Utilizing Evidence-Based Resources to Develop an Employee Wellness Toolkit for Small Worksites

Center of Excellence in Rural Health

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Introduction/Background

Healthy People 2010 proposed that 75% of all employers should offer a Comprehensive Wellness Program (CWP) for their employees. CWP includes: 1) Health education; 2) Supportive social and physical work environment; 3) Integration; 4) Linkage; and 5) Worksite screening and education.

The workplace is uniquely suited for implementing wellness programs because employees can receive information in a structured and familiar environment where social support and established channels of communication already exist. However, small businesses lack wellness resources compared to larger companies.

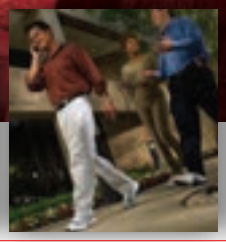
This toolkit provides information about evidence-based health and wellness guidlelines and educational content that are available for free or at a minimal cost.

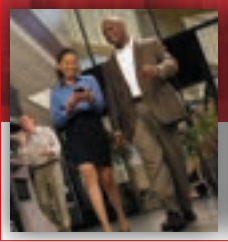
American Heart Association®

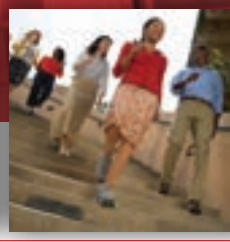
My Heart. My Life.™

With your help, your workplace and your employees can be on the way to better health. There's no better benefit to offer your employees than helping them have healthier, longer lives.

Since the Fit-Friendly program began in 2007, more than 4,200 worksites representing more than 10 million employees have participated.





American Heart Association®

My Heart. My Life.™

7272 Greenville Avenue
Dallas,Texas 75231

Fit-Friendly

WORKSITE

heart.org/workplacewellness

About Fit-Friendly

The American Heart Association's goal by the year 2020 is to not only reduce the rate of death from cardiovascular diseases and stroke by 20 percent, but also to improve the heart health of all Americans by 20 percent.

More than two-thirds of American adults are overweight or obese, putting them at risk for heart disease and stroke as well as many other chronic illnesses and conditions. Making healthy changes in the workplace, where many adults spend much of their day, is an important way to help people be healthier.

That's why the American Heart Association places such an importance on creating a healthy work environment, and why we encourage employers to become recognized as Fit-Friendly Worksites.

Studies suggest that by encouraging physical activity and healthy eating and promoting an overall culture of health, employers can:

- Increase productivity
- Reduce absenteeism
- Lower turnover
- Reduce healthcare costs

And the American Heart Association wants to help.

That's why we provide free tools for worksites and employees, including:

- Healthy eating resources, like our Healthy Workplace Food and Beverage Toolkit
- Walking and physical activity programs
- Worksite wellness materials
- National Walking Day and National Eating Healthy Day event materials
- Informative e-newsletters for employers and employees

How do worksites earn Fit-Friendly recognition?

- Work with your local American Heart Association to determine your eligibility.
- Submit your application online (by April 1 or November 1).
- Renew your recognition status annually.

What do recognized worksites receive?

- Recognition on the American Heart Association's Fit-Friendly program website
- Recognition by the American Heart Association at local events and in recognition program communication materials, including the Annual Honor Roll published on the website
- The right to use the program's annual recognition seal for internal communications to employees and external communications related specifically to employment recruitment
- An official recognition letter and recognition plaque sent by the American Heart Association
- A quarterly worksite wellness e-newsletter with resources you can use in your own newsletters and programs

Where do I start?

Apply (or renew) online at **heart.org/fitfriendly**

Award Levels and Criteria

Here are the different levels your worksite can qualify for each year:

This workplace has been recognized by the American Heart Association for meeting criteria for employee wellness.

Gold Level

For worksites that fulfill criteria such as offering employees physical activity support, increasing healthy eating options at work, promoting a wellness culture, and adhering to a strict tobacco policy; as well as implement at least six of the physical activities, two of the nutrition activities and one of the culture activities listed in the application form.

This workplace has been recognized by the American Heart Association for meeting criteria for employee wellness.

Platinum Level

For worksites that fulfill all the gold-level criteria, are 100% tobacco-free campuses, and achieve at least one behavior change, specified cost savings outcome, or positive return on investment (as documented by supporting data).

This workplace has been recognized by the American Heart Association for meeting criteria for employee wellness.

Worksite Innovation Award

Given to a worksite that achieves all criteria for gold-level recognition and leads the development and implementation of a notably innovative and effective program in the workplace.

This workplace has been recognized by the American Heart Association for meeting criteria for employee wellness.

Community Innovation Award

Given to a worksite that achieves all criteria for gold-level recognition and leads the development and implementation of a notably innovative and effective program not only in the workplace, but also in the community.

American Heart Association
Life's Simple 7® Journey to Health™

The American Heart Association has launched an ambitious movement to build a culture of health throughout America's workplaces. Our goal is to provide employers with solutions for adopting an environment and a common set of best practices to improve the quality of workplace health programs and engage individuals where they spend most of their day—at work.

Employees are highly receptive to workplace health initiatives programs, and evidence-based programs are proven to help companies build healthy workplaces and workforces:

- Employees report better productivity (45%), improved quality of work (36%), fewer sick days (36%), and higher job satisfaction (33%) *(Nielsen Employee Health Survey 2016)*.
- Scientific evidence supports that moving toward ideal heart health improves overall health, productivity, quality of life, longevity and reduces healthcare costs. Moving toward ideal heart health is also associated with lower risk for cancer, diabetes and depression and improved cognitive function in younger and older adults *(Fonarow et al., 2015, Joseph et al.,2016)*.

The Problem

Unfortunately, 99% of the U.S. adult population has at least one of seven cardiovascular health risks: tobacco use, poor diet, physical inactivity, unhealthy weight, high blood pressure, high cholesterol, or high blood glucose. The combined contribution of these risk factors increases employer medical spending by 213.6% per person per year *(Goetzel et al., 2017)*.

- Heart disease is the leading cause of death in the United States and it is the most expensive chronic condition, costing the country about $207 billion each year in medical expenditures and lost productivity *(Goetzel et al., 2017)*.

- Unless effective prevention strategies are implemented, the direct healthcare costs of cardiovascular disease are projected to triple from $273 billion in 2010 to $818 billion in 2030. Indirect costs associated with lost productivity are predicted to increase from $172 billion to $276 billion during the same period *(Fonarow et al., 2015)*.

- Cardiovascular disease has direct and indirect costs to employers:
  - Employees with cardiovascular disease lost 56 hours more per year in productivity
  - Those employees cost $1,119 more per year in insurance
  - Congestive heart failure costs all payers $8,332 per person per year
  - Heart disease leads to an average of 13 lost workdays per year per patient *(Song et al., 2015, Trogdon et al., 20017)*

The Solution: Life's Simple 7® Journey to Health™

In response to the dangers and costs of these devastating diseases, the American Heart Association has created a science-based, evidence-informed, integrated solution for creating a culture of health in the workplace as part of our larger mission to help achieve improved health and wellbeing for employees, their families and the communities in which they live. We keep it simple, focusing on increasing awareness of health risks and the importance of taking small, simple steps in lifestyle behaviors to work toward improved Life's Simple 7 metrics and improved overall health.

Life's Simple 7®

The American Heart Association has defined ideal cardiovascular health based on seven simple risk factors (Life's Simple 7®) that people can improve through lifestyle changes:

These health behaviors and metrics represent seven out of the top 10 most costly risk factors for employers *(Goetzel et al., 2012)*. Studies show people in optimal ranges of Life's Simple 7 have a lower risk of heart disease and stroke compared to people in poor ranges. In a study of a large, ethnically diverse population of one employer, annual employer healthcare costs were on average $2,021 less for employees with at least six ideal Life's Simple 7 metrics compared to employees with two or fewer ideal metrics *(Osondu et al., 2017)*.

The good news is that small, simple steps can make a big difference. Ideal status for at least

- 4 of the Life's Simple 7 metrics have a 75% lower diabetes incidence
- 5 of the Life's Simple 7 metrics cuts the risk of cardiovascular disease by 50%
- 6 of the Life's Simple 7 metrics have a 51% lower risk of cancer

(Joseph et. al., 2016; Ford et.al., 2012; Rassmussen-Torvik et. al., 2013)

Building a healthy workplace and encouraging a healthy workforce can create a self-reinforcing environment that can lead to increased productivity, less absenteeism, and health-spend savings for employees and employers.

Life's Simple 7® Journey to Health™ helps employers build and maximize effective workplace cultures of health by empowering employers to:

- Assess their supporting workplace environment
- Consult resources to make improvements
- Promote workplace health screenings integrated with health assessment and education
- Engage employees to help them work toward ideal cardiovascular health
- Monitor progress with digital dashboards
- Qualify for annual recognition from the American Heart Association

99% of the adult US population has at least one of seven cardiovascular health risks.
(Goetzel et al., 2017)

All American Heart Association Workplace Health Solutions products and services are compliant with HIPAA patient-privacy laws and the Americans with Disabilities Act. Employees can see their individual data and screening results, but employers can only see deidentified, aggregated data.

Workplace Health Achievement Index

It all starts with the Workplace Health Achievement Index—an online organizational assessment for companies to measure the quality and comprehensiveness of their workplace health efforts and the aggregated health of their workforce. There are approximately 1800 companies enrolled in the Index today, representing 8 million employees. Index reports indicate the levels to which a company has successfully integrated a culture of health within the workplace and offer constructive feedback for improvements.

Participating companies can access a secure, password protected administration portal to view benchmark reports from the Index and dashboard reports for monitoring changes in the overall health of a workforce based on My Life Check Enhance, the American Heart Association's digital health risk assessment tool, or equivalent Life's Simple 7 data. This data can be used to gain greater insights into a company's culture of health and help determine action plans to improve performance. Participating organizations can strive for the bronze, silver, or gold levels of achievement, then can elect to receive recognition from the American Heart Association.

Of the companies participating in the Index, 85% to 95% conduct health screenings, yet only 25% have provided aggregate Life's Simple 7 specific performance data. Many companies have told us their wellness vendors and health plans are not collecting Life's Simple 7 equivalent data and therefore are unable to provide the data in an aggregated data reporting format that can meet the performance measure requirements for the Index. To solve this problem, we now provide prepopulated aggregate data reporting as part of our comprehensive product and services solution.

Health Screening Services

The next step in the journey is Health Screening Services—so much more than just a health screening: all areas of our unique web-based portal are infused with Life's Simple 7 health content and are focused on putting personal health data results within the context of Life's Simple 7 awareness, education, and engagement. Each step of the way, we provide clear, understandable health content that emphasizes the importance of participants knowing and understanding their personal health numbers and their personal health risk factors, while also providing guidance and engagement in small, simple steps that participants can take toward improving their health.

All participants are provided with an easy-to-read *Understanding Your Risk* booklet, based on the powerful science of Life's Simple 7. The booklet contains descriptions of the tests performed as well as typical causes of risk factors and lifestyle changes that can be made to work toward improved health.

The Association's Health Screening Services offers a comprehensive menu of included services, including a state-of-the-art event management scheduling system. We also offer many upgrades for creating a screening event that meets the precise needs of your workplace, for example:

- Voucher programs for retail pharmacy and/or laboratory testing
- Expanded Personal Health Consultation to help participants understand their results
- Incentives management activity-based tracking system
- Employee Health Intelligence System online reporting, with point-and-click organizational biometric health data and robust data analytics

The most effective workplace health screening models combine health screening with health assessment, followed by actionable encouragement to promote activation and engagement in behavioral change, resulting in higher participation in health and wellness programs.

Integrated My Life Check® Enhance Health Assessment

The health screening itself helps people know their numbers, then we integrate the screening results with the My Life Check® Enhance health assessment, the final step in the journey.

My Life Check® Enhance is a digital health assessment tool informed by the science and evidence of Life's Simple 7. My Life Check Enhance is fully integrated with Health Screening Services, so participants will log in to prepopulated profiles with individual biometric screenings lab results already in place.

After participants answer a few more questions (typically in 3 minutes or less), the system provides a Heart Health Score derived by the Life's Simple 7 algorithm and suggests up to 35 personalized Health Action recommendations—based specifically on individual results and presented in order of potential impact—for lifestyle and behavioral changes that can help people work toward improved health.

Worksite health screenings alone offer little ROI benefit, whereas a health assessment followed by screening, behavioral counseling, and incentives achieve favorable cost savings.
(Arena et al., 2014)

The assessment aims to activate, engage, and motivate participants to make behavior changes or to seek support for lifestyle changes and follow-up medical care as appropriate.

Active participants can revisit the assessment and update their values as often and as many times as they like, receiving new Health Actions as their Heart Health Scores change.

Aggregate data can be sent from My Life Check enhance directly to your organization's Workplace Health Achievement Index account. My Life Check Enhance also offers employer reporting to compare aggregate data by corporate, division and geographic locations, as well as the ability to segment reporting by employee vs. adult dependent.

Blending the simplicity and effectiveness of the Association's evidence-based, scientifically validated Life's Simple 7 and My Life Check Enhance with the power of objective biometric health screening data provides opportunities for employers to activate and engage employees in best practices and strategies to make behavioral health improvements and objectively track progress in their heart health.

The Experience

The American Heart Association provides a safe, trusted environment for employees as they work toward improving their health.

Health Screening Services

Designed with convenience in mind, health screenings offered by the American Heart Association provide an easy-to-use, trusted interface for scheduling health screenings and obtaining results.

- Depending on client customization, employees can attend an onsite health screening or get their health screening from healthcare providers, a national diagnostic laboratory facility (with a voucher), a national retail pharmacy (with a voucher), or at home (with a test kit).
- A state-of-the-art registration and scheduling tool provides effortless registration and selection of time and location.
- Results of the health screenings are automatically incorporated into employees' My Life Check Enhance profiles before they take the health assessment to ensure convenient, accurate results.

