



MEMO

DATE:	4/13/20
TO:	HSCDP STAFF
FROM:	DANIELA/ ADMIN SRVS MGR
SUBJECT:	INCENTIVE PLAN TAI CHI MAKE-UP OPPORTUNITY

Hello All,

Since Tai Chi sessions had to be cancelled due to the COVID-19 health emergency, we are offering a make-up opportunity that qualifies for this year’s incentive plan goal.

Complete a self-study, which consists of reading two physical activity articles, watching a brief Beginner’s Tai Chi video and completing a short writing assignment (see attached). We expect this to take approximately one hour and a half to complete and it may be completed during work time. Please send this completed assignment to Daniela at the Central Office for review and credit towards the HSCDP incentive plan goal by no later than **June 30, 2020**.

Please let me know if you have any questions.

Thank you,
Daniela



Name: _____

Date: _____

Self-Study Staff Wellness Topic: Physical Activity/Tai Chi

1. Identify two key points from each of the articles below:

Chapter 2: Physical Activity and Health- Physical Activity Guidelines for Americans 2nd Edition (Attached)

1. _____

2. _____

The Health Benefits of Tai Chi – Harvard Health Publishing (Attached)

<https://www.health.harvard.edu/staying-healthy/the-health-benefits-of-tai-chi>

1. _____

2. _____

2. Learn basic Tai Chi movements at home. Watch the 7 Tai Chi Moves for Beginners video and try it out!

Note: If you have any physical health restrictions, please be cautious. It is alright to only watch the video.

7 Tai Chi Moves for Beginners | 15 Minute Daily Taiji Routine

https://www.youtube.com/watch?v=DmlsB_KOGtM

3. Describe how you will implement what you learned into your daily life. Please provide detailed examples citing at least one key point from each resource. (~ 2-3 paragraphs)



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
<ul style="list-style-type: none">■ 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
<ul style="list-style-type: none">■ 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.

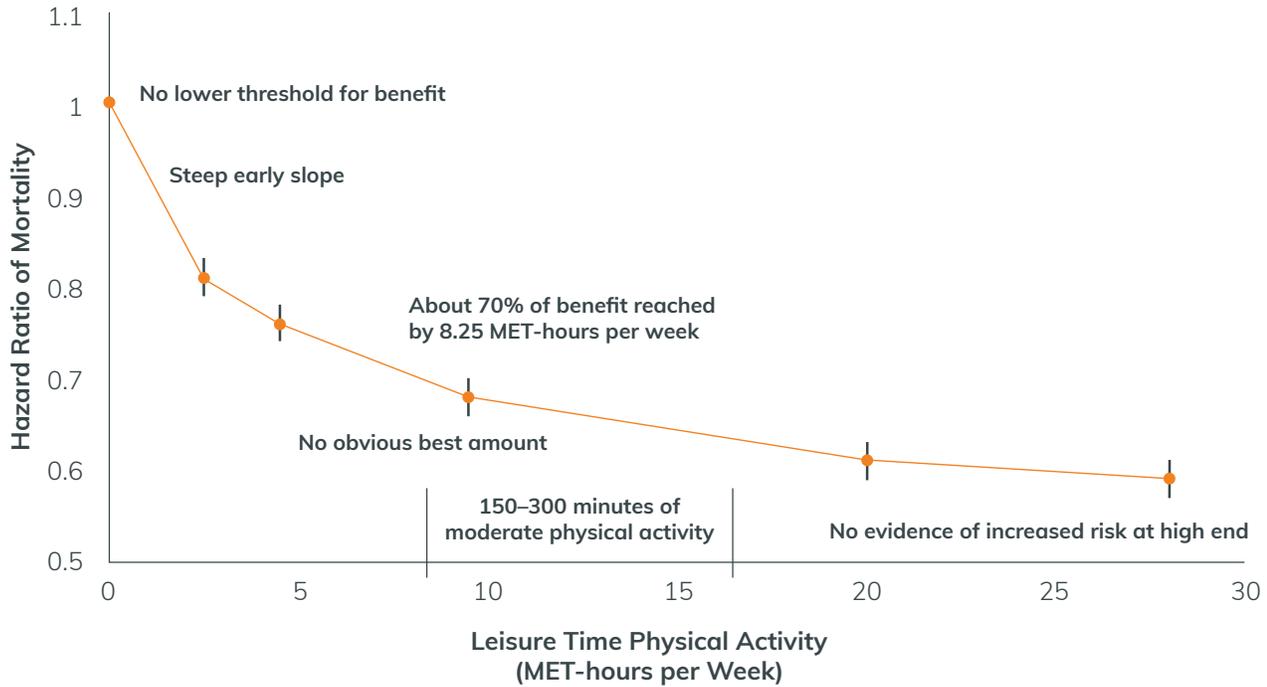
All-Cause Mortality

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.

