Physical Activity Guidelines for Americans* recommended accumulating moderate-to-vigorous physical activity in bouts of 10 minutes or more because not enough evidence was available to support the value of bouts less than 10 minutes in duration. The 2018 Advisory Committee concluded that bouts of any length contribute to the health benefits associated with the accumulated volume of physical activity. Even a brief episode of physical activity like climbing up a few flights of stairs counts.

Bouts of any length contribute to the health benefits associated with the accumulated volume of physical activity.

What Does "Progressing Toward Targets" Mean for People's Daily Lives?

The risk of injury to bones, muscles, and joints is directly related to the gap between a person's usual level of activity and a new level of activity. When amounts of physical activity need to be increased to meet the key guidelines or personal goals, physical activity should be increased gradually over time, no matter what the person's current level of physical activity. This concept is addressed more fully in Chapter 6. Safe and Active.

For people who are inactive, that is, people who do not do any moderate- or vigorous-intensity physical activity beyond basic movement from daily life activities:

- Reducing sedentary behavior has health benefits. It reduces the risk of all-cause mortality, cardiovascular disease incidence and mortality, and the incidence of type 2 diabetes and some cancers. A good first step is to replace sedentary behavior with light-intensity physical activity. Previously, evidence that light-intensity physical activity could provide health benefits was not sufficient to support a recommendation.
- No matter how much time they spend in sedentary behavior or light-intensity activity, inactive people can reduce their health risks by gradually increasing their moderate-intensity physical activity.

For people who are insufficiently active, that is, people who do some moderate- or vigorous-intensity physical activity, but who do not yet meet the key guidelines target range (150 to 300 minutes a week of moderate-intensity physical activity for adults):

- Even small increases in moderate-intensity physical activity provide health benefits. There is no threshold that must be exceeded before benefits begin to occur.
- Greater benefits can be achieved by reducing sedentary behavior, increasing moderate-intensity physical activity, or a combination of both.
- For any given increase in moderate-to-vigorous physical activity, the relative gain in benefits is greater for insufficiently active people than for people who are already meeting the key guidelines.

For people who are active, that is, people who already meet the key guidelines (150 to 300 minutes a week of moderate-intensity physical activity for adults):

- Although those within the target range already have substantial benefits from their current volume of physical activity, more benefits can be gained by doing additional moderate-to-vigorous physical activity or reducing sedentary behavior.

For people who are highly active, that is, people who do more than the equivalent of 300 minutes a week of moderate-intensity physical activity:

- These people should maintain or increase their activity level by doing a variety of activities.

Health Benefits Versus Other Reasons to Be Physically Active

Although the Guidelines focuses on the health benefits of physical activity, these benefits are not the only reason why people are active. Physical activity gives people a chance to have fun, be with friends and family, enjoy the outdoors, and improve fitness so they can more easily participate in additional physical activity or sporting events. Some people are active because it helps them feel more energetic and healthier.

Nothing in the Guidelines is intended to mean that health benefits are the only reason to do physical activity. People should be physically active for any and all reasons that are meaningful for them.

Health-Related Versus Performance-Related Fitness

Promoting health, reducing risk of chronic disease, and promoting health-related fitness—particularly cardiovascular and muscular fitness—are the primary focus of the Guidelines. People can gain this kind of fitness by doing the amounts and types of activities recommended in the key guidelines for each age group and population.

The types and amounts of activity necessary to improve performance-related fitness are not addressed in the Guidelines. Athletes need this kind of fitness when they compete. Medical screening issues for competitive athletes also are outside the scope of the Guidelines.

People who are interested in training programs to increase performance-related fitness should seek advice from other sources. Generally, these people do much more activity than required to meet the targets in the key guidelines.

Lifespan Approach

The best way to be physically active is to be active for life. Therefore, the Guidelines takes a lifespan approach and provides recommendations for three broad age groups—children and adolescents, adults, and older adults.

The 2008 Guidelines provided recommendations for children, adolescents, and adults, covering individuals ages 6 years and older. Recent research has provided support for recommendations for children ages 3 through 5 years, and so the 2018 Guidelines are designed for those ages 3 years and older. Physical activity is necessary for healthy growth and development of infants and young children of all ages.

Putting the Guidelines Into Practice

Assessing Whether Physical Activity Programs Are Consistent With the Guidelines

Programs that provide opportunities for physical activity, such as classes or community activities, can help people meet the key guidelines. These programs do not have to provide all, or even most, of the recommended weekly activity. For example, a mall walking program for older adults may meet only once a week yet provide useful amounts of activity, as long as people get the rest of their weekly recommended activity on other days.

Programs that are consistent with the *Physical Activity Guidelines for Americans:*

- Provide advice and education consistent with the Guidelines;
- Add episodes of activity that count toward meeting the key guidelines; and
- May also include activities, such as stretching or warming up and cooling down, whose health benefits are not yet proven but that are often used in effective physical activity programs.

The Importance of Understandable Guidelines

HHS has tried to keep the *Physical Activity Guidelines for Americans* straightforward and understandable, while remaining consistent with complex scientific information. In each chapter, the key guidelines are set apart from the text to identify the most important information to disseminate to the public. The messages contained in the Guidelines should be communicated to the public and to anyone involved in promoting physical activity.

Taking Action: Increasing Physical Activity Levels of Americans

Action is needed at individual, community, and societal levels to help Americans become physically active. Regular physical activity needs to be made the safe and easy choice for Americans. To most effectively increase physical activity levels, evidence-based strategies should be used. This means that researchers or practitioners have tested the strategy and shown that it can increase physical activity.

A review of the science by the 2018 Physical Activity Guidelines Advisory Committee shows that many evidence-based strategies can be used to promote and support physical activity. Some strategies involve working with people one-on-one or in small groups to change their physical activity. Other strategies can be implemented more broadly at the community level through programs, practices, and policies that make physical activity an easy choice.

Chapter 8. Taking Action: Increasing Physical Activity of Americans highlights several evidence-based strategies that focus on individuals and on communities. Because improving physical activity across the country will require the efforts of individuals and many sectors of society, the chapter closes with some potential steps individuals and groups can take to increase physical activity levels.

Chapter 2. Physical Activity and Health

All Americans should engage in regular physical activity to improve overall health and fitness and to prevent negative health outcomes. The benefits of physical activity occur in generally healthy people of all ages, in people at risk of developing chronic diseases, and in people with chronic conditions or disabilities. This chapter describes an overview of research findings on physical activity and health. The accompanying box provides a summary of these benefits.

Physical activity affects many health conditions, and the specific amounts and types of activity that benefit each condition vary. In developing public health guidelines, the challenge is to integrate scientific information across all health benefits and identify a critical range of physical activity that appears to have an effect across the health benefits. One consistent finding from research studies is that once the health benefits from physical activity begin to accumulate, additional amounts of activity provide additional benefits.

Some health benefits occur immediately after an episode of physical activity. Other benefits begin with as little as 60 minutes a week. Research shows that a total amount of at least 150 minutes a week of moderate-intensity aerobic activity, such as brisk walking, consistently reduces the risk of many chronic diseases and other adverse health outcomes.

The Health Benefits of Physical Activity—Major Research Findings

- Regular moderate-to-vigorous physical activity reduces the risk of many adverse health outcomes.
- Some physical activity is better than none.
- For most health outcomes, additional benefits occur as the amount of physical activity increases through higher intensity, greater frequency, and/or longer duration.
- Substantial health benefits for adults occur with 150 to 300 minutes a week of moderate-intensity physical activity, such as brisk walking. Additional benefits occur with more physical activity.
- Both aerobic and muscle-strengthening physical activity are beneficial.
- Health benefits occur for children and adolescents, young and middle-aged adults, older adults, and those in every studied racial and ethnic group.
- The health benefits of physical activity occur for people with chronic conditions or disabilities.
- The benefits of physical activity generally outweigh the risk of adverse outcomes or injury.

Examining the Relationship Between Physical Activity and Health

In many studies covering a wide range of issues, researchers have focused on exercise as well as on the more broadly defined concept of physical activity.

Studies have examined the role of physical activity in many groups—men and women, children, adolescents, adults, older adults, people with chronic conditions and disabilities, and women during pregnancy and the postpartum period. These studies have focused on the role that physical activity plays in many health outcomes, including:

- All-cause mortality;
- Diseases such as coronary heart disease, stroke, cancer at multiple sites, type 2 diabetes, obesity, hypertension, and osteoporosis;
- Risk factors for disease, such as overweight or obesity, hypertension, and high blood cholesterol;
- Physical fitness, such as aerobic capacity and muscle strength and endurance;
- Functional capacity, or the ability to engage in activities needed for daily living;
- Brain health and conditions that affect cognition, such as depression and anxiety, and Alzheimer's disease; and
- Falls or injuries from falls.

These studies have also prompted questions as to what type of physical activity and how much is needed for various health benefits. To answer this question, investigators have studied three main kinds of physical activity—aerobic, muscle strengthening, and bone strengthening. Investigators have also studied balance and flexibility activities.

Aerobic Activity

In this kind of physical activity (also called an *endurance activity* or *cardio activity*), the body's large muscles move in a rhythmic manner for a sustained period of time. Brisk walking, running, bicycling, jumping rope, and swimming are all examples. Aerobic activity causes a person's heart to beat faster, and they will breathe harder than normal.

Physical Activity, Exercise, and Health

Physical activity refers to any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level. In the Guidelines, *physical activity* generally refers to the subset of physical activity that enhances health. Exercise is a form of physical activity that is planned, structured, repetitive, and performed with the goal of improving health or fitness. Although all exercise is physical activity, not all physical activity is exercise.

Health is a human condition with physical, social, and psychological dimensions, each characterized on a continuum with positive and negative poles. Positive health is associated with a capacity to enjoy life and to withstand challenges; it is not merely the absence of disease. Negative health is associated with illness, and in the extreme, with premature death.

Learn More

See Chapter 3. Active Children and Adolescents, Chapter 4. Active Adults, and Chapter 5. Active Older Adults for more information about the types and amounts of physical activity needed for various health benefits.

Aerobic physical activity has three components:

- **Intensity,** or how hard a person works to do the activity. The intensities most often studied are moderate (equivalent in effort to brisk walking) and vigorous (equivalent in effort to running or jogging);
- **Frequency,** or how often a person does aerobic activity; and
- **Duration,** or how long a person does an activity in any one session.

Although these components make up an aerobic physical activity profile, research has shown that the total amount of physical activity (minutes of moderate-intensity physical activity in a week, for example) is more important for achieving health benefits than is any one component (frequency, intensity, or duration). All time spent in moderate- or vigorous-intensity physical activity counts toward meeting the key guidelines.

Muscle-Strengthening Activity

This kind of activity, which includes resistance training and weight lifting, causes the body's muscles to work or hold against an applied force or weight. These activities often involve lifting relatively heavy objects, such as weights, multiple times to strengthen various muscle groups. Muscle-strengthening activity can also be done by using elastic bands or body weight for resistance (climbing a tree or doing push-ups, for example).

Muscle-strengthening activity has three components:

- **Intensity,** or how much weight or force is used relative to how much a person is able to lift;
- **Frequency,** or how often a person does muscle-strengthening activity; and
- **Sets and repetitions,** or how many times a person does the muscle-strengthening activity, like lifting a weight or doing a push-up (comparable to duration for aerobic activity).

The effects of muscle-strengthening activity are limited to the muscles doing the work. It is important to work all the major muscle groups of the body—the legs, hips, back, abdomen, chest, shoulders, and arms.

Bone-Strengthening Activity

This kind of activity (sometimes called *weight-bearing* or *weight-loading activity*) produces a force on the bones of the body that promotes bone growth and strength. This force is commonly produced by impact with the ground. Examples of bone-strengthening activity include jumping jacks, running, brisk walking, and weight-lifting exercises. As these examples illustrate, bone-strengthening activities can also be aerobic and muscle strengthening.

Balance Activities

These kinds of activities can improve the ability to resist forces within or outside of the body that cause falls while a person is stationary or moving. Walking backward, standing on one leg, or using a wobble board are examples of balance activities. Strengthening muscles of the back, abdomen, and legs also improves balance.

Flexibility Activities

These kinds of activities enhance the ability of a joint to move through the full range of motion. Stretching exercises are effective in increasing flexibility, and thereby can allow people to more easily do activities that require greater flexibility.

The Health Benefits of Physical Activity

Research demonstrates that participating in regular moderate-to-vigorous physical activity provides many health benefits. These benefits are summarized in Table 2-1. Some benefits of physical activity can be achieved immediately, such as reduced feelings of anxiety, reduced blood pressure, and improvements in sleep, some aspects of cognitive function, and insulin sensitivity. Other benefits, such as increased cardiorespiratory fitness, increased muscular strength, decreases in depressive symptoms, and sustained reduction in blood pressure, require a few weeks or months of participation in physical activity. Physical activity can also slow or delay the progression of chronic diseases, such as hypertension and type 2 diabetes. Benefits persist with continued physical activity.

The health benefits of physical activity are seen in children and adolescents, young and middle-aged adults, older adults, women and men, people of different races and ethnicities, and people with chronic conditions or disabilities. The health benefits of physical activity are generally independent of body weight. Adults of all sizes and shapes gain health and fitness benefits by being habitually physically active. The benefits of physical activity also outweigh the risk of injury and heart attacks, two concerns that may prevent people from becoming physically active.

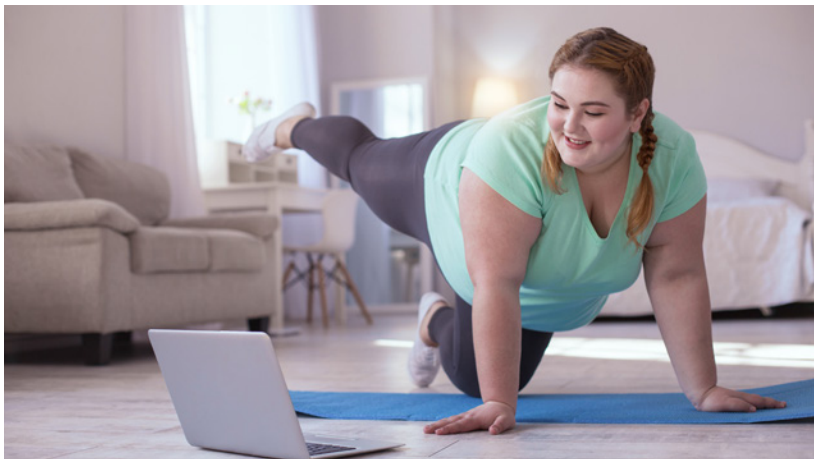


Table 2-1. Health Benefits Associated With Regular Physical Activity

Children and Adolescents
■ Improved bone health (ages 3 through 17 years) ■ Improved weight status (ages 3 through 17 years) ■ Improved cardiorespiratory and muscular fitness (ages 6 through 17 years) ■ Improved cardiometabolic health (ages 6 through 17 years) ■ Improved cognition (ages 6 to 13 years)* ■ Reduced risk of depression (ages 6 to 13 years)
Adults and Older Adults
■ Lower risk of all-cause mortality ■ Lower risk of cardiovascular disease mortality ■ Lower risk of cardiovascular disease (including heart disease and stroke) ■ Lower risk of hypertension ■ Lower risk of type 2 diabetes ■ Lower risk of adverse blood lipid profile ■ Lower risk of cancers of the bladder, breast, colon, endometrium, esophagus, kidney, lung, and stomach ■ Improved cognition* ■ Reduced risk of dementia (including Alzheimer's disease) ■ Improved quality of life ■ Reduced anxiety ■ Reduced risk of depression ■ Improved sleep ■ Slowed or reduced weight gain ■ Weight loss, particularly when combined with reduced calorie intake ■ Prevention of weight regain following initial weight loss ■ Improved bone health ■ Improved physical function ■ Lower risk of falls (older adults) ■ Lower risk of fall-related injuries (older adults)

Note: The Advisory Committee rated the evidence of health benefits of physical activity as strong, moderate, limited, or grade not assignable. Only outcomes with strong or moderate evidence of effect are included in this table.

*See Table 2-3 for additional components of cognition and brain health.

The Role of Fitness in Health

Physical fitness is an important factor in the ability of people to perform routine daily activities and an important issue from a public health perspective. *Physical fitness* has been defined as "the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies."

Physical fitness has multiple components, including cardiorespiratory fitness (endurance or aerobic power), musculoskeletal fitness, flexibility, balance, and speed of movement (see Table 2-2).

Table 2-2. Components of Physical Fitness

Cardiorespiratory Fitness	The ability to perform large-muscle, whole-body exercise at moderate-to-vigorous intensities for extended periods of time.
Musculoskeletal Fitness	The integrated function of muscle strength, muscle endurance, and muscle power to enable performance of work.
Flexibility	The range of motion available at a joint or group of joints.
Balance	The ability to maintain equilibrium while moving or while stationary.
Speed	The ability to move the body quickly.

A substantial body of research has examined the relationship between physical fitness—cardiorespiratory fitness and, in some cases, musculoskeletal fitness—and health outcomes. The findings show that greater physical fitness is associated with reduced all-cause mortality and cardiovascular disease mortality and reduced risk of developing a wide range of chronic diseases, such as type 2 diabetes and hypertension. To date, most studies were done in men, but new data indicate these relationships also exist in women.

Physical activity and physical fitness are related to each other, and both provide important health benefits. Increases in the amount and intensity of physical activity typically produce increases in physical fitness, particularly in those who are less physically active. The available evidence suggests that physical activity and physical fitness interact in their effects on a variety of health outcomes.

Some possible ways that fitness and health outcomes may relate to physical activity are:

- Physical activity leads to improvements in physical fitness, and physical fitness causes improvements in health outcomes;
- Physical fitness may modify the amount of the effect that physical activity has on health outcomes; or
- Physical activity can lead to improved physical fitness as a health outcome.

The Beneficial Effects of Increasing Physical Activity: It Is About Overload, Progression, and Specificity

Overload is the physical stress placed on the body when physical activity is greater in amount or intensity than usual. The body's structures and functions respond and adapt to these stresses. For example, aerobic physical activity places a stress on the cardiorespiratory system and muscles, requiring the lungs to move more air and the heart to pump more blood and deliver it to the working muscles. This increase in demand increases the efficiency and capacity of the lungs, heart, circulatory system, and exercising muscles. In the same way, muscle-strengthening and bone-strengthening activities overload muscles and bones, making them stronger.

Progression is closely tied to overload. Once a person reaches a certain fitness level, he or she is able to progress to higher levels of physical activity by continued overload and adaptation. Small, progressive changes in overload help the body adapt to the additional stresses while minimizing the risk of injury.

Specificity means that the benefits of physical activity are specific to the body systems that are doing the work. For example, the physiologic benefits of walking are largely specific to the lower body and the cardiovascular system. Push-ups primarily benefit the muscles of the chest, shoulders, and upper arms.

The following sections provide more detail on what is known from research studies about the specific health benefits of physical activity.

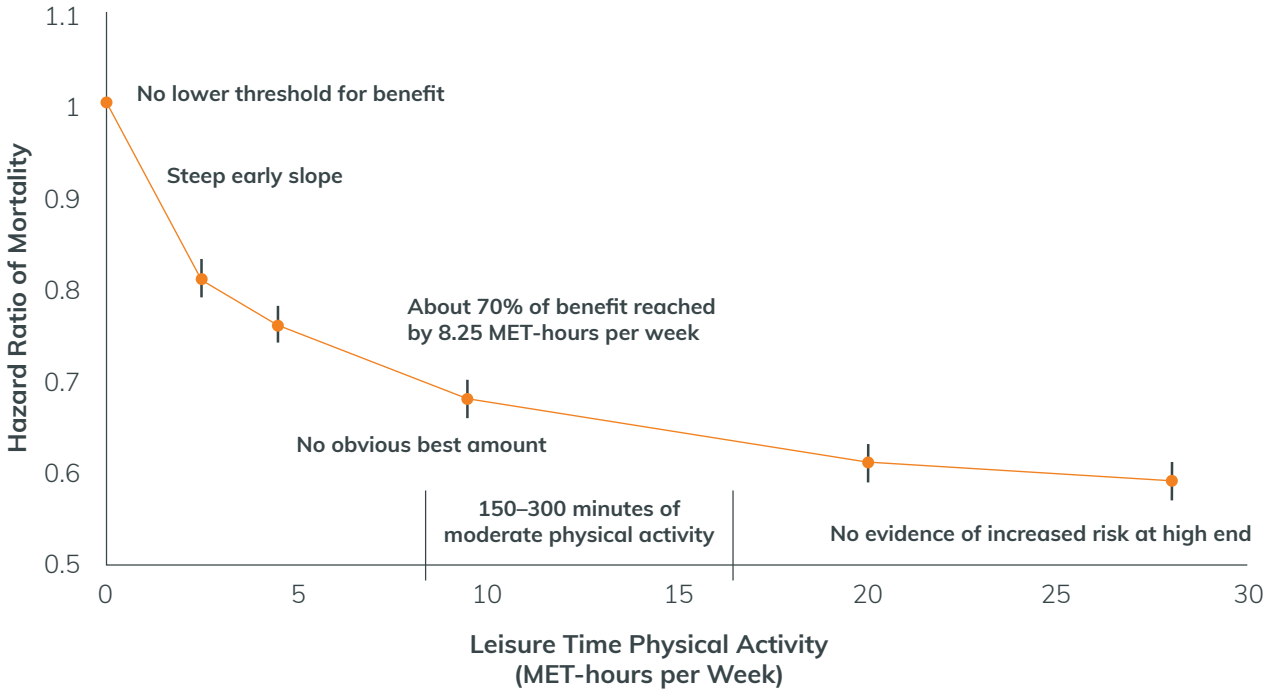
All-Cause Mortality

Strong scientific evidence shows that physical activity delays death from all causes. This includes the leading causes of death, such as heart disease and some cancers, as well as other causes of death. This effect is remarkable in two ways:

- First, only a few lifestyle choices have as large an effect on mortality as physical activity. It has been estimated that people who are physically active for approximately 150 minutes a week have a 33 percent lower risk of all-cause mortality than those who are not physically active.
- Second, it is not necessary to do large amounts of activity or vigorous-intensity activity to reduce the risk of all-cause mortality. Benefits start to accumulate with any amount of moderate- or vigorous-intensity physical activity.