72% of consumers are emotionally connected with (love or like) the American Heart Association.
(EquiTrend Brand Tracker, 2016)

My Life Check Enhance

Employees want quick, easily actionable health assessments. Employers want health assessments that provide meaningful context, a good return on investment, and a clear path for employees to take, to work toward improved health.

Unlike other health assessments, with questionnaires that take upwards of 45 minutes and produce dozens of pages of results that often go unread, My Life Check Enhance can provide simple, understandable results and actionable engagement in just a few minutes.

1. A personal Heart Health Score calculated using the Life's Simple 7 algorithm: a scientifically validated measure of ideal cardiovascular health
2. Personalized action plan and Health Actions based on individual responses to the assessment and incorporated health screening lab values, with the latest scientific information from the American Heart Association bundled and sequenced into actions anyone can take to work toward ideal heart health:
   - ✓ Bite-sized
   - ✓ Achievable
   - ✓ Trackable by employees, with email reminders to check in
3. A personal dashboard to monitor progress over time
4. Participants can return as often and as many times as they like, to update their Heart Health Score, select new Health Actions, and view their dashboards

Eligible Employer Size

American Heart Association Health Screening Services are available for employers that have no fewer than 500 employees eligible for screenings across all worksites combined. There are no minimums per worksite.

Our Recommendation

Companies that intentionally and strategically invest resources in workplace health may be seen as employers of choice, experience less turnover, increase the ability to attract and retain top talent, increase the likelihood of achieving safety targets, enhancing manufacturing reliability, increasing employee engagement and job satisfaction, and managing healthcare costs better *(Fonarow et al., 2015)*.

*The American Heart Association creates a trusted platform: **60%** of employees are willing to share personal health information with a non-profit for health purposes. Only **35%** of employees are comfortable sharing such data directly with their employer.*
(Employee Health Survey., 2016)

Improved workplace health benefits employers *and* employees. Healthy, engaged employees are more productive, with lower absenteeism and lower healthcare costs.

With Life's Simple 7 health behaviors representing seven out of the top 10 most costly risk factors for employers, and knowing that incremental changes have a big impact over time and over populations, we recommend that your organization team with us to design and implement a comprehensive workplace health solution involving:

- Workplace Health Achievement Index (a service provided by the American Heart Association at no charge)
- American Heart Association Health Screening Services
- My Life Check Enhance health assessment

Join us on a journey to improved health… for your workplace, for your workforce, for life.

WHS@heart.org • 888-242-4503

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"It's a well-planned program with detailed resources and Arthritis Foundation staff support. It's an important program for companies looking to address arthritis and sedentary lifestyle among the population."

– Partner Worksite

Wellness Programs Work!

Studies from 56 worksites offering wellness programs of some type showed an average:

- 26% reduction in health care costs
- 27% reduction in sick leave absenteeism
- 32% reduction in workers' compensation and disability management cost claims

(Chapman LS. Meta-Evaluation of Worksite Health Promotion Economic Return Studies: 2005 update. American Journal of Health Promotion. 2005;19(6):1-11.)

The Arthritis Foundation is focused on finding a cure and championing the fight against arthritis with life-changing information, advocacy, science and community.

Arthritis Foundation

Walk With Ease

Say Yes to a Healthier Workforce

Arthritis Foundation℠

arthritis.org

Help Employees Say Yes to Better Health

Say Yes to *Walk With Ease* – a six-week program proven to reduce the pain of arthritis, improve employees' overall health and safely make walking a part of their everyday routine.

Our *Walk With Ease* in the Worksite program encourages happier, healthier employees who are less sedentary, more energetic and more fulfilled. This can:

- Reduce medical and health care costs
- Increase work attendance
- Boost employee morale
- Increase productivity
- Improve job satisfaction

The Arthritis Foundation *Walk With Ease* program is successful in the worksite because it is a program anyone can do, at any time, regardless of physical fitness level. *Walk With Ease* can be integrated into your current wellness program or offered independently.

"I spend long days sitting at my desk. *Walk With Ease* gets me moving and encourages me to get active."

– Program Participant

Arthritis Foundation℠

Why Start *Walk With Ease* in Your Worksite?

Arthritis – America's #1 cause of disability – is a serious and growing health crisis that affects more than 50 million people of all ages, races and ethnic groups. One-third of people with arthritis report work limitations due to arthritis. The two major types of arthritis alone (osteoarthritis and rheumatoid arthritis) cost the U.S. economy more than $156 billion annually in lost wages and medical expenses.

Arthritis costs American businesses a fortune in missed workdays, lower productivity and health care costs, but the Arthritis Foundation can help. Start a *Walk With Ease* in the Worksite program and help employees take the first step toward a better life filled with more energy, less pain and more opportunities to say Yes to what they love in life.

About the Program

The Arthritis Foundation *Walk With Ease* Program is an evidence-based program that has been proven to improve the quality of life of people with arthritis. It is the only walking program identified as arthritis-appropriate by the Centers for Disease Control and Prevention. The program can benefit people with or without arthritis who want to live a healthier lifestyle. It's a fun, safe six-week program that employees can do as a group with a trained leader or individually using the *Walk With Ease* guidebook. While walking is the central activity, *Walk With Ease* is a multi-component program that includes health education, stretching exercises, and motivational strategies to stay physically active. Sessions can fit within an employees' lunch break or before or after work. *Walk With Ease* is an easy to implement program using the resources and expert guidance from the Arthritis Foundation. The Arthritis Foundation provides step-by-step direction on how to launch each stage of the *Walk With Ease* in the Worksite program.

Proven Results

Walk With Ease in the Worksite is proven to:

- Improve physical and mental health
- Teach proper stretching and pain management techniques
- Build stamina, strength, confidence and walking pace
- Improve workplace limitation

"I'm so glad that I started walking. I've been walking for a couple of years and I find it to be good for everything. It lowers my blood pressure, my back is better, my glucose level is better. It simply improves everything."

- *Walk With Ease* participant

A Joint Effort: Partner With the Arthritis Foundation

Let's get your workforce moving toward better health! The Arthritis Foundation is committed to helping your employees live their lives to the fullest and provides the tools to launch a successful program in your workplace:

- Program leader training
- *Walk With Ease* guidebook full of information and tips to help your employees set and reach their health goals
- Marketing material to promote the program
- *Walk with Ease* online tools and app to track results

Let's Get Started

If you're ready to say Yes to making healthy living a priority for your employees, contact your local Arthritis Foundation office for information about starting a *Walk With Ease* program at your workplace. Visit **www.arthritis.org** or call 800-283-7800 for the nearest location. Join the *Walk With Ease* online community at **www.arthritis.org/wwe**.

About the Arthritis Foundation

The Arthritis Foundation is the Champion of Yes. Leading the fight for the arthritis community, the Arthritis Foundation helps conquer everyday battles through life-changing information and resources, access to optimal care, advancements in science and community connections. Our goal is to chart a winning course, guiding families in developing personalized plans for living a full life – and making each day another stride towards a cure.

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1-800-QUIT-NOW

We can help you draw the line.

Be a Quitter!

Quitting Tobacco – What Gets In Your Way?

If you are a tobacco user who has decided to quit, 1-800-QUIT-NOW is a *free* service that can help. When you call, a trained quit coach in your state will work with you to help you quit and avoid the things that tempt you back into the habit.

It's not easy to quit. 1-800-QUIT-NOW has helped many people quit for good and we can help you too. The support that 1-800-QUIT-NOW provides will help you overcome the obstacles – or common *triggers* – that often keep people from quitting successfully. Here are a few ideas to help you with your plan to quit tobacco.

What Is Keeping You From Quitting?

Are there situations that tempt you to smoke or use tobacco products even though you are trying to quit?

People who have successfully quit smoking or using tobacco products report certain circumstances and activities, or *triggers* that tempt them to return to their old habits. Common triggers include:

- Being around other smokers, such as friends, family members, or coworkers
- Feeling anxious or tense
- Feeling sad or depressed
- Drinking beer, wine, or mixed drinks
- Drinking coffee or tea
- Enjoying meals at home, work, or at a restaurant
- Being bored or waiting for someone or something
- Driving a car or traveling as a passenger
- Going through a typical morning routine (many smokers "light up" when they wake up)

How Can You Handle a Trigger Without Smoking or Using Tobacco?

- Ask others for help in your quit attempt. *Quitting is difficult, but with support from friends and loved ones, it can be easier. Ask others to help you by distracting you from trigger events and by not smoking around you. You may also want to contact 1-800-QUIT-NOW and talk with a trained quit coach for additional support.*

- If you are in a group and others light up, go somewhere else until they finish their cigarettes. *When others are smoking, it is tempting to join them. By leaving and not returning until they have finished, you are more likely to follow your quit plan.*

continued

- Think of what you are gaining by quitting (e.g., a healthy body, fresh breath). *It is easy to focus on the negative aspects of quitting. For instance, you may miss the "alert" feeling that you got from cigarettes. By reminding yourself of the positives of quitting, such as being able to climb a flight of stairs without becoming winded, you will find it easier to stay on track.*

- Take a walk, soak in a hot bath, or work on a project to distract yourself from the urge to smoke. *Many people who are trying to quit smoking say that they feel more anxious. Because anxiety is measured as an increase in muscle tension, doing these types of activities may serve as a distraction as well as help you to relax.*

- Drink nonalcoholic beverages and stay away from places where you usually drink alcohol (for a while). *When drinking alcoholic beverages, many people experience a strong urge to smoke. By switching to nonalcoholic drinks and avoiding places that served you alcohol in the past, you can avoid this trigger.*

- Address your feelings by increasing physical activity, writing down goals, or determining how much money you'll save by not spending on tobacco products. *Adding these activities to your schedule as part of your quit plan will help to improve your mood and prevent boredom and depression, two common triggers.*

- Try switching to decaffeinated beverages for a period of time. *When trying to quit, you may feel more irritable and nervous. Because consuming caffeine can affect you the same way, try avoiding it for a while.*

- Know what foods increase your urge to smoke and stay away from them. *You may notice that smoking urges are stronger when you eat certain things, such as spicy foods and sweets. By avoiding these trigger foods, you are more likely to follow your quit plan.*

- Try nibbling on healthy foods to keep your hands busy. *For many people, smoking gives them something to do—especially when they are drinking coffee or tea. When you feel an urge to occupy your hands, try doodling on a scratch pad or nibbling on healthy foods instead.*

- Remove the ashtray, lighter, and cigarettes from your car. *Like many people, you may like to smoke on your way to and from work or school to relieve stress, stay alert, or just pass the time. By removing these items from your car, you can help to avoid this trigger.*

- Turn on your radio or put on your favorite tape, CD, or MP3 and sing along. *Listening to music may help you to avoid becoming bored. Because boredom is a common trigger, you may want to add these types of enjoyable activities to your quit plan.*

What are you waiting for? Call today – 1-800-QUIT-NOW – and let's get started.

1-800-QUIT-NOW (1-800-784-8669), TTY 1-800-332-8615 is a service of the
National Cancer Institute
National Institutes of Health
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
and your state

1-800-QUIT-NOW
We can help you draw the line.

Tobacco Cessation Services

Fact Sheet

The single most important thing that you can do for your health and the health of others is to quit using tobacco.

Quit Now Kentucky is a FREE tobacco cessation service to help Kentuckians quit smoking or using tobacco products. Quit Now Kentucky features proactive telephone coaching, web-based services, and text messaging. Many people who use tobacco want to quit. By using Quit Now Kentucky, participants are one step closer to becoming tobacco free.

Kentuckians who want to stop using tobacco or are concerned about a family member or friend's tobacco use can call **1-800-QUIT NOW** (1-800-784-8669) from 8 am to 1 am EST (7 am to 12 midnight CST) Monday through Sunday or log on to www.QuitNowKentucky.org for resources to prepare to quit. All cessation services are offered in English or Spanish at the point of contact. Counseling in other languages is available free through a third party translation service. Deaf and hard-of-hearing services are also available.

You receive FREE:

- Support and advice from an experienced quit coach
- A personalized quit program with self-help materials
- The latest information about medications that can help you quit
- Online resources (websites, interactive sites)
- eCoach mobile app
- Text messaging and other smart phone applications
- Social support available online
- Referral to additional Kentucky cessation resources
- Pregnancy/postpartum program

DOES IT WORK? YES.

Participants who use Quit Now Kentucky will receive one intake call, a quit kit, up to 5 scheduled coaching calls (9 for pregnant smokers), and unlimited inbound calls as part of their quit attempt. Quit Now Kentucky serves all Kentuckians 15 years of age and older without parental consent regardless of tobacco use.

FOUR GOOD REASONS TO CALL IT QUITS:

- Your Family – Live a healthier, longer life and watch your family grow.
- Your Health – Tobacco use can cause cancer, heart disease, chronic bronchitis, emphysema, asthma attacks, and poor birth outcomes if pregnant – just to name a few.
- Your Child's Health – SIDS, ear infections, asthma, and bronchitis from exposure to secondhand smoke.
- Tobacco use is costly – The average smoker spends $500 to $3,000 a year on cigarettes.

Take control of your tobacco dependence and Quit Now Kentucky.

ARE YOU AT RISK FOR

TYPE 2 DIABETES?

American Diabetes Association®

Diabetes Risk Test

Write your score in the box.