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.

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.



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	●	

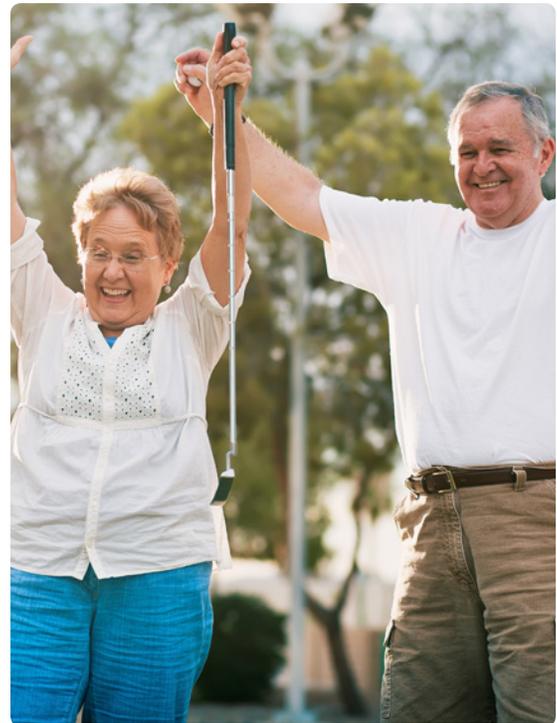
Note: The Advisory Committee rated the evidence of health benefits of physical activity as strong, moderate, limited, or grade not assignable. Only outcomes with strong or moderate evidence of effect are included in this table.

*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
<ul style="list-style-type: none">▪ Improved health-related quality of life▪ Improved fitness
Breast Cancer Survivors
<ul style="list-style-type: none">▪ Lower risk of dying from breast cancer▪ Lower risk of all-cause mortality
Colorectal Cancer Survivors
<ul style="list-style-type: none">▪ Lower risk of dying from colorectal cancer▪ Lower risk of all-cause mortality
Prostate Cancer Survivors
<ul style="list-style-type: none">▪ Lower risk of dying from prostate cancer
People with Osteoarthritis (knee and hip)
<ul style="list-style-type: none">▪ Decreased pain▪ Improved physical function▪ Improved health-related quality of life▪ No effect on disease progression at recommended physical activity levels
People with Hypertension
<ul style="list-style-type: none">▪ Lower risk of cardiovascular disease mortality▪ Reduced cardiovascular disease progression▪ Lower risk of increased blood pressure over time
People with Type 2 Diabetes
<ul style="list-style-type: none">▪ Lower risk of cardiovascular disease mortality▪ Reduced progression of disease indicators: hemoglobin A1c, blood pressure, body mass index, and lipids
People with Dementia
<ul style="list-style-type: none">▪ 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 pregnancy 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.

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.

Learn More



See [Appendix 1. Physical Activity Behavior: Intensity, Bouts, and Steps](#) for more information about METs.

Learn More



See [Chapter 1. Introducing the Physical Activity Guidelines for Americans](#) for a more detailed discussion of the relationships of sedentary behavior and health.



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Harvard Women's Health Watch

The health benefits of tai chi

This gentle form of exercise can help maintain strength, flexibility, and balance, and could be the perfect activity for the rest of your life.

Updated: August 20, 2019 Published: May, 2009

Tai chi is often described as "meditation in motion," but it might well be called "*medication* in motion." There is growing evidence that this mind-body practice, which originated in China as a martial art, has value in treating or preventing many health problems. And you can get started even if you aren't in top shape or the best of health.

In this low-impact, slow-motion exercise, you go without pausing through a series of motions named for animal actions — for example, "white crane spreads its wings" — or martial arts moves, such as "box both ears." As you move, you breathe deeply and naturally, focusing your attention — as in some kinds of meditation — on your bodily sensations. Tai chi differs from other types of exercise in several respects. The movements are usually circular and never forced, the muscles are relaxed rather than tensed, the joints are not fully extended or bent, and connective tissues are not stretched. Tai chi can be easily adapted for anyone, from the most fit to people confined to wheelchairs or recovering from surgery.

Tai chi movement



A tai chi class practices a short form at the Tree of Life Tai Chi Center in Watertown, Mass.

A growing body of carefully conducted research is building a compelling case for tai chi as an adjunct to standard medical treatment for the prevention and rehabilitation of many conditions commonly associated with age. An adjunct therapy is one that's used together with primary medical treatments, either to address a disease itself or its primary symptoms, or, more generally, to improve a patient's functioning and quality of life.

Belief systems

You don't need to subscribe to or learn much about tai chi's roots in Chinese philosophy to enjoy its health benefits, but these concepts can help make sense of its approach:

- **Qi** — an energy force thought to flow through the body; tai chi is said to unblock and encourage the proper flow of qi.
- **Yin and yang** — opposing elements thought to make up the universe that need to be kept in harmony. Tai chi is said to promote this balance.

Tai chi in motion

A tai chi class might include these parts:

Warm-up. Easy motions, such as shoulder circles, turning the head from side to side, or rocking back and forth, help you to loosen your muscles and joints and focus on your breath and body.

Instruction and practice of tai chi forms. Short forms — forms are sets of movements — may include a dozen or fewer movements; long forms may include hundreds. Different styles require smaller or larger movements. A short form with smaller, slower movements is usually recommended at the beginning, especially if you're older or not in good condition.

Qigong (or chi kung). Translated as "breath work" or "energy work," this consists of a few minutes of gentle breathing sometimes combined with movement. The idea is to help relax the mind and mobilize the body's energy. Qigong may be practiced standing, sitting, or lying down.

Getting started

The benefits of tai chi are generally greatest if you begin before you develop a chronic illness or functional limitations. Tai chi is very safe, and no fancy equipment is needed, so it's easy to get started. Here's some advice for doing so:

Don't be intimidated by the language. Names like Yang, Wu, and Cheng are given to various branches of tai chi, in honor of people who devised the sets of movements called forms. Certain programs emphasize the martial arts aspect of tai chi rather than its potential for healing and stress reduction. In some forms, you learn long sequences of movements, while others involve shorter series and more focus on breathing and meditation. The name is less important than finding an approach that matches your interests and needs.

Check with your doctor. If you have a limiting musculoskeletal problem or medical condition — or if you take medications that can make you dizzy or lightheaded — check with your doctor before starting tai chi. Given its excellent safety record, chances are that you'll be encouraged to try it.

Consider observing and taking a class. Taking a class may be the best way to learn tai chi. Seeing a teacher in action, getting feedback, and experiencing the camaraderie of a group are all pluses. Most teachers will let you observe the class first to see if you feel comfortable with the approach and atmosphere. Instruction can be individualized. Ask about classes at your local Y, senior center, or community education center.

If you'd rather learn at home, you can buy or rent videos geared to your interests and fitness needs (see "Selected resources"). Although there are some excellent tai chi books, it can be difficult to appreciate the flow of movements from still photos or illustrations.

Talk to the instructor. There's no standard training or licensing for tai chi instructors, so you'll need to rely on recommendations from friends or clinicians and, of course, your own judgment. Look for an experienced teacher who will accommodate individual health concerns or levels of coordination and fitness.

Dress comfortably. Choose loose-fitting clothes that don't restrict your range of motion. You can practice barefoot or in lightweight, comfortable, and flexible shoes. Tai chi shoes are available, but ones you find in your closet will probably work fine. You'll need shoes that won't slip and can provide enough support to help you balance, but have soles thin enough to allow you to feel the ground. Running shoes, designed to propel you forward, are usually unsuitable.

Gauge your progress. Most beginning programs and tai chi interventions tested in medical research last at least 12 weeks, with instruction once or twice a week and practice at home. By the end of that time, you should know whether you enjoy tai chi, and you may already notice positive physical and psychological changes.

No pain, big gains

Although tai chi is slow and gentle and doesn't leave you breathless, it addresses the key components of fitness — muscle strength, flexibility, balance, and, to a lesser degree, aerobic conditioning. Here's some of the evidence:

Muscle strength. Tai chi can improve both lower-body strength and upper-body strength. When practiced regularly, tai chi can be comparable to resistance training and brisk walking.

Although you aren't working with weights or resistance bands, the unsupported arm exercise involved in tai chi strengthens your upper body. Tai chi strengthens both the lower and upper extremities and also the core muscles of the back and abdomen.

Flexibility. Tai chi can boost upper- and lower-body flexibility as well as strength.

Balance. Tai chi improves balance and, according to some studies, reduces falls. Proprioception — the ability to sense the position of one's body in space — declines with age. Tai chi helps train this sense, which is a function of sensory neurons in the inner ear and stretch receptors in the muscles and ligaments. Tai chi also improves muscle strength and flexibility, which makes it easier to recover from a stumble. Fear of falling can make you more likely to fall; some studies have found that tai chi training helps reduce that fear.

Aerobic conditioning. Depending on the speed and size of the movements, tai chi can provide some aerobic benefits. If your clinician advises a more intense cardio workout with a higher heart rate than tai chi can offer, you may need something more aerobic as well.

Selected resources

An Introduction to Tai Chi [Harvard Health Special Report](#)

Tai Chi Health www.taichihealth.com

Tree of Life Tai Chi Center www.treeoflifetaichi.com

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