

2018 Physical Activity
Guidelines Advisory
Committee
Scientific Report

February 2018

PART A. EXECUTIVE SUMMARY

Table of Contents

Introduction	A-1
Major Findings	A-2
Public Health Impact	A-6
The Future	A-7

INTRODUCTION

The 2018 *Physical Activity Guidelines Advisory Committee Scientific Report* abundantly demonstrates that physical activity is a “best buy” for public health. The report provides a detailed summary of the disease prevention and health promotion benefits of a more physically active America that is firmly established by the latest scientific evidence. It builds on and significantly expands the scientific evidence summarized in the first *Physical Activity Guidelines Advisory Committee Report, 2008*. The Committee judged the 2008 Scientific Report to be an excellent document and used it as the foundation for the current report. It is clear, however, that the expansion of knowledge about the relationships between physical activity and health during the past 10 years has provided evidence of even more health benefits, demonstrated greater flexibility about how to achieve those benefits, and shown that a more physically active American population can be facilitated in a wide variety of ways.

The 17 members of the 2018 Physical Activity Guidelines Advisory Committee were appointed in June 2016 and sworn into duty in July 2016. The Committee was instructed to examine the scientific literature, especially articles published in the 10 years since the publication of the 2008 Scientific Report, and to confirm, expand, or modify the recommendations in that report. The Committee conducted detailed searches of the scientific literature, evaluated and discussed at length the quality of the evidence, and developed conclusions based on the evidence as a whole. The quantity and quality of the report reflects this careful and diligent process.

MAJOR FINDINGS

Physically active individuals sleep better, feel better, and function better. The 2018 Scientific Report demonstrates that, in addition to disease prevention benefits, regular physical activity provides a variety of benefits that help individuals sleep better, feel better, and perform daily tasks more easily.

- Strong evidence demonstrates that moderate-to-vigorous physical activity improves the quality of sleep. 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 arising in the morning. It also can increase the time in deep sleep and reduce daytime sleepiness.
- Single episodes of physical activity promote acute improvements in executive function for a period of time. Executive function includes the processes of the brain that help organize daily activities and plan for the future. Tasks such as one's ability to plan and organize, self-monitor and inhibit or facilitate behaviors, initiate tasks, and control emotions all are part of executive function. Physical activity also improves other components of cognition, including memory, processing speed, attention, and academic performance.
- Regular physical activity not only reduces the risk of clinical depression but reduces depressive symptoms among people both with and without clinical depression. Physical activity can reduce the severity of those symptoms whether one has only a few or many.
- Regular physical activity reduces symptoms of anxiety, including both chronic levels of anxiety as well as the acute feelings of anxiety felt by many individuals from time to time.
- Strong evidence also demonstrates that perceived quality of life is improved by regular physical activity.
- 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 not only reduces risk of falls and fall-related injuries but contributes to their ability to maintain independence. It is also true for young and middle-aged adults, as improved physical function is manifested in the ability to more easily accomplish the tasks of daily living, such as climbing stairs or carrying groceries.

Some benefits happen immediately. A single bout of moderate-to-vigorous physical activity will reduce blood pressure, improve insulin sensitivity, improve sleep, reduce anxiety symptoms, and improve 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 physical function, accrue within days to weeks after adopting a new physical activity routine.

Physical activity reduces the risk of a large number of diseases and conditions. The past 10 years have greatly expanded the list of diseases and conditions for which greater amounts of physical activity reduce the risk. Some of the major results include:

- Strong evidence demonstrates that greater volumes of moderate-to-vigorous physical activity are associated with preventing or minimizing excessive weight gain in adults, maintaining weight within a healthy range, and preventing obesity. This is important because losing weight is difficult and costly.
- Strong evidence demonstrates that higher amounts of physical activity are associated with a reduced risk of excessive increases in body weight and adiposity in children ages 3 to 17 years.
- Strong evidence also demonstrates that more physically active women are less likely to gain excessive weight during pregnancy. They also are less likely to develop gestational diabetes or develop postpartum depression than their less active peers. Maternal and child health has been, appropriately, a priority in the United States for generations. These findings indicate that physical activity is an important tool in the maintenance of maternal health, and affects a key time period when establishing lifelong healthy behaviors can be beneficial to women and their children alike.
- Strong evidence demonstrates that greater volumes of physical activity reduce the risk of dementia and improve other aspects of cognitive function. Given the high and rising prevalence of older Americans and the expense and heartache of caring for individuals with dementia, the value of preventing dementia is high.
- For the first time, the 2018 Scientific Report demonstrates that regular physical activity provides health benefits to children as young as ages 3 to 5 years. The 2008 Committee was unable to reach a conclusion about this young age group because of insufficient information. A substantial increase in evidence since then has allowed the 2018 Committee to conclude that, in addition to the reduced risk of excessive gains in body weight and adiposity, regular physical activity improves bone health in this young age group. These findings call attention to the importance of establishing healthy physical activity behaviors at an early age.
- For older adults, strong evidence demonstrates a reduced risk of falls and fall-related injuries.

Part A. Executive Summary

- The 2008 Committee concluded that regular moderate-to-vigorous physical activity reduced the risk of breast and colon cancer. The 2018 Committee expanded that list to include a reduced risk for cancers of the bladder, endometrium, esophagus, kidney, lung, and stomach.
- A large portion of the general population already has a chronic disease or condition. The 2018 Committee has concluded that, for many of these individuals, regular physical activity can reduce the risk of developing a new chronic condition, reduce the risk of progression of the condition they already have, and improve their quality of life and physical function. The conditions examined by the Committee included some of the most prevalent, including osteoarthritis, hypertension, and type 2 diabetes.

The benefits of physical activity can be achieved in a variety of ways. The public health target range suggested in the 2008 Scientific Report was 500 to 1,000 MET-minutes of moderate-to-vigorous physical activity (or 150 to 300 minutes per week of moderate-intensity physical activity). The 2018 Committee concurs with this target range. Unfortunately, half the U.S. adult population does not currently attain this level of physical activity. Thirty percent of the population reports doing no moderate-to-vigorous physical activity. Thus, for a large segment of the population, major improvements in health are available from modest increases in regular physical activity.

The 2008 Committee reported that inactive individuals can achieve substantial health gains by increasing their activity level even if they do not reach the target range. Since 2008, substantially more information in the scientific literature documents the value of reducing inactivity even if the 150- to 300-minute weekly target range is not achieved. Here is a brief review of the major findings.

- For individuals who perform no or little moderate-to-vigorous physical activity, replacing sedentary behavior with light-intensity physical activity reduces the risk of all-cause mortality, cardiovascular disease incidence and mortality, and the incidence of type 2 diabetes. Before this report, evidence that light-intensity physical activity could provide health benefits had not been clearly stated.
- Individuals who perform no or little moderate-to-vigorous physical activity, no matter how much time they spend in sedentary behavior, can reduce their health risks by gradually adding some or more moderate-intensity physical activity.
- For individuals whose amount of moderate-to-vigorous physical activity is below the current public health target range of 150 to 300 minutes of moderate-intensity physical activity, even

small increases in moderate-intensity physical activity provide health benefits. There is no threshold that must be exceeded before benefits begin to occur.

- For individuals whose physical activity is below the current public health target range, greater benefits can be achieved by reducing sedentary behavior, increasing moderate-intensity physical activity, or combinations of both.
- For any given increase in moderate-to-vigorous physical activity, the relative gain in benefits is greater for individuals who are below the current public health target range than for individuals already within the physical activity target range. For individuals below the target range, substantial reductions in risk are available with relatively small increases in moderate-intensity physical activity.
- Individuals already within the physical activity target range can gain more benefits by doing more moderate-to-vigorous physical activity. Individuals within the target range already have substantial benefits from their current volume of physical activity.
- 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. Research now shows that any amount of moderate-to-vigorous physical activity counts toward meeting the target range. Previously, insufficient evidence was available to support the value of bouts less than 10 minutes in duration. The 2018 Committee was able to conclude that bouts of any length contribute to the health benefits associated with the accumulated volume of physical activity.