1 How old are you?

Less than 40 years (0 points)
40—49 years (1 point)
50—59 years (2 points)
60 years or older (3 points)

2 Are you a man or a woman?

Man (1 point) Woman (0 points)

3 If you are a woman, have you ever been diagnosed with gestational diabetes?

Yes (1 point) No (0 points)

4 Do you have a mother, father, sister, or brother with diabetes?

Yes (1 point) No (0 points)

5 Have you ever been diagnosed with high blood pressure?

Yes (1 point) No (0 points)

6 Are you physically active?

Yes (0 points) No (1 point)

7 What is your weight status? *(see chart at right)*

Height	Weight (lbs.)		
4′ 10″	119-142	143-190	191+
4′ 11″	124-147	148-197	198+
5′ 0″	128-152	153-203	204+
5′ 1″	132-157	158-210	211+
5′ 2″	136-163	164-217	218+
5′ 3″	141-168	169-224	225+
5′ 4″	145-173	174-231	232+
5′ 5″	150-179	180-239	240+
5′ 6″	155-185	186-246	247+
5′ 7″	159-190	191-254	255+
5′ 8″	164-196	197-261	262+
5′ 9″	169-202	203-269	270+
5′ 10″	174-208	209-277	278+
5′ 11″	179-214	215-285	286+
6′ 0″	184-220	221-293	294+
6′ 1″	189-226	227-301	302+
6′ 2″	194-232	233-310	311+
6′ 3″	200-239	240-318	319+
6′ 4″	205-245	246-327	328+
	(1 Point)	(2 Points)	(3 Points)
	You weigh less than the amount in the left column (0 points)		

Add up your score.

If you scored 5 or higher:
You are at increased risk for having type 2 diabetes. However, only your doctor can tell for sure if you do have type 2 diabetes or prediabetes (a condition that precedes type 2 diabetes in which blood glucose levels are higher than normal). Talk to your doctor to see if additional testing is needed.

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009.
Original algorithm was validated without gestational diabetes as part of the model.

Type 2 diabetes is more common in African Americans, Hispanics/Latinos, American Indians, and Asian Americans and Pacific Islanders.

For more information, visit us at www.diabetes.org or call 1-800-DIABETES

Visit us on Facebook
Facebook.com/AmericanDiabetesAssociation

Lower Your Risk

The good news is that you can manage your risk for type 2 diabetes. Small steps make a big difference and can help you live a longer, healthier life.

If you are at high risk, your first step is to see your doctor to see if additional testing is needed.

Visit diabetes.org or call 1-800-DIABETES for information, tips on getting started, and ideas for simple, small steps you can take to help lower your risk.

STOP DIABETES®

What Is Diabetes and How Can I Manage It?

Your digestive track breaks down the carbohydrates that you eat into glucose — a type of sugar — which gets absorbed into the blood. Insulin is a hormone that helps your body's cells absorb the glucose from the blood and use it or store it for energy.

When you have diabetes, your body either doesn't make enough insulin or can't use its own insulin as well as it should, or both. This causes sugars to build up too high in your blood.

Between doctor visits, you can monitor your blood sugar with a home glucose monitor. They are available at many large retailers and pharmacies.

What types of diabetes are there?

There are two main forms of diabetes: **type 1 diabetes and type 2 diabetes**.

Type 2 is the most common. About 90 percent to 95 percent of American adults diagnosed with diabetes have type 2 diabetes. It most often develops in middle-aged and older adults. It's often linked with being overweight, obese and physically inactive.

Insulin resistance is a condition where the body produces insulin but does not use it efficiently and blood glucose goes up. If uncontrolled, insulin resistance can lead to pre-diabetes or type 2 diabetes.

Type 1 diabetes usually starts early in life, but it can also develop in adults. It results from the body's failure to produce insulin. People with it must take insulin each day to control their levels of blood glucose.

Am I at risk?

The number of people with diabetes is increasing. More people are overweight or obese, don't get enough physical activity and don't eat a healthy diet. These factors can increase risk of type 2 diabetes. While type 2 diabetes has historically been more common in adults, many younger people are developing diabetes at an alarming rate.

People in several ethnic groups seem to be more likely to develop type 2 diabetes. These groups include:

- Hispanics/Latinos
- African Americans
- Native Americans
- Asians (especially South Asians)

How can I control my risk for heart disease and stroke?

Diabetes is a major risk factor for stroke and heart disease. Other major risk factors are smoking, high cholesterol, high blood pressure, physical inactivity or obesity.

If you have diabetes, it's very important to have

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regular check-ups. Work closely with your healthcare provider to manage your diabetes and reduce any other risk factors:

- Manage your weight, blood pressure and cholesterol with a heart-healthy eating plan that is low in saturated fat, *trans* fat, salt (sodium) and added sugars.
- Be physically active. Aim for at least 150 minutes of moderate-intensity physical activity, such as brisk walking, or 75 minutes of vigorous-intensity aerobic activity each week.
- If you drink alcohol, don't have more than one drink per day for women or two per day for men.
- Lower your blood pressure, if it's too high. Aim for a normal blood pressure which is less than 120 mm Hg for the systolic (upper) number and less than 80 mm Hg for the diastolic (lower) number.
- Don't smoke, and avoid second-hand smoke.
- If you take medications, take them exactly as directed. If you have questions about the dosage or side effects, ask your healthcare provider or pharmacist.

Following a heart-healthy eating plan is a great way to manage your diabetes and reduce other risk factors.

HOW CAN I LEARN MORE?

1. Call **1-800-AHA-USA1** (1-800-242-8721), or visit **heart.org** to learn more about heart disease and stroke.
2. Sign up to get *Heart Insight*, a free magazine for heart patients and their families, at **heartinsight.org**.
3. Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at **heart.org/supportnetwork**.

Do you have questions for the doctor or nurse?

Take a few minutes to write your questions for the next time you see your healthcare provider.

For example:

Can diabetes be cured?

What type of diet would be most helpful?

My Questions:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage disease or care for a loved one. Visit **heart.org/answersbyheart** to learn more.

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How Do My Cholesterol Levels Affect My Risk?

High cholesterol can increase your risk of heart attack and stroke. If you're 20 or older, you should have your traditional risk factors (including cholesterol) checked every 4 to 6 years. If certain factors put you at risk, or if you already have heart disease, your healthcare provider may need you to have it checked more often.

What should my cholesterol levels be?

The best approach to risk reduction goes beyond cholesterol levels alone. It considers overall risk assessment and reduction.

It's still important to know your numbers, but work with your healthcare provider to treat your risk. They will assess your risk factors and work with you to choose the best treatment options.

- If you're between 40 and 75, ask your healthcare provider to assess your 10-year risk.
- If you're between 20 and 39, your healthcare provider should assess your lifetime risk. If your risks are high, lifestyle and statin medication may help manage your risk

If your risk remains uncertain, and treatment options are unclear, your healthcare provider may request a coronary artery calcium (CAC) measurement to provide greater insight into your risk and help in decision-making.

You can find out your risk with our Check. Change. Control. Calculator™. In minutes, you'll learn your risk for a heart attack or stroke.

How will I know my numbers?

Your healthcare provider will do a blood test to measure your cholesterol levels. This may be a "fasting" or "non-fasting lipoprotein profile". It assesses several types of fat in the blood. It is measured in milligrams per deciliter (mg/dL).

The test gives you four results: total cholesterol, LDL (bad) cholesterol and HDL (good) cholesterol, and triglycerides (blood fats).

What is HDL cholesterol?

HDL cholesterol is called "good" cholesterol. Having a higher level of HDL can lower your risk of heart attack and stroke.

HDL takes cholesterol away from your arteries and back to the liver. There, it's processed so that excess can be removed from your body. HDL may also remove cholesterol from plaque in the arteries.

What is LDL cholesterol?

LDL cholesterol is known as "bad" cholesterol. The

(continued)

body's tissues use some of this cholesterol to build cells. But when you have too much of it, LDL can build up inside your arteries.

Together with other substances, it can form plaque (a thick, hard, fatty deposit). Plaque narrows the arteries and reduces blood flow. This is called atherosclerosis. If the buildup of plaque ruptures, a blood clot may form at this location or a piece may break off and travel in the bloodstream, causing a heart attack or stroke.

With LDL, lower is better.

What are triglycerides?

Triglycerides are the most common type of fat in your body. They're also a major energy source. They come from food, and your body also makes them.

As people get older, gain excess weight (or both), their triglyceride and cholesterol levels tend to rise.

Should I track my numbers?

You can use the chart below to keep track of your numbers each time you have a test.

Make sure you discuss with your healthcare provider how these numbers and other risk factors you have affect your overall risk.

	1st Visit	2nd Visit	3rd Visit	4th Visit
Total Blood Cholesterol				
LDL Cholesterol				
HDL Cholesterol				
Triglycerides				

HOW CAN I LEARN MORE?

1. Call **1-800-AHA-USA1** (1-800-242-8721), or visit **heart.org** to learn more about heart disease and stroke.
2. Sign up to get ***Heart Insight***, a free magazine for heart patients and their families, at **heartinsight.org**.
3. Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at **heart.org/supportnetwork**.

Do you have questions for the doctor or nurse?

Take a few minutes to write your questions for the next time you see your healthcare provider.

For example:

How often should I have my cholesterol checked?

How can I reduce my cholesterol?

My Questions:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage disease or care for a loved one. Visit **heart.org/answersbyheart** to learn more.

American Heart Association.

What Is High Blood Pressure?

Blood pressure is the force of blood pushing against blood vessel walls. It is measured in millimeters of mercury (mm Hg).

High blood pressure (HBP) means the pressure in your arteries is higher than it should be. Another name for high blood pressure is hypertension.

Blood pressure is written as two numbers, such as 112/78 mm Hg. The top, systolic, number is the pressure when the heart beats. The bottom, diastolic, number is the pressure when the heart rests between beats.

Normal blood pressure is below 120/80 mm Hg. If you're an adult and your systolic pressure is 120 to 129, and your diastolic pressure is less than 80, you have elevated blood pressure. High blood pressure is a pressure of 130 systolic or higher, or 80 diastolic or higher, that stays high over time.

High blood pressure usually has no signs or symptoms. That's why it is so dangerous. But it can be managed.

Nearly half of the American population over age 20 has HBP, and many don't even know it. Not treating high blood pressure is dangerous. HBP increases the risk of heart attack and stroke.

Make sure you get your blood pressure checked regularly and treat it the way your doctor advises.

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and /or	HIGHER THAN 120

Am I at higher risk of developing HBP?

There are risk factors that increase your chances of developing HBP. Some you can control, and some you can't.

Those that can be controlled are:

- Smoking and exposure to secondhand smoke
- Diabetes
- Being obese or overweight
- High cholesterol
- Unhealthy diet (high in sodium, low in potassium, and drinking too much alcohol)
- Physical inactivity

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What Is High Blood Pressure?

Factors that cannot be modified or are difficult to control are:

- Family history of high blood pressure
- Race/ethnicity
- Increasing age
- Gender (males)
- Chronic kidney disease
- Obstructive sleep apnea

Socioeconomic status and psychosocial stress are also risk factors for HBP. These can affect access to basic living necessities, medication, healthcare providers, and the ability to adopt lifestyle changes.

How can I tell I have it?

The only way to know if you have high blood pressure is to get it checked regularly by your healthcare provider.

For proper diagnosis of high blood pressure, your healthcare provider will use an average based on two or more readings obtained on two or more occasions.

What can I do about HBP?

- Don't smoke and avoid secondhand smoke.
- Reach and maintain a healthy weight.
- Eat a healthy diet that is low in saturated and *trans* fats and rich in fruits, vegetables, whole grains, and low-fat dairy products.
- Aim to consume less than 1,500 mg/day of sodium (salt). Even reducing your daily intake by 1000 mg can help.
- Eat foods rich in potassium. Aim for 3,500 – 5,000 mg of dietary potassium per day.
- Limit alcohol to no more than one drink per day if you're a woman or two drinks a day of you're a man.
- Be more physically active. Aim for at least 90 to 150 minutes of aerobic and/or dynamic resistance exercise per week, and/or three sessions of isometric resistance exercises per week.
- Take medicine the way your doctor tells you.
- Know what your blood pressure should be and work to keep it at that level.

HOW CAN I LEARN MORE?

1. Call **1-800-AHA-USA1** (1-800-242-8721), or visit **heart.org** to learn more about heart disease and stroke.
2. Sign up to get *Heart Insight*, a free magazine for heart patients and their families, at **heartinsight.org**.
3. Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at **heart.org/supportnetwork**.

Do you have questions for the doctor or nurse?

Take a few minutes to write your questions for the next time you see your healthcare provider.

For example:

Will I always have to take medicine?

What should my blood pressure be?

My Questions:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage disease or care for a loved one. Visit **heart.org/answersbyheart** to learn more.

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Body Mass Index Table

	Normal						Overweight					Obese										Extreme Obesity																
BMI	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**
Height (inches)	**Body Weight (pounds)**																																			
58	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186	191	196	201	205	210	215	220	224	229	234	239	244	248	253	258
59	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173	178	183	188	193	198	203	208	212	217	222	227	232	237	242	247	252	257	262	267
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255	261	266	271	276
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264	269	275	280	285
62	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213	218	224	229	235	240	246	251	256	262	267	273	278	284	289	295
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220	225	231	237	242	248	254	259	265	270	278	282	287	293	299	304
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291	296	302	308	314
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300	306	312	318	324
66	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216	223	229	235	241	247	253	260	266	272	278	284	291	297	303	309	315	322	328	334
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319	325	331	338	344
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256	262	269	276	282	289	295	302	308	315	322	328	335	341	348	354
69	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338	345	351	358	365
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355	362	369	376
71	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250	257	265	272	279	286	293	301	308	315	322	329	338	343	351	358	365	372	379	386
72	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258	265	272	279	287	294	302	309	316	324	331	338	346	353	361	368	375	383	390	397
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378	386	393	401	408
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	280	287	295	303	311	319	326	334	342	350	358	365	373	381	389	396	404	412	420
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	303	311	319	327	335	343	351	359	367	375	383	391	399	407	415	423	431
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410	418	426	435	443

Source: Adapted from *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*.