Research clearly demonstrates the importance of avoiding inactivity. Even low amounts of moderate-to-vigorous intensity physical activity reduce the risk of all-cause mortality. As Figure 2-1 shows, a large benefit occurs when a person moves from being inactive to being insufficiently active. The relative risk of all-cause mortality continues to decline as people become even more physically active. Even at very high levels of physical activity (3 to 5 times the key guidelines), there is no evidence of increased risk.

Figure 2-1. Relationship of Moderate-to-Vigorous Physical Activity to All-Cause Mortality



Source: Adapted from data found in Moore SC, Patel AV, Matthews CE. Leisure time physical activity of moderate to vigorous intensity and mortality: a large pooled cohort analysis. PLoS Med. 2012;9(11):e1001335. doi:10.1371/journal.pmed.1001335.

All adults can gain this health benefit of physical activity, no matter their age, sex, race, or ethnicity. Physically active people with all body weights (normal weight, overweight, obesity) also have lower risk of all-cause mortality than do inactive people.

Cardiorespiratory Health

The benefits of physical activity on cardiorespiratory health are some of the most extensively documented of all the health benefits. Cardiorespiratory health involves the health of the heart, lungs, and blood vessels.

Heart disease and stroke are two of the leading causes of death in the United States. Risk factors that increase the likelihood of cardiovascular diseases include smoking, hypertension, type 2 diabetes, and high levels of certain blood lipids (such as low-density lipoprotein [LDL] cholesterol). Low cardiorespiratory fitness also is a risk factor for heart disease.

Physical activity strongly reduces both the risk of dying from cardiovascular disease and the risk of developing cardiovascular disease, including heart attack, stroke, and heart failure. Regularly active adults have lower rates of heart disease and stroke and have lower blood pressure, better blood lipid profiles, and better physical fitness. Significant reductions in risk of cardiovascular disease occur at activity levels equivalent to 150 minutes a week of moderate-intensity physical activity. As with all-cause mortality, benefits begin with less than 150 minutes a week, and strong evidence shows that greater amounts of physical activity result in even further reductions in risk of cardiovascular disease.

Regular physical activity can greatly affect blood pressure, and effects can be immediate. People who have normal blood pressure benefit because the risk of developing hypertension is reduced. People who have hypertension also benefit because systolic and diastolic blood pressure are lowered. Both aerobic and muscle-strengthening physical activity are recommended to improve blood pressure. Even physical activity at levels below the key guidelines tends to benefit blood pressure, and engaging in more physical activity can have even greater benefits.

Everyone, including children and adolescents, can gain the cardiovascular health benefits of physical activity. The amount of physical activity that provides favorable cardiorespiratory health and fitness outcomes is similar for men and women of all ages, including older people, as well as for adults of various races and ethnicities. Aerobic exercise also improves cardiorespiratory fitness in people with disabilities, including people who have lost the use of one or both legs and those with multiple sclerosis, stroke, and spinal cord injury.

Cardiometabolic Health and Weight Management

Cardiometabolic health is a term that encompasses cardiovascular diseases and metabolic diseases, such as type 2 diabetes. Cardiovascular disease and metabolic disease share a number of risk factors, and reducing risk of one can reduce risk for the other. Cardiometabolic health and weight status are also closely related issues and are often considered together.

Type 2 Diabetes and Cardiometabolic Health

Regular physical activity strongly reduces the risk of developing type 2 diabetes in people of all body sizes. Physical activity can have an additive benefit for reducing risk of type 2 diabetes because physical activity reduces the risk of excessive weight gain, an independent risk factor for type 2 diabetes. Adults who regularly engage in aerobic activity of at least moderate intensity have a significantly lower risk of developing type 2 diabetes than do inactive adults. These benefits begin to accrue at levels of physical activity below the key guideline of 150 to 300 minutes a week, and additional amounts of moderate- or vigorous-intensity physical activity seem to lower risk even further. Insulin sensitivity can be improved with just a single bout of physical activity. In addition, physical activity helps control blood glucose in people who already have type 2 diabetes.

Physical activity improves cardiometabolic health in children and adolescents, as well as in adults. Specifically, regular physical activity contributes to lower plasma triglycerides and insulin levels and may also play a role in improving high-density lipoprotein (HDL) cholesterol and blood pressure.

Can High-Intensity Interval Training Be Helpful for Cardiovascular Health?

Most of the benefits of physical activity have been studied with moderate- or vigorous-intensity aerobic activity. Recent research has examined high-intensity interval training (HIIT), which may provide similar reductions in cardiovascular disease risk factors as those observed with continuous moderate-intensity physical activity. HIIT is a form of interval training that consists of alternating short periods of maximal-effort exercise with less intense recovery periods. This type of exercise can improve insulin sensitivity, blood pressure, and body composition in adults. Interestingly, adults with overweight or obesity and those at higher risk of cardiovascular disease and type 2 diabetes tend to have greater cardiovascular benefits when doing HIIT compared to normal-weight or healthy adults.

Weight Management

Physical activity and caloric intake both must be considered when trying to control body weight. Because of its role in energy balance, physical activity is a critical factor in determining whether a person can maintain a healthy body weight, lose excess body weight, or maintain successful weight loss.

Strong scientific evidence shows that physical activity helps people maintain a stable weight over time and can reduce the risk of excessive weight gain and the incidence of obesity. People vary a great deal in how much physical activity they need to achieve and maintain a healthy weight. Some need more physical activity than others to maintain a healthy body weight, to lose weight, or to keep weight off once it has been lost. Many people need more than the equivalent of 150 minutes of moderate-intensity activity a week to maintain their weight. The relationship between physical activity and prevention of weight gain is most often observed with moderate- or vigorous-intensity aerobic physical activity. Muscle-strengthening activities help promote weight maintenance, although not to the same degree as aerobic activity.

People who want to lose a substantial amount of weight (more than 5 percent of body weight) and people who are trying to keep a significant amount of weight off once it has been lost may need to do more than 300 minutes of moderate-intensity activity a week to meet weight-control goals. Muscle-strengthening activities can also help maintain lean body mass during weight loss. Combining both caloric restriction and physical activity tend to be most beneficial for weight loss rather than just caloric restriction or just physical activity.

People with overweight or obesity tend to experience the same benefits of physical activity as those with normal weight. However, there are specific exceptions. Compared to women with normal weight, women with overweight or obesity see a greater risk reduction for developing endometrial cancer and a greater risk reduction of breast cancer-specific mortality as a result of being more physically active.

Regular physical activity also helps control body weight or reduce body fat in children and adolescents ages 3 through 17 years. Throughout childhood and adolescence, higher levels of physical activity are associated with smaller increases in body weight and adiposity.

Bone and Musculoskeletal Health

Bones, muscles, and joints support the body and help it move. Healthy bones, joints, and muscles are critical to the ability to do daily activities without physical limitations such as climbing stairs, working in the garden, or carrying a small child.

Progressive muscle-strengthening activities preserve or increase muscle mass, strength, and power. Greater amounts (through higher frequency, heavier weights, or more resistance) improve muscle function to a greater degree. Improvements occur in children and adolescents as well as in younger and older adults. Resistance exercises also improve muscular strength in persons with conditions such as stroke, multiple sclerosis, cerebral palsy, and spinal cord injury. Though aerobic activity does not increase muscle mass in the same way that muscle-strengthening activities do, it may also help slow the loss of muscle with aging.

Preserving bone, joint, and muscle health is essential with increasing age. Studies show that the frequent decline in bone density that happens during aging can be slowed with regular physical activity. These effects are seen in people who participate in aerobic, muscle-strengthening, and bone-strengthening physical activity programs of moderate or vigorous intensity. The range of total physical activity for these benefits varies widely. Important changes seem to begin at 90 minutes a week.

Building strong, healthy bones is also important for children and adolescents. Along with having a healthy diet that includes adequate calcium and vitamin D, physical activity is critical for bone development in youth. Children and adolescents ages 3 through 17 years who are physically active (such as by running, jumping, and doing other bone-strengthening activities) have higher bone mass, improved bone structure, and greater bone strength.

Regular physical activity also helps people with osteoarthritis or other rheumatic conditions affecting the joints. Participation in 150 minutes a week of moderate-intensity aerobic physical activity plus muscle-strengthening activity improves pain management, function, and quality of life. Up to 10,000 steps per day does not appear to worsen the progression of osteoarthritis. Very high levels of physical activity, however, may have extra risks. People who participate in very high levels of high-impact physical activity—such as elite or professional athletes—have a higher risk of hip and knee osteoarthritis, mostly due to the risk of injury involved in competing in some sports.

Functional Ability and Fall Prevention

Physical function, or *functional ability*, is the capacity of a person to perform tasks or behaviors that enable him or her to carry out everyday activities, such as climbing stairs, or to fulfill basic life roles, such as personal care, grocery shopping, or playing with grandchildren. Loss of functional ability is referred to as *functional limitation*. Middle-aged and older adults who are physically active have lower risk of functional limitations than do inactive adults. Physical activity can prevent or delay the onset of substantial functional or role limitations. Older adults who already have functional limitations also benefit from regular physical activity.

Hip fracture is a serious health condition that can have life-changing negative effects for many older people. Physically active people, especially women, appear to have a lower risk of hip fracture than do inactive people. Among older adults, physical activity reduces the risk of falling and injuries from falls. Research demonstrates that multicomponent physical activity programs are most successful at reducing falls and injuries. These programs commonly include muscle-strengthening activities and balance training and may also include gait and coordination training, physical function training, and moderate-intensity activities, such as walking. It is important to note that doing only low-intensity walking does not seem to reduce the risk of fall-related injuries

and fractures. Older adults, including those with a variety of health conditions such as Parkinson's disease, stroke, and hip fracture, and those with frailty obtain benefits from multicomponent physical activities.

Brain Health

Brain health can be defined in many ways, but the Guidelines focuses on the following areas:

- Youth—brain maturation and development and academic achievement;
- Older adults—dementia and cognitive impairment; and
- Across the lifespan—cognition, anxiety and depression, quality of life, and sleep.

Learn More

See Chapter 6. Additional Considerations for Some Adults for a discussion of physical activity and brain health in conditions such as Parkinson's disease, stroke, and spinal cord injury.

Some of the benefits of physical activity on brain health occur immediately after a session of moderate-to-vigorous physical activity (acute effect), such as reduced feelings of state anxiety (short-term anxiety), improved sleep, and improved aspects of cognitive function. With regular physical activity (habitual effect), improvements are seen in trait anxiety (long-term anxiety), deep sleep, and components of executive function (including the ability to plan and organize; monitor, inhibit, or facilitate behaviors; initiate tasks; and control emotions). Table 2-3 describes the benefits of physical activity for brain health.

Table 2-3. The Benefits of Physical Activity for Brain Health

Outcome	Population	Benefit	Acute	Habitual
Cognition	Children ages 6 to 13 years	Improved cognition (performance on academic achievement tests, executive function, processing speed, memory)	●	●
	Adults	Reduced risk of dementia (including Alzheimer's disease)		●
	Adults older than age 50 years	Improved cognition (executive function, attention, memory, crystallized intelligence,* processing speed)		●
Quality of life	Adults	Improved quality of life		●
Depressed mood and depression	Children ages 6 to 17 years and adults	Reduced risk of depression Reduced depressed mood		●
Anxiety	Adults	Reduced short-term feelings of anxiety (state anxiety)	●	
	Adults	Reduced long-term feelings and signs of anxiety (trait anxiety) for people with and without anxiety disorders		●
Sleep	Adults	Improved sleep outcomes (increased sleep efficiency, sleep quality, deep sleep; reduced daytime sleepiness, frequency of use of medication to aid sleep)		●
	Adults	Improved sleep outcomes that increase with duration of acute episode	●	

Note: The Advisory Committee rated the evidence of health benefits of physical activity as strong, moderate, limited, or grade not assignable. Only outcomes with strong or moderate evidence of effect are included in this table.

*Crystallized intelligence is the ability to retrieve and use information that has been acquired over time. It is different from fluid intelligence, which is the ability to store and manipulate new information.

Cognition

Compared to inactive people, people who do greater amounts of moderate- or vigorous-intensity physical activity may experience improvements in cognition, including performance on academic achievement tests, and performance on neuropsychological tests, such as those involving mental processing speed, memory, and executive function. Physical activity also lowers the risk of developing cognitive impairment, such as dementia, including Alzheimer's disease. These improvements from physical activity are present for people who have normal as well as impaired cognitive health, including conditions such as attention deficit hyperactivity disorder (ADHD), schizophrenia, multiple sclerosis, Parkinson's disease, and stroke.

Healthy older adults, even in the absence of dementia, often show evidence of cognitive decline, especially on measures of processing speed, memory, and executive function. Physical activity may be an effective approach for improving cognitive function in older adults.

Quality of Life

Physically active adults and older adults are likely to report having a better quality of life. Being physically active also improves the sense of a better quality of life among people who have schizophrenia and related disorders.

Anxiety and Depression

Anxiety and anxiety disorders are the most prevalent mental disorders. Participating in moderate-to-vigorous physical activity over longer durations (weeks or months of regular physical activity) reduces symptoms of anxiety in adults and older adults.

Major depression is one of the most common mental disorders in the United States and is a leading cause of disability for middle-aged adults in the United States. The prevalence of depressive episodes is higher among females, both adolescents and adults, than among males. Engaging in regular physical activity reduces the risk of developing depression in children and adults and can improve many of the symptoms experienced by people with depression.

Sleep

In addition to feeling better, adults who are more physically active sleep better. Greater volumes of moderate-to-vigorous physical activity are associated with reduced sleep latency (taking less time to fall asleep), improved sleep efficiency (higher percentage of time in bed actually sleeping), improved sleep quality, and more deep sleep. Greater volumes of moderate-to-vigorous physical activity are also associated with significantly less daytime sleepiness, better sleep quality, and reduced frequency of use of sleep-aid medications. The improvements in sleep with regular physical activity are also reported by people with insomnia and obstructive sleep apnea.

The evidence that habitual moderate-to-vigorous physical activity reduces the risk of excessive weight gain, an important risk factor for obstructive sleep apnea, suggests that physical activity could have a favorable impact on the incidence of obstructive sleep apnea.

The number of hours before bedtime at which the activity is performed does not matter. Benefits are similar for physical activity performed more than 8 hours before bedtime, 3 to 8 hours before, and less than 3 hours before bedtime.

Cancer

Physically active adults have a significantly lower risk of developing several commonly occurring cancers, as well as lower risk of several other cancers. Research shows that adults who participate in greater amounts of physical activity have reduced risks of developing cancers of the:

- Bladder;
- Breast;
- Colon (proximal and distal);
- Endometrium;
- Esophagus (adenocarcinoma);
- Kidney;
- Lung; and
- Stomach (cardia and non-cardia adenocarcinoma).

These effects appear to apply to both men and women, regardless of weight status. Benefits for cancer survivors are shown in Table 2-4.

People With Chronic Health Conditions and Disabilities

Regular physical activity provides important health benefits for adults with chronic health conditions. As seen in Table 2-4, benefits exist for cancer survivors and people with osteoarthritis, hypertension, type 2 diabetes, dementia, multiple sclerosis, spinal cord injury, and other cognitive disorders.

Table 2-4. Health Benefits Associated With Regular Physical Activity for People With Chronic Health Conditions and Disabilities

Cancer Survivors
▪ Improved health-related quality of life ▪ Improved fitness
Breast Cancer Survivors
▪ Lower risk of dying from breast cancer ▪ Lower risk of all-cause mortality
Colorectal Cancer Survivors
▪ Lower risk of dying from colorectal cancer ▪ Lower risk of all-cause mortality
Prostate Cancer Survivors
▪ Lower risk of dying from prostate cancer
People with Osteoarthritis (knee and hip)
▪ Decreased pain ▪ Improved physical function ▪ Improved health-related quality of life ▪ No effect on disease progression at recommended physical activity levels
People with Hypertension
▪ Lower risk of cardiovascular disease mortality ▪ Reduced cardiovascular disease progression ▪ Lower risk of increased blood pressure over time
People with Type 2 Diabetes
▪ Lower risk of cardiovascular disease mortality ▪ Reduced progression of disease indicators: hemoglobin A1C, blood pressure, body mass index, and lipids
People with Dementia
▪ Improved cognition

People with Multiple Sclerosis
■ Improved physical function, including walking speed and endurance ■ Improved cognition
People with Spinal Cord Injury
■ Improved walking function, muscular strength, and upper extremity function
People with diseases or disorders that impair cognitive function (including ADHD, schizophrenia, Parkinson's disease, and stroke)
■ Improved cognition

Note: The Advisory Committee rated the evidence of health benefits of physical activity as strong, moderate, limited, or grade not assignable. Only outcomes with strong or moderate evidence of effect are included in this table.

Women During Pregnancy and the Postpartum Period

Moderate-intensity physical activity is safe for generally healthy women during pregnancy. Physical activity reduces the risk of excessive weight gain and gestational diabetes during pregnancy. Physical activity increases cardiorespiratory fitness without increasing the risk of negative pregnacy outcomes, such as low birth weight, preterm delivery, or early pregnancy loss. Physical activity during the postpartum period (first year after delivery) also improves the mother's cardiorespiratory fitness, decreases symptoms of postpartum depression, and, when combined with caloric restriction, can help her return to her pre-pregnancy body weight after delivery.

Adverse Events

Some people hesitate to become active or increase their level of physical activity because they fear getting injured or having a heart attack. Studies in generally healthy people clearly show that moderate-intensity physical activity, such as brisk walking, has a low risk of such adverse events.

The risk of musculoskeletal injury increases with the total amount of physical activity. For example, a person who regularly runs 40 miles a week has a higher risk of injury than a person who runs 10 miles each week. Participation in contact or collision sports, such as soccer or football, has a higher risk of injury than non-contact physical activity, such as swimming or walking. However, when performing the same activity, people who are less fit are more likely to be injured than people who are more fit.

Cardiac events, such as a heart attack or sudden death during physical activity, are rare. However, the risk of such cardiac events does increase when a person suddenly becomes much more active than usual. The greatest risk occurs when an adult who is usually inactive engages in vigorous-intensity activity (such as shoveling heavy snow). People who are regularly physically active have the lowest risk of cardiac events both while being active and overall.

The bottom line is that the health benefits of physical activity far outweigh the risks of adverse events for almost everyone.

Risks of Sedentary Behavior

In general, *sedentary behavior* refers to any waking behavior characterized by a low level of energy expenditure (less than or equal to 1.5 METs) while sitting, reclining, or lying. The Guidelines operationalizes the definition of sedentary behavior to include self-reported sitting (leisure-time, occupational, and total), television (TV) viewing or screen time, and low levels of movement measured by devices that assess movement or posture.

More time spent in sedentary behavior increases risk of:

- All-cause mortality;
- Cardiovascular disease mortality;
- Cardiovascular disease;
- Type 2 diabetes; and
- Cancer of the colon, endometrium, and lung.

Learn More

See Appendix 1. Physical Activity Behavior: Intensity, Bouts, and Steps for more information about METs.

Learn More

See Chapter 1. Introduction to the Physical Activity Guidelines for Americans for a more detailed discussion of the relationships of sedentary behavior and health.

For inactive adults, replacing sedentary behavior with light-intensity physical activity is likely to produce some health benefits. Among all adults, replacing sedentary behavior with moderate- or vigorous-intensity physical activity may produce even greater benefits.

Chapter 3. Active Children and Adolescents

Childhood and adolescence are critical periods for developing movement skills, learning healthy habits, and establishing a firm foundation for lifelong health and well-being. Regular physical activity in children and adolescents promotes health and fitness. Compared to those who are inactive, physically active youth have higher levels of cardiorespiratory fitness and stronger muscles. They also typically have lower body fat and stronger bones. Physical activity also has brain health benefits for school-aged children, including improved cognition and reduced symptoms of depression. Evidence indicates that both acute bouts and regular moderate-to-vigorous physical activity improve the cognitive functions of memory, executive function, processing speed, attention, and academic performance for these children.

Youth who are regularly active also have a better chance of a healthy adulthood. Children and adolescents do not usually develop chronic diseases, such as heart disease, hypertension, type 2 diabetes, or osteoporosis. However, current evidence shows that obesity and other risk factors for these diseases, such as elevated insulin, blood lipids, and blood pressure, are increasingly appearing in children and adolescents. Exercise training in youth with overweight or obesity can improve body composition by reducing overall levels of body fat as well as abdominal fat. Regular physical activity also makes it less likely that these risk factors will develop and more likely that children remain healthy when they become adults.

This chapter provides physical activity guidance for children and adolescents 3 through 17 years old. The Advisory Committee did not review evidence for children younger than age 3 years.

Preschool-aged children (ages 3 through 5 years) should be encouraged to move and engage in active play as well as in structured activities, such as throwing games and bicycle or tricycle riding. To strengthen bones, young children should do activities that involve hopping, skipping, jumping, and tumbling. Although the specific amount of activity needed to improve bone health and avoid excess fat in young children is not well defined, a reasonable target may be 3 hours per day of activity of all intensities: light, moderate, or vigorous intensity. This is the average amount of activity observed among children of this age and is consistent with guidelines from Canada, the United Kingdom, and the Commonwealth of Australia.

Key Guidelines for Preschool-Aged Children

- ✓ Preschool-aged children (ages 3 through 5 years) should be physically active throughout the day to enhance growth and development.
- ✓ Adult caregivers of preschool-aged children should encourage active play that includes a variety of activity types.

School-aged youth (ages 6 through 17 years) can achieve substantial health benefits by doing moderate- and vigorous-intensity physical activity for periods of time that add up to 60 minutes or more each day. This activity should include aerobic activity as well as age-appropriate muscle- and bone-strengthening activities. It appears that, as in adults, the total amount of physical activity is more important for achieving health benefits than is any one component (frequency, intensity, or duration) or specific mix of activities (aerobic, muscle strengthening, bone strengthening). Even so, bone-strengthening activities remain especially important for children and young adolescents because the greatest gains in bone mass occur during the years just before and during puberty. In addition, the majority of peak bone mass is obtained by the end of adolescence.