Efforts to promote physical activity can be effective. The 2008 Scientific Report included no information about methods of promoting and facilitating healthy levels of physical activity. The 2018 Scientific Report includes a summary of major findings from the large body of scientific literature about promoting physical activity through different interventions.

- Strong evidence demonstrates that individual-level interventions can increase the volume of physical activity performed by youth and by adults, especially when the interventions are based on behavioral change theories and techniques.
- School-based, especially multi-component, programs and community-wide physical activity programs can be effective.

Part A. Executive Summary

- Environmental and policy changes that improve access to places where people can be physically active, modify the built environment to better support physical activity behaviors (including physically active transport), and that, in general, make it easier for people to be physically active can be effective.
- Information and communication technologies, including wearable activity monitors, telephone and smartphone programs and applications, computer-tailored print interventions, and the Internet, can be used to enable self-monitoring, deliver messages, and provide support, all of which are helpful in promoting regular physical activity.

PUBLIC HEALTH IMPACT

The public health impact of insufficient physical activity and the potential gains from even small population-wide increases are substantial. Information contained in this report indicates that, in addition to a reduced risk of death, greater amounts of regular moderate-to-vigorous physical activity reduce the risk of many of the most common and expensive diseases or conditions in the United States. Heart disease, stroke, hypertension, type 2 diabetes, dementia, depression, postpartum depression, excessive weight gain, falls with injuries among the elderly, and breast, colon, endometrial, esophageal, kidney, stomach, and lung cancer are all less common among individuals who are or become more physically active. In addition, this report provides evidence that for some of these conditions, individuals who are or become more physically active, relative to their peers with the same condition, have a reduced risk of mortality, reduced risk of developing other chronic diseases or conditions, and reduced risk of progression of the disease they already have. They also have improved physical function and better quality of life.

Each of these conditions alone adds substantially to annual direct and indirect medical costs in the United States. Even small increases in regular moderate-to-vigorous physical activity, especially if made by the least physically active individuals, would appreciably reduce the nation's direct and indirect medical costs. Quantification of the costs attributable to insufficient physical activity was beyond the scope of this Committee. It is clear, however, that the cost reductions would be large by any standards.

More difficult to quantify, but equally as important, are the benefits associated with how individuals feel every day and the energy and vitality they have to carry out their daily lives. Placing dollar estimates on improved cognition across the full life span, better quality of life, fewer symptoms of depression and anxiety, enhanced quality of sleep, and improved physical function is difficult. In addition, monetizing

these benefits likely cannot adequately describe the intangible societal benefits that derive from a happier and more energetic population.

THE FUTURE

The field of physical activity and public health has matured markedly in the past 10 years, and it will continue to develop at a rapid pace. Using the existing extensive scientific foundation and aided by recent technological advances, increases in knowledge about the relationships between physical activity and a wide variety of health and quality of life outcomes will surely continue. The Committee has described current evidence and recent gains in knowledge, but recognizes that in the near future, the field will generate more information about the benefits of physical activity and the types and volumes that provide those benefits. In addition, gains in the area of physical activity promotion are accumulating rapidly. Transferring this new knowledge into public health practice has the potential to improve the health of the American public to an unprecedented level.

At the same time, the Committee recognized that important gaps in knowledge still remain. It prepared a substantial list of topic-specific research recommendations. Six overarching recommendations are provided here.

- Determine the independent and interactive effects of physical activity and sedentary behavior on multiple health outcomes in youth, adults, and older adults.
- Determine the role and contribution of light-intensity physical activity alone or in combination with moderate-to-vigorous physical activity to health outcomes.
- Identify effective intervention strategies for increasing physical activity through actions in multiple settings in youth, adults, and older adults. Determine how the effectiveness of interventions differs by sex, age, race, ethnicity, socioeconomic status, and other factors.
- Strengthen the understanding of dose-response relationships between physical activity and multiple health outcomes in youth, adults, and older adults, and especially during the life transitions between these categories.
- Expand knowledge of the extent to which the relationships between physical activity and health outcomes are modified by demographic factors, including sex and race/ethnicity.
- Develop instrumentation and data collection systems that will enhance physical activity surveillance systems in the United States.

Table D-1. Physical Activity-Related Health Benefits for the General Population and Selected Populations Documented by the 2018 Physical Activity Guidelines Advisory Committee

Children	
3 to <6 Years of Age	Improved bone health and weight status
6 to 17 years of age	Improved cognitive function (ages 6 to 13 years) Improved cardiorespiratory and muscular fitness Improved bone health Improved cardiovascular risk factor status Improved weight status or adiposity Fewer symptoms of depression
Adults, all ages	
All-cause mortality	Lower risk
Cardiometabolic conditions	Lower cardiovascular incidence and mortality (including heart disease and stroke) Lower incidence of hypertension Lower incidence of type 2 diabetes
Cancer	Lower incidence of bladder, breast, colon, endometrium, esophagus, kidney, stomach, and lung cancers
Brain health	Reduced risk of dementia Improved cognitive function Improved cognitive function following bouts of aerobic activity Improved quality of life Improved sleep Reduced feelings of anxiety and depression in healthy people and in people with existing clinical syndromes Reduced incidence of depression
Weight status	Reduced risk of excessive weight gain Weight loss and the prevention of weight regain following initial weight loss when a sufficient dose of moderate-to-vigorous physical activity is attained An additive effect on weight loss when combined with moderate dietary restriction
Older Adults	
Falls	Reduced incidence of falls Reduced incidence of fall-related injuries
Physical function	Improved physical function in older adults with and without frailty
Women who are Pregnant or Postpartum	
During pregnancy	Reduced risk of excessive weight gain Reduced risk of gestational diabetes No risk to fetus from moderate-intensity physical activity
During postpartum	Reduced risk of postpartum depression

Individuals with Pre-Existing Medical Conditions	
Breast cancer	Reduced risk of all-cause and breast cancer mortality
Colorectal cancer	Reduced risk of all-cause and colorectal cancer mortality
Prostate cancer	Reduced risk of prostate cancer mortality
Osteoarthritis	Decreased pain Improved function and quality of life
Hypertension	Reduced risk of progression of cardiovascular disease Reduced risk of increased blood pressure over time
Type 2 diabetes	Reduced risk of cardiovascular mortality Reduced progression of disease indicators: hemoglobin A1c, blood pressure, blood lipids, and body mass index
Multiple sclerosis	Improved walking Improved physical fitness
Dementia	Improved cognition
Some conditions with impaired executive function (attention deficit hyperactivity disorder, schizophrenia, multiple sclerosis, Parkinson's disease, and stroke)	Improved cognition

Note: Benefits in **bold font** are those added in 2018; benefits in normal font are those noted in the 2008 Scientific Report.¹ Only outcomes with strong or moderate evidence of effect are included in the table.

Question 2. Does current evidence indicate that people who habitually perform greater amounts of moderate-to-vigorous physical activity feel better and sleep better?

People who are more physically active feel better and sleep better (see *Part F. Chapter 3. Brain Health*). In addition to reductions in risk for a variety of chronic health diseases and conditions, strong evidence demonstrates that more physically active people consistently report better quality of life, reduced anxiety, and reduced feelings of depression. The improved feelings have been observed in both observational cohort studies and experimental trials. Strong evidence also demonstrates that people who are more physically active sleep better. Laboratory assessments of sleep using polysomnography demonstrate that 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. Research using standardized self-reported assessments of sleep demonstrate that a greater volume of moderate-to-vigorous physical activity is associated with significantly less daytime sleepiness, better sleep quality, and a reduced frequency of use of medication to aid sleep. These improvements in sleep are reported

The cardiometabolic profile also shows improvements soon after an episode of moderate-to-vigorous physical activity. Blood pressure is reduced, and insulin sensitivity is increased. These cardiometabolic benefits persist for hours to days after the last bout. They also may be sufficient to lower the blood pressure of people with pre-hypertension and hypertension into normal ranges for a major portion of the day.

Other benefits, such as reduced risk of cardiovascular disease (CVD), diabetes, falls, and fall-related injuries among older adults, and improved physical function accrue as the physiologic adaptations to greater physical activity transpire. Improved cardiorespiratory and muscular fitness and biomarkers of disease risk start to accrue within days, and for a given amount of physical activity, maximize after a few months. Additional benefits accrue if physical activity volume is further increased. The reductions in risk apply every day and at all ages, including young adults, even though their risk for chronic disease is lower than for middle-aged and older adults.

Question 5. What does the evidence indicate about the public health target range, or “dose,” of moderate-to-vigorous physical activity that is likely to provide many of the health benefits listed in Table 1?

Current evidence continues to indicate that the majority of potential benefit or risk reduction is achieved by people who perform in the range of 500 to 1,000 MET-minutes per week of aerobic physical activity. Because MET-minutes is a unit of measure unfamiliar to most people, the target range has been commonly expressed as 150 to 300 minutes of moderate-intensity physical activity per week. Because vigorous-intensity physical activities (6 or more METs) require roughly twice the energy expenditure of moderate-intensity activities (3 to less than 6 METs), the time required to perform 500 to 1,000 MET-minutes of vigorous-intensity physical activity is roughly half that for moderate-intensity physical activity. As a result, about 75 to 150 minutes of vigorous-intensity physical activity per week is considered within the target range. Combinations of moderate- and vigorous-intensity activity that sum to within 500 to 1,000 MET-minutes per week are also in the target range. As an example, most healthy adults walking at about 3 miles per hour for 150 minutes during a week, or about a total of 7.5 miles, will expend about 500 MET-minutes of energy; if they walk for 300 minutes, or about 15 miles, they will expend about 1,000 MET-minutes of energy. Fewer minutes are needed to be in the target range for more vigorous activities. For example, running at 5 miles per hour would require about 60 minutes to reach 500 MET-minutes per week, or 120 minutes to reach 1,000 MET-minutes per week.

Question 6. What does the evidence indicate about the benefits of moderate-to-vigorous physical activity below or above the target range?

People do not need to reach the lower end of the 150 to 300-minute target range to benefit from

regular physical activity. Individuals who exceed the target range usually achieve even greater health benefits. For example, the line in Figure D-1 displays a typical dose-response curve for moderate-to-vigorous physical activity and the relative risk of all-cause mortality. The dose-response curve indicates no lower threshold and a steep early decline in relative risk. It also suggests some additional reduction in risk at volumes of physical activity above the current target range. In addition, the bars on the figure display the percentage of adults reporting different amounts of moderate-to-vigorous physical activity. The population distribution of self-reported moderate-to-vigorous physical activity indicates that about half of the adult population could reduce their risk substantially by modestly increasing their moderate-to-vigorous physical activity.

The shape of the dose-response curves for cardiovascular disease incidence and mortality, and for the incidence of type 2 diabetes are similar to the shape of the dose-response curve for all-cause mortality depicted in Figure D-1. The evidence is currently insufficient to depict dose-response curves for other health outcomes listed in Table D-1, such as reduction in risk of dementia, several cancer sites, or excessive weight gain.

Part D. Integrating the Evidence

At the lowest volume of moderate-to-vigorous physical activity (the ordinate), the risk of all-cause mortality increases as time spent sitting increases. This suggests that for individuals who do not perform any moderate-to-vigorous physical activity, replacing sitting time with light-intensity physical activities, such as walking at 2 miles per hour, dusting or polishing furniture, or easy gardening, 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 the individuals who sit the least have an elevated risk if they perform no moderate-to-vigorous physical activity. High volumes of moderate-to-vigorous physical activity appear to remove the risk of all-cause mortality 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.