How Can I Manage Stress?

It's important to learn how to recognize how stress affects you, learn how to deal with it, and develop healthy habits to ease your stress. What is stressful to one person may not be to another. Stress can come from happy events (a new marriage, job promotion, new home) as well as unhappy events (illness, overwork, family problems).

What is stress?

Stress is your body's response to change. Your body reacts to it by releasing adrenaline (a hormone) that can cause your breathing and heart rate to speed up, and your blood pressure to rise. These reactions help you deal with the situation.

The link between stress and heart disease is not clear. But, over time, unhealthy responses to stress may lead to health problems. For instance, people under stress may overeat, drink too much alcohol or smoke. These unhealthy behaviors can increase your risk of heart disease.

Not all stress is bad. Speaking to a group or watching a close football game can be stressful, but they can be fun, too. The key is to manage your stress properly.

How does stress make you feel?

Stress affects each of us in different ways. You may have physical signs, emotional signs or both.

- You may feel angry, afraid, excited or helpless.
- It may be hard to sleep.
- You may have aches and pains in your head, neck, jaw and back.
- It can lead to habits like smoking, drinking, overeating or drug abuse.
- You may not even feel it at all, even though your body suffers from it.

How can I cope with it?

Taking steps to manage stress will help you feel more in control of your life. Here are some good ways to cope.

- Try positive self-talk — turning negative thoughts into positive ones. For example, rather than thinking "I can't do this," say "I'll do the best I can."
- Take 15 to 20 minutes a day to sit quietly, relax, breathe deeply and think of something peaceful.
- Engage in physical activity regularly. Do what you enjoy — walk, swim, ride a bike or do yoga. Letting go of the tension in your body will help you feel a lot better.
- Try to do at least one thing every day that you enjoy, even if you only do it for 15 minutes.

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How can I live a more relaxed life?

Here are some positive healthy habits you may want to develop to manage stress and live a more relaxed life.

- Think ahead about what may upset you. Have a plan ready to deal with situations. Some things you can avoid. For example, spend less time with people who bother you. Avoid driving in rush-hour traffic.
- Learn to say "no." Don't promise too much.
- Give up your bad habits. Too much alcohol, cigarettes or caffeine can increase stress. If you smoke, make the decision to quit now.
- Slow down. Try to "pace" not "race." Plan ahead and allow enough time to get the most important things done.
- Get enough sleep. Try to get 6 to 8 hours of sleep each night.
- Get organized. Use "To Do" lists if it helps you focus on your most important tasks. Approach big tasks one step at a time.

HOW CAN I LEARN MORE?

1. Call **1-800-AHA-USA1** (1-800-242-8721), or visit **heart.org** to learn more about heart disease and stroke.
2. Sign up to get *Heart Insight,* a free magazine for heart patients and their families, at **heartinsight.org**.
3. Connect with others sharing similar journeys with heart disease and stroke by joining our Support Network at **heart.org/supportnetwork.**

Do you have questions for the doctor or nurse?

Take a few minutes to write your questions for the next time you see your healthcare provider.

For example:

How can family and friends help?

My Questions:

We have many other fact sheets to help you make healthier choices to reduce your risk, manage disease or care for a loved one. Visit **heart.org/answersbyheart** to learn more.

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Hotlines and Helplines

What To Expect When Calling a Helpline by ReachOut.com

The National Suicide Prevention Lifeline
1-800-273-TALK (8255)
The National Suicide Prevention Lifeline provides free and confidential emotional support to individuals experiencing a suicidal crisis or emotional distress via telephone or chat 24 hours a day, 7 days a week.
http://www.suicidepreventionlifeline.org/

La Red Nacional de Prevención del Suicidio
1-888-628-9454
National Suicide Prevention Lifeline for Spanish Speaking Individuals
http://www.suicidepreventionlifeline.org/gethelp/spanish.aspx

Veterans Crisis Line
1-800-273-8255, Press 1
Veterans, Active Duty, Reserve, Guard and their family and friends can call, chat online, or send a text message to 838255 to receive confidential support 24 hours a day, 7 days a week.
http://www.veteranscrisisline.net/

Trevor Lifeline
1-866-4-U-TREVOR (1-866-488-7386)
A national 24-hour, toll free confidential suicide hotline for gay and questioning youth. The Trevor Lifeline website also features information about TrevorChat, TrevorText, TrevorSpace, and the Trevor Support Center.
http://www.thetrevorproject.org/

National Treatment Referral Helpline
1-800-662-HELP (4357)
A free, confidential, 24/7, 365-day-a-year treatment referral and information service (in English and Spanish) for individuals and families facing mental health and/or substance use disorders.
https://findtreatment.samhsa.gov/

GLBT National Hotline
1-888-843-4564
The Gay, Lesbian, Bisexual and Transgender (GLBT) National Hotline provides telephone, online private one-to-one chat and email peer-support for individuals of all ages. Hours: Monday - Friday from 4pm to midnight; Saturday from noon to 5pm, Eastern Time.
http://www.glbthotline.org/national-hotline.html

Disaster Distress Helpline
1-800-985-5990
TTY for Deaf/Hearing Impaired: 1-800-846-8517
If you or someone you know has been affected by a natural or human-caused disaster and needs immediate assistance, please call the toll-free number or text “TalkWithUs” to 66746 for information, support, and counseling.
http://disasterdistress.samhsa.gov/

GLBT National Youth Talkline
1-800-246-PRIDE (1-800-246-7743)
The Gay, Lesbian, Bisexual and Transgender (GLBT) National Youth Talkline provides telephone, online private one-to-one chat and email peer-support for teens and young adults up to age 25. Hours: Monday - Friday from 4pm to midnight; Saturday from noon to 5pm, Eastern Time.
http://www.glbthotline.org/youth-talkline.html

Boys Town National Hotline
1-800-448-3000
Text “Voice” to 20121, every day from 7pm -1am Eastern Time.
The Boys Town National Hotline is a toll free number available to kids, teens and young adults at anytime. Please contact us if you're depressed, contemplating suicide, being physically or sexually abused, on the run, addicted, threatened by gang violence, fighting with a friend or parent, or if you are faced with an overwhelming challenge. Online chat and email support is available at their website.
http://www.yourlifeyourvoice.org/Pages/home.aspx

National Problem Gambling Helpline
1-800-522-4700
Text 1-800-522-4700
A national helpline, text and chat service that provides support and information on local resources for those seeking help for a gambling problem.
http://www.ncpgambling.org/help-treatment/national-helpline-1-800-522-4700/

National Sexual Assault Hotline
1-800-656-HOPE (4673)
A national hotline and chat service providing free confidential help for sexual assault victims and their friends and families.
https://ohl.rainn.org/online/

National Parent Helpline
1-855- 4A PARENT (1-855-427-2736)
A trained Parent Advocate is available to assist parents and caregivers of children and youth of all ages. Hours: Monday – Friday from 1pm to 8pm, Eastern Time.
http://www.nationalparenthelpline.org/

IMAlive
An online crisis center that is a part of the Hopeline Network that provides crisis intervention services via online chat.
https://www.imalive.org/

National Runaway Safeline
1-800-RUNAWAY (1-800-786-2929)
A national hotline and chat service for teens who have runaway or who are considering leaving home.
http://www.1800runaway.org/

Love is Respect
1-866-331-9474
Text “loveis” to 22522*.
A resource to engage, educate and empower young people to prevent and end abusive relationships. Free and confidential phone, live chat and texting services are available 24/7/365.
http://www.loveisrespect.org/

National Domestic Violence Hotline
1-800-799-7233 | 1-800-787-3224 (TTY)
A national hotline and chat service that provides lifesaving tools and immediate support to enable victims to find safety and live lives free of abuse.
http://www.thehotline.org/

Military One Source
1-800-342-9647
24 hour Resource for Military Members, Spouses and Families
http://www.militaryonesource.mil/

National Eating Disorder Helpline
(800) 931-2237
A national helpline and chat service for individuals struggling with an eating disorder and their friends and families. Monday-Thursday from 9am - 9pm and Friday from 9am - 5pm Eastern Time.
http://www.nationaleatingdisorders.org/information-referral-helpline

Kentucky Department of Corrections Reentry Resource
(877) 466-2834
A 24-hour telephone community information and referral helpline and online resource guide for Kentucky.
http://corrections.ky.gov/reentry/Pages/Pre-ReleaseCommunityResources.aspx

Kentucky Housing Corporation- Emergency Services
A resource guide developed by the Kentucky Housing Corporation for individuals who are seeking homeless assistance.
http://www.kyhousing.org/Specialized-Housing/Documents/Community%20Resource%20Guide.pdf

kynect, Kentucky's Healthcare Connection
(855)-4kynect (459-6328)
(855)-326-4654 TTY
Kentucky's health benefit exchange website.
https://kynect.ky.gov/

National Suicide Prevention Resources

American Association of Suicidology
AAS is a charitable non-profit membership organization whose goal is to understand and prevent suicide.
www.suicidology.org

American Foundation for Suicide Prevention
The AFSP is a leading not-for-profit organization exclusively dedicated to preventing suicide.
www.afsp.org

Jed Foundation
The nation's leading organization working to promote emotional health and prevent suicide among college students.
www.jedfoundation.org

National Action Alliance for Suicide Prevention
The National Action Alliance for Suicide Prevention is the public-private partnership advancing the *National Strategy for Suicide Prevention.*
http://actionallianceforsuicideprevention.org/

National P.O.L.I.C.E. Suicide Foundation
The National Police Suicide Foundation provides training in peer support to help agencies prevent police suicide and lessen post-traumatic stress disorder.
www.psf.org

National Strategy for Suicide Prevention: Goals and Objectives for Action, 2012
The revised National Strategy is a call to action that is intended to guide suicide prevention actions in the United States over the next decade that Includes 13 goals and 60 objectives across four strategic directions: wellness and empowerment, prevention services; treatment and support services; and surveillance, research, and evaluation.
http://www.surgeongeneral.gov/library/reports/national-strategy-suicide-prevention/full-report.pdf

QPR Institute
The QPR mission is to reduce suicidal behaviors and save lives by providing innovative, practical and proven suicide prevention training.
www.qprinstitute.com

Society for the Prevention of Teen Suicide
Their mission is to reduce the number of youth suicides and attempted suicides by encouraging public awareness through the development and promotion of educational training programs.
http://www.sptsnj.org

Suicide Prevention Resource Center
Information on government suicide prevention efforts, news, events and links to important prevention publications.
www.sprc.org

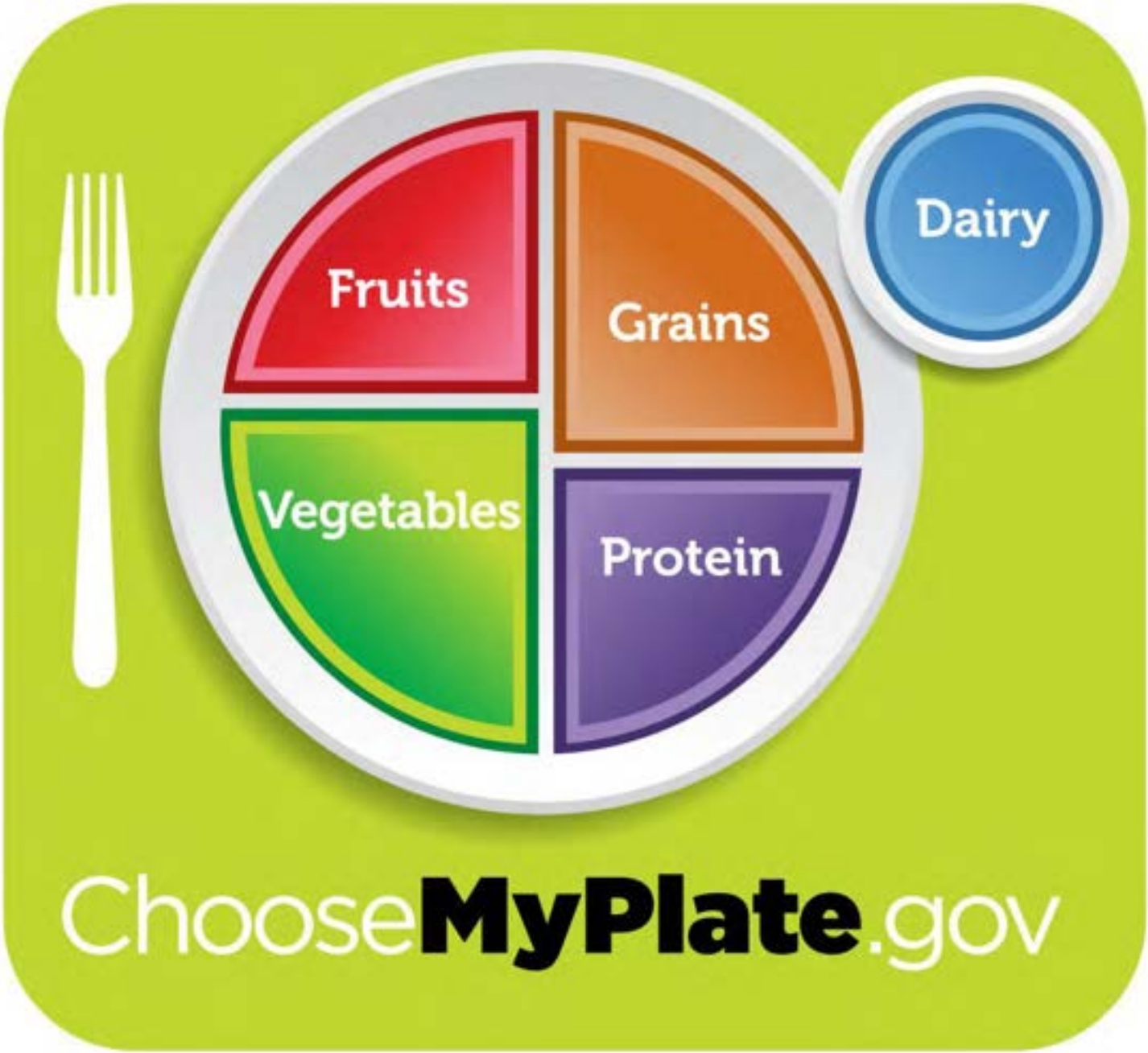
Suicide Prevention Best Practice Registry
The purpose of the Best Practices Registry is to identify, review, and disseminate information about best practices that address specific objectives of the *National Strategy for Suicide Prevention.*
http://www.sprc.org/bpr

Zero Suicide in Health and Behavioral Health Care
The foundational belief of Zero Suicide is that suicide deaths for individuals under care within health and behavioral health systems are preventable and that a systematic approach to quality improvement in these settings is both available and necessary.
http://zerosuicide.sprc.org/

State Suicide Prevention Resources

Kentucky Suicide Prevention Group
A grassroots organization dedicated to supporting prevention, intervention, and postvention services throughout Kentucky.
http://kentuckysuicideprevention.org/

University of Kentucky-Lexington Survivors of Suicide Loss Support Group
An open group for those who have lost a family member or friend due to death by suicide.
https://www.facebook.com/uksosgroup


Fruits
Grains
Dairy
Vegetables
Protein
ChooseMyPlate.gov

DIETARY GUIDELINES FOR AMERICANS 2015-2020

EIGHTH EDITION

DietaryGuidelines.gov

This publication may be viewed and downloaded from the Internet at DietaryGuidelines.gov.