Parents and other adults who work with or care for youth should be familiar with the key guidelines in this chapter. Adults play an important role in providing age-appropriate opportunities for physical activity. In doing so, they help lay an important foundation for lifelong, health-promoting physical activity. Adults need to encourage active play in children and encourage sustained and structured activity as children grow older. As children become adolescents, they typically reduce their physical activity, making it all the more important for adults to provide age-appropriate, enjoyable opportunities for physical activity and to encourage youth to participate.

Key Guidelines for School-Aged Children and Adolescents

- ✓ It is important to provide young people opportunities and encouragement to participate in physical activities that are appropriate for their age, that are enjoyable, and that offer variety.
- ✓ Children and adolescents ages 6 through 17 years should do 60 minutes (1 hour) or more of moderate-to-vigorous physical activity daily:
  - **Aerobic:** Most of the 60 minutes or more per day should be either moderate- or vigorous-intensity aerobic physical activity and should include vigorous-intensity physical activity on at least 3 days a week.
  - **Muscle-strengthening:** As part of their 60 minutes or more of daily physical activity, children and adolescents should include muscle-strengthening physical activity on at least 3 days a week.
  - **Bone-strengthening:** As part of their 60 minutes or more of daily physical activity, children and adolescents should include bone-strengthening physical activity on at least 3 days a week.

Explaining the Guidelines

Types of Activity

The key guidelines for school-aged children and adolescents focus on three types of activity—aerobic, muscle strengthening, and bone strengthening. Each has important health benefits. Certain activities can be aerobic as well as muscle or bone strengthening. Illustrations of these activities can be found in the real-life examples at the end of this chapter.

Aerobic activities are those in which young people rhythmically move their large muscles for a sustained period of time. Running, hopping, skipping, jumping rope, swimming, dancing, and bicycling are all examples of aerobic activities. Aerobic activities increase cardiorespiratory fitness. Children often do activities in short bursts, which may not technically be aerobic. However, the Guidelines uses the term *aerobic* to refer to these types of activities, even if they are done only briefly.

Muscle-strengthening activities make muscles do more work than usual during activities of daily life. This is called *overload*, and strengthens the muscles. Muscle-strengthening activities can be unstructured and part of play, such as playing on playground equipment, climbing trees, and playing tug-of-war. Or they can be structured, such as lifting weights or working with resistance bands.

Learn More

See Chapter 2. Physical Activity and Health for more on overload and related concepts.

Bone-strengthening activities produce a force on the bones of the body that promotes bone growth and strength. This force is commonly produced by impact with the ground. Running, jumping rope, basketball, tennis, and hopscotch are all examples of bone-strengthening activities. As these examples illustrate, bone-strengthening activities can also be aerobic and muscle strengthening.

How Age Influences Physical Activity in Children and Adolescents

Children and adolescents should meet the key guidelines by doing activity that is appropriate for their age. Their natural patterns of movement differ from those of adults. For example, children are naturally active in an intermittent way, particularly when they do unstructured active play. During recess and in their free play and games, children use basic aerobic and bone-strengthening activities, such as running, hopping, skipping, and jumping, to develop movement patterns and skills. They alternate brief periods of moderate- and vigorous-intensity activity with periods of light-intensity physical activity or rest. Any episode of moderate- or vigorous-intensity physical activity, however brief, counts toward the key guidelines for children and adolescents ages 6 through 17 years. For preschool-aged children, activity of any intensity counts, including light intensity.

Children also commonly increase muscle strength through unstructured activities that involve lifting or moving their body weight or working against resistance. Children do not usually do or need formal muscle-strengthening programs, such as lifting weights. However, these programs are safe for children if they are properly prescribed and supervised.

As children grow into adolescents, their patterns of physical activity change. They are able to play organized games and sports and are able to sustain longer periods of activity. But they still commonly do intermittent activity, and any period of moderate- or vigorous-intensity activity can count toward the key guidelines.

During the transition to adolescence, sex differences in physical activity behavior appear. The amount of physical activity done by girls tends to decrease dramatically compared to that of boys, and the disparity persists into adulthood (Figures 1-1 and 1-2). Therefore, adolescent girls may need additional support and encouragement to maintain health-enhancing physical activity.

Adolescents may meet the key guidelines by doing free play, sports, or structured programs. Structured exercise programs can include muscle-strengthening activities, such as lifting weights, working with resistance bands, or using body weight for resistance (such as push-ups, pull-ups, and planks). Muscle-strengthening activities count if they involve a moderate or greater level of effort and work the major muscle groups of the body—legs, hips, back, abdomen, chest, shoulders, and arms.

Levels of Intensity for Aerobic Activity

Children and adolescents ages 6 and older can meet the key guidelines by doing a combination of moderate- and vigorous-intensity aerobic physical activities or by doing only vigorous-intensity aerobic physical activities. Youth should not do only moderate-intensity activity. It is important to include vigorous-intensity activities because they lead to greater improvement in cardiorespiratory fitness.

The intensity of aerobic physical activity can be defined on either an absolute or a relative scale. Either scale can be used to monitor the intensity of aerobic physical activity:

Absolute intensity is the amount of energy expended during the activity, without considering a person's cardiorespiratory fitness.

Relative intensity uses a person's level of cardiorespiratory fitness to assess level of effort.

Relative intensity describes a person's level of effort relative to his or her fitness. As a rule of thumb, on a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10, moderate-intensity activity is a 5 or 6. Young people doing moderate-intensity activity will notice that their hearts are beating faster than normal and they are breathing harder than normal. Vigorous-intensity activity begins at a level of 7 or 8. Youth doing vigorous-intensity activity will feel their heart beating much faster than normal, and they will breathe much harder than normal.

Learn More

See Appendix 1. Physical Activity Behavior: Intensity, Bouts, and Steps for *a more detailed discussion of intensity and how to measure it.*

When adults supervise children, they generally cannot ascertain a child's heart or breathing rate. However, they can observe whether a child is doing an activity which, based upon absolute energy expenditure, is considered to be either moderate or vigorous intensity. For example, a child walking to school is doing

moderate-intensity activity. A child running on the playground is doing vigorous-intensity activity. However, children with low fitness may experience activities that are moderate intensity on the absolute scale as being vigorous intensity. Table 3-1 includes examples of activities classified by absolute intensity. It shows that some activities, such as bicycling, can be moderate or vigorous intensity, depending upon level of effort.

Table 3-1. Examples of Aerobic, Muscle-, and Bone-Strengthening Physical Activities for Children and Adolescents

Type of Physical Activity	Preschool-Aged Children	School-Aged Children	Adolescents
Moderate–intensity aerobic	■ Games such as tag or follow the leader ■ Playing on a playground ■ Tricycle or bicycle riding ■ Walking, running, skipping, jumping, dancing ■ Swimming ■ Playing games that require catching, throwing, and kicking ■ Gymnastics or tumbling	■ Brisk walking ■ Bicycle riding ■ Active recreation, such as hiking, riding a scooter without a motor, swimming ■ Playing games that require catching and throwing, such as baseball and softball	■ Brisk walking ■ Bicycle riding ■ Active recreation, such as kayaking, hiking, swimming ■ Playing games that require catching and throwing, such as baseball and softball ■ House and yard work, such as sweeping or pushing a lawn mower ■ Some video games that include continuous movement
Vigorous–intensity aerobic	■ Games such as tag or follow the leader ■ Playing on a playground ■ Tricycle or bicycle riding ■ Walking, running, skipping, jumping, dancing ■ Swimming ■ Playing games that require catching, throwing, and kicking ■ Gymnastics or tumbling	■ Running ■ Bicycle riding ■ Active games involving running and chasing, such as tag or flag football ■ Jumping rope ■ Cross-country skiing ■ Sports such as soccer, basketball, swimming, tennis ■ Martial arts ■ Vigorous dancing	■ Running ■ Bicycle riding ■ Active games involving running and chasing, such as flag football ■ Jumping rope ■ Cross-country skiing ■ Sports such as soccer, basketball, swimming, tennis ■ Martial arts ■ Vigorous dancing

Type of Physical Activity	Preschool-Aged Children	School-Aged Children	Adolescents
Muscle strengthening	■ Games such as tug of war ■ Climbing on playground equipment ■ Gymnastics	■ Games such as tug of war ■ Resistance exercises using body weight or resistance bands ■ Rope or tree climbing ■ Climbing on playground equipment ■ Some forms of yoga	■ Games such as tug of war ■ Resistance exercises using body weight, resistance bands, weight machines, hand-held weights ■ Some forms of yoga
Bone strengthening	■ Hopping, skipping, jumping ■ Jumping rope ■ Running ■ Gymnastics	■ Hopping, skipping, jumping ■ Jumping rope ■ Running ■ Sports that involve jumping or rapid change in direction	■ Jumping rope ■ Running ■ Sports that involve jumping or rapid change in direction

Note: Some activities, such as bicycling or swimming, can be moderate or vigorous intensity, depending upon level of effort. For preschool-aged children, aerobic activities listed can be either moderate or vigorous intensity.

Meeting the Key Guidelines

American youth vary in their physical activity participation. Some do not participate at all, others participate in enough activity to meet the key guidelines, and some exceed the key guidelines.

One practical strategy to promote activity in youth is to replace sedentary behavior with activity whenever possible. For example, where appropriate and safe, young people should walk or bicycle to school or the bus stop instead of riding in a car. Rather than only watching sporting events on television, young people should participate in age-appropriate sports or games.

- **Children and adolescents who do not meet the key guidelines** should slowly increase their moderate-to-vigorous physical activity in small steps and in ways that they enjoy. A gradual increase in the number of days and the time spent being active will help reduce the risk of injury.
- **Children and adolescents who meet the key guidelines** should continue doing moderate-to-vigorous physical activity every day and, if appropriate, become even more active. Evidence suggests that even more than 60 minutes of activity daily may provide additional health benefits for school-aged youth.
- **Children and adolescents who exceed the key guidelines** should maintain their activity level and vary the kinds of activities they do to reduce the risk of overtraining or injury.

Special Considerations

Children and Adolescents With Disabilities

Children and adolescents with disabilities are more likely to be inactive than those without disabilities. Youth with disabilities should work with a health care professional or physical activity specialist to understand the types and amounts of physical activity appropriate for them. When possible, children and adolescents with disabilities should meet the key guidelines. When young people are not able to participate in the appropriate types or amounts of physical activities needed to meet the key guidelines, they should be as active as possible and avoid being inactive.

Getting and Staying Active: Real-Life Examples

Children and adolescents can meet the key guidelines and become regularly physically active in many ways. The first example is for a preschool-aged child showing how light-, moderate-, and vigorous-intensity physical activity can be incorporated throughout the day. The next examples are for a child and for an adolescent who are meeting the 60 minutes-a-day key guideline.

Jake: A 4-Year-Old Child

At childcare, Jake goes outside twice a day and plays games like hide-and-seek or hopscotch, chases his friends, and enjoys climbing up and going down the slide. At home, Jake is always on the move, whether he is building a fort in the living room, running around with his older sister, or seeing how high he can jump. On the weekends, Jake takes swimming lessons at the community pool or does gymnastics at the local recreation center. His family also likes to go to the city park, where Jake enjoys riding his tricycle. At home, Jake's parents limit his screen time. All these activities ensure that Jake does at least 3 hours of movement a day.

Ebony: An 11-Year-Old Child

Ebony has a physical disability and uses a wheelchair to get around. Ebony does 60 or more minutes of daily physical activity that is at least moderate intensity, and she also includes vigorous-intensity, bone-strengthening, and muscle-strengthening activities. Here are the daily activities she participates in during a sample week:

- **Monday and Friday:** Wheels to and from school (20 minutes); races a friend during recess (10 minutes); plays basketball during an afterschool program (30 minutes)
- **Tuesday and Thursday:** Wheels to and from school (20 minutes); actively participates during physical education class (50 minutes); plays four square in her afterschool program (15 minutes)

- **Wednesday:** Wheels to and from school (20 minutes); plays tag during recess (20 minutes); participates in an adaptive swim program (45 minutes)
- **Saturday:** Participates in an adaptive swim program (45 minutes); wheels with her mom to and from the grocery store (25 minutes)
- **Sunday:** Goes on a family bike ride using her adaptive bike (60 minutes); plays catch with her sister (10 minutes)

Ebony meets the key guidelines by doing vigorous-intensity aerobic activities, bone-strengthening, and muscle-strengthening activities on at least 3 days a week:

- **Vigorous-intensity** activities on 5 days: basketball, tag or racing at recess, bicycling, and swimming
- **Bone-strengthening** activities on 2 days: physical education class
- **Muscle-strengthening** activities on 2 days: physical education class

Darius: A 16-Year-Old Adolescent

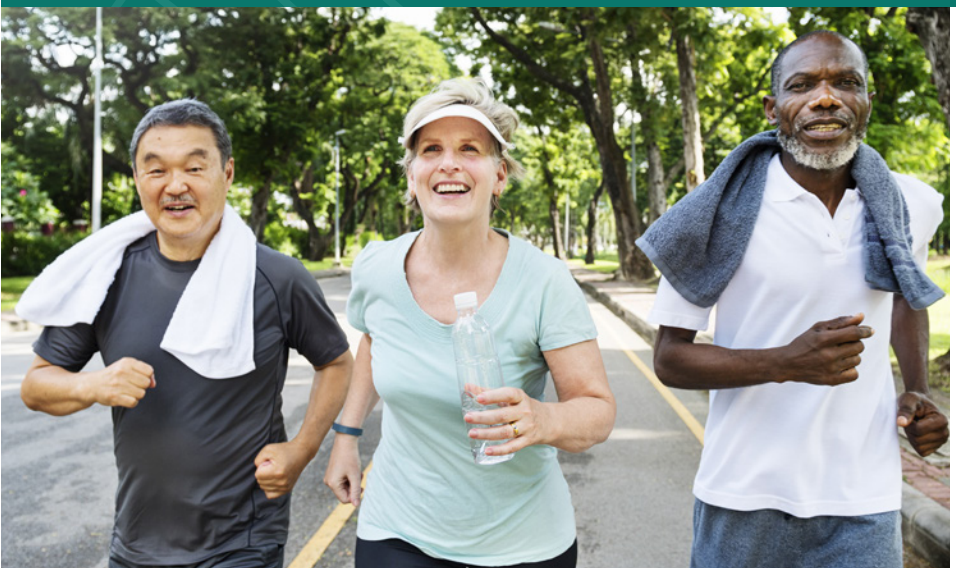
Darius does 60 or more minutes of daily physical activity that is at least moderate intensity. Here are the daily activities he participates in during a sample week when school is not in session:

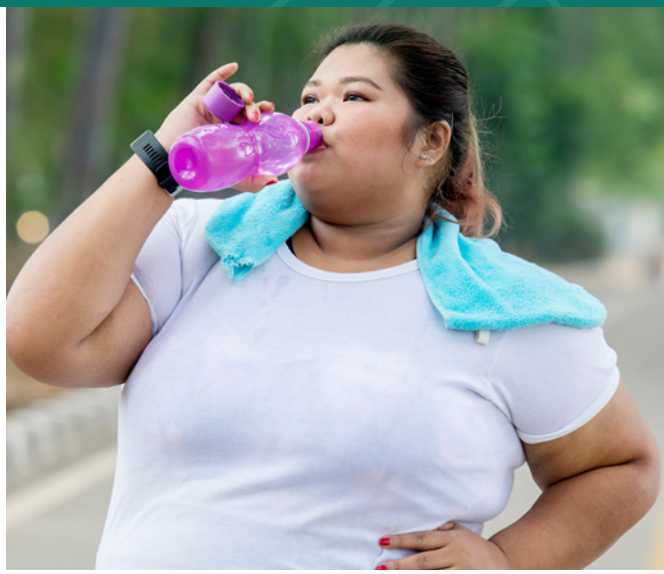
- **Monday and Wednesday:** Walks dog (10 minutes); plays basketball at a nearby school gym that has a shared-use agreement for community physical activity during the summer (50 minutes)
- **Tuesday and Thursday:** Walks dog (10 minutes); plays doubles tennis (30 minutes); does planks and push-ups (5 minutes) with his dad in the evening; rides his bicycle to a friend's home (15 minutes)
- **Friday:** Plays Frisbee in the park with friends (60 minutes)
- **Saturday:** Vacuums his family's home and cleans the bathrooms (30 minutes); rides his bike on a local trail (30 minutes)
- **Sunday:** Plays an active video game with his family that involves continuous movement at a moderate intensity (30 minutes); does body-weight exercises in his room (30 minutes)

Darius meets the key guidelines by doing vigorous-intensity aerobic activities, bone-strengthening, and muscle-strengthening activities on at least 3 days a week:

- **Vigorous-intensity** activities on 4 days: basketball and bicycling
- **Bone-strengthening** activities on 4 days: basketball, tennis
- **Muscle-strengthening** activities on 3 days: body-weight exercises, including planks and push-ups

Chapter 4. Active Adults





Adults who are physically active are healthier, feel better, and are less likely to develop many chronic diseases, such as cardiovascular disease, type 2 diabetes, and several types of cancer than are adults who are inactive. Regular moderate-to-vigorous physical activity also reduces feelings of anxiety and depression and improves sleep and quality of life. Even a single episode of physical activity provides temporary improvements in cognitive function and state anxiety. Adults who are more physically active are better able to perform everyday tasks without undue fatigue. Increased amounts of moderate-to-vigorous physical activity are associated with improved cardiorespiratory and muscular fitness, including a healthier body weight and body composition. Adults who are more physically active can more easily carry out daily tasks like climbing stairs, carrying heavy packages, and performing household chores. These benefits are true for men and women of all ages, races, and ethnicities.

Learn More

See Chapter 6. Additional Considerations for Some Adults. It discusses key guidelines for women during pregnancy and the postpartum period and for adults with chronic conditions or disabilities.

Adults gain most of these health benefits when they do the equivalent of 150 to 300 minutes (2 hours and 30 minutes to 5 hours) of moderate-intensity aerobic physical activity each week. Adults gain additional and more extensive health benefits with even more physical activity. Muscle-strengthening activities also provide health benefits and are an important part of an adult's overall physical activity plan. This chapter provides guidance for men and women ages 18 through 64 years.

Key Guidelines for Adults

- ✓ Adults should move more and sit less throughout the day. Some physical activity is better than none. Adults who sit less and do any amount of moderate-to-vigorous physical activity gain some health benefits.
- ✓ For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.
- ✓ Additional health benefits are gained by engaging in physical activity beyond the equivalent of 300 minutes (5 hours) of moderate-intensity physical activity a week.
- ✓ Adults should also do muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.

Explaining the Key Guidelines

The key guidelines for adults focus on two types of activity—aerobic and muscle strengthening. Each provides important health benefits, as explained in Chapter 2. Physical Activity and Health.

Aerobic Activity

Aerobic activities, also called *endurance* or *cardio activities*, are physical activities in which people move their large muscles in a rhythmic manner for a sustained period of time. Running, brisk walking, bicycling, playing basketball, dancing, and swimming are all examples of aerobic activities. Aerobic activity makes a person's heart beat more rapidly and breathing rate increase to meet the demands of the body's movement. Over time, regular aerobic activity makes the cardiorespiratory system stronger and more fit.

The purpose of aerobic activity does not affect whether or not it counts toward meeting the key guidelines. For example, physically active occupations can count toward meeting the key guidelines, as can active transportation choices (walking or bicycling). All types of aerobic activities can count as long as they are of sufficient intensity. For health benefits, the total amount of moderate-to-vigorous physical activity is more important than the length of each physical activity episode.

Learn More

See Chapter 1. Introducing the Physical Activity Guidelines for Americans. It provides more information about the relationship between sitting time, physical activity, and risk of all-cause mortality.

How Much Total Activity a Week?

When adults do the equivalent of at least 150 minutes of moderate-intensity aerobic activity each week, the benefits are substantial. These benefits include lower risk of all-cause mortality, coronary heart disease, stroke, hypertension, type 2 diabetes, some cancers, anxiety, depression, and Alzheimer's disease and other dementias. Physically active adults also sleep better, have improved cognition, and have better quality of life.

As a person moves from 150 minutes a week toward 300 minutes a week, the health benefits become more extensive. For example, a person who does 300 minutes a week has an even lower risk of heart disease or type 2 diabetes than a person who does 150 minutes a week.

Furthermore, adults who are regularly active at or near the higher end of the key guideline range—300 minutes a week—gain *additional* health benefits. These additional benefits include further risk reduction for several cancers and prevention of unhealthy weight gain (by physical activity alone).

The benefits continue to increase when a person does more than the equivalent of 300 minutes a week of moderate-intensity aerobic activity. Research has not identified an upper limit of total activity, above which additional health benefits cease to occur.

How Many Days a Week and for How Long?

Aerobic physical activity preferably should be spread throughout the week. Research studies consistently show that activity performed on at least 3 days a week produces health benefits. Spreading physical activity across at least 3 days a week may also help reduce the risk of injury and prevent excessive fatigue.

All amounts of aerobic activity count toward meeting the key guidelines if they are performed at moderate or vigorous intensity. Episodes of physical activity can be divided throughout the day or week, depending on personal preference.

How Intense?

The key guidelines for adults focus on two levels of intensity—moderate and vigorous. To meet the key guidelines, adults can do either moderate-intensity or vigorous-intensity aerobic activities, or a combination of both. It takes less time to get the same benefit from vigorous-intensity activities than from moderate-intensity activities. A general rule of thumb is that 2 minutes of moderate-intensity activity counts the same as 1 minute of vigorous-intensity activity. For example, 30 minutes of moderate-intensity activity is roughly the same as 15 minutes of vigorous-intensity activity.

The intensity of aerobic activity can be tracked in two ways—absolute intensity and relative intensity.

Absolute intensity is the amount of energy expended during the activity, without considering a person's cardiorespiratory fitness. The energy expenditure of light-intensity activity is 1.6 to 2.9 times the amount of energy expended when a person is at rest. Moderate-intensity activities expend 3.0 to 5.9 times the amount of energy expended at rest. The energy expenditure of vigorous-intensity activities is 6.0 or more times the energy expended at rest.

Relative intensity is the level of effort required to do an activity. Less fit people generally require a higher level of effort than more fit people to do the same activity. Relative intensity can be estimated using a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10. Moderate-intensity activity is a 5 or 6. Vigorous-intensity activity begins at a level of 7 or 8.

Offsetting the Risks of Too Much Sitting

People who sit a lot have an increased risk of all-cause and cardiovascular disease mortality, as well as an increased risk of developing cardiovascular disease, type 2 diabetes, and colon, endometrial, and lung cancers. The mortality risk related to sitting is not observed among people who do 60 to 75 minutes of moderate-intensity physical activity a day, but this amount of activity is far more than most people obtain. Therefore, both reducing sitting time and increasing physical activity will provide benefits.

Learn More

See Appendix 1. Physical Activity Behaviors: Intensity, Bouts, and Steps for more information on using either method to assess intensity.

Table 4-1 lists some examples of activities classified as moderate-intensity or vigorous-intensity based on absolute intensity. Either absolute or relative intensity can be used to monitor progress in meeting the key guidelines.

Table 4-1. Examples of Different Aerobic Physical Activities and Intensities, Based on Absolute Intensity

Moderate-Intensity Activities
■ Walking briskly (2.5 miles per hour or faster) ■ Recreational swimming ■ Bicycling slower than 10 miles per hour on level terrain ■ Tennis (doubles) ■ Active forms of yoga (for example, Vinyasa or power yoga) ■ Ballroom or line dancing ■ General yard work and home repair work ■ Exercise classes like water aerobics
Vigorous-Intensity Activities
■ Jogging or running ■ Swimming laps ■ Tennis (singles) ■ Vigorous dancing ■ Bicycling faster than 10 miles per hour ■ Jumping rope ■ Heavy yard work (digging or shoveling, with heart rate increases) ■ Hiking uphill or with a heavy backpack ■ High-intensity interval training (HIIT) ■ Exercise classes like vigorous step aerobics or kickboxing

Spotlight on Aerobic Activities: A Tried and True Favorite and Two Increasingly Popular Options

Walking

Walking is an easy physical activity to begin and maintain as part of a physically active lifestyle. It does not require special skills, facilities, or expensive equipment. Many studies show that walking has health benefits and a low risk of injury. It can be done year round and in many settings.

Yoga and Tai Chi

Many different forms of yoga exist, and they range in intensity level from more meditative Hatha yoga to power yoga. For this reason, yoga may include time that would be characterized as light-intensity physical activity or as moderate-intensity physical activity. Yoga may also be considered both aerobic and muscle strengthening, depending on the type and the postures practiced.

Tai chi is typically classified as a light-intensity physical activity but may be considered relatively moderate intensity for some adults. It includes balance activities, and some forms may be considered muscle strengthening.

High-Intensity Interval Training

High-intensity interval training (HIIT) is a form of interval training that consists of alternating short periods of maximal-effort exercise with less intense recovery periods. There are no universally accepted lengths for the maximal-effort period, the recovery period, or the ratio of the two; no universally accepted number of cycles per session or the entire duration of the session; and no precise relative intensity at which the maximal-effort component should be performed.

When using relative intensity, people pay attention to how physical activity affects their heart rate and breathing. As a rule of thumb, a person doing moderate-intensity aerobic activity can talk, but not sing, during the activity. A person doing vigorous-intensity activity cannot say more than a few words without pausing for a breath.

Talk Test

As a rule of thumb, a person doing moderate-intensity aerobic activity can talk, but not sing, during the activity. A person doing vigorous-intensity activity cannot say more than a few words without pausing for a breath.

Older or less fit adults may find that activities in Table 4-1 labeled as moderate intensity are experienced as vigorous intensity. These adults will gain health benefits from starting with activities that would be considered light intensity and, as they are able, to gradually build up to moderate- or vigorous-intensity activities. In contrast, younger or more fit adults may experience activities labeled as moderate intensity easy enough that they can sing while doing them. These adults may need to do more vigorous-intensity activities to gain certain health benefits.

Muscle-Strengthening Activity

Muscle-strengthening activities provide additional benefits not found with aerobic activity. The benefits of muscle-strengthening activity include increased bone strength and muscular fitness. Muscle-strengthening activities can also help maintain muscle mass during weight loss.

Muscle-strengthening activities make muscles do more work than they are accustomed to doing. That is, they overload the muscles. Examples of muscle-strengthening activities include lifting weights, working with resistance bands, doing calisthenics that use body weight for resistance (such as push-ups, pull-ups, and planks), carrying heavy loads, and heavy gardening.

Muscle-strengthening activities count if they involve a moderate or greater level of intensity or effort and work the major muscle groups of the body—the legs, hips, back, chest, abdomen, shoulders, and arms. Muscle-strengthening activities for all the major muscle groups should be done at least 2 days a week. The improvement in, or maintenance of, muscle strength is specific to the muscles used during the activity, so a variety of activities is necessary to achieve balanced muscle strength.

No specific amount of time is recommended for muscle strengthening, but muscle-strengthening exercises should be performed to the point at which it would be difficult to do another repetition. When resistance training is used to enhance muscle strength, one set of 8 to 12 repetitions of each exercise is effective, although 2 or 3 sets may be more effective. Improvements in muscle strength and endurance are progressive over time. Increases in the amount of weight or the days a week of exercising will result in stronger muscles.

Flexibility Activities

Flexibility is an important part of physical fitness. Some types of physical activity, such as ballet or salsa dancing, require more flexibility than others. Flexibility activities enhance the ability of a joint to move through the full range of motion. Stretching exercises are effective in increasing flexibility, and thereby can allow people to more easily do activities that require greater flexibility. For these reasons, flexibility activities are an appropriate part of a physical activity program, even though their health benefits are unknown and it is unclear whether they reduce risk of injury. Time spent doing flexibility activities by themselves does not count toward meeting the aerobic or muscle-strengthening key guidelines.

Warm-Up and Cool-Down

Warm-up and cool-down activities are an acceptable part of a person's physical activity plan. Commonly, the warm-up and cool-down involve doing an activity at a slower speed or lower intensity. A warm-up before moderate- or vigorous-intensity aerobic activity allows a gradual increase in heart rate and breathing at the start of the episode of activity. A cool-down after activity allows a gradual decrease at the end of the episode. Time spent doing warm-up and cool-down may count toward meeting the aerobic key guidelines if the activity is at least moderate intensity (for example, walking briskly as a warm-up before jogging). A warm-up for muscle-strengthening activity commonly involves doing exercises with lighter weight.

Meeting the Key Guidelines

Adults have many options for becoming physically active, increasing their physical activity, and staying active throughout their lives. In all cases, adults should try to move more and sit less each day. In deciding how to meet the key guidelines, adults should think about how much physical activity they are already doing and how physically fit they are. Personal health and fitness goals are also important to consider. Examples of how to meet the key guidelines are provided later in this chapter.

In general, healthy men and women who plan gradual increases in their weekly amounts of physical activity do not need to consult a health care provider before becoming physically active. Women who are pregnant and adults with chronic conditions or disabilities are discussed in Chapter 6. Additional Considerations for Some Adults.

Inactive or Insufficiently Active Adults

Adults who do not yet do the equivalent of 150 minutes of moderate-intensity physical activity a week (inactive or insufficiently active) should work gradually toward this goal. The initial amount of activity should be at a light or moderate intensity, for short periods of time, with the sessions spread throughout the week. People likely gain some health benefits even when they replace sitting time with light-intensity activity. Sitting less and doing moderate- or vigorous-intensity physical activity has even more benefits. The good news is that "some is better than none." As shown in Figure 2-1, which plots the benefits of increasing physical activity on all-cause mortality, the biggest gain in benefits occurs when going from no physical activity to being active for just 60 minutes a week.

To reduce risk of injury, it is important to increase the amount of physical activity gradually over a period of weeks to months. For example, an inactive person could start with a walking program consisting of 5 minutes of walking several times each day, 5 to 6 days a week. The length of time could then gradually be increased to 10 minutes per session, 3 times a day, and the walking speed could be increased slowly.

Learn More

See Chapter 7. Active and Safe for more information on how to increase physical activity gradually.

Muscle-strengthening activities should also be gradually increased over time. Initially, these activities can be done just 1 day a week starting at a light or moderate level of effort. Over time, the number of days a week can be increased to 2, and then possibly to more than 2. Each week, the intensity can be increased slightly until it becomes moderate or greater.

Active Adults

Adults who are already active and meet the minimum key guidelines (the equivalent of 150 minutes of moderate-intensity aerobic activity and 2 days of muscle-strengthening activity every week) can gain additional and more extensive health benefits by reducing sedentary behavior and increasing physical activity above this amount. Most adults should increase their aerobic activity to exceed the minimum level and move toward 300 minutes a week. Adults should also do muscle-strengthening activities on at least 2 days each week.

One time-efficient way to achieve greater fitness and health goals is to substitute vigorous-intensity aerobic activity for some moderate-intensity activity. Using the 2-to-1 rule of thumb, doing 150 minutes of vigorous-intensity aerobic activity a week provides about the same benefits as 300 minutes of moderate-intensity activity.

Adults are encouraged to do a variety of activities to reduce the risk of injury often caused by doing too much of one kind of activity (this is called an *overuse injury*).

Highly Active Adults

Adults who are highly active—doing more than the equivalent of 300 minutes of moderate-intensity physical activity and at least 2 days of muscle-strengthening activity each week—should maintain or continue to increase their activity level. These adults are also encouraged to do a variety of activities.

Special Considerations

Maintaining a Healthy Body Weight

The health benefits of physical activity are generally independent of body weight. The good news for people needing to lose weight is that regular physical activity provides major health benefits, no matter how their weight changes over time. Physical activity, along with appropriate dietary intake, is an important part of maintaining a healthy weight because it helps in preventing weight gain, losing weight, and keeping extra weight off once it has been lost. Physical activity also helps reduce abdominal fat and preserve muscle during weight loss. Adults should aim for a healthy, stable body weight. The amount of physical activity necessary to achieve this weight varies greatly from person to person.

Physical Activity and Body Weight: What's the Relationship?

The health benefits of physical activity are generally independent of body weight. The good news for people needing to lose weight is that regular physical activity provides major health benefits, no matter how their weight changes over time.

The first step in achieving or maintaining a healthy weight is to meet the minimum level of physical activity in the Guidelines. For some people this will result in a stable and healthy body weight, but for many it may not.

Learn More

See the Dietary Guidelines for Americans for additional information on weight management and how to determine a healthy weight.

People who are at a healthy body weight, but slowly gaining weight, can either gradually increase their level of physical activity (toward the equivalent of 300 minutes a week of moderate-intensity aerobic activity) or reduce caloric intake, or both, until their weight is stable. That is, by regularly checking body weight, people can find the amount of physical activity that works for them.

Many adults will need to do more than the 150 minutes a week of moderate-intensity aerobic physical activity to lose weight or keep it off. These adults should do more physical activity and/or further reduce their caloric intake. Some people will need to do the equivalent of 300 or more minutes of moderate-intensity physical activity a week to meet their body-weight goals. In addition to restricting caloric intake, these adults should gradually increase minutes or the intensity of aerobic physical activity, to the point at which the physical activity is effective in achieving a healthy weight.

It is important to remember that all activities, whether light, moderate, or vigorous intensity, "count" for energy balance. Active choices, such as taking the stairs rather than the elevator or adding short episodes of walking to the day, are examples of activities that can be helpful in weight control.

Getting and Staying Active: Real-Life Examples

Adults can meet the key guidelines in all sorts of ways and with many types of physical activity. The choices of types and amounts of physical activity depend upon personal health and fitness goals. Here are a few examples:

Madison: A 20-Year-Old Woman

Madison is an active 20-year-old who lives on campus at a small university. At the end of her first year, she realized she had become quite sedentary and had gained weight. She found that physical activity helped her feel less anxious and study more productively, so she made the commitment to build regular physical activity into her week. Now at the end of her second year, Madison does the equivalent of at least 420 minutes of moderate-intensity aerobic activity each week, plus muscle-strengthening activities 2 days a week. Below is a sample week of her activities.

- Madison walks briskly to class, the gym, the dining hall, and friends' dorms instead of taking the campus shuttle. Walking provides at least 30 minutes of moderate-intensity activity each day (150 minutes a week).

- She attends a cardio exercise class at the university's fitness facility twice a week. The 45-minute class is mostly vigorous-intensity activity (equivalent of 180 minutes of moderate-intensity activity a week) and incorporates dance, calisthenics (e.g., jumping jacks, running in place), and step aerobics.
- Madison meets a friend twice a week to lift weights at the university's gym. They use dumbbells, weight machines, suspension trainers, and kettlebells to target all of their major muscle groups.
- As part of the Outdoor Adventure Club at school, Madison goes kayaking for 90 minutes at the nearby river on the weekend.

Miguel: A 40-Year-Old Man With Young Children

Between a demanding job, caring for his two children ages 5 and 7, and spending time with his wife and extended family, Miguel does not have much time to spare. But physical activity helps Miguel deal with the stress of his hectic life, and he squeezes it in wherever he can. Adding it up, he does the equivalent of 95 minutes a week of moderate-intensity physical activity and 1 day of muscle-strengthening activity each week. Miguel has downloaded a few HIIT workouts on his phone and squeezes in two 20-minute sessions a week (40 minutes of vigorous intensity, the equivalent of 80 minutes of moderate-intensity activity a week), often before his kids wake up or after they go to bed. On Saturdays he and his wife stroll to the park with their children. The leisurely walk counts as light-intensity activity, but Miguel typically spends at least 15 minutes running around and playing with the kids each time they visit the park. While at the park, Miguel and his wife take turns doing body-weight exercises like squats, push-ups, and crunches while the other parent keeps an eye on the kids. Miguel knows he has not quite met the key guidelines, so he plans to add another park outing each week this summer. He also talked to a coworker about increasing activity at work. He plans to start walking briskly up or down the stairs in his office rather than taking the elevator to attend various meetings to accumulate at least 10 minutes of moderate-to-vigorous physical activity each day. Once he makes these changes, he will be getting the equivalent of 160 minutes of moderate-intensity activity and 2 days of muscle-strengthening activity each week.

Chapter 5. Active Older Adults

The benefits of regular physical activity occur throughout life and are essential for healthy aging. Adults ages 65 years and older gain substantial health benefits from regular physical activity. However, it is never too late to start being physically active. Being physically active makes it easier to perform activities of daily living, including eating, bathing, toileting, dressing, getting into or out of a bed or chair, and moving around the house or neighborhood. Physically active older adults are less likely to experience falls, and if they do fall, they are less likely to be seriously injured. Physical activity can also preserve physical function and mobility, which may help maintain independence longer and delay the onset of major disability. Research shows that physical activity can improve physical function in adults of any age, adults with overweight or obesity, and even those who are frail. Promoting physical activity and reducing sedentary behavior for older adults is especially important because this population is the least physically active of any age group, and most older adults spend a significant proportion of their day being sedentary.

Older adults are a varied group. Most, but not all, have one or more chronic conditions, such as type 2 diabetes, cardiovascular disease, osteoarthritis, or cancer, and these conditions vary in type and severity. Nevertheless, being physically active has significant benefits for all older adults. Physical activity is key to preventing and managing chronic disease. Other benefits include a lower risk of dementia, better perceived quality of life, and reduced symptoms of anxiety and depression. Additionally, doing physical activity with others can provide opportunities for social engagement and interaction. All older adults experience a loss of physical fitness and function with age, but some experience this more than others. This diversity means that some older adults can run several miles, while others struggle to walk a few blocks.

Learn More

See Chapter 6. Additional Considerations for Some Adults for a discussion of physical activity for older adults with chronic conditions.

This chapter provides guidance about physical activity for adults ages 65 years and older. The Guidelines seeks to help older adults select the types and amounts of physical activity appropriate for their own abilities.

For adults ages 65 years and older who have good fitness and no chronic conditions, the guidance in this chapter is essentially the same as that provided in Chapter 4. Active Adults.

Key Guidelines for Older Adults

These guidelines are the same for adults and older adults:

- ✓ Adults should move more and sit less throughout the day. Some physical activity is better than none. Adults who sit less and do any amount of moderate-to-vigorous physical activity gain some health benefits.
- ✓ For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.
- ✓ Additional health benefits are gained by engaging in physical activity beyond the equivalent of 300 minutes (5 hours) of moderate-intensity physical activity a week.
- ✓ Adults should also do muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.

Guidelines just for older adults:

- ✓ As part of their weekly physical activity, older adults should do multicomponent physical activity that includes balance training as well as aerobic and muscle-strengthening activities.
- ✓ Older adults should determine their level of effort for physical activity relative to their level of fitness.
- ✓ Older adults with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.
- ✓ When older adults cannot do 150 minutes of moderate-intensity aerobic activity a week because of chronic conditions, they should be as physically active as their abilities and conditions allow.

Explaining the Key Guidelines

As with other adults, the key guidelines for older adults focus mainly on two types of activity—aerobic and muscle-strengthening. In addition, these key guidelines discuss the importance of multicomponent physical activity, which includes balance training along with aerobic and muscle-strengthening activity. Each provides important health benefits, especially to improve physical function, as explained in Chapter 2. Physical Activity and Health.

Aerobic Activity

Aerobic activities, also called *endurance* or *cardio activities*, are physical activities in which people move their large muscles in a rhythmic manner for a sustained period of time. Brisk walking, jogging, biking, dancing, and swimming are all examples of aerobic activities. Aerobic activity makes a person's heart beat more rapidly and breathing rate increase to meet the demands of the body's movement. Over time, regular aerobic activity makes the cardiorespiratory system stronger and more fit.

No matter what the purpose—from walking the dog, to taking a dance or exercise class, to bicycling to the store—all types of aerobic activity count toward meeting the key guidelines. When putting the key guidelines into action, it is important to consider the total amount of activity, how often, and at what intensity. For health benefits, the total amount of moderate-to-vigorous physical activity is more important than the length of each physical activity episode. In general, muscle-strengthening activities do not count toward meeting the aerobic key guidelines. Table 5-1 lists some examples of aerobic and muscle-strengthening activities for older adults.

How Much Total Activity a Week?

Older adults should aim to do at least 150 to 300 minutes of moderate-intensity physical activity a week, or an equivalent amount (75 to 150 minutes) of vigorous-intensity activity. They can also do an equivalent amount of activity by doing both moderate- and vigorous-intensity activity. As is true for people of all other ages, greater amounts of physical activity provide additional and more extensive health benefits. Older adults who do more aerobic physical activity have a reduced risk of age-related loss of function and reduced risk of physical function limitations compared to the general aging population.

Older adults should strongly consider walking as one good way to get aerobic activity. Walking has many health benefits, and it has a low risk of injury. It can be done year round and in many settings.

Table 5-1. Examples of Physical Activities for Older Adults

Aerobic Activities	Muscle-Strengthening Activities
■ Walking or hiking ■ Dancing ■ Swimming ■ Water aerobics ■ Jogging or running ■ Aerobic exercise classes ■ Some forms of yoga ■ Bicycle riding (stationary or outdoors) ■ Some yard work, such as raking and pushing a lawn mower ■ Sports like tennis or basketball ■ Walking as part of golf	■ Strengthening exercises using exercise bands, weight machines, or hand-held weights ■ Body-weight exercises (push-ups, pull-ups, planks, squats, lunges) ■ Digging, lifting, and carrying as part of gardening ■ Carrying groceries ■ Some yoga postures ■ Some forms of tai chi

Note: The intensity of these activities can be either relatively moderate or relatively vigorous, depending upon an older adult's level of fitness.

Yoga and Tai Chi

Yoga and tai chi are increasingly popular forms of physical activity.

Many different forms of yoga exist, and they range in intensity level from more meditative Hatha yoga to power yoga. For this reason, yoga may include time that can be characterized as light-intensity physical activity or as moderate-intensity physical activity. Yoga may also be considered both aerobic and muscle strengthening, depending on the type and the postures practiced.

Tai chi is typically classified as a light-intensity physical activity but may be relatively moderate intensity for older adults. Some forms of tai chi may be muscle strengthening. Research is currently exploring the effects that tai chi may have on balance and physical function in older adults.

How Many Days a Week and for How Long?

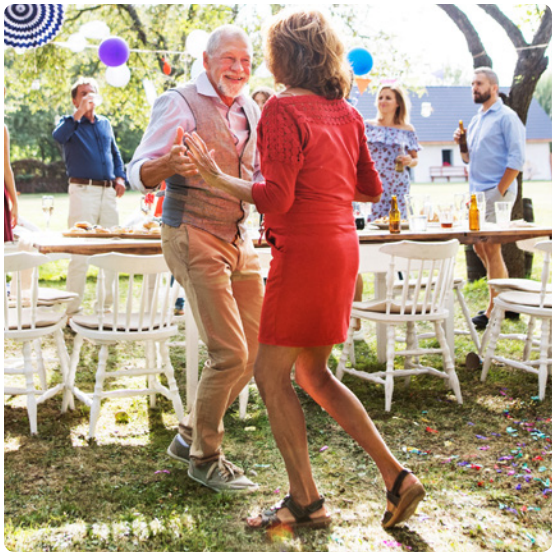
Aerobic physical activity preferably should be spread throughout the week. Research studies consistently show that activity performed on at least 3 days a week produces health benefits. Spreading physical activity across at least 3 days a week may help to reduce the risk of injury and prevent excessive fatigue.

All amounts of aerobic activity count toward meeting the key guidelines if they are performed at moderate or vigorous intensity. Episodes of physical activity can be divided throughout the day or week, depending on personal preference.

How Intense?

The intensity of aerobic activity can be tracked in two ways—absolute intensity and relative intensity. Most studies on older adults use relative intensity to track aerobic physical activity.

- **Absolute intensity** is the amount of energy expended during the activity without considering a person's cardiorespiratory fitness. The energy expenditure of light-intensity activity, for example, is 1.6 to 2.9 times the amount of energy expended when a person is at rest. Moderate-intensity activities expend 3.0 to 5.9 times the amount of energy expended at rest. The energy expenditure of vigorous-intensity activities is 6.0 or more times the energy expended at rest.
- **Relative intensity** is the level of effort required to do an activity. Less fit people generally require a higher level of effort than more fit people to do the same activity. Relative intensity can be estimated using a scale of 0 to 10, where sitting is 0 and the highest level of effort possible is 10.



When using relative intensity, people pay attention to how physical activity affects their heart rate and breathing. As a rule of thumb, a person doing moderate-intensity aerobic activity can talk, but not sing, during the activity. A person doing vigorous-intensity activity cannot say more than a few words without pausing for a breath.

Either absolute or relative intensity can be used to monitor progress in meeting the key guidelines. Because older adults expend more energy than younger adults for the same task, such as walking, and because aerobic capacity declines with age, relative intensity is a better guide for older adults than absolute intensity. Certain activities, such as some types of yoga or tai chi, that are considered light-intensity on an absolute scale for younger adults may be perceived as moderate or vigorous intensity for older adults. People who have been very inactive and are working to increase their physical activity levels can also use relative intensity to help determine their level of effort.

Older adults can meet the key guidelines by doing relatively moderate-intensity activity, relatively vigorous-intensity activity, or a combination of both. The relative intensity of aerobic activity is related to a person's level of cardiorespiratory fitness.

Moderate-intensity activity requires a medium level of effort. On a scale of 0 to 10, where sitting is 0 and the greatest effort possible is 10, moderate-intensity activity is a 5 or 6 and produces noticeable increases in breathing rate and heart rate.

Vigorous-intensity activity begins at a level of 7 or 8 on this scale and produces large increases in a person's breathing and heart rate.

A general rule of thumb is that 2 minutes of moderate-intensity activity counts the same as 1 minute of vigorous-intensity activity. For example, 30 minutes of moderate-intensity activity is roughly the same as 15 minutes of vigorous-intensity activity.

Muscle-Strengthening Activities

At least 2 days a week, older adults should do muscle-strengthening activities that involve all the major muscle groups. These are the muscles of the legs, hips, chest, back, abdomen, shoulders, and arms. The improvements in, or maintenance of, muscular strength are specific to the muscles used during the activity, so a variety of activities is necessary to achieve balanced muscle strength.

Muscle-strengthening activities make muscles do more work than they are accustomed to during activities of daily life. Examples of muscle-strengthening activities include lifting weights, working with resistance bands, doing calisthenics that use body weight for resistance (such as push-ups, pull-ups, and planks), climbing stairs, shoveling snow, and carrying heavy loads (such as groceries and heavy gardening).

Muscle-strengthening activities count if they involve a moderate or greater level of intensity or effort and work the major muscle groups of the body. Whatever the reason for doing it, any muscle-strengthening activity counts toward meeting the key guidelines. For example, muscle-strengthening activity done as part of a therapy or rehabilitation program can count.

No specific amount of time is recommended for muscle strengthening, but muscle-strengthening exercises should be performed to the point at which it would be difficult to do another repetition. When resistance training is used to enhance muscle strength, one set of 8 to 12 repetitions of each exercise is effective, although 2 or 3 sets may be more effective. Development of muscle strength and endurance is progressive over time. That means that gradual increases in the amount of weight, number of sets or repetitions, or the number of days a week of exercise will result in stronger muscles.

Balance Activities

These kinds of activities can improve the ability to resist forces within or outside of the body that cause falls. Fall prevention programs that include balance training and other exercises to improve activities of daily living can also significantly reduce the risk of injury, such as bone fractures, if a fall does occur. Studies of fall prevention programs generally include about three sessions a week. Balance training examples include walking heel-to-toe, practicing standing from a sitting position, and using a wobble board. Strengthening muscles of the back, abdomen, and legs also improves balance.

Multicomponent Physical Activity

Doing multicomponent physical activities can help reduce the risk of injury from falls and improve physical function. *Multicomponent* refers to physical activity that includes more than one type of physical activity, such as aerobic, muscle strengthening, and balance training. Multicomponent physical activity can be done at home or in a community setting as part of a structured program that includes a combination of balance, muscle-strengthening, and aerobic physical activity, and may include gait, coordination, and physical function training. Recreational activities such as dancing, yoga, tai chi, gardening, or sports can also be considered multicomponent because they often incorporate multiple types of physical activity. It is appropriate and recommended that all older adults do multicomponent physical activities.

What Is Multicomponent Physical Activity?

For older adults, multicomponent physical activity is important to improve physical function and decrease the risk of falls or injury from a fall. These activities can be done at home or in a structured group setting. Many studied interventions combine all types of exercise (aerobic, muscle strengthening, and balance) into one session, and this has been shown to be effective.

An example of a multicomponent physical activity program could include walking (aerobic activity), lifting weights (muscle strengthening), and could incorporate balance by walking backwards or sideways or by standing on one foot while doing an upper body muscle-strengthening activity, such as bicep curls. Ballroom dancing also combines aerobic and balance components.

Flexibility, Warm-Up, and Cool-Down

Older adults should maintain the flexibility necessary for regular physical activity and activities of daily life. Flexibility activities enhance the ability of a joint to move through the full range of motion. Stretching exercises are effective in increasing flexibility, and thereby can allow people to more easily do activities that require greater flexibility. Although the health benefits of these activities alone are not known and they have not been demonstrated to reduce risk of activity-related injuries, they are an appropriate component of a physical activity program. However, time spent doing flexibility activities by themselves does not count toward meeting the aerobic or muscle-strengthening key guidelines.

Research studies of effective exercise programs typically include warm-up and cool-down activities. A warm-up before moderate- or vigorous-intensity aerobic activity allows a gradual increase in heart rate and breathing at the start of the episode of activity. A cool-down after activity allows a gradual heart rate decrease at the end of the session. Time spent doing warm-up and cool-down activities may count toward meeting the aerobic activity guidelines if the activity is at least moderate intensity (for example, walking briskly to warm up for a jog). A warm-up for muscle-strengthening activity commonly involves doing exercises with less weight.

Meeting the Key Guidelines

Older adults have many options for how to live an active lifestyle that meets the key guidelines. Many factors influence decisions to be active, such as personal goals, current physical activity habits, and health and safety considerations. In all cases, older adults should try to move more and sit less each day. In working toward meeting the key guidelines, older adults are encouraged to do a variety of activities. This approach can make activity more enjoyable and may reduce the risk of overuse injury. Examples of how to meet the key guidelines are provided later in this chapter.

Healthy older adults who plan gradual increases in their weekly amounts of physical activity generally do not need to consult a health care professional before becoming physically active. However, health care professionals and physical activity specialists can help people attain and maintain regular physical activity by providing advice on appropriate types of activities and ways to progress at a safe and steady pace.

Learn More

See Chapter 7. Active and Safe for details on consulting a health care provider.

Older adults with chronic conditions should talk with their health care professional to determine whether their conditions limit, in any way, their ability to do regular physical activity. Such a conversation should also help people learn about appropriate types and amounts of physical activity.

Inactive and Insufficiently Active Older Adults

Some physical activity is better than none. Older adults who do not yet do the equivalent of 150 minutes of moderate-intensity physical activity a week can gain health benefits by doing small amounts of physical activity. In addition, swapping out sedentary behavior, such as sitting, for light-intensity physical activity, such as light housework, may produce some benefits. There are even more benefits to sitting less and doing moderate- or vigorous-intensity physical activity. As shown in Figure 2-1, which plots the benefits of increasing physical activity on all-cause mortality, the biggest gain in benefits occurs when going from no physical activity to being active for just 60 minutes a week.

Older adults should increase their amount of physical activity gradually. It can take months for those with low fitness to gradually meet their activity goals. To reduce risk of injury, it is important to increase the amount of physical activity gradually over a period of weeks to months. For example, an inactive person could start with a walking program consisting of 5 minutes of slow walking several times each day, 5 to 6 days a week. The length of time could then gradually be increased to 10 minutes per session, 3 times a day, and the walking speed could be increased slowly.

Learn More

See Chapter 7. Active and Safe for more information on how to increase physical activity gradually.

Muscle-strengthening activities should also be gradually increased over time. Initially, these activities can be done just 1 day a week starting at a light or moderate intensity. Over time, the number of days a week can be increased to 2, and then possibly to more than 2. Each week, the intensity can be increased slightly until it becomes moderate or greater.

Active Older Adults

Older adults who are already active and meet or exceed the key guidelines range—150 to 300 minutes a week—can gain additional and more extensive health benefits by reducing sedentary behavior and increasing relatively moderate-intensity aerobic activity to 300 or more minutes a week. Muscle-strengthening activities should also be done at least 2 days a week.

Special Considerations

Maintaining a Healthy Body Weight

The amount of physical activity necessary to successfully maintain a healthy body weight depends upon caloric intake and varies considerably among older adults. To help achieve and maintain a healthy body weight, older adults should do the equivalent of 150 minutes of moderate-intensity aerobic activity each week. If necessary, they should increase their weekly minutes of aerobic physical activity gradually over time and decrease caloric intake to a point where they can achieve energy balance and a healthy weight.

Some older adults will need a higher level of physical activity to maintain a healthy body weight or prevent weight regain. Some may need more than the equivalent of 300 minutes a week of moderate-intensity activity. It is possible to achieve this level of activity by gradually increasing activity over time.

Older adults who are capable of relatively vigorous-intensity activity and need a high level of physical activity to maintain a healthy weight should consider some relatively vigorous-intensity activity as a means of weight control. This approach is more time-efficient than doing only moderate-intensity activity. However, high levels of activity are not feasible for many older adults. These adults should achieve a level of physical activity that is sustainable and safe. If further weight loss is needed, these older adults should achieve energy balance by reducing caloric intake.

It is important to remember that all activities, whether light, moderate, or vigorous intensity, "count" for energy balance. Active choices, such as taking the stairs rather than the elevator or adding short episodes of walking to the day, are examples of activities that can be helpful in maintaining a healthy body weight.

Being Active in the Presence of Health Challenges

Older adults who have chronic conditions or other health challenges that prevent them from doing the equivalent of 150 to 300 minutes of moderate-intensity aerobic activity a week should set physical activity goals that meet their abilities. They should talk with their health care professional about setting physical activity goals. They should avoid an inactive lifestyle. Physical inactivity is among the strongest predictors of physical disability in older people. Even small amounts of moderate-intensity aerobic activity provide some health benefits. Older adults with frailty and those who have had a hip fracture are discussed below.

Learn More

See Chapter 6. Additional Considerations for Some Adults for information on some conditions.

Frailty

In frail older adults, strong evidence demonstrates that physical function can be improved with regular physical activity. Physical activity can contribute to improved walking and gait, balance, strength, self-reported measures of activities of daily living, and quality of life. Multicomponent physical activity of at least moderate intensity that is performed 3 or more times a week for a duration of 30 to 45 minutes per session, over at least 3 to 5 months, appears most effective to increase functional ability in frail older adults. Multicomponent physical activity programs are more effective than doing just a single type of physical activity.

After a Hip Fracture

Regular physical activity can reduce the risk of falls and the extent of an injury from a fall. Physical activity is also important to improve physical function following a hip fracture. Much of the research has been on extended exercise programs beginning after the fracture and has documented improved walking and performance-based measures of gait, balance, strength, and activities of daily living, or self-reported mobility.

Being Active With a Functional Limitation

When a person has lost some ability to do a task of everyday life, such as climbing stairs, the person has a functional limitation. In older adults with existing functional limitations, scientific evidence indicates that regular physical activity is safe and has a beneficial effect on functional ability, thus making it easier to do activities of daily living.

Resuming Activity After an Illness

An older adult may have to take a break from regular physical activity because of an illness, such as the flu. If these interruptions occur, older adults should resume activity at a lower level and gradually work back up to their usual level of activity.

Getting and Staying Active: Real-Life Examples

These examples show how different people with different living circumstances and levels of fitness can meet the key guidelines for older adults.

Barbara: An Active, 65-Year-Old Woman

Barbara is recently retired and enjoys spending time being active with friends and family and at the local recreation center. Barbara does the equivalent of approximately 220 minutes of moderate-intensity aerobic activity each week, plus muscle-strengthening activities 2 days a week. Some of her active time is spent doing multicomponent physical activity.

- Twice a week, Barbara takes a 45-minute aqua aerobics class at the local recreation center with her husband. The class incorporates aerobic and muscle-strengthening activities, and it helps her work on her balance.
- Many of Barbara's friends have begun to take dance classes at the local recreation center in the afternoons. Barbara now joins them; she dances for 45 minutes and typically goes twice a week.
- In addition to her traditional activities, Barbara makes sure to park farther away when running errands, and she tries to take the stairs whenever possible. These shorter bouts contribute an average of 40 minutes of relatively moderate-intensity activity to her total weekly amount.

Rumi: A 79-Year-Old Woman in an Assisted-Living Community

Rumi struggles to stay active. She lives in an assisted-living community and no longer drives. She is worried about falling and heard from her doctor that staying active can improve her physical function and reduce her risk of falls and fall-related injuries.

Her goals and current activity pattern: Currently, Rumi walks 5 times a week in a loop around her assisted-living complex; this takes her about 10 minutes (50 minutes of moderate-intensity activity each week). Her goal is to increase the number of walks each week and also increase the length of some of her walks. In addition to her walks, Rumi goes with a friend to do bird watching with a group once a week at the local park. These outings usually involve at least 20 minutes of walking.

Starting out: Rumi slowly adds to her walks by taking a slightly longer route. After a few weeks, she is able to walk about 15 minutes 3 times a week. She continues to go to the bird-watching group.

Reaching her goal: Within a few months, Rumi is consistently walking the 10-minute loop around her assisted-living complex every day. She extends to a longer 15-minute loop at least 4 times a week. She continues to attend the bird-watching group, and she feels more comfortable walking on uneven terrain; she has extended these walks to about 40 minutes a week. Rumi has also started going to an exercise class for older adults twice a week. The leader teaches different exercises that focus on aerobic activity, muscle-strengthening activity, and balance training. Rumi is now meeting the key guideline of 150 minutes of moderate-intensity aerobic activity. This class has helped Rumi to meet the twice-weekly guideline for muscle-strengthening activities and adds multicomponent activities to her routine.

Chapter 6. Additional Considerations for Some Adults

All Americans should be physically active to improve overall health and fitness and to prevent many adverse health outcomes. However, some people have conditions that raise special issues about recommended types and amounts of physical activity. These people include healthy women during pregnancy and the postpartum period (first year after delivery), people with chronic health conditions, and people with disabilities. Often, these people avoid physical activity because of concern that the risks outweigh the benefits. However, for most people, the benefits of being physically active outweigh any potential risks.

This chapter provides guidance on physical activity for healthy women who are pregnant or postpartum. This chapter also provides guidance on physical activity for adults with selected chronic conditions or disabilities, including the following:

- Adults with osteoarthritis;
- Adults with type 2 diabetes;
- Adults with hypertension;
- Adults who are cancer survivors; and
- Adults with physical disabilities.

Learn More

See Chapter 3. Active Children and Adolescents for a discussion on physical activity in children and adolescents with disabilities.

For the groups discussed in this chapter, either absolute or relative intensity can be used to monitor progress in meeting the key guidelines. This chapter complements guidance provided in Chapter 4. Active Adults and Chapter 5. Active Older Adults, which discuss how to use relative intensity.

Physical Activity in Women During Pregnancy and the Postpartum Period

Physical activity during pregnancy benefits a woman's overall health. Moderate-intensity physical activity by healthy women during pregnancy increases or maintains cardiorespiratory fitness, reduces the risk of excessive weight gain and gestational diabetes, and reduces symptoms of postpartum depression. Reduced risk of excessive weight gain during pregnancy can also reduce the risk of excessive postpartum weight retention, future obesity, and an infant born with high birth weight. Strong scientific evidence shows that the risks of moderate-intensity activity done by healthy women during pregnancy are very low, and do not increase risk of low birth weight, preterm delivery, or early pregnancy loss. Some evidence suggests that physical activity may reduce the risk of pregnancy complications, such as preeclampsia, reduce the length of labor and postpartum recovery, and reduce the risk of having a Cesarean section.

During a normal postpartum period, regular physical activity continues to benefit a woman's overall health. Studies show that moderate-intensity physical activity during the period following the birth of a child increases a woman's cardiorespiratory fitness and improves her mood. Such activity does not appear to have adverse effects on breast milk volume, breast milk composition, or infant growth.

Physical activity also helps women achieve and maintain a healthy weight during the postpartum period and, when combined with caloric restriction, helps promote weight loss.

Key Guidelines for Women During Pregnancy and the Postpartum Period

- ✓ Women should do at least 150 minutes (2 hours and 30 minutes) of moderate-intensity aerobic activity a week during pregnancy and the postpartum period. Preferably, aerobic activity should be spread throughout the week.
- ✓ Women who habitually engaged in vigorous-intensity aerobic activity or who were physically active before pregnancy can continue these activities during pregnancy and the postpartum period.
- ✓ Women who are pregnant should be under the care of a health care provider who can monitor the progress of the pregnancy. Women who are pregnant can consult their health care provider about whether or how to adjust their physical activity during pregnancy and after the baby is born.

Explaining the Key Guidelines

Women who are pregnant should be under the care of a health care provider with whom they can discuss whether or how to adjust their physical activity during pregnancy and after the baby is born. Unless a woman has medical reasons to avoid physical activity during pregnancy or the postpartum period, she can begin or continue light- to moderate-intensity aerobic and muscle-strengthening physical activity. When beginning physical activity during pregnancy, women should increase the amount of physical activity gradually over time.

Women who habitually did vigorous-intensity activity or a lot of aerobic or muscle-strengthening physical activity before pregnancy can continue to be physically active during pregnancy and after giving birth. They generally do not need to drastically reduce their activity levels, provided that they remain healthy and discuss with their health care provider whether and how to adjust activity levels during this time.

During pregnancy, perceived exertion is often a better indicator of intensity than heart rate or estimated absolute energy requirements of specific activities. On a rating-of-perceived-exertion scale of 0 to 10, where 0 is sitting and 10 is the greatest effort possible, moderate-intensity activity would be an effort of 5 to 6. Another way to gauge moderate intensity is with a talk test, where carrying on a conversation (but not singing) is still possible.

Women should avoid doing exercises that involve lying on their back after the first trimester of pregnancy because this position can restrict blood flow to the uterus and fetus. They should also avoid participating in contact or collision sports and activities with high risk of falling or abdominal trauma, such as soccer, basketball, horseback riding, or downhill skiing.

Physical Activity in People With Chronic Health Conditions or Disabilities

This section addresses both adults with chronic conditions and adults with disabilities. Some adults with chronic conditions may develop an acute or chronic disability as a result of their chronic condition. Some people

may be born with a disability, or it may result from trauma or illness. In either case, these adults may be at greater risk of developing chronic conditions. Although types and amounts of recommended physical activity may differ, adults with chronic conditions or disabilities benefit from physical activity.

Regular physical activity can help promote improved quality of life for people with chronic conditions and reduce the risk of developing new conditions. The type and amount of physical activity should be determined by a person's abilities and the severity of the chronic condition. For many chronic conditions, physical activity provides therapeutic benefits and is part of recommended treatment for the condition. However, the Guidelines does not discuss therapeutic exercise or rehabilitation, except in the context of how physical activity for disease prevention and general health benefits can be done by people with chronic conditions.

The benefits of physical activity for people with disabilities have been studied in diverse groups with disabilities related to traumatic events or to chronic health conditions. These groups include stroke survivors and people with spinal cord injury, multiple sclerosis, Parkinson's disease, muscular dystrophy, cerebral palsy, traumatic brain injury, limb amputations, mental illness, intellectual disability, and Alzheimer's disease and other dementias. Physical activity may improve some aspects of cognition in most diseases or disorders that impair cognitive function.

Overall, the evidence shows that regular physical activity provides important health benefits for people with disabilities. The benefits include improved cardiovascular and muscle fitness, improved brain health, and better ability to do tasks of daily life. Though much remains to be learned about the benefits of activity for specific types of disabilities, sufficient evidence exists to recommend that adults with disabilities should do regular physical activity.

Key Guidelines for Adults With Chronic Health Conditions and Adults With Disabilities

- ✓ Adults with chronic conditions or disabilities, who are able, should do at least 150 minutes a week (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week.
- ✓ Adults with chronic conditions or disabilities, who are able, should also do muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.
- ✓ When adults with chronic conditions or disabilities are not able to meet the above key guidelines, they should engage in regular physical activity according to their abilities and should avoid inactivity.
- ✓ Adults with chronic conditions should be under the care of a health care provider. People with chronic conditions can consult a health care professional or physical activity specialist about the types and amounts of activity appropriate for their abilities and chronic conditions.

Explaining the Key Guidelines

The key guidelines affirm that adults with chronic conditions or disabilities should be physically active on a regular basis. In consultation with a health care professional or physical activity specialist, people with chronic conditions or disabilities should understand how their disease or disability affects their ability to do physical activity. Some may be capable of doing substantial amounts of physical activity, and they should essentially follow the Guidelines for adults.

Learn More

See Chapter 4. Active Adults for details on these key guidelines and how to meet them.

Some people with chronic conditions or disabilities are not able to follow the key guidelines for adults. These people should adapt their physical activity program to match their abilities, in consultation with a health care professional or physical activity specialist. Studies show that physical activity can be done safely when the program is matched to their ability.

Meeting the Key Guidelines

People with chronic conditions or disabilities are encouraged to create an individualized physical activity plan. It is a good idea to get advice from professionals with experience in physical activity and disability because matching activity to abilities can require modifying physical activity in many different ways. For example, a person with a disability or condition affecting leg function may get aerobic activity from an arm ergometer or from wheelchair walking.

Some people with disabilities also need supervised activity to help with an exercise program. For example, some people may need assistance when performing muscle-strengthening activities, such as lifting weights.

Special Considerations for Specific Chronic Conditions and Disabilities

Physical Activity in Adults With Osteoarthritis

Osteoarthritis is a common condition in older adults, and people can live many years with osteoarthritis. People with osteoarthritis are commonly concerned that physical activity can make their condition worse. Osteoarthritis can be painful and cause fatigue, making it hard to begin or maintain regular physical activity. Yet, people with this condition should get regular physical activity to lower their risk of getting other chronic diseases, such as heart disease or type 2 diabetes, and to help maintain a healthy body weight.

Physical activity has both preventive health benefits and therapeutic benefits among people with osteoarthritis. Strong scientific evidence indicates that both aerobic activity and muscle-strengthening activity provide therapeutic benefits. Adults with osteoarthritis can expect improvements in pain, physical function, quality of life, and mental health with regular physical activity. When done safely, physical activity does not make the disease or the pain worse. And evidence shows that the benefits of physical activity can continue even after stopping a physical activity program.

People with osteoarthritis should match the type and amount of physical activity to their abilities and the severity of their condition. Most people can usually tolerate doing moderate-intensity activity for 150 minutes a week or more, such as being active 3 to 5 days a week for 30 to 60 minutes per episode. Walking up to 10,000 steps per day does not appear to worsen osteoarthritis of the knee. Some people with osteoarthritis can safely do more than 150 minutes of moderate-intensity activity each week and may be able to tolerate vigorous-intensity activity. Health care professionals typically counsel people with osteoarthritis to do activities that are low impact, not painful, and have low risk of joint injury. Swimming, walking, tai chi, and many muscle-strengthening exercises are good examples of this type of activity.

Physical Activity in Adults With Type 2 Diabetes

Physical activity in adults with type 2 diabetes shows how important it can be for people with a chronic disease to be active. Physical activity has therapeutic effects, can reduce comorbidities, and can prevent risk factors that contribute to the progression of type 2 diabetes. Therefore, in addition to benefits specific to type 2 diabetes, physical activity is routinely recommended to reduce risk of other diseases and help promote a healthy body weight. Physical activity may also benefit adults with type 1 diabetes, but this condition was not addressed for the development of the Guidelines.

Strong scientific evidence shows that physical activity protects against heart disease, the leading cause of death in people with type 2 diabetes, and can reduce risk of death by 30 to 40 percent. Physical activity helps protect against heart disease and factors related to the progression of type 2 diabetes by helping to reduce the risk factors of high blood pressure, body weight, blood lipids (cholesterol), and elevated hemoglobin A1c in people with type 2 diabetes. The beneficial effects on blood glucose (indicated by hemoglobin A1c) may also reduce other complications of type 2 diabetes. Moderate-intensity activity for at least 150 minutes a week plus 2 days a week of muscle-strengthening activities help to substantially lower the risk of heart disease. A person who moves toward 300 minutes or more of moderate-intensity activity a week gets even greater benefit.

Adults with a chronic condition should work with a health care professional or physical activity specialist to adapt physical activity so it is appropriate for their condition. For example, people with diabetes must be especially careful about monitoring their blood glucose, choosing appropriate footwear, and avoiding injury to their feet.

Physical Activity in Adults With Hypertension

Hypertension is one of the most common, costly, and preventable cardiovascular disease risk factors. It is the most prevalent chronic condition among adults. Physical activity has therapeutic benefits for people with hypertension by helping to reduce blood pressure. It also lowers their risk of cardiovascular disease mortality.

Both aerobic and muscle-strengthening activities are beneficial for people with hypertension. Because the benefits of physical activity are actually greater in people with hypertension than in those with normal blood pressure, moderate-intensity activity for about 90 minutes a week or the equivalent amount of vigorous-intensity activity helps to substantially lower the risk of heart disease. A person who moves toward greater amounts of physical activity a week gets even greater benefit. People with hypertension should work with their health care provider as they increase their physical activity, as adjustments to medication may be needed.

Physical Activity in Adult Cancer Survivors

Earlier detection of cancer and modern improved treatments mean that more than 15.5 million cancer survivors are living in the United States today. This growing population faces unique challenges, including risk of recurrent cancer, death from their cancer or other causes, development of other chronic diseases, worsening of physical functioning and quality of life, and other adverse effects from their disease and treatments.

Cancer survivors should engage in regular physical activity for its many health benefits. For adults with breast, colorectal, or prostate cancer, greater amounts of physical activity after diagnosis help to substantially lower the risk of dying from their cancer. For adults with breast and colorectal cancer, greater amounts of physical activity after diagnosis also help to substantially lower the risk of dying from any cause. Cancer survivors who are physically active have a better quality of life, improved fitness and physical function, and less fatigue. Physical activity also plays a role in reducing the adverse effects of cancer treatment. As a result of cancer and its treatment, some cancer survivors are at increased risk of heart disease, and physical activity can help reduce this risk.

As with other adults with chronic conditions, cancer survivors can consult with a health care professional or physical activity specialist to match a physical activity plan to their abilities, health status, and any treatment toxicities.

Physical Activity in Adults With Selected Physical Disabilities

For many types of physical disabilities, physical activity reduces pain, improves fitness, improves physical function, and improves quality of life. People with disabilities that affect their ability to walk or move about benefit from physical activity. Physically active people who have Parkinson's disease, multiple sclerosis, a spinal cord injury, or a stroke have better physical function, including walking ability, than less active adults with the same condition. These improvements have been shown with multicomponent physical activity programs that included aerobic activity (commonly walking), muscle-strengthening, and balance-training activities.

Potential specific benefits include:

- Parkinson's disease—Improved physical function, including walking, balance, muscle strength, and disease-specific motor scores.
- Multiple sclerosis—Improved physical function, including walking speed and endurance, and fitness. Physical activity does not appear to exacerbate multiple sclerosis.
- Spinal cord injury—Improved walking function, wheelchair skills, muscular strength, and upper extremity function. Benefits can be seen with recent or older injuries and across severities of spinal cord injury.
- Stroke—Improved walking function, such as walking velocity or endurance.

Adults with physical disabilities can consult with a health care professional or physical activity specialist to match a physical activity plan to their abilities.

Getting and Staying Active: Real-Life Examples

These examples show how people with various health conditions can meet the key guidelines.

Jessica: A 28-Year-Old Woman Who Is Pregnant

Jessica is 16 weeks pregnant, and her pregnancy is progressing normally. Before she became pregnant, Jessica did some light- and moderate-intensity physical activity, but she did not meet the key guidelines. Jessica's pregnancy motivates her to be more physically active. She discusses her plans with her doctor, who tells her it is safe for her to increase her activity level as long as she keeps him informed throughout her pregnancy. Jessica joins a prenatal yoga class at her local hospital, which meets once a week. She also starts walking during her lunch break for 30 minutes 3 days a week, for a total of 90 minutes of moderate-intensity activity. As she begins to gain strength and endurance, Jessica adds a 60-minute walk and 30 minutes of muscle-strengthening activities with resistance bands each weekend, modifying exercises to avoid lying on her back. With these additions, Jessica has reached 150 minutes of moderate-intensity physical activity a week and participates in 1 day of muscle strengthening. As Jessica's pregnancy progresses, she notices lower back pain that intensifies on longer walks, so she replaces her longer walk with swimming. She continues using resistance bands and attending her prenatal yoga class until her baby is born.

Ines: An 83-Year-Old Woman With Osteoarthritis

Ines has been active all her life, but osteoarthritis in her hip and knee have started to slow her down. Ines communicates regularly with her doctor, who agrees that staying active can help to reduce her level of pain, as well as improve her physical function and health-related quality of life. Because of her age and ability level, Ines typically judges the intensity of her activity based on her own level of exertion.

Ines does the equivalent of at least 160 minutes of moderate-intensity aerobic activity each week, plus muscle-strengthening activities 2 days a week.

- Three days a week, Ines follows along with a fitness video at home. The video includes 20 minutes of moderate-intensity movements, including stepping, marching, and walking in place.
- Two days a week, Ines participates in a 30-minute chair yoga class at the senior center nearby, which incorporates muscle-strengthening, stretching, and balance exercises.
- On Saturday before the mall opens, Ines and her daughter walk for 40 minutes. The mall provides a safe, indoor place to walk with clear paths, even surfaces, and places to sit down if needed.

Chris: A 53-Year-Old Man With Multiple Sclerosis

His goals: Chris is a 53-year-old man with multiple sclerosis who sets a goal of doing 30 minutes of moderate-intensity aerobic activity on 4 days a week (a total of 120 minutes a week).

Starting out: Chris starts where he feels safe and comfortable, using a stationary bike at his gym. On the stationary bike, Chris does moderate-intensity physical activity for 20 minutes on 2 days each week. In order to track his progression, he takes note of his intensity level and tries to keep his level of effort at a 5 or 6 on a scale of 0 to 10.

Making good progress: Two months later, Chris is comfortably using a stationary bike at a moderate intensity for 30 minutes on 3 days a week. In addition to his time on the stationary bike, Chris has started to attend a water exercise class specifically for individuals with multiple sclerosis. The class focuses on multicomponent physical activity and meets one evening a week for 30 minutes.

Reaching his goal: Eventually, Chris surpasses his goal and works up to 160 minutes a week of moderate-intensity aerobic activity, including 30 minutes of stationary bicycling 4 times a week, a water fitness class for 30 minutes once a week, and a 10-minute brisk walk after work once a week.

Raymond: A 42-Year-Old Man With Type 2 Diabetes

Raymond is a 42-year-old man with type 2 diabetes. Recently, at the recommendation of his physician, he started paying more attention to his activity levels. He received a step counter for his birthday, and he uses it to track his daily activity and stay motivated.

After a few months of increasing his physical activity, Raymond now does the equivalent of at least 150 minutes of moderate-intensity aerobic activity each week, plus muscle-strengthening activities 3 days a week.

- Raymond walks briskly to and from the bus stop each weekday (10 minutes each day).
- He walks with a coworker during lunch 3 times a week (25 minutes each day).
- On the weekends, he and his wife ride their bikes to and from worship service (25 minutes).

Three nights a week, Raymond does body-weight exercises while watching TV after dinner. He does push-ups, lunges, planks, and squats.

Chapter 7. Active and Safe

Although physical activity has many health benefits, injuries and other adverse events do sometimes happen. The most common injuries affect the musculoskeletal system. Other adverse events can also occur during activity, such as overheating and dehydration. Rarely, people have heart attacks during activity.

The good news is that scientific evidence strongly shows that physical activity can be safe for almost everyone. Moreover, the health benefits of physical activity far outweigh the risks.

Still, people may hesitate to become physically active because of concern they will get hurt. For these people, there is even more good news: people can take steps that are proven to reduce their risk of injury and adverse events.

The key guidelines in this chapter provide advice to help people do physical activity safely. Most advice applies to people of all ages. Specific guidance for particular age groups and people with certain conditions is also provided.

Key Guidelines for Safe Physical Activity

To do physical activity safely and reduce risk of injuries and other adverse events, people should:

- ✓ Understand the risks, yet be confident that physical activity can be safe for almost everyone.
- ✓ Choose types of physical activity that are appropriate for their current fitness level and health goals, because some activities are safer than others.
- ✓ Increase physical activity gradually over time to meet key guidelines or health goals. Inactive people should "start low and go slow" by starting with lower intensity activities and gradually increasing how often and how long activities are done.
- ✓ Protect themselves by using appropriate gear and sports equipment, choosing safe environments, following rules and policies, and making sensible choices about when, where, and how to be active.
- ✓ Be under the care of a health care provider if they have chronic conditions or symptoms. People with chronic conditions and symptoms can consult a health care professional or physical activity specialist about the types and amounts of activity appropriate for them.

Explaining the Guidelines

Be Confident That Physical Activity Is Safe for Almost Everyone

Most people are not likely to be injured when doing moderate-intensity activities in amounts that meet the key guidelines. However, injuries and other adverse events do sometimes happen. The most common problems are musculoskeletal injuries. Even so, studies show that only one such injury occurs for every 1,000 hours of walking for exercise, and fewer than four injuries occur for every 1,000 hours of running.

Both physical fitness and total amount of physical activity affect risk of musculoskeletal injuries. People who are physically fit have a lower risk of injury than people who are not. People who do more activity generally have a higher risk of injury. So, what should people do if they want to be active and safe? The best strategies are to:

- Be regularly physically active to increase physical fitness; and
- Follow the other guidance in this chapter (especially increasing physical activity gradually over time) to minimize the risk of injury.

Choose Appropriate Types and Amounts of Activity

People can reduce their risk of injury by choosing appropriate types of activity. The safest activities are moderate intensity, low impact, and do not involve purposeful collision or contact.

Walking for exercise, gardening or yard work, bicycling or riding a stationary bike, dancing, swimming, and golf are activities with the lowest injury rates. In the amounts commonly done by adults, walking (a moderate-intensity and low-impact activity) has a third or less of the injury risk of running (a vigorous-intensity and higher impact activity). Sports that involve collision or contact, such as football, hockey, and soccer, have a higher risk of injuries, including concussion.

The risk of injury for a type of physical activity can also differ by the purpose of the activity. For example, recreational bicycling or bicycling for transportation leads to fewer injuries than training for and competing in bicycle races.

People who have had a past injury are at risk of re-injuring that body part. The risk of injury can be reduced by performing appropriate amounts of activity and setting appropriate personal goals. Performing a variety of different physical activities may also reduce the risk of overuse injury.

Increase Physical Activity Gradually Over Time

Scientific studies indicate that the risk of injury to bones, muscles, and joints is directly related to the gap between a person's usual level of activity and a new level of activity. The size of this gap is called the *amount of overload*. Creating a small overload and waiting for the body to adapt and recover reduces the risk of injury. When amounts of physical activity need to be increased to meet the key guidelines or personal goals, physical activity should be increased gradually over time, no matter what the person's current level of physical activity. Here is general guidance for inactive people and those with low levels of physical activity on how to increase physical activity:

Learn More

See Chapter 2. Physical Activity and Health for a discussion of overload, progression, and specificity and how they relate to physical fitness.

- Use relative intensity (intensity of the activity relative to a person's fitness) to guide the level of effort for aerobic or muscle-strengthening physical activity.
- Generally, start with relatively moderate-intensity activity. Avoid relatively vigorous-intensity activity, such as shoveling heavy snow or running. Adults with low fitness may need to start with light activity, or a mix of light- to moderate-intensity activity.
- First, increase the number of minutes per session (duration) and the number of days a week (frequency) of moderate-intensity activity. Later, if desired, increase the intensity.
- Pay attention to the relative size of the increase in physical activity each week, as this is related to injury risk. For example, a 20-minute increase each week is safer for a person who already does 200 minutes a week of jogging (a 10% increase) than in a person who does 40 minutes a week (a 50% increase).

The available scientific evidence suggests that adding a small and comfortable amount of light- to moderate-intensity activity, such as walking 5 to 15 minutes per session, 2 to 3 times a week, to one's usual activities results in a low risk of musculoskeletal injury and no known risk of severe cardiac events. Because this range is rather wide, people should consider three factors when individualizing their rate of increase—age, level of fitness, and level of experience.

Age

The amount of time required to adapt to a new level of activity probably depends upon age. Youth and young adults probably can safely increase activity by small amounts every week or two. Older adults appear to require more time to adapt to a new level of activity, in the range of 2 to 4 weeks.

Level of Fitness

Less fit adults are at higher risk of injury when doing a given amount of activity, compared to more fit adults. Slower rates of increase over time may reduce injury risk. This guidance applies particularly to adults with overweight or obesity, as they are commonly less physically fit.

Prior Experience

People may use their experience to learn ways to increase physical activity over time that minimize their risk of overuse injury. Generally, if an overuse injury occurred in the past with a certain rate of progression, a person should increase activity more slowly the next time.

Warming up before and cooling down after exercise are commonly recommended to prevent injuries and adverse cardiac events. A warm-up before moderate- or vigorous-intensity aerobic activity allows a gradual increase in heart rate and breathing at the start of the episode of activity. A warm-up for muscle-strengthening activity commonly involves doing exercises with lighter weight. A cool-down after activity allows a gradual decrease at the end of the episode.

Take Appropriate Precautions

Taking appropriate precautions means using the right gear and equipment, choosing safe environments in which to be active, following rules and policies, and making sensible choices about how, when, and where to be active.

Use Protective Gear and Appropriate Equipment

Using personal protective gear can reduce the frequency of injury. Personal protective gear is something worn by a person to protect a specific body part. Examples include helmets, eyewear and goggles, shin guards, elbow and knee pads, and mouth guards.

Using appropriate sports equipment can also reduce risk of injury. *Sports equipment* refers to sport- or activity-specific tools, such as balls, bats, sticks, and shoes.

For the most benefit, protective equipment and gear should be:

- The right equipment for the activity;
- Appropriately fitted;
- Appropriately maintained; and
- Used consistently and correctly.

Be Active in Safe Environments

People can reduce their injury risks by paying attention to the places where they choose to be active. To help them stay safe, people can look for:

- Physical separation from motor vehicles, such as sidewalks, walking paths, or bike lanes;
- Neighborhoods with traffic-calming measures that slow traffic;
- Places to be active that are well lit, where other people are present, and that are well maintained;
- Shock-absorbing surfaces on playgrounds;
- Well-maintained playing fields and courts without holes or obstacles;
- Breakaway bases at baseball and softball fields; and
- Padded and anchored goals and goal posts at soccer and football fields.

Follow Rules and Policies That Promote Safety

Rules, policies, and laws are potentially the most effective and wide-reaching way to reduce activity-related injuries. To get the benefit, people should look for and follow these rules, policies, and laws. For example, policies that promote the use of bicycle helmets reduce the risk of head injury among bicyclists. Rules against diving into shallow water at swimming pools prevent head and neck injuries.

Make Sensible Choices About When and How to Be Active

A person's choices can obviously influence the risk of adverse events. By making sensible choices, injuries and adverse events can be prevented. For example, wearing reflective clothing and lights when doing outdoor activities (walking, running, or bicycling) in the early morning or evening can help increase visibility. Consider weather conditions such as extremes of heat and cold, and apply sunscreen as appropriate. For example, during very hot and humid weather, people lessen the chances of dehydration and heat stress by:

- Exercising in the cool of early morning as opposed to mid-day heat;
- Switching to indoor activities (playing basketball in the gym rather than on the playground);
- Changing the type of activity (swimming rather than playing soccer);
- Lowering the intensity of activity (walking rather than running); and
- Paying close attention to resting, seeking shade, drinking enough fluids, and finding other ways to minimize effects of heat.

Consider Air Quality When Planning to Be Active

Exposure to air pollution is associated with several adverse health outcomes, including asthma attacks and cardiovascular disease-related events. People who can modify the location or time of exercise may wish to reduce these risks by exercising away from heavy traffic and industrial sites, especially during rush hour or times when pollution is known to be high. The Environmental Protection Agency Air Quality Index (AQI) provides information about when air conditions are unhealthy. The AQI can be found at https://www.airnow.gov/.

Advice From Health Care Providers

No evidence is available to indicate that people who consult with their health care provider receive more benefits and suffer fewer adverse events than people who do not. People without diagnosed chronic conditions (such as diabetes, heart disease, or osteoarthritis) and who do not have symptoms (such as chest pain or pressure, dizziness, or joint pain) most likely do not need to consult with a health care provider about physical activity.

Inactive people who gradually progress over time to relatively moderate-intensity activity have no known risk of sudden cardiac events and very low risk of bone, muscle, or joint injuries. A person who is habitually active with moderate-intensity activity can gradually increase to vigorous intensity without needing to consult a health care provider. People who develop new symptoms when increasing their levels of activity should consult a health care provider.

Learn More

See Chapter 4. Active Adults for guidance and examples of how to gradually increase activity levels.

Health care professionals and physical activity specialists can provide useful, personalized advice on how to reduce risk of injuries. For people who wish to seek the advice of a health care professional, it is particularly appropriate to do so when contemplating vigorous-intensity activity, because the risks of this activity are higher than the risks of moderate-intensity activities.

The choice of appropriate types and amounts of physical activity can be affected by chronic conditions. People with symptoms or known chronic conditions should be under the regular care of a health care provider. In consultation with a health care professional or physical activity specialist, they can develop a physical activity plan that is appropriate for them. People with chronic conditions typically find that moderate-intensity activity is safe and beneficial. However, they may need to take special precautions. For example, people with diabetes need to pay special attention to blood glucose control and proper footwear during activity.

Light- and moderate-intensity physical activity are generally safe and are recommended for women with uncomplicated pregnancies, but women should talk with their providers about how to adjust their activity while they are pregnant and after the baby's birth.

Learn More

See Chapter 6. Additional Considerations for Some Adults for more details about physical activity during pregnancy and the postpartum period.

During pregnancy, women should avoid:

- Doing activities that involve lying on their back after the first trimester of pregnancy; and
- Doing contact or collision sports and activities with high risk of falling or abdominal trauma, such as soccer, basketball, horseback riding, or downhill skiing.

Chapter 8. Taking Action: Increasing Physical Activity Levels of Americans

Being physically active is one of the most important steps Americans of all ages and abilities can take to improve their overall health. When people are physically active, they receive a wide array of health benefits—from reducing feelings of anxiety and depression and improving sleep and quality of life to lowering the risk of developing type 2 diabetes, heart disease, and many cancers.

Based upon a careful review of the science, the second edition of the *Physical Activity Guidelines for Americans* provides guidance on how much physical activity is needed to obtain health benefits. However, providing guidance by itself is rarely sufficient to produce change. In 2015, only about 20 percent of high school students and adults reported getting enough physical activity to meet the aerobic and muscle-strengthening key guidelines. To make progress, action is necessary.

For those who are not yet physically active, the news is good—a number of proven strategies can help increase levels of physical activity. This chapter highlights several evidence-based strategies individuals and communities can take. Because improving physical activity across the country will require the efforts of individuals, families, and many sectors of society, the chapter closes with steps everyone can take.

Learn More

See Appendix 2 for Federal resources with information on how to increase physical activity, including:

- *Physical Activity Guidelines for Americans Midcourse Report: Strategies to Increase Physical Activity Among Youth*
- *Step it Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities*
- *Guide to Community Preventive Services*

Evidence-Based Strategies

To most effectively increase physical activity levels, evidence-based strategies should be used. This means that researchers or practitioners have tested the strategy and shown that it can increase physical activity.

A review of the science shows that many evidence-based strategies can be used to promote and support physical activity. Some strategies involve working with people one-on-one or in small groups to change their physical activity. Other strategies can be implemented more broadly at the community level through programs, practices, and policies that make physical activity an easy choice. These evidence-based strategies show that making physical activity the safe and easy choice does help people become more active.

For Individuals or Small Groups

Strategies targeting individuals can benefit all age groups, including children, adolescents, adults, and older adults. Many ways exist to deliver information and guidance to these groups to motivate their participation in physical activity.

Studies with individuals or small groups show that interventions based on theories of behavior change are successful in helping people achieve an active lifestyle. Theory-based approaches apply knowledge about how people change behaviors to teach people skills that help them incorporate physical activity into their daily routines. Below are three evidence-based strategies that can be applied to help individuals change their behaviors and attain a physically active lifestyle.

Guidance From Professionals or Peers

Groups led by professionals or peers can help improve physical activity levels. These groups usually incorporate some form of counseling or guidance from a health professional or trainer to help participants set physical activity goals, monitor their progress toward these goals, seek social support to maintain physical activity, and use self-reward and positive self-talk to reinforce progress. They also use structured problem-solving to prevent relapse to an inactive or low active lifestyle. To reduce staff burden and costs, groups can also be led by trained peers who deliver the intervention in full or in part and often share similar characteristics or experiences as group members. Youth, adults, and older adults can benefit from using these strategies to achieve an active lifestyle.

Support From Others

Participation in physical activity in a community setting with others, such as friends and family, can increase physical activity levels. Adults are more likely to participate in physical activity when they are supported by others. Buddy systems, contracts with others to complete specified levels of physical activity, and walking groups are ways to provide individuals with friendship and support for physical activity.

Technology

Technology-based approaches can take many forms. They can be used to provide virtual coaching to help people set and monitor physical activity goals. They can be used alone or combined with other strategies. Step counters (pedometers) and other wearable activity monitors combined with behavioral strategies, such as goal-setting and coaching, increase physical activity by providing physical activity feedback directly to the user.

Technology can also be used to provide guidance remotely to individuals through text messaging, by telephone, or through the Internet. Telephone and Internet delivery strategies offer guidance to individuals from trained peers or through interactive voice-response systems. For those with lower computer or technology literacy or living in remote areas, computer-tailored mailings can increase physical activity. Use of smartphone applications can increase regular physical activity in children and adolescents.

For Communities

Although individuals make the final choice about whether to be physically active, they can face challenges that make this choice more difficult. For example, they may not know about or have access to safe places to be physically active, may live in communities not designed for activity, or may have chronic conditions or physical limitations that create additional barriers. Through programs, practices, and policies, communities can help individuals overcome these challenges and make physical activity the easy choice.

Strategies at the community level generally have greater reach and can result in longer lasting change than strategies focused on individual behavior. Actions can be taken across an entire community or within settings in the community, such as schools. The following are five proven strategies to show how this can work.

Point-of-Decision Prompts

These interventions provide signs or other prompts that encourage people to make an active choice, such as taking the stairs instead of elevators or escalators. They can be done in a variety of places, including worksites or public venues, such as transportation hubs and shopping malls. Wayfinding signs placed at strategic points can make people aware of walkable destinations, including parks, recreational facilities, and other attractions.

School Policies and Practices

Schools can use a variety of effective interventions to increase physical activity before, during, and after school. Evidence-based strategies include improving physical education (PE); providing classroom physical activity breaks; providing programs, space, or equipment for physical activity before and after school; and building behavioral skills related to physical activity participation.

Physical education class policies are one vehicle for these interventions. Strategies that schools can use to increase physical activity during PE include employing a well-designed curriculum, changing instructional practices to better incorporate more time for moderate-to-vigorous physical activity, and providing teachers with appropriate training.

Access to Indoor or Outdoor Recreation Facilities or Outlets

These interventions provide or improve places to be active in the community. The places can be indoors, such as gyms or on-site fitness rooms at worksites, or outdoors, such as parks, trails, or other green spaces. Interventions to improve access can be more effective if they also include outreach efforts that make people aware of the place or facilities and the physical activity opportunities available there.

Community-Wide Campaigns

Community-wide campaigns are intensive interventions that involve groups across the community working together. They are designed to be visible, sustainable, and reach large numbers of people in the community and often involve many groups in the community. The interventions generally combine physical activity messaging with community activities focused on physical activity. The messages are often delivered through multiple channels, including television, radio, and written materials. Associated community activities can include efforts that focus on individuals, such as providing counseling or support groups, or that focus on the community environment, such as developing and promoting walking trails.

Community Design

These interventions design the built environment of communities in ways that make it easier for people to be active, particularly for transportation. This includes locating destinations such as schools, stores, or public transportation near homes or workplaces so that people can easily walk, bike, or wheelchair walk there. It includes making routes to these places more accommodating for walkers, bicyclists, or wheelchair users by making them safer and more seamlessly connected. For example, sidewalks and paths can be added and kept well maintained and well lit, streets can be designed to reduce speeds or separate bicyclists from motor vehicles, and street networks can have shorter blocks and more intersections with crosswalks or traffic signals.

Everyone Has a Role to Play to Increase Physical Activity

Everyone has a role to play to increase physical activity levels of Americans. Individuals can take steps to increase their own physical activity. Families and caregivers can help youth be active. Community groups, such as faith groups, businesses, civic organizations, parent-teacher associations, health groups, and public safety agencies, can provide opportunities and encouragement for physical activity. This section illustrates ways that individuals, families and caregivers, and community groups can take action to make physical activity safe, easy, and enjoyable.

What Can Individuals Do to Get Enough Physical Activity?

Individuals can take a variety of steps to adopt an active lifestyle.

Personalize the Benefits of Regular Physical Activity

Adults need to identify benefits of personal value to them. For some people, the health benefits, which are the focus of the *Physical Activity Guidelines for Americans*, are compelling enough to motivate them to be active. For others, different reasons are key motivators to be active. For example, physical activity:

- Provides opportunities to enjoy recreational activities, often in a social setting;
- Improves personal appearance and feelings of energy and well-being;
- Provides a chance to help a family member or friend be active; and
- Gives older adults a greater opportunity to live independently in the community.

Set Personal Goals for Physical Activity

Individuals should set goals for activity that allow them to achieve the benefits they value. In setting goals, people can consider doing a variety of activities and try both indoor and outdoor activities. Simple goals are fine. For example, a brisk walk in the neighborhood with friends for 45 minutes on 3 days a week and walking to lunch twice a week may be just the right approach for someone who wants to increase both physical activity

and social opportunities. More ambitious goals are fine, too. For example, a person may create a physical activity plan that is aimed at training for a 10-kilometer community run. Activities that are multipurpose are another way for people to incorporate physical activity into their busy lives. For example, people can use active transportation—walking, biking, or wheelchair walking—to get to school, work, or a store.

Develop Knowledge and Skills to Attain Goals

It is important to learn about the types and amounts of activity needed to attain personal goals. For example, if weight loss is a goal, it is useful to know that vigorous-intensity activity can be more time-efficient in burning calories than moderate-intensity activity. If running is a goal, it is important to learn how to reduce risk of running injuries by selecting an appropriate training program and proper shoes. If regular walking is a goal, learning about neighborhood walking trails can help a person attain this goal.

What Can Families and Caregivers Do to Help Youth Get Enough Physical Activity?

Children and adolescents are naturally physically active, and they need opportunities to be active and to learn skills. They benefit from encouragement from parents and other adults. Adults can promote age-appropriate activity in children and adolescents through these steps:

- **Start early.** Young children love to play and be active. Encouraging lots of safe and unstructured movement and play at home and in the neighborhood can help build a strong foundation in which children understand that being physically active can and should be a healthy habit throughout their lives.
- **Provide time for both structured and unstructured physical activity during school and outside of school.** School-aged children need time for active play. Through recess, physical activity breaks, physical education classes, team and individual sports and other after-school programs, and active time with family and friends, youth can learn about physical activity and spend time doing it.
- **Provide youth with positive feedback and good role models.** Parents, caregivers, and teachers should model and encourage an active lifestyle for children. Praise, rewards, and encouragement help children to be active. Being active as a family is a great way to model and encourage physical activity.
- **Help young people learn skills required to do physical activity safely.** As appropriate for their age, youth need to understand how to regulate the intensity of activity, increase physical activity gradually over time, set goals, use protective gear and proper equipment, follow rules, and avoid injuries.
- **Promote activities that set the basis for a lifetime of activity.** Children and adolescents should be exposed to a variety of activities, including active recreation, team sports, and individual sports. In this way, they can find activities they can do well and enjoy, including activities that adults commonly do, such as jogging, bicycling, hiking, swimming, exercise classes, and strength training. Young people should experience noncompetitive activities, and activities that do not require above-average athletic skills.

What Can Sectors of Society Do to Improve Physical Activity?

Many sectors of society have a role to play in improving physical activity across the United States. Implementing population-level approaches to improve physical activity requires collaboration across sectors of society at local, state, and national levels. Although all groups can benefit from efforts to make physical activity easier, attention to underserved groups or those with barriers to physical activity is particularly needed.

The National Physical Activity Plan Alliance is a nonprofit organization that has a memorandum of understanding with HHS to help promote physical activity. The *2016 National Physical Activity Plan* (http://www.physicalactivityplan.org/index.html) identified nine sectors of society that have a role to play in promoting physical activity. This section briefly illustrates some of the roles that each sector can play—and in some cases are already playing—in promoting physical activity.

- **Business and Industry.** Employers can encourage workers to be physically active. They can provide access to facilities and encourage their use through outreach activities. Businesses can consider access to opportunities for active transportation and public transit when selecting new locations.
- **Community Recreation, Fitness, and Parks.** This sector plays a leading role in providing access to places for active recreation, such as playgrounds, hiking and biking trails, senior centers, sports fields, and swimming pools. This sector can also provide access to exercise programs and equipment for a wide variety of people, including underserved populations and people with disabilities.
- **Education.** This sector can take a lead role in providing opportunities for age-appropriate physical activity in all educational settings. Opportunities include offering physical education, after-school sports, public access to school facilities during after-school hours, and expanded intramural sports and campus recreation opportunities.
- **Faith-Based Settings.** Faith-based organizations can be important partners in providing access to places for physical activity and promotion through outreach activities that can be tailored for diverse, faith-based groups.
- **Health Care.** Health care professionals can assess, counsel, and advise patients on physical activity and how to do it safely. Health care systems can partner with other sectors to promote access to community-based physical activity programs.
- **Mass Media.** Media outlets can provide easy-to-understand messages about the health benefits of physical activity as part of community promotion efforts. Messages can also provide information about facilities or outlets where individuals can be active.
- **Public Health.** Public health departments can monitor community progress in providing places and opportunities to be physically active and track changes in the proportion of the population meeting the *Physical Activity Guidelines for Americans*. They can also take the lead in setting objectives and coordinating activities among sectors. Public health departments and organizations can disseminate appropriate messages and information to the public about physical activity.
- **Sports.** This sector can provide organized opportunities for people to be active. Youth sports can expose children and adolescents to a variety of age-appropriate activities that can set the basis for a lifetime of activity. Sports organizations can also ensure that sports programs are conducted in a manner that minimizes risk of injuries.

- **Transportation, Land Use, and Community Design.** This sector plays a lead role in designing and implementing options that provide areas for safe walking, bicycling, and wheelchair walking. Public transit systems also promote walking, as people typically walk to and from transit stops. Community planners and designers can implement design principles to create communities with activity-friendly routes to everyday destinations for people of all ages and abilities. They can also help create or improve access to places for physical activity, such as parks and other green spaces.

Taking Action

Improving the physical activity levels of Americans will not be a small task. Many partners are already involved, but more engagement is needed to increase the reach, breadth, and impact of these efforts. Realizing a shared vision of a more physically active and healthy America will require the dedication, ingenuity, skill, and commitment from many partners working across many different sectors. Being physically active is one of the best investments individuals and communities can make in their health and welfare. Now is the time to take action and help more Americans attain the numerous benefits of physical activity.

Getting and Staying Active: Real-Life Examples

Jim: A 75-Year-Old Man Who Uses a Pedometer to Track His Increasing Activity

Establishing baseline: Jim does not yet meet the key guidelines, but he wants to increase his physical activity so he can continue to live independently in his own home. Jim spends 45 minutes each week taking care of his yard and garden. He also spends about 55 minutes cleaning the inside of his house, including vacuuming, cleaning bathrooms, and washing the floors. He is participating in 100 minutes of moderate-intensity physical activity each week.

Setting goals: Jim wants to add at least 60 additional minutes of moderate-intensity walking to each week. He purchases an inexpensive step counter to help set his physical activity goal and monitor his progress. Before starting to incorporate any extra walking, Jim wears his new step counter for one day and finds he gets 5,100 steps. He then wears his step counter on a 10-minute, moderate-intensity walk around his neighborhood and notes that this adds about 1,000 steps. Based on his initial activity, Jim sets a goal of adding 10 minutes of walking each day, which would add 6,000 extra steps a week with 60 minutes of moderate-intensity walking.

Reaching his goal: To reach his goal, Jim uses strategies like parking at the back of the parking lot when he goes shopping, walking to a nearby convenience store to pick up ingredients for dinner, or walking to a neighbor's house. Over time, he builds up to the equivalent of 160 minutes of moderate-intensity aerobic activity each week.

Anytown, USA: A Community Working Together to Increase Physical Activity for All

Recognizing the impact of physical activity on overall health, leaders of Anytown, USA, have dedicated themselves to helping residents become more physically active. Leaders wanted to ensure that the community made it safe and convenient for people of all ages and abilities to be physically active.

Officials began by forming a coalition of public health, transportation, local business, parks and recreation, city planning, and community residents to identify shared goals. The coalition also conducted a baseline assessment to document physical activity levels of residents and to identify opportunities for improvement related to community supports to promote physical activity.

Based on this assessment, and available skills and resources, the coalition developed a 10-year action plan that included strategies organized by three areas of focus.

- Improve residents' access to places to be active in the community.
  - Offer free yoga classes for older adults at local senior centers.
  - Work with local schools to share gyms, playgrounds, or sports facilities with residents.
  - Convert an unused building to a community recreation center.
  - Develop a multi-use path from a residential area to the town retail center.
  - Construct wheelchair-accessible bus stops along transit routes to grocery stores.
- Improve pedestrian and cyclist safety.
  - Create safe crossings within one mile of all schools.
  - Construct protected bike lanes within the retail district and surrounding the city park.
- Increase the use of existing community resources for physical activity.
  - Increase awareness of safe routes to parks and trails by adding signage.
  - Add lights to local parks so they can be used at night.

The coalition then developed a plan to implement these strategies. The plan identified who would work on each project, what resources would be needed, and the timeline. For example:

- The Anytown School District agreed to pay for an adult safety guard at the three major street crossings within one mile of the local elementary school starting in the next school year.
- The Parks and Recreation Department will include money in their annual budget to add lights to one different community park each year for the next three years.
- The Mayor's Office will apply for a grant from a foundation next year to create the community center.

The coalition also worked with Anytown University to develop an evaluation plan prior to implementation. At the end of the 10-year period, the coalition hopes to see:

- A 10 percent decrease in the number of pedestrian and bicyclist traffic injuries;
- A 5 percent increase in the number of walkers and bicyclists in the retail center;
- A 10 percent increase in the use of local parks; and
- A 5 percent increase in the proportion of adults and children meeting the key guidelines.

Over the next 10 years, the coalition will meet twice a year to monitor progress, identify and address barriers to completing projects, and look for additional opportunities.

Glossary

This section provides definitions for many terms important to physical activity and health. It has been adapted from the glossary provided in the *2018 Physical Activity Guidelines Advisory Committee Scientific Report*. It is not meant to be an exhaustive list, and definitions of additional terms can be found in the Scientific Report.

Absolute intensity. See **Intensity.**

Adaptation. The body's response to exercise or activity. Some of the body's structures and functions favorably adjust to the increase in demands placed on them whenever physical activity of a greater amount or higher intensity is performed than what is usual for the individual. These adaptations are the basis for much of the improved health and fitness associated with increases in physical activity.

Adverse event. In the context of physical activity, a negative health event. Examples of adverse events as a result of physical activity include musculoskeletal injuries (injury to bone, muscles, or joints), heat-related conditions (heat exhaustion), and cardiovascular events (heart attack or stroke).

Aerobic physical activity. Activity in which the body's large muscles move in a rhythmic manner for a sustained period of time. Aerobic activity, also called *endurance* or *cardio activity*, improves cardiorespiratory fitness. Examples include brisk walking, running, swimming, and bicycling. Aerobic activity has three components:

- **Intensity,** or how hard a person works to do the activity. The intensities most often studied are moderate (equivalent in effort to brisk walking) and vigorous (equivalent in effort to running or jogging);
- **Frequency,** or how often a person does aerobic activity; and
- **Duration,** or how long a person does an activity in any one session.

Balance. A component of physical fitness that involves maintaining the body's equilibrium while stationary or moving.

Balance training. Static and dynamic exercises that are designed to improve individuals' ability to resist forces within or outside of the body that cause falls while a person is stationary or moving. Walking backward, standing on one leg, or using a wobble board are examples of balance-training activities.

Body composition. A health-related component of physical fitness that applies to body weight and the relative amounts of muscle, fat, bone, and other vital tissues of the body. Most often, the components are limited to fat and lean body mass (or fat-free mass).

Bone-strengthening activity. Physical activity designed primarily to increase the strength of specific sites in bones that make up the skeletal system. Bone-strengthening activities produce an impact or tension force on the bones that promotes bone growth and strength. Running, jumping rope, and lifting weights are examples of bone-strengthening activities.

Cardiorespiratory fitness (endurance). The ability to perform large-muscle, whole-body exercise at moderate-to-vigorous intensities for extended periods of time.

Exercise. A form of physical activity that is planned, structured, repetitive, and performed with the goal of improving health or fitness. All exercise is physical activity, but not all physical activity is exercise.

Fitness. See **Physical fitness.**

Flexibility. A health- and performance-related component of physical fitness that is the range of motion possible at a joint. Flexibility is specific to each joint and depends on a number of specific variables, including but not limited to the tightness of specific muscles and tendons. Flexibility exercises enhance the ability of a joint to move through its full range of motion.

Functional limitation. Loss of functional ability, or the ability to carry out everyday tasks and life roles.

Health. A human condition with physical, social, and psychological dimensions, each characterized on a continuum with positive and negative poles. Positive health is associated with a capacity to enjoy life and to withstand challenges; it is not merely the absence of disease. Negative health is associated with illness, and in the extreme, with premature death.

Health-related fitness. A type of physical fitness aimed at promoting health and reducing risk of chronic disease and that includes cardiorespiratory fitness, muscular strength and endurance, body composition, flexibility, and balance.

Intensity. *Intensity* refers to how much work is being performed or the magnitude of the effort required to perform an activity or exercise. Intensity can be expressed either in absolute or relative terms.

- **Absolute.** The absolute intensity of an activity is determined by the rate of work being performed and does not consider the physiologic capacity of the individual. For aerobic activity, absolute intensity typically is expressed as the rate of energy expenditure (for example, milliliters per kilogram of body weight per minute of oxygen being consumed, kilocalories per minute, or METs; see MET definition below). For muscle-strengthening activities, intensity frequently is expressed as the amount of weight lifted or moved.
    - Light-intensity activity is non-sedentary waking behavior that requires less than 3.0 METs; examples include walking at a slow or leisurely pace (2 mph or less), cooking activities, or light household chores.
    - Moderate-intensity activity requires 3.0 to 5.9 METs; examples include walking briskly or with purpose (2.5 to 4 mph), mopping or vacuuming, or raking the yard.
    - Vigorous-intensity activity requires 6.0 or more METs; examples include walking very fast (4.5 to 5 mph), running, carrying heavy groceries or other loads upstairs, shoveling snow, or participating in a strenuous fitness class. Many adults do no vigorous-intensity activity.
- **Relative.** Relative intensity takes into account or adjusts for a person's cardiorespiratory fitness. For aerobic exercise, relative intensity is expressed as a percentage of a person's aerobic capacity (VO_2max) or VO_2 reserve, or as a percentage of a person's measured or estimated maximum heart rate or heart rate reserve. It also can be expressed as an index of how hard the person feels he or she is exercising (for example, on a 0 to 10 scale).

Levels of physical activity. A concept to describe how much regular aerobic physical activity a person gets. These categories are related to how many health benefits a person obtains at a given level.

- **Inactive** is not getting any moderate- or vigorous-intensity physical activity beyond basic movement from daily life activities.
- **Insufficiently active** is doing some moderate- or vigorous-intensity physical activity but less than 150 minutes of moderate-intensity physical activity a week or 75 minutes of vigorous-intensity activity or the equivalent combination. This level is less than the target range for meeting the key guidelines for adults.
- **Active** is doing the equivalent of 150 minutes to 300 minutes of moderate-intensity physical activity a week. This level meets the key guideline target range for adults.
- **Highly Active** is doing the equivalent of more than 300 minutes of moderate-intensity physical activity a week. This level exceeds the key guideline target range for adults.

Metabolic equivalent of task. *Metabolic equivalent of task (MET)* refers to the energy expenditure required to carry out a specific activity, and 1 MET is the rate of energy expenditure while sitting at rest. This generally corresponds to an oxygen uptake of 3.5 milliliters per kilogram of body weight per minute. Physical activities frequently are classified by their intensity using the MET value as a reference.

Moderate-intensity physical activity. On an absolute scale, physical activity that is done at 3.0 to 5.9 METs. On a scale relative to an individual's personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0 to 10.

Multicomponent physical activity. Physical activity that includes more than one type of physical activity, such as aerobic, muscle strengthening, and balance training. Multicomponent physical activity programs include a combination of balance, muscle-strengthening, and aerobic physical activity and may include gait, coordination, and physical function training.

Muscle-strengthening activity (strength training, resistance training, or muscular strength and endurance exercises). Physical activity, including exercise, that increases skeletal muscle strength, power, endurance, and mass. Muscle-strengthening activity has three components:

- **Intensity,** or how much weight or force is used relative to how much a person is able to lift;
- **Frequency,** or how often a person does muscle-strengthening activity; and
- **Sets and repetitions,** or how many times a person does the muscle-strengthening activity, like lifting a weight or doing a push-up (comparable to duration for aerobic activity).

Overload. The amount of new activity added to a person's usual level of activity. The risk of injury to bones, muscles, and joints is directly related to the size of the gap between these two levels. This gap is called the *amount of overload*.

Performance-related fitness. Those attributes that significantly contribute to athletic performance, including aerobic endurance or power, muscle strength and power, flexibility, speed of movement, and reaction time.

Physical activity. Any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level. In these Guidelines, *physical activity* generally refers to the subset of physical activity that enhances health.

Physical fitness. The ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies. Physical fitness includes several components: cardiorespiratory fitness (endurance or aerobic power), musculoskeletal fitness, flexibility, balance, and speed of movement.

Physical function. The capacity of a person to perform tasks or behaviors of everyday life, such as climbing stairs, or to fulfill basic life roles, such as personal care or grocery shopping.

Progression. The process of increasing the intensity, duration, frequency, or amount of activity or exercise as the body adapts to a given activity pattern.

Relative intensity. See **Intensity.**

Resistance training. See **Muscle-strengthening activity.**

Sedentary behavior. Any waking behavior characterized by a low level of energy expenditure (less than or equal to 1.5 METs) while sitting, reclining, or lying.

Specificity. A principle of exercise physiology that indicates that physiologic changes in the human body in response to physical activity are highly dependent on the type of physical activity. For example, the physiologic effects of walking are largely specific to the lower body and the cardiovascular system.

Strength. A health and performance component of physical fitness that is the ability of a muscle or muscle group to exert force.

Strength training. See **Muscle-strengthening activity.**

Vigorous-intensity physical activity. On an absolute scale, physical activity that is done at 6.0 or more METs. On a scale relative to an individual's personal capacity, vigorous-intensity physical activity begins at a 7 or 8 on a scale of 0 to 10.

Appendix 1. Physical Activity Behaviors: Intensity, Bouts, and Steps

In developing this second edition of the *Physical Activity Guidelines for Americans*, the U.S. Department of Health and Human Services considered three issues of particular relevance to translating scientific evidence into physical activity guidance for the public:

- How to incorporate the two methods used to assess the intensity of aerobic physical activity—absolute intensity and relative intensity;
- How to describe the relationship between the duration of bouts of physical activity and health outcomes; and
- How to incorporate steps.

How Are Methods to Assess Intensity of Aerobic Physical Activity Incorporated Into the Guidelines?

A well-known physiologic effect of physical activity is that it expends energy. A metabolic equivalent of task, or MET, is a unit useful for describing the energy expenditure of a specific activity. A MET is the ratio of the rate of energy expended during an activity to the rate of energy expended at rest. For example, 1 MET is the rate of energy expenditure while at rest. A 4 MET activity expends 4 times the energy used by the body at rest. If a person does a 4 MET activity for 30 minutes, they have done 4 x 30 = 120 MET-minutes (or 2.0 MET-hours) of physical activity. A person could also achieve 120 MET-minutes by doing an 8 MET activity for 15 minutes.

Two Methods of Assessing Aerobic Intensity

The intensity of aerobic physical activity can be defined in absolute or relative terms.

Absolute Intensity

Absolute aerobic intensity is defined in terms of METs, as described above:

- Light-intensity activities are defined as waking non-sedentary behaviors of less than 3.0 METs. Walking at 2.0 miles per hour requires 2.5 METs of energy expenditure and is therefore considered a light-intensity activity.
- Moderate-intensity activities are defined as 3.0 to 5.9 METs. Walking at 3.0 miles per hour requires 3.5 METs of energy expenditure and is therefore considered a moderate-intensity activity.
- Vigorous-intensity activities are defined as 6.0 METs or more. Running a mile in 10 minutes (6.0 mph) is a 10 MET activity and is therefore classified as a vigorous-intensity activity.

Information on the absolute intensity of many activities for adults can be found in the *Compendium of Physical Activities* (https://sites.google.com/site/compendiumofphysicalactivities/home). Information for youth can be found in the *Youth Compendium of Physical Activities* (https://www.nccor.org/tools-youthcompendium/).

Relative Intensity

Intensity can also be defined relative to fitness, with the intensity expressed in terms of a percent of a person's maximal heart rate, heart rate reserve, or aerobic capacity reserve. For example, relative moderate intensity is defined as 40 percent to 59 percent of aerobic capacity reserve (where 0 percent of reserve is resting and 100 percent of reserve is maximal effort). Relative vigorous-intensity activity is 60 percent to 84 percent of reserve.

To better communicate the concept of relative intensity (or relative level of effort), a simpler definition is useful:

- Relatively moderate-intensity activity is a level of effort of 5 or 6 on a scale of 0 to 10, where 0 is the level of effort of sitting, and 10 is maximal effort.
- Relatively vigorous-intensity activity begins at a 7 or 8 on this scale.

Using Minutes of Moderate- and Vigorous-Intensity Activity to Reach a Goal

People can meet the key guidelines by doing either moderate- or vigorous-intensity physical activity or a combination of both. A simple rule of thumb is that 1 minute of vigorous-intensity activity counts the same as 2 minutes of moderate-intensity activity. The lower limit of vigorous-intensity physical activity (6.0 METs) is twice the lower limit of moderate-intensity activity (3.0 METs). Therefore, 75 minutes of vigorous-intensity activity a week is roughly equivalent to 150 minutes of moderate-intensity activity a week. The recommendation that adults do 150 to 300 minutes of moderate-intensity physical activity or 75 to 150 minutes of vigorous-intensity physical activity are both equivalent to doing about 500-1,000 MET-minutes a week. Because the MET range for vigorous-intensity physical activity has no upper limit, highly fit people can exceed 1,000 MET-minutes in 75 minutes if they do activities requiring 13.4 METs or more (running at approximately a 7.5 minute-per-mile pace or faster). This amount of activity will provide additional health benefits.

Using Relative Intensity to Meet Guidelines Expressed in Terms of Absolute Intensity

The aerobic key guideline uses METs (i.e., absolute intensity) of 3.0 to 5.9 METs for moderate-intensity activities and 6.0 METs or greater for vigorous-intensity activities. However, the key guidelines for adults indicate that relative intensity can also be used as a means of assessing the intensity of aerobic activities.

For many adults, activities will be similar, whether considering relative or absolute intensity. When reasonably fit adults do absolute moderate-intensity activities in the range of 3.0 to 5.9 METs, they generally are also doing relative moderate-intensity activity. Similarly, absolute vigorous-intensity and relative vigorous-intensity activities overlap a great deal.

For adults with greater levels of fitness, using relative intensity means they will do greater amounts of activity than the key guidelines. For example, a 3.5 MET activity can be relatively light intensity for these adults, and perhaps 6.0 MET activities are relatively moderate. Doing 150 minutes of a 6.0 MET activity will exceed the minimum amount of activity in the key guidelines. This is acceptable for two reasons. First, the key guidelines encourage people to do more activity to gain additional health benefits. Second, people with higher fitness are likely choosing to do greater amounts of activity to maintain that fitness.

The aerobic key guideline for older adults encourages the use of relative intensity because many have low levels of fitness. Therefore, activities in the range of 3.0 to 5.9 METs will be relatively vigorous or physiologically impossible. Thus, the level of effort should be guided by relative as opposed to absolute intensity. As fitness improves with physical activity, activities with greater absolute intensity will be possible.

Allowing the Use of Either Relative Intensity or Absolute Intensity in Children

The key guidelines for children and adolescents ages 6 through 17 years do not require careful tracking of the intensity of activity. The mix of moderate- and vigorous-intensity physical activity is flexible, if some vigorous-intensity activity is done on at least 3 days a week. Intensity can be measured on either the absolute or relative scale.

Relative intensity is appropriate because children and adolescents 6 through 17 years of age who follow the key guidelines should experience improvements in cardiorespiratory fitness, and the relative intensity of the activity is a major determinant of its fitness effects. Observing a youth's breathing can provide an indication of relative intensity. If a child breathes rapidly during physical activity, this indicates relatively vigorous-intensity activity.

However, it is often not feasible to observe children closely enough to determine their level of effort. In this case, absolute intensity can be used to judge whether the child is doing activity that counts toward meeting the key guidelines. Absolute intensity varies by the age and sex of the child. Information on the absolute intensity of various activities for children and adolescents ages 6 years and older is found in the *Youth Compendium of Physical Activities* (https://www.nccor.org/tools-youthcompendium/). In general, similar to adults, brisk walking (as opposed to slow walking) counts as a moderate-intensity physical activity and running counts as a vigorous-intensity activity.

The key guidelines for children ages 3 through 5 years do not require careful monitoring of intensity. All intensities and types of activities provide health benefits and count toward meeting the key guidelines.

What Is the Relationship Between Bout Duration of Physical Activity and Health Outcomes?

Historical Context

Physical activity recommendations have traditionally focused on moderate- to vigorous-intensity physical activity performed in a continuous manner, such as in exercise. In the 1990s, the focus shifted to accumulating physical activity throughout the day in bouts as short as 10 minutes. The *2008 Physical Activity Guidelines for Americans* included the guidance that activity needed to last 10 minutes to count.

Evolving Evidence

Research continues to support the conclusion that physical activity accumulated in bouts of at least 10 minutes can improve a variety of health-related outcomes. In addition, new research indicates that bouts of any length of moderate-to-vigorous physical activity contribute to health benefits associated with the accumulated volume of physical activity. This new evidence justified the current guidance that moderate-to-vigorous physical activity of any duration counts toward meeting the key guidelines.

How Are Steps Considered in the Guidelines?

Steps are a basic unit of locomotion and provide an easy-to-understand metric of ambulation (anything that requires steps, such as walking, dancing, or running). Measuring step counts combined with goal setting and other behavioral approaches has been shown to increase physical activity levels. Step counts are generally measured with wearable activity monitors, including step counters (pedometers, which measure number of steps over a given time) and accelerometers (which can measure both number of steps over a given time and the level of intensity of movement over a given time). Step counters are frequently included in health-tracking smart phone applications.

Over the past 10 years, expanding research and advances in technological approaches for measuring physical activity have led to examinations of the association of step counts with health outcomes and effective approaches to promoting regular physical activity. The research evidence on the influence of incremental increases in the number of steps per day on health outcomes is limited but is expanding rapidly.

Monitoring Physical Activity With Steps

Most of the technological approaches for measuring step counts used within research have provided total step counts for all physical activity over a day. The baseline number of steps per day has varied across studies but the typical amount is about 5,000 steps a day. It is estimated that 80 percent of daily steps among less active people are light intensity. Most research studies designed to increase physical activity have focused on increasing both the amount and intensity of physical activity above basic movement from daily life activities. Studies that focus on steps often set targets of 10,000 steps a day or a percentage increase in steps a day to encourage people to increase their amount of moderate-to-vigorous physical activity.

Increases in physical activity of any duration and any intensity are captured with step counters. Therefore, all types of activities that increase the number of steps taken during the day, such as taking stairs, doing errands by walking, or breaking up sedentary behavior by standing and moving during the work day, are included in estimating total physical activity over a day. The key to using a step counter to monitor progress in meeting the key guidelines is to first set a time goal related to moderate- or vigorous-intensity physical activity (minutes per day of brisk walking or other types of ambulation) and then to calculate how many steps are needed each day to reach that goal. Figure A1-1 explains how to use a pedometer to track walking to achieve the key guidelines goal.

Figure A1-1. Using a Pedometer or Fitness Tracker to Track Walking

Walking is a popular and easy way to meet the key guidelines, and pedometers or step counters are a useful way to track progress. Popular advice, such as walking 10,000 steps a day, is not a guideline per se, but a way people may choose to meet the key guidelines. The main idea in using a pedometer to meet the key guidelines is to first set a time goal (minutes of walking a day) and then calculate how many steps are needed each day to reach that goal.

Moderate- or vigorous-intensity physical activity, such as a brisk walk, counts toward meeting the key guidelines. People generally need to plan episodes of walking if they want to use step goals to progress toward meeting key guidelines.

As a basis for setting step goals, it is preferable that people know how many steps they take per minute of a brisk walk. A person with a lower fitness level, who takes fewer steps per minute than a fit adult, will need fewer steps to achieve the same time of walking.

One way to set a step goal is the following:

1. To determine one's usual daily steps, a person uses a pedometer or fitness tracker to count the number of steps taken on several ordinary days with no episodes of walking for exercise. Suppose the average is about 5,000 steps a day. (Most of those steps are light-intensity activity.)
2. With the pedometer or fitness tracker, the person measures the number of steps taken during a 10-minute walk. Suppose this is 1,000 steps. For a goal of 20 minutes of walking, the goal would total 2,000 steps (1,000 times 2).
3. To calculate a daily step goal, add the usual daily steps (5,000) to the steps required for a 20-minute walk (2,000), to get the total steps per day (5,000 + 2,000 = 7,000).

Then, each week, the person gradually increases the number of total steps a day until the step goal is reached. Rate of progression should be individualized. Some people who start out at 5,000 steps a day can add 500 steps per day each week. Others, who are less fit and starting out at a lower number of steps, should add a smaller number of steps each week.

Appendix 2. Federal Physical Activity Resources

Centers for Disease Control and Prevention (CDC):

BAM! Body and Mind

https://www.cdc.gov/bam/

BAM! Body and Mind was specifically designed for children ages 9 to 12 years to promote age-appropriate nutrition, physical activity, stress management, and other healthy lifestyle habits.

Division of Cancer Prevention and Control (DCPC), Policies and Practices for Cancer Prevention and Survivorship: Physical Activity

https://www.cdc.gov/cancer/dcpc/prevention/policies_practices/physical_activity/index.htm

This DCPC resource highlights the benefits of physical activity for children, adults, and cancer survivors. It also outlines strategies for increasing physical activity in the community and provides guidance for how comprehensive cancer control programs can help promote physical activity for cancer prevention.

Division of Nutrition, Physical Activity, and Obesity (DNPAO)

https://www.cdc.gov/nccdphp/dnpao/state-local-programs/physicalactivity.html

The DNPAO physical activity website provides resources for state and local program planners, health professionals, and other community members to increase physical activity access through community design and programs in various settings.

https://www.cdc.gov/nccdphp/dnpao/data-trends-maps/index.html

Data, Trends, and Maps is an interactive database that provides information about the health status and behaviors of Americans, state-by-state, through clickable maps, charts, and tables. Data can be filtered by category (such as physical activity) and topic (such as behavior or environmental and policy supports).

https://www.cdc.gov/physicalactivity/community-strategies/index.htm

This CDC website offers resources that can help state and local health departments, public health professionals, and community organizations build activity-friendly communities.

Division of Population Health (DPH), Physical Activity for Arthritis

https://www.cdc.gov/arthritis/basics/physical-activity-overview.html

This DPH website provides resources and guidance on physical activity for individuals with arthritis.

Healthy Schools

https://www.cdc.gov/healthyschools/physicalactivity/index.htm

CDC Healthy Schools works to prevent chronic disease and promote the health and well-being of children and adolescents in schools. The physical activity section of the website provides resources on how to effectively implement physical education and physical activity in the school setting.

Million Hearts

https://millionhearts.hhs.gov/tools-protocols/tools/physical-activity.html

The Million Hearts Initiative was established to prevent a million cardiovascular events over a 5-year period by aligning national cardiovascular disease prevention efforts around a select set of evidence-based public health and clinical goals and strategies. This website provides information on community-based programs and resources that promote physical activity as a strategy for preventing cardiovascular disease for people with known cardiovascular disease risk factors.

National Center on Birth Defects and Developmental Disabilities, Increasing Physical Activity Among Adults With Disabilities

https://www.cdc.gov/ncbddd/disabilityandhealth/pa.html

The National Center on Birth Defects and Developmental Disabilities website provides data, resources, and guidance on increasing physical activity among adults with disabilities.

National Institute of Occupational Safety and Health Total Worker Health®

https://www.cdc.gov/niosh/TWH/

Total Worker Health® is defined as policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness prevention efforts to advance worker well-being. This website includes information on how to reduce the health risks from sedentary work.

Older Adult Falls Program

https://www.cdc.gov/homeandrecreationalsafety/falls/programs.html

This collection of effective fall interventions is designed to help public health practitioners, senior service providers, clinicians, and others who want to address older adult falls in their community. The website also provides a program guide designed for community-based organizations that are interested in implementing their own evidence-based fall prevention programs.

Workplace Health Promotion

https://www.cdc.gov/workplacehealthpromotion/index.html

The CDC Workplace Health Program provides leadership to improve the health, safety, and well-being of employees through science-based workplace health promotion programs. Through the Workplace Health Program, CDC works with national employer groups and coalitions, state health agencies, academic institutions, employers, and other key groups to develop, set up, and promote effective strategies for improving the health in the work environment. This website provides health promotion program planners with information on a variety of health promotion programs, as well as how to design, implement, and evaluate effective workplace health programs.

Department of Transportation (DOT)

Federal Highway Administration's Bicycle and Pedestrian Program

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/index.cfm

The Bicycle and Pedestrian program provides resources to help promote bicycle and pedestrian transportation use, safety, and accessibility. Resources include a listing of State Pedestrian and Bicycle Coordinators, information on funding sources, and bicycle- and pedestrian-related legislation.

Federal Highway Administration's Small Town and Rural Multimodal Networks

https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/page00.cfm

The DOT's Small Town and Rural Multimodal Networks guide is a design resource and idea book to help small towns and rural communities support safe, accessible, comfortable, and active travel for people of all ages and abilities.

Environmental Protection Agency (EPA)

Healthy Places for Healthy People

https://www.epa.gov/smartgrowth/healthy-places-healthy-people

Healthy Places for Healthy People engages with community leaders and health care partners to create walkable, healthy, and economically vibrant communities that can improve health, protect the environment, and support economic growth. One key focus of the program is creating physical activity programs and supporting sidewalks, bike paths, trails, and parks in the community to promote active living.

National Walkability Index

https://www.epa.gov/smartgrowth/smart-location-mapping#walkability

The EPA's National Walkability Index is a nationwide geographic data resource that ranks block groups according to their relative walkability. The national dataset includes walkability scores for all block groups as well as the underlying attributes that are used to rank the block groups.

National Institutes of Health (NIH)

National Heart, Lung, and Blood Institute (NHLBI), We Can!

https://www.nhlbi.nih.gov/health/educational/wecan/

We Can! (Ways to Enhance Children's Activity and Nutrition) provides resources for families and communities focused on helping youth improve food choices, increase physical activity, and reduce screen time. This website provides useful information and tips created specifically for individuals, parents, caregivers, and families. *We Can!* was jointly created by the NHLBI, the National Institute of Diabetes and Digestive and Kidney Diseases, the Eunice Kennedy Shriver National Institute for Child Health and Human Development, and the National Cancer Institute.

National Institutes on Aging (NIA), Go4Life

https://go4life.nia.nih.gov/

Go4Life is an exercise and physical activity campaign designed to help older Americans fit exercise and physical activity into daily life. *Go4Life* offers exercises, motivational tips, and free resources to help older Americans get ready, start exercising, and keep going. The *Go4Life* campaign includes an evidence-based exercise guide in both English and Spanish, an exercise video, an interactive website, and a national outreach campaign.

National Park Service (NPS)

Healthy Parks Healthy People Program

https://www.nps.gov/public_health/hp/hphp/about.htm

The National Park Service's *Healthy Parks Healthy People* program connects people to parks through health promotion, fosters society's understanding and appreciation for the life-sustaining role of parks, and creates the next generation of park stewards. The program addresses health promotion in parks and communities, at local, state, national and international levels through five main programmatic areas, including healthy recreation.

Office of the Assistant Secretary for Health (OASH)

Office of Adolescent Health (OAH), Think, Act, and Grow (TAG)

https://www.hhs.gov/ash/oah/tag/index.html

TAG is a national call to action to improve adolescent health in the United States. This website provides information about how professionals, parents, and adolescents can take action as well as resources and success stories to engage and empower teens and young people to be physically active and improve their overall health.

Office of Disease Prevention and Health Promotion (ODPHP)

https://health.gov/paguidelines/

The ODPHP website includes information on the science base used to develop the *Physical Activity Guidelines for Americans*, as well as the Move Your Way campaign resources for health professionals and consumers. This website also offers an online tool to help consumers determine what physical activities they can fit into their daily life and make a plan to help them meet the Guidelines.

https://healthypeople.gov

Healthy People provides science-based, 10-year national objectives for improving the health of all Americans. It has a physical activity topic area, which includes objectives used to track the progress of populations meeting the *Physical Activity Guidelines for Americans* as well as other physical activity areas.

Office of the Surgeon General, Step it Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities

https://www.surgeongeneral.gov/library/calls/walking-and-walkable-communities/index.html

This *Call to Action* is intended to increase walking across the United States by calling for improved access to safe and convenient places to walk and wheelchair roll, as well as for a culture that supports these activities for people of all ages and abilities. This publication presents five goals and supporting implementation strategies that are grounded in scientific and practice-based evidence. These goals call for action by multiple sectors of society, as well as families and individuals.

President's Council on Sports, Fitness & Nutrition (PCSFN)

https://www.hhs.gov/fitness/index.html

PCSFN engages, educates, and empowers all Americans to adopt a healthy lifestyle. The "Be Active" page of the website provides useful information on how all individuals can engage in appropriate types and amounts physical activities.

The Guide to Community Preventive Services

The Community Guide

https://www.thecommunityguide.org/topic/physical-activity

The Community Guide is a collection of evidence-based findings of the Community Preventive Services Task Force. It is a resource to help select interventions to improve health and prevent disease in states, communities, community organizations, health care organizations, businesses, and schools.

U.S. Preventive Services Task Force (USPSTF)

https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/healthful-diet-and-physical-activity-for-cardiovascular-disease-prevention-in-adults-without-known-risk-factors-behavioral-counseling

https://www.uspreventiveservicestaskforce.org/Page/Document/evidence-summary2/healthy-diet-and-physical-activity-counseling-adults-with-high-risk-of-cvd

https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/healthy-diet-and-physical-activity-counseling-adults-with-high-risk-of-cvd

The USPSTF is an independent, volunteer panel of national experts in disease prevention and evidence-based medicine that makes evidence-based recommendations about clinical preventive services. The USPSTF recognizes that regular physical activity helps prevent chronic disease and decrease morbidity, and its counseling recommendations about promoting physical activity are focused on behavioral counseling services delivered in primary care practices.

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