The heat map demonstrates that many combinations of less sitting time and more moderate-to-vigorous physical activity are associated with reduced risk of all-cause mortality. Figure D-2 is based on firm evidence for all-cause and cardiovascular mortality, outcomes with well-established dose-response relationships with sedentary behavior and moderate-to-vigorous physical activity. The dose-response relationships for various combinations of sedentary behavior and moderate-to-vigorous physical activity with other health outcomes are unknown. A similar pattern seems likely, but other patterns may emerge as additional research on other outcomes is conducted.

Question 10. How do different types of physical activity contribute to health outcomes?

Aerobic Activity

Although other types of physical activity contribute to positive health outcomes, moderate-to-vigorous aerobic activity is associated with nearly all the benefits listed in Table D-1. Aerobic activity leads to improved cardiorespiratory fitness ($VO_2\max$) with an increase in the capacity and efficiency of the cardiorespiratory system to transport oxygen to skeletal muscles and for muscles to use this oxygen. Cardiorespiratory fitness also is associated with improvements in biomarkers for CVD and type 2 diabetes (e.g., atherogenic lipoprotein profile, blood pressure, insulin sensitivity) in adults and older adults with and without these diseases. Although generally not considered muscle-strengthening behavior, aerobic activity leads to improved strength and endurance of the major muscle groups used to perform the chosen behavior, such as running or swimming. The high impact of some aerobic activities, such as running or playing tennis, and the strong muscular forces of others, such as rowing or wrestling, improve bone health.

Table D-2. Summary of Conclusion Statements Regarding Strength* of the Evidence for Relationships Between Physical Activity and Cognition, Depression, Anxiety, Affect, Quality of Life, and Sleep

Outcome	Population	Benefit	Strength of Evidence
Cognition	General population and children 5 to 13 years of age: habitual moderate-to-vigorous physical activity	Improved cognition Reduced risk of dementia Improved performance on academic achievement tests Improved neuropsychological performance (executive function, processing speed, memory)	Moderate Strong Moderate Moderate
	General population and children 5 to 13 years of age: acute episodes of moderate-to-vigorous physical activity	Improved cognition (executive function, attention, academic performance, memory, crystallized intelligence, processing speed)	Strong
	Individuals with dementia and some other conditions that affect cognition (attention deficit hyperactivity disorder, schizophrenia, multiple sclerosis, Parkinson’s disease, stroke)	Improved cognition	Moderate
Quality of life	Adults, ages 18 years and older	Improved quality of life	Strong
	Individuals with schizophrenia	Improved quality of life	Moderate
Depressed mood and depression	Adults, ages 18 years and older	Reduced risk of depression	Strong
		Fewer depressive symptoms for individuals with and without major depression	Strong
		Dose-related reduction in depressive symptoms (i.e., present at low levels, increases with greater frequency, intensity, volume)	Strong
Anxiety	Adults, ages 18 years and older: Acute episodes of moderate-to-vigorous physical activity	Reduced state anxiety	Strong
	Adults, ages 18 years and older: habitual moderate-to-vigorous physical activity	Reduced trait anxiety for individuals with and without anxiety disorders	Strong

Outcome	Population	Benefit	Strength of Evidence
Affect	Adolescents through middle-aged adults	In experimental studies, direct relationship between feelings of negative affect and intensity of moderate-to-vigorous physical activity	Strong
Sleep	Adults, ages 18 years and older: acute and habitual moderate-to-vigorous physical activity	Improved sleep outcomes Size of benefit directly related to duration of episode	Strong Moderate
	Individuals with symptoms of insomnia or sleep apnea	Improved sleep outcomes with greater amounts of moderate-to-vigorous physical activity	Moderate

Note: “Strength of the evidence” refers to the strength of the evidence that a relationship exists and not to the size of the effect of the relationship. Only populations and outcomes with strong or moderate evidence of effect are included in the table.

YOUTH

Question 13. Does current evidence indicate health and fitness benefits from physical activity for children and youth?

In 2008, insufficient evidence was available to comment on the impact of physical activity on the health of children younger than age 6 years. New evidence has emerged since then, and now, strong evidence indicates that greater volumes of physical activity among children ages 3 through 5 years are associated with a reduced risk of excessive weight gain and favorable indicators of bone health.

Among older children and youth through high school age, the evidence continues to demonstrate that moderate-to-vigorous physical activity improves cardiovascular and muscular fitness, bone health, weight status, and cardiometabolic risk factor status. For children ages 5 through 13, the evidence indicates that both acute bouts and regular moderate-to-vigorous physical activity improve cognition, including memory, processing speed, attention, and academic performance. Information on the effect on cognition for younger children and adolescents is not yet sufficient.

Question 14. What does the evidence indicate about the type and dose of physical activity most likely to produce these health benefits among children?

For children 3 through 5 years, little information is available currently on the type or volume of activity most likely to be associated with weight status. Until such information becomes available, a prudent

PART F. CHAPTER 11. PROMOTING REGULAR PHYSICAL ACTIVITY

Table of Contents

Introduction	F11-2
Review of the Science	F11-4
Overview of Questions Addressed.....	F11-4
Data Sources and Process Used to Answer Questions	F11-5
Question 1: What interventions are effective for increasing physical activity at different levels of impact?	F11-8
Older Adult Interventions	F11-9
Postnatal Women	F11-11
Youth.....	F11-13
Theory-Based Behavioral Interventions and Techniques	F11-16
Peer-Led Interventions	F11-23
Community-Wide Interventions	F11-25
Child Care and Preschool Settings	F11-29
Faith Based Community Interventions	F11-33
Nurse-Delivered Interventions in Home or Other Community Settings.....	F11-35
Interventions in Primary Care Settings	F11-37
School Interventions	F11-41
Worksite Interventions	F11-46
Wearable Activity Monitors	F11-48
Telephone-assisted Interventions.....	F11-53
Web-based or Internet-delivered Interventions	F11-54
Computer-tailored Print Interventions	F11-56
Mobile Phone Programs	F11-58

derived step counts and/or accelerometer-derived activity. For prescription schemes specifically, physical activity adherence to recommendations was a prevalent outcome assessed.⁸⁷

Evidence on Specific Factors

[Melvin et al⁸⁹](#) reported on a limited number of studies specifically involving African American (N=2) and Latino (N=2) adults and found no significant increases in physical activity.

[Orrow et al⁸⁶](#) described one study that reported on adverse events. This study observed small increases in musculoskeletal injury (7%) and falls (11%), relative to usual care, in women ages 40 to 74 years.

One study,⁹⁹ reviewed by [Gagliardi et al,⁹⁵](#) provided a cost analysis, estimating that an initial monthly cost for adding a physical activity counseling into a primary care practice would be \$91.43 (in Canadian dollars) per month. Another study found favorable cost effectiveness for prescription schemes, relative to usual care, in inactive individuals without a medical condition, inactive individuals with obesity, inactive individuals with hypertension, and inactive individuals with depression.⁹⁶ Although not analyzed systematically, factors noted to be of potential importance for prescription schemes were the reasons for referral and participant-related payments. Health status was a reason for referral in most of the European studies included, but not for all countries. The fees associated with access to locations and exercise professionals also were found to vary across countries and were not consistently reported or analyzed.⁸⁷

For additional details on this body of evidence, visit: <https://health.gov/paguidelines/second-edition/report/supplementary-material.aspx> for the Evidence Portfolio.

Public Health Impact

The primary care setting may be an appealing venue for offering physical activity counseling or referral. Despite increasing demands upon clinical providers during primary care visits, the primary care setting represents a scalable opportunity to influence population-level physical activity if effective approaches can be implemented. The current state of the evidence suggests that brief interventions in the context of a clinic visit have limited efficacy for significantly increasing physical activity. Intervention efficacy may be enhanced by providing more standardized interventions (e.g., delivered in a similar manner across providers and health care systems) and more robust strategies (e.g., strategies beyond brief advice that include messaging from one or more members of the provider team using motivational interviewing or other theory-based approaches). Such strategies can be supplemented with written “prescriptions” involving specific physical activity recommendations.