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December 2015

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Message From the Secretaries

One of our Government's most important responsibilities is to protect the health of the American public. Today, about half of all American adults—117 million people—have one or more preventable, chronic diseases, many of which are related to poor quality eating patterns and physical inactivity. Rates of these chronic, diet-related diseases continue to rise, and they come not only with increased health risks, but also at high cost. In 2008, the medical costs linked to obesity were estimated to be $147 billion. In 2012, the total estimated cost of diagnosed diabetes was $245 billion, including $176 billion in direct medical costs and $69 billion in decreased productivity.

The *Dietary Guidelines for Americans* is an essential resource for health professionals and policymakers as they design and implement food and nutrition programs that feed the American people, such as USDA's National School Lunch Program and School Breakfast Program, which feed more than 30 million children each school day. The *Dietary Guidelines* also provides information that helps Americans make healthy choices for themselves and their families.

This new edition of the *Dietary Guidelines*, the *2015-2020 Dietary Guidelines for Americans*, is grounded in the most current scientific evidence and is informed by the recommendations of the 2015 Dietary Guidelines Advisory Committee. This Federal advisory committee, which was composed of prestigious researchers in the fields of nutrition, health, and medicine, conducted a multifaceted, robust process to analyze the available body of scientific evidence. Their work culminated in a scientific report which provided advice and recommendations to the Federal Government on the current state of scientific evidence on nutrition and health. Informed by this report and by consideration of public and Federal agency comments, HHS and USDA nutrition and health experts then developed the *Dietary Guidelines*.

The *2015-2020 Dietary Guidelines* provides guidance for choosing a healthy diet and focuses on preventing the diet-related chronic diseases that continue to affect our population. Its recommendations are ultimately intended to help individuals improve and maintain overall health and reduce the risk of chronic disease. Its focus is disease prevention, not treatment. This edition also includes data describing the significant differences between Americans' current consumption and the *Dietary Guidelines* recommendations. It also recommends where shifts are encouraged to help people achieve healthy eating patterns. These analyses will assist professionals and policymakers as they use the *Dietary Guidelines* to help Americans adopt healthier eating patterns and make healthy choices in their daily lives, while enjoying food and celebrating cultural and personal traditions through food. Now more than ever, we recognize the importance of focusing not on individual nutrients or foods in isolation, but on everything we eat and drink—healthy eating patterns as a whole—to bring about lasting improvements in individual and population health.

The body of scientific literature looking at healthy eating patterns and their impact on disease prevention is far more robust now than ever before. Chronic diet-related diseases continue to rise and levels of physical activity remain low. Progress in reversing these trends will require comprehensive and coordinated strategies, and the *Dietary Guidelines* is an important part of a complex and multifaceted solution to promote health and help to reduce the risk of chronic disease. The *Dietary Guidelines* translates science into succinct, food-based guidance that can be relied upon to help Americans choose a healthy eating pattern and enjoyable diet. We believe that aligning with the recommendations in the *Dietary Guidelines* will help many Americans lead healthier and more active lives.

/Sylvia M. Burwell/

Sylvia M. Burwell
Secretary, U.S. Department of Health and Human Services

/Thomas J. Vilsack/

Thomas J. Vilsack
Secretary, U.S. Department of Agriculture

Acknowledgments

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Executive Summary

Over the past century, deficiencies of essential nutrients have dramatically decreased, many infectious diseases have been conquered, and the majority of the U.S. population can now anticipate a long and productive life. At the same time, rates of chronic diseases—many of which are related to poor quality diet and physical inactivity—have increased. About half of all American adults have one or more preventable, diet-related chronic diseases, including cardiovascular disease, type 2 diabetes, and overweight and obesity.

However, a large body of evidence now shows that healthy eating patterns and regular physical activity can help people achieve and maintain good health and reduce the risk of chronic disease throughout all stages of the lifespan. The *2015-2020 Dietary Guidelines for Americans* reflects this evidence through its recommendations.

The *Dietary Guidelines* is required under the 1990 National Nutrition Monitoring and Related Research Act, which states that every 5 years, the U.S. Departments of Health and Human Services (HHS) and of Agriculture (USDA) must jointly publish a report containing nutritional and dietary information and guidelines for the general public. The statute (Public Law 101-445, 7 U.S.C. 5341 et seq.) requires that the *Dietary Guidelines* be based on the preponderance of current scientific and medical knowledge. The 2015-2020 edition of the *Dietary Guidelines* builds from the 2010 edition with revisions based on the *Scientific Report of the 2015 Dietary Guidelines Advisory Committee* and consideration of Federal agency and public comments.

The *Dietary Guidelines* is designed for professionals to help all individuals ages 2 years and older and their families consume a healthy, nutritionally adequate diet. The information in the *Dietary Guidelines* is used in developing Federal food, nutrition, and health policies and programs. It also is the basis for Federal nutrition education materials designed for the public and for the nutrition education components of HHS and USDA food programs. It is developed for use by policymakers and nutrition and health professionals. Additional audiences who may use *Dietary Guidelines* information to develop programs, policies, and communication for the general public include businesses, schools, community groups, media, the food industry, and State and local governments.

Previous editions of the *Dietary Guidelines* focused primarily on individual dietary components such as food groups and nutrients. However, people do not eat food groups and nutrients in isolation but rather in combination, and the totality of the diet forms an overall eating pattern. The components of the eating pattern can have interactive and potentially cumulative effects on health. These patterns can be tailored to an individual's personal preferences, enabling Americans to choose the diet that is right for them. A growing body of research has examined the relationship between overall eating patterns, health, and risk of chronic disease, and findings on these relationships are sufficiently well established to support dietary guidance. As a result, eating patterns and their food and nutrient characteristics are a focus of the recommendations in the *2015-2020 Dietary Guidelines*.

The *2015-2020 Dietary Guidelines* provides five overarching Guidelines that encourage healthy eating patterns, recognize that individuals will need to make shifts in their food and beverage choices to achieve a healthy pattern, and acknowledge that all segments of our society have a role to play in supporting healthy choices. These Guidelines also embody the idea that a healthy eating pattern is not a rigid prescription, but rather, an adaptable framework in which individuals can enjoy foods that meet their personal, cultural, and traditional preferences and fit within their budget. Several examples of healthy eating patterns that translate and integrate the recommendations in overall healthy ways to eat are provided.

The Guidelines

1. **Follow a healthy eating pattern across the lifespan.** All food and beverage choices matter. Choose a healthy eating pattern at an appropriate calorie level to help achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease.

2. **Focus on variety, nutrient density, and amount.** To meet nutrient needs within calorie limits, choose a variety of nutrient-dense foods across and within all food groups in recommended amounts.

3. **Limit calories from added sugars and saturated fats and reduce sodium intake.** Consume an eating pattern low in added sugars, saturated fats, and sodium. Cut back on foods and beverages higher in these components to amounts that fit within healthy eating patterns.

4. **Shift to healthier food and beverage choices.** Choose nutrient-dense foods and beverages across and within all food groups in place of less healthy choices. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.

5. **Support healthy eating patterns for all.** Everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities.

Key Recommendations provide further guidance on how individuals can follow the five Guidelines. The *Dietary Guidelines'* Key Recommendations for healthy eating patterns should be applied in their entirety, given the interconnected relationship that each dietary component can have with others.

Key Recommendations:

Consume a healthy eating pattern that accounts for all foods and beverages within an appropriate calorie level.

A healthy eating pattern includes:[1]

- A variety of vegetables from all of the subgroups—dark green, red and orange, legumes (beans and peas), starchy, and other
- Fruits, especially whole fruits
- Grains, at least half of which are whole grains
- Fat-free or low-fat dairy, including milk, yogurt, cheese, and/or fortified soy beverages
- A variety of protein foods, including seafood, lean meats and poultry, eggs, legumes (beans and peas), and nuts, seeds, and soy products
- Oils

A healthy eating pattern limits:

- Saturated fats and *trans* fats, added sugars, and sodium

Key Recommendations that are quantitative are provided for several components of the diet that should be limited. These components are of particular public health concern in the United States, and the specified limits can help individuals achieve healthy eating patterns within calorie limits:

- Consume less than 10 percent of calories per day from added sugars[2]
- Consume less than 10 percent of calories per day from saturated fats[3]
- Consume less than 2,300 milligrams (mg) per day of sodium[4]
- If alcohol is consumed, it should be consumed in moderation—up to one drink per day for women and up to two drinks per day for men—and only by adults of legal drinking age.[5]

In tandem with the recommendations above, Americans of all ages—children, adolescents, adults, and older adults—should meet the *Physical Activity Guidelines for Americans* to help promote health and reduce the risk of chronic disease. Americans should aim to achieve and maintain a healthy body weight. The relationship between diet and physical activity contributes to calorie balance and managing body weight. As such, the *Dietary Guidelines* includes a Key Recommendation to:

- Meet the *Physical Activity Guidelines for Americans*.[6]

[1] Definitions for each food group and subgroup are provided throughout Chapter 1: Key Elements of Healthy Eating Patterns and are compiled in Appendix 3. USDA Food Patterns: Healthy U.S.-Style Eating Pattern.

[2] The recommendation to limit intake of calories from added sugars to less than 10 percent per day is a target based on food pattern modeling and national data on intakes of calories from added sugars that demonstrate the public health need to limit calories from added sugars to meet food group and nutrient needs within calorie limits. The limit on calories from added sugars is not a Tolerable Upper Intake Level (UL) set by the Institute of Medicine (IOM). For most calorie levels, there are not enough calories available after meeting food group needs to consume 10 percent of calories from added sugars and 10 percent of calories from saturated fats and still stay within calorie limits.

[3] The recommendation to limit intake of calories from saturated fats to less than 10 percent per day is a target based on evidence that replacing saturated fats with unsaturated fats is associated with reduced risk of cardiovascular disease. The limit on calories from saturated fats is not a UL set by the IOM. For most calorie levels, there are not enough calories available after meeting food group needs to consume 10 percent of calories from added sugars and 10 percent of calories from saturated fats and still stay within calorie limits.

[4] The recommendation to limit intake of sodium to less than 2,300 mg per day is the UL for individuals ages 14 years and older set by the IOM. The recommendations for children younger than 14 years of age are the IOM age- and sex-appropriate ULs (see Appendix 7. Nutritional Goals for Age-Sex Groups Based on Dietary Reference Intakes and Dietary Guidelines Recommendations).

[5] It is not recommended that individuals begin drinking or drink more for any reason. The amount of alcohol and calories in beverages varies and should be accounted for within the limits of healthy eating patterns. Alcohol should be consumed only by adults of legal drinking age. There are many circumstances in which individuals should not drink, such as during pregnancy. See Appendix 9. Alcohol for additional information.

[6] U.S. Department of Health and Human Services. *2008 Physical Activity Guidelines for Americans.* Washington (DC): U.S. Department of Health and Human Services; 2008. ODPHP Publication No. U0036. Available at: http://www.health.gov/paguidelines. Accessed August 6, 2015.

Terms To Know

Several terms are used to operationalize the principles and recommendations of the *2015-2020 Dietary Guidelines*. These terms are essential to understanding the concepts discussed herein:

Eating Pattern—The combination of foods and beverages that constitute an individual's complete dietary intake over time. Often referred to as a "dietary pattern," an eating pattern may describe a customary way of eating or a combination of foods recommended for consumption. Specific examples include USDA Food Patterns and the Dietary Approaches to Stop Hypertension (DASH) Eating Plan.

Nutrient Dense—A characteristic of foods and beverages that provide vitamins, minerals, and other substances that contribute to adequate nutrient intakes or may have positive health effects, with little or no solid fats and added sugars, refined starches, and sodium. Ideally, these foods and beverages also are in forms that retain naturally occurring components, such as dietary fiber. All vegetables, fruits, whole grains, seafood, eggs, beans and peas, unsalted nuts and seeds, fat-free and low-fat dairy products, and lean meats and poultry—when prepared with little or no added solid fats, sugars, refined starches, and sodium—are nutrient-dense foods. These foods contribute to meeting food group recommendations within calorie and sodium limits. The term "nutrient dense" indicates the nutrients and other beneficial substances in a food have not been "diluted" by the addition of calories from added solid fats, sugars, or refined starches, or by the solid fats naturally present in the food.

Variety—A diverse assortment of foods and beverages across and within all food groups and subgroups selected to fulfill the recommended amounts without exceeding the limits for calories and other dietary components. For example, in the vegetables food group, selecting a variety of foods could be accomplished over the course of a week by choosing from all subgroups, including dark green, red and orange, legumes (beans and peas), starchy, and other vegetables.

An underlying premise of the *Dietary Guidelines* is that nutritional needs should be met primarily from foods. All forms of foods, including fresh, canned, dried, and frozen, can be included in healthy eating patterns. Foods in nutrient-dense forms contain essential vitamins and minerals and also dietary fiber and other naturally occurring substances that may have positive health effects. In some cases, fortified foods and dietary supplements may be useful in providing one or more nutrients that otherwise may be consumed in less-than-recommended amounts.

For most individuals, achieving a healthy eating pattern will require changes in food and beverage choices. This edition of the *Dietary Guidelines* focuses on ***shifts*** to emphasize the need to make substitutions—that is, choosing nutrient-dense foods and beverages in place of less healthy choices—rather than increasing intake overall. Most individuals would benefit from shifting food choices both within and across food groups. Some needed shifts are minor and can be accomplished by making simple substitutions, while others will require greater effort to accomplish.

Although individuals ultimately decide what and how much to consume, their personal relationships; the settings in which they live, work, and shop; and other contextual factors strongly influence their choices. Concerted efforts among health professionals, communities, businesses and industries, organizations, governments, and other segments of society are needed to support individuals and families in making dietary and physical activity choices that align with the *Dietary Guidelines*. Everyone has a role, and these efforts, in combination and over time, have the potential to meaningfully improve the health of current and future generations.

Figure ES-1.
2015-2020 Dietary Guidelines for Americans at a Glance

The *2015-2020 Dietary Guidelines* focuses on the big picture with recommendations to help Americans make choices that add up to an overall healthy eating pattern. To build a healthy eating pattern, combine healthy choices from across all food groups—while paying attention to calorie limits, too. Check out the 5 Guidelines that encourage healthy eating patterns:

Figure ES-1. *(continued...)*

2015-2020 Dietary Guidelines for Americans at a Glance

The *2015-2020 Dietary Guidelines* focuses on the big picture with recommendations to help Americans make choices that add up to an overall healthy eating pattern. To build a healthy eating pattern, combine healthy choices from across all food groups—while paying attention to calorie limits, too. Check out the 5 Guidelines that encourage healthy eating patterns:

3

Limit calories from added sugars and saturated fats and reduce sodium intake. Consume an eating pattern low in added sugars, saturated fats, and sodium. Cut back on foods and beverages higher in these components to amounts that fit within healthy eating patterns.

Consume an eating pattern low in added sugars, saturated fats, and sodium.

Example Sources of:

4

Shift to healthier food and beverage choices. Choose nutrient-dense foods and beverages across and within all food groups in place of less healthy choices. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.

Replace typical food and beverages choices with more nutrient-dense options. Be sure to consider personal preferences to maintain shifts over time.

Example:

Meal A **Meal B**

Everyone has a role in helping to create and support healthy eating patterns in places where we learn, work, live, and play.

5

Support healthy eating patterns for all. Everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities.

Introduction

Every 5 years since 1980, a new edition of the *Dietary Guidelines for Americans* has been published. Its goal is to make recommendations about the components of a healthy and nutritionally adequate diet to help promote health and prevent chronic disease for current and future generations. Although many of its recommendations have remained relatively consistent over time, the *Dietary Guidelines* has evolved as scientific knowledge has grown. These advancements have provided a greater understanding of, and focus on, the importance of healthy eating patterns as a whole, and how foods and beverages act synergistically to affect health. Therefore, healthy eating patterns is a focus of the *2015-2020 Dietary Guidelines*.

Nutrition & Health Are Closely Related

Over the past century, essential nutrient deficiencies have dramatically decreased, many infectious diseases have been conquered, and the majority of the U.S. population can now anticipate a long and productive life. However, as infectious disease rates have dropped, the rates of noncommunicable diseases—specifically, chronic diet-related diseases—have risen, due in part to changes in lifestyle behaviors. A history of poor eating and physical activity patterns have a cumulative effect and have contributed to significant nutrition- and physical activity-related health challenges that now face the U.S. population. About half of all American adults—117 million individuals—have one or more preventable chronic diseases, many of which are related to poor quality eating patterns and physical inactivity. These include cardiovascular disease, high blood pressure, type 2 diabetes, some cancers, and poor bone health. More than two-thirds of adults and nearly one-third of children and youth are overweight or obese. These high rates of overweight and obesity and chronic disease have persisted for more than two decades and come not only with increased health risks, but also at high cost. In 2008, the medical costs associated with obesity were estimated to be $147 billion. In 2012, the total estimated cost of diagnosed diabetes was $245 billion, including $176 billion in direct medical costs and $69 billion in decreased productivity.[1]

Table I-1 describes the high rates of nutrition- and physical activity-related chronic diseases and their related risk factors. These diseases affect all ages—children, adolescents, adults, and older adults—though rates vary by several factors, including race/ethnicity, income status, and body weight status.

Table I-1.
Facts About Nutrition & Physical Activity-Related Health Conditions in the United States

Health Condition	Facts
Overweight & Obesity	• For more than 25 years, more than half of the adult population has been overweight or obese. • Obesity is most prevalent in those ages 40 years and older and in African American adults, and is least prevalent in adults with highest incomes. • Since the early 2000s, abdominal obesity[a] has been present in about half of U.S. adults of all ages. Prevalence is higher with increasing age and varies by sex and race/ethnicity. • In 2009-2012, 65% of adult females and 73% of adult males were overweight or obese. • In 2009-2012, nearly one in three youth ages 2 to 19 years were overweight or obese.

[1] For more information, see: Centers for Disease Control and Prevention (CDC). Chronic Disease Overview. August 26, 2015. Available at http://www.cdc.gov/chronicdisease/overview/. Accessed November 3, 2015.

Table I-1. *(continued...)*

Facts About Nutrition & Physical Activity-Related Health Conditions in the United States

Health Condition	Facts
Cardiovascular Disease (CVD) & Risk Factors: Coronary Heart Disease Stroke Hypertension High Total Blood Cholesterol	• In 2010, CVD affected about 84 million men and women ages 20 years and older (35% of the population). • In 2007-2010, about 50% of adults who were normal weight, and nearly three-fourths of those who were overweight or obese, had at least one cardiometabolic risk factor (i.e., high blood pressure, abnormal blood lipids, smoking, or diabetes). • Rates of hypertension, abnormal blood lipid profiles, and diabetes are higher in adults with abdominal obesity. • In 2009-2012, almost 56% of adults ages 18 years and older had either prehypertension (27%) or hypertension (29%).[b] • In 2009-2012, rates of hypertension among adults were highest in African Americans (41%) and in adults ages 65 years and older (69%). • In 2009-2012, 10% of children ages 8 to 17 years had either borderline hypertension (8%) or hypertension (2%).[c] • In 2009-2012, 100 million adults ages 20 years or older (53%) had total cholesterol levels ≥200 mg/dL; almost 31 million had levels ≥240 mg/dL. • In 2011-2012, 8% of children ages 8 to 17 years had total cholesterol levels ≥200 mg/dL.
Diabetes	• In 2012, the prevalence of diabetes (type 1 plus type 2) was 14% for men and 11% for women ages 20 years and older (more than 90% of total diabetes in adults is type 2). • Among children with type 2 diabetes, about 80% were obese.
Cancer[d]: Breast Cancer Colorectal Cancer	• Breast cancer is the third leading cause of cancer death in the United States. • In 2012, an estimated 3 million women had a history of breast cancer. • Colorectal cancer is the second leading cause of cancer death in the United States. • In 2012, an estimated 1.2 million adult men and women had a history of colorectal cancer.
Bone Health	• A higher percent of women are affected by osteoporosis (15%) and low bone mass (51%) than men (about 4% and 35%, respectively). • In 2005-2010, approximately 10 million (10%) adults ages 50 years and older had osteoporosis and 43 million (44%) had low bone mass.

[a] Abdominal obesity, as measured by waist circumference, is defined as a waist circumference of >102 centimeters in men and >88 centimeters in women.

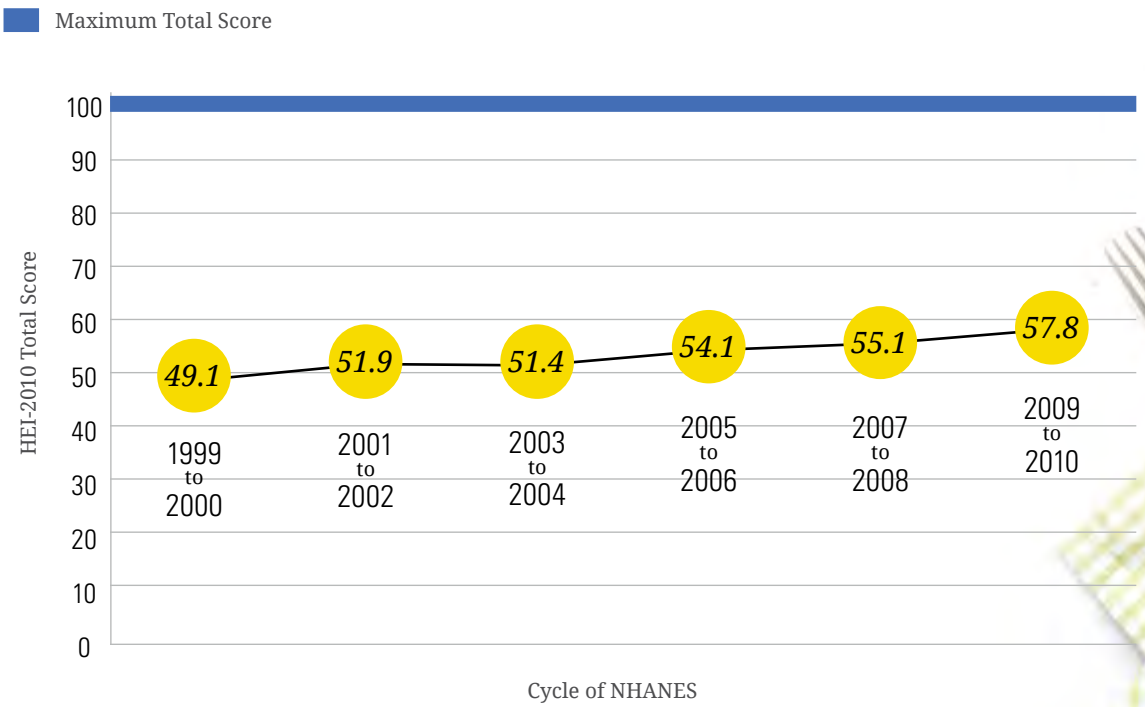
[b] For adults, prehypertension was defined as a systolic blood pressure of 120-139 mm mercury (Hg) or diastolic blood pressure of 80-89 mm Hg among those who were not currently being treated for hypertension. Hypertension was defined as systolic blood pressure (SBP) >140 mm Hg, diastolic blood pressure (DBP) >90 mm Hg, or taking antihypertensive medication.

[c] For children, borderline hypertension was defined as systolic or diastolic blood pressure at the 90th percentile or higher but lower than the 95th percentile or as blood pressure levels of 120/80 mm Hg or higher (but less than the 95th percentile). Hypertension was defined as a systolic or diastolic blood pressure at the 95th percentile or higher.

[d] The types of cancer included here are not a complete list of all diet- and physical activity-related cancers.

Concurrent with these diet-related health problems persisting at high levels, trends in food intake over time show that, at the population level, Americans are not consuming healthy eating patterns. For example, the prevalence of overweight and obesity has risen and remained high for the past 25 years, while Healthy Eating Index (HEI) scores, a measure of how food choices align with the *Dietary Guidelines*, have remained low (Figure I-1). Similarly, physical activity levels have remained low over time (Figure I-2). The continued high rates of overweight and obesity and low levels of progress toward meeting *Dietary Guidelines* recommendations highlight the need to improve dietary and physical activity education and behaviors across the U.S. population. Progress in reversing these trends will require comprehensive and coordinated strategies, built on the *Dietary Guidelines* as the scientific foundation, that can be maintained over time. The *Dietary Guidelines* is an important part of a complex and multifaceted solution to promoting health and helping to reduce the risk of chronic disease.

Figure I-1.
Adherence of the U.S. Population Ages 2 Years and Older to the *2010 Dietary Guidelines*, as Measured by Average Total Healthy Eating Index-2010 (HEI-2010) Scores

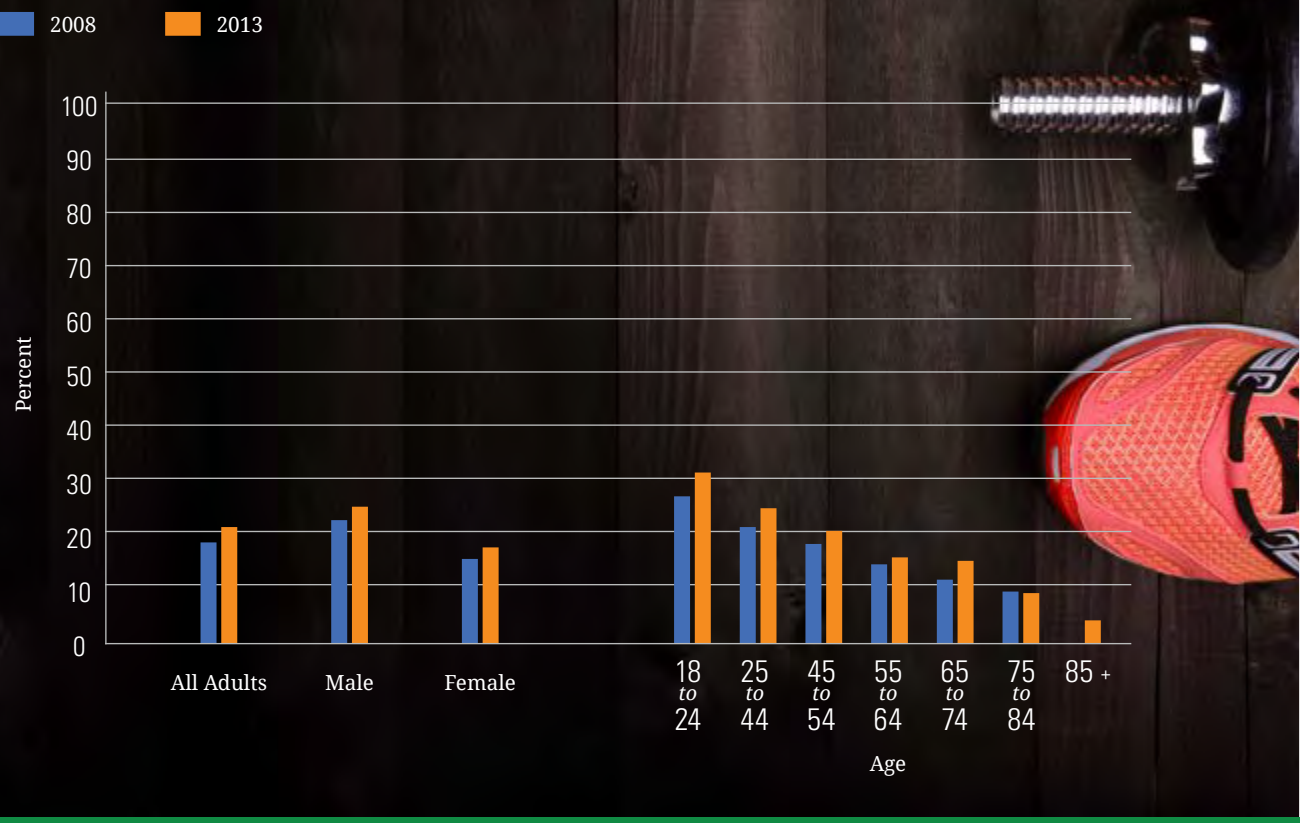


DATA SOURCES: Analyses of What We Eat in America, National Health and Nutrition Examination Survey (NHANES) data from 1999-2000 through 2009-2010.

NOTE: HEI-2010 total scores are out of 100 possible points. A score of 100 indicates that recommendations on average were met or exceeded. A higher total score indicates a higher quality diet.

Figure I-2.

Percentage of Adults Meeting the *Physical Activity Guidelines* (Aerobic & Muscle-Strengthening Recommendations)



DATA SOURCES: Analyses of the National Health Interview Survey, 2008 and 2013.
Healthy People 2020 PA-2.4. Increase the proportion of adults who meet the objectives for aerobic physical activity and for muscle strengthening activity. Washington, DC: U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, June 3, 2015. Available at: http://www.healthypeople.gov/2020/data-search/Search-the-Data?nid=5072.

The *Dietary Guidelines for Americans*: What It Is, What It Is Not

The main purpose of the *Dietary Guidelines* is to inform the development of Federal food, nutrition, and health policies and programs. The primary audiences are policymakers, as well as nutrition and health professionals, not the general public. The *Dietary Guidelines* is a critical tool for professionals to help Americans make healthy choices in their daily lives to help prevent chronic disease and enjoy a healthy diet. It serves as the evidence-based foundation for nutrition education materials that are developed by the Federal Government for the public. For example, Federal dietary guidance publications are required by law to be consistent with the *Dietary Guidelines*. It also is used to inform USDA and HHS food programs, such as USDA's National School Lunch Program and School Breakfast Program, which feed more than 30 million children each school day, and the Special Supplemental Nutrition Program for Women, Infants and Children, which uses the *Dietary Guidelines* as the scientific underpinning for its food packages and nutrition education program with about 8 million beneficiaries. In HHS, the Administration on Aging implements the *Dietary Guidelines* through the Older Americans Act Nutrition Services programs (i.e., nutrition programs for older adults), with about 5,000 community-based nutrition service providers who together serve more

The Importance of Physical Activity in a Healthy Lifestyle

Although the primary focus of the *Dietary Guidelines* is on nutrition recommendations, physical activity is mentioned throughout this edition because of its critical and complementary role in promoting good health and preventing disease, including many diet-related chronic diseases. The following chapters note the role of physical activity in improving health and reducing chronic disease risk; describe the gap between current physical activity recommendations and reported levels of activity; and discuss how the settings in which people live, learn, work, and play can be enhanced to encourage increased physical activity. For more information, see the *Physical Activity Guidelines for Americans* at www.health.gov/paguidelines.

than 900,000 meals a day across the United States. Other Departments, such as the Department of Defense and the Department of Veterans Affairs, also use the *Dietary Guidelines* to inform programs. The *Dietary Guidelines* also may be used to inform the development of programs, policies, and communication by audiences other than the document's principal audiences. These audiences, who share the common goal of serving the general public, include businesses, schools, community groups, media, the food industry, and State and local governments.

The *2015-2020 Dietary Guidelines* translates science into succinct, food-based guidance that can be relied upon to help Americans choose foods that provide a healthy and enjoyable diet. Its recommendations are ultimately intended to help individuals improve and maintain overall health and reduce the risk of chronic disease—its focus is disease prevention. The *Dietary Guidelines* is not intended to be used to treat disease. Regardless of an individual's current health status, almost all people in the United States could benefit from shifting choices to better support healthy eating patterns. Thus, the *Dietary Guidelines* may be used or adapted by medical and nutrition professionals to encourage healthy eating patterns to patients.

Developing the *Dietary Guidelines for Americans*

A greater understanding of the relationships between nutrition and human health has and will continue to evolve over time. Creating each edition of the *Dietary Guidelines* is a joint effort of HHS and USDA. A new edition is published every 5 years to reflect advancements in scientific knowledge and translate the science current at the time into sound food-based guidance to promote health in the United States.[2] The process to develop the *Dietary Guidelines* has also evolved and includes three stages.

Figure I-3.

Science, Policy, Implementation: Developing the *2015-2020 Dietary Guidelines for Americans*

To develop each edition of the *Dietary Guidelines for Americans*, HHS and USDA collaborate during a 3-stage process.

1 Review the Science

First, an external Advisory Committee creates the Advisory Report and submits it to the Secretaries of HHS and USDA.

This report is informed by:

- Original systematic reviews
- Review of existing systematic reviews, meta-analyses, and reports by Federal agencies or leading scientific organizations
- Data analyses
- Food pattern modeling analyses

2 Develop the *Dietary Guidelines*

Using the previous edition of the *Dietary Guidelines*, the Advisory Report, and consideration of public and Federal agency comments, HHS and USDA develop a new edition of the *Dietary Guidelines*. The *2015-2020 Dietary Guidelines for Americans* includes:

5 Guidelines

+

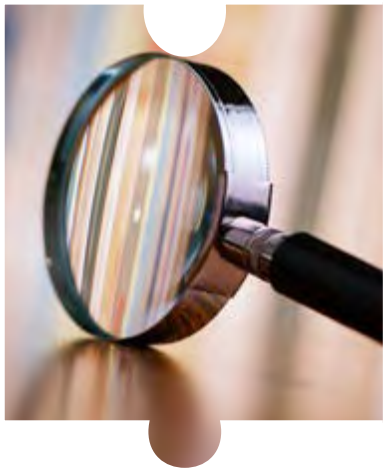
Key Recommendations that support the Guidelines

Science-based nutrition guidance for both professionals and organizations working to improve our nation's health.

3 Implement the *Dietary Guidelines*

Federal programs apply the *Dietary Guidelines* to meet the needs of Americans through food, nutrition, and health policies and programs—and in nutrition education materials for the public.

[2] Public Law 101-445, Title III, Section 301, 7 U.S.C. 5341 et seq. requires that the U.S. Departments of Health and Human Services and of Agriculture publish a new edition of the *Dietary Guidelines for Americans* every 5 years.



Stage 1: Review of Current Scientific Evidence

In the first stage, the Secretaries of HHS and of USDA appoint an external Dietary Guidelines Advisory Committee (Advisory Committee). The use of a Federal advisory committee is to ensure the Federal Government is seeking sound external scientific advice to inform policy decisions. Nominations from the public were sought for candidates to serve on the 2015 Advisory Committee. The 15 members of the 2015 Advisory Committee are prestigious researchers in the fields of nutrition, health, and medicine. Their role was to provide advice and recommendations to the Federal Government on the current state of scientific evidence on nutrition and health. Per Federal Advisory Committee Act rules, Advisory Committee members were thoroughly vetted for conflicts of interest before they were appointed to their positions and were required to submit a financial disclosure form annually.

The 2015 Advisory Committee was charged with reviewing the 2010 edition of the *Dietary Guidelines* to determine the topics for which new scientific evidence was likely to be available, and to review that evidence to inform the development of the 2015-2020 edition. The Advisory Committee was asked to place primary emphasis on evidence published since the 2010 Advisory Committee completed its work and on evidence to support the development of food-based recommendations that are of public health importance for Americans ages 2 years and older. It met in public meetings to discuss its findings and develop its recommendations. The public was invited to submit written comments to the Advisory Committee throughout the entirety of its work as well as oral comments at a public meeting.

The 2015 Advisory Committee used four state-of-the-art approaches to review and analyze the available evidence: original systematic reviews; existing systematic reviews, meta-analyses, and reports by Federal agencies or leading scientific organizations; data analyses; and food pattern modeling analyses. Most of its conclusion statements on nutrition and health were informed by systematic reviews, which are a gold standard for informing clinical practice guidelines and public health policies worldwide. The Dietary Reference Intakes (DRIs), as set by the Institute of Medicine (IOM), also serve as a source of evidence for the Advisory Report and the *Dietary Guidelines*. This multifaceted approach allowed the Advisory Committee to ask and answer scientific questions about the relationship of diet and health to systematically, objectively, and transparently synthesize research findings and to limit bias in its evaluation of the totality of the evidence for the topics it reviewed. This approach also allowed one or more methods to be used that were best suited to comprehensively answer each question. These methods are described here.

Original Systematic Reviews. The Advisory Committee used this approach to systematically search the scientific literature for relevant articles; assess the methodologic rigor of each included article; and summarize, analyze, and grade the evidence presented in the articles.

For systematic reviews, all studies published by the time the literature search was conducted were screened for inclusion to ensure all available evidence was reviewed in a systematic manner. To preserve the integrity of the process, individual studies that were published after the systematic review was concluded were not included on an ad hoc basis. Recent studies that were not included in the 2015 Advisory Committee's review will be available for consideration during the development of the next edition of the *Dietary Guidelines*.

The USDA Nutrition Evidence Library (NEL) uses a systematic review methodology designed to analyze food, nutrition, and public health science. The medical field has used systematic reviews as the standard practice for more than 25 years to inform the development of national guidelines for health professionals.

Review of Existing Systematic Reviews, Meta-Analyses, and Reports by Federal Agencies or Leading Scientific Organizations. The Advisory Committee used this method when a high-quality existing review or report had already addressed a question under consideration. The approach involved applying a systematic process to assess the quality of the existing review or report and to ensure that it presented a comprehensive review of the Advisory Committee's question of interest.

At the time that the NEL was created by USDA for use in informing the *2010 Dietary Guidelines*, it was among the first to apply the systematic review methodology in the field of nutrition. Thus, very few *existing* nutrition-focused systematic reviews were available for the 2010 Advisory Committee to use. Since that time, systematic reviews in the nutrition field have become common practice. Therefore, unlike the 2010 Advisory Committee, the 2015 Advisory Committee was able to use *existing* reviews to answer many of its research questions, preventing duplication of effort. Existing systematic reviews underwent quality assessment to ensure they were just as rigorous and were held to the same high standards as the systematic reviews conducted through the NEL.

Data Analyses. The Advisory Committee used national data from Federal agencies to answer questions about chronic disease prevalence rates; food and nutrient intakes of the U.S. population across age, sex, and other demographic characteristics; and nutrient content of foods.

For other questions, a new analysis from existing data sets was requested from the appropriate Federal agency to provide the answer to the question posed. Data analyses tailored to a specific question helped inform the Advisory Committee's recommendations.

Food Pattern Modeling Analyses. The Advisory Committee used this method to estimate the effect on diet quality of possible changes in types or amounts of foods in the USDA Food Patterns that it was considering recommending. The USDA Food Patterns describe the types and amounts of foods[3] to eat that can provide a healthy and nutritionally adequate diet. The Food Patterns aim to meet the DRIs while taking into consideration current intakes in the United States and systematic reviews of scientific research. They were developed to demonstrate how *Dietary Guidelines* recommendations can be met within an overall eating pattern.

Food pattern modeling analyses guided by the Advisory Committee provided objective information on the potential nutritional effects of recommending an eating pattern with specific changes, such as selecting foods to increase vitamin D intake or modifying the pattern based on studies of Mediterranean diets. The results of the modeling analyses informed the Committee's recommendations on specific topics, including keeping recommendations grounded within the structure of an overall healthy eating pattern.

As part of its assessment of evidence on diet and health, the Committee also formulated recommendations for future research. These research recommendations reflect an acknowledgment that knowledge about nutrition, diet, and health associations continues to evolve and that new findings build on and enhance existing evidence.

The Advisory Committee's work culminated in the *Scientific Report of the 2015 Dietary Guidelines Advisory Committee*, which was submitted to the Secretaries of HHS and of USDA and made available for public and agency comment in February 2015. For more information about the Advisory Committee and its review process and Advisory Report, visit http://health.gov/dietaryguidelines/.

Stage 2: Development of the *Dietary Guidelines for Americans*

In the second stage, HHS and USDA develop the policy document *Dietary Guidelines*, applying several process steps to promote scientific rigor. Similar to previous editions, this 8th edition builds upon the preceding edition, with the scientific justification for revisions informed by the Advisory Committee's report and consideration of public and Federal agency comments.

As previously mentioned, the public is invited to submit written comments to the Advisory Committee throughout the entirety of its work as well as oral comments at a public meeting. In addition, after the Advisory Committee's report was submitted to the Secretaries, the public is again invited to submit written comments to the Federal Government on the Advisory Committee's final report as well as oral comments at a public meeting. Comments on the Advisory Committee's report are considered in the development of the policy document, placing emphasis on those with scientific justification while ensuring that the policy is based on the totality of the evidence and not on individual studies.

[3] If not specified explicitly, references to "foods" refer to "foods and beverages."

Federal agencies within HHS and USDA have extensive, broad scientific expertise in nutrition and health, as well as experts who specialize in unique aspects of nutrition and health. Federal experts validate the rigor of the policy document in multiple ways. After the Advisory Committee's report is complete, Federal agencies provide comments regarding the applicability and rigor of the report for consideration in translating the science into policy. Those who update the policy document are Federal experts with specialized knowledge in the evidence under consideration and its policy applications within the Federal Government. These policy writers include nutrition scientists, policy experts, and communications specialists. Consultation with other Federal experts occurs throughout the policy development process.

A peer-review step also is completed, in which nonfederal experts independently conduct a confidential review of the draft policy document for clarity and technical accuracy of the translation of the evidence from the Advisory Report into policy language. In addition, extensive review and clearance of the policy document also occurs by Federal experts within the agencies of both Departments. The Federal clearance of the policy document culminates with review and approval by the Secretaries of HHS and of USDA.

The *2015-2020 Dietary Guidelines* is built around five Guidelines with accompanying Key Recommendations that provide detail on the elements of healthy eating patterns. The Key Recommendations represent the preponderance of the most current scientific evidence. Emphasis is placed on topics with the strongest evidence or public health need, indicating a low likelihood that new or additional evidence would greatly change the recommendation. Ultimately, the *Dietary Guidelines* aims to represent the current science on diet and health, provide food-based guidance that meets nutrient needs, and address areas of particular public health importance in the United States.

Looking Ahead to 2020—Expanding Guidance

Traditionally, the *Dietary Guidelines* has focused on individuals ages 2 and older in the United States, including those who are at increased risk of chronic disease. This is the focus of the recommendations in this edition as well. However, the relationship of early nutrition to health outcomes throughout the lifespan has grown as a public health interest, and it is expected that evidence will become sufficiently robust to support additional dietary guidance in the future. As mandated by Congress in the Agricultural Act of 2014, also known as the Farm Bill, the *Dietary Guidelines* will expand to include infants and toddlers (from birth to age 2), as well as additional guidance for women who are pregnant, beginning with the 2020-2025 edition.

Describing the Strength of Evidence Supporting Recommendations

Considerable evidence demonstrates that a healthy diet and regular physical activity can help improve health and reduce the risk of certain chronic diseases. Throughout, the 2015-2020 edition of the *Dietary Guidelines* notes the strength of evidence supporting its recommendations. This information is provided to show how much evidence is available and how consistent the evidence is for a particular statement or recommendation:

Strong evidence reflects a large, high-quality, and/or consistent body of evidence. There is a high level of certainty that the evidence is relevant to the population of interest, and additional studies are unlikely to change conclusions derived from this evidence. Topics that are supported by strong evidence often lead to policy recommendations with the greatest emphasis because of the confidence generated by the evidence.

Moderate evidence reflects sufficient evidence to draw conclusions. The level of certainty may be restricted by certain limitations in the evidence, such as the amount of evidence available, inconsistencies in findings, or limitations in methodology or generalizability. Topics that are supported by moderate evidence can support recommendations of varying emphasis, including complementing those with a strong evidence base.

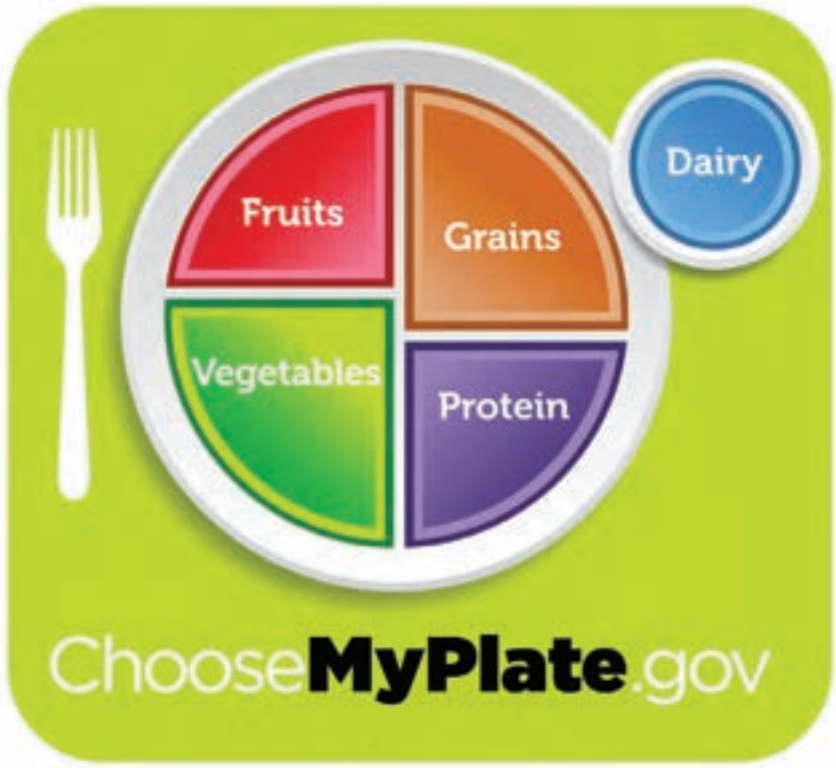
Limited evidence reflects either a small number of studies, studies of weak design or with inconsistent results, and/or limitations on the generalizability of the findings. When only limited evidence is available on a topic, it is insufficient to inform Key Recommendations. However, policy statements are sometimes useful for topics that have limited supporting evidence, such as when the evidence for those topics reinforces recommendations on related topics that have a stronger evidence base, to clarify that it is not possible to make a recommendation, or to identify an area of emerging research.

The evidence described in the *Dietary Guidelines* also reflects an understanding of the difference between *association*

and *causation*. Two factors may be associated; however, this association does not mean that one factor necessarily causes the other. Often, several different factors may contribute to a health outcome. In some cases, scientific conclusions are based on relationships or associations because studies examining cause and effect are not available.

Stage 3: Implementing the *Dietary Guidelines for Americans*

In the third and final stage, the Federal Government implements the recommendations in the *Dietary Guidelines*. Federal programs apply the *Dietary Guidelines* to meet the needs of Americans and specific population groups through food, nutrition, and health policies and programs and in nutrition education materials for the public. Although the *Dietary Guidelines* provides the foundation for Federal nutrition and health initiatives, it is each Federal agency's purview and responsibility to determine how best to implement the *Dietary Guidelines* to serve its specific audiences. For example, one way USDA and other Federal agencies can implement the *Dietary Guidelines* is through MyPlate, which serves as a reminder to build healthy eating patterns by making healthy choices across the food groups. Both Federal and nonfederal programs may use MyPlate as a resource to help Americans make shifts in their daily food and beverage choices to align with the *Dietary Guidelines*. For more information about *Dietary Guidelines* implementation for the public through MyPlate, see Chapter 3. Everyone Has a Role To Play in Supporting Healthy Eating Patterns and Figure 3-2.



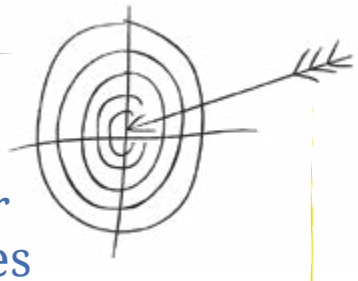
Implementation of the *Dietary Guidelines* Through MyPlate

MyPlate is a Federal symbol that serves as a reminder to build healthy eating patterns by making healthy choices across the food groups. For more information about *Dietary Guidelines* implementation for the public through MyPlate, see Chapter 3 and **Figure 3-2.**

The *Dietary Guidelines* recognizes that many factors influence the diet and physical activity choices individuals make. The United States is a highly diverse nation, with people from many backgrounds, cultures, and traditions, and with varied personal preferences. It also acknowledges that income and life circumstances play a major role in food and physical activity decisions. Significant health and food access disparities exist, with nearly 15 percent of U.S. households unable to acquire adequate food to meet their needs because of insufficient income or other resources for food.[4] These factors—along with the settings in which people live, learn, work, and play—can have a profound impact on their choices.

In addition to implementation by the Federal Government and as discussed in Chapter 3, ample opportunities exist for many other sectors of society to implement the *Dietary Guidelines* in the multiple settings they influence, from home to school to work to community.

[4] U.S. Department of Agriculture. Economic Research Service. Food security in the U.S. Key Statistics and Graphics. [Updated September 8, 2015.] Available at: http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx. Accessed June 10, 2015.



Aligning With the *Dietary Guidelines for Americans*: What Does This Mean in Practice?

As introduced here and described in detail in the following Chapters, the *Dietary Guidelines* describes adaptable eating patterns that can help promote health and reduce risk of chronic disease across the lifespan. It presents an array of options that can be tailored to income levels and that can accommodate cultural, ethnic, traditional, and personal preferences.

All segments of society—individuals, families, communities, businesses and industries, organizations, governments, and others—can and should "align with the *Dietary Guidelines*." In practice, the goal is to take the following actions in their entirety and maintain them over time:

- Make food and beverage choices that meet the Key Recommendations for food groups, subgroups, nutrients, and other components in combination to contribute to overall healthy eating patterns.
- Meet nutritional needs primarily through foods. Foods provide an array of nutrients and other components that are associated with beneficial effects on health. Individuals should aim to consume a diet that achieves the most recent DRIs, which consider many factors, including the individual's age, life stage, and sex. In some cases, fortified foods and dietary supplements may be useful in providing one or more nutrients that otherwise may be consumed in less than recommended amounts or that are of particular concern for specific population groups.
- Establish and maintain settings (e.g., homes, schools, worksites, restaurants, stores) that support and encourage food and beverage choices that help individuals make shifts to meet the Key Recommendations for healthy eating patterns.
- Ensure that food is kept safe to eat by using the principles of clean, separate, cook, and chill.[5]
- Establish and maintain sectors and settings that support and encourage regular physical activity as part of a healthy lifestyle.

All of these actions are important individually, but they are intended to be taken together. Aligning with the *Dietary Guidelines* by taking these actions is powerful because it can help change social norms and values and ultimately support a new prevention and healthy lifestyle paradigm that will benefit the U.S. population today as well as future generations.

A Roadmap to the 2015-2020 Edition of the *Dietary Guidelines for Americans*

People do not eat foods and nutrients in isolation but in combination, and this combination forms an overall eating pattern. A growing body of research has examined the relationship between overall eating patterns, health, and risk of chronic disease, and findings on these relationships are sufficiently well established to support dietary guidance. As a result, eating patterns and their food and nutrient characteristics are a primary emphasis of the recommendations in this 2015-2020 edition of the *Dietary Guidelines*. This edition of the *Dietary Guidelines* consists of this Introduction, three chapters, and 14 appendixes:

- **Chapter 1. Key Elements of Healthy Eating Patterns** discusses the relationship of diet and physical activity to health over the lifespan and explains the principles of a healthy eating pattern. The chapter provides quantitative recommendations for a Healthy U.S.-Style Eating Pattern at the 2,000-calorie level as an example to show how individuals can follow these principles and recommendations. It also includes two variations at the same 2,000-calorie level as examples of other healthy eating patterns individuals can choose based on personal preference: the Healthy Mediterranean-Style Eating Pattern and the Healthy Vegetarian Eating Pattern. Chapter 1 focuses on the first three Guidelines and the Key Recommendations.

[5] For more information on this action, see Appendix 14. Food Safety Principles and Guidance.

- **Chapter 2. Shifts Needed To Align With Healthy Eating Patterns** compares current food and nutrient intakes in the United States to recommendations and describes the shifts in dietary choices that are needed to align current intakes with recommendations. Chapter 2 focuses on the fourth Guideline.
- **Chapter 3. Everyone Has a Role in Supporting Healthy Eating Patterns** explains how all individuals and segments of society in the United States have an important role to play in supporting healthy eating and physical activity choices. It outlines a variety of strategies and actions that align with the *Dietary Guidelines*. Chapter 3 focuses on the fifth Guideline.
- **The Appendixes** provide additional information to support the content of the chapters, including recommendations from the *Physical Activity Guidelines for Americans*; calorie needs by age, sex, and level of physical activity; the base Healthy U.S.-Style Eating Pattern; two other examples of healthy eating patterns: the Healthy Mediterranean-Style and Healthy Vegetarian Eating Patterns; a glossary of terms; and nutritional goals for various age-sex groups. The Appendixes also include a list of selected Government resources on diet and physical activity; additional information on alcohol; lists of food sources of nutrients of public health concern; and food safety principles and guidance.

Terms To Know

Several terms are used to operationalize the principles and recommendations of the *2015-2020 Dietary Guidelines*. These terms are essential to understanding the concepts discussed herein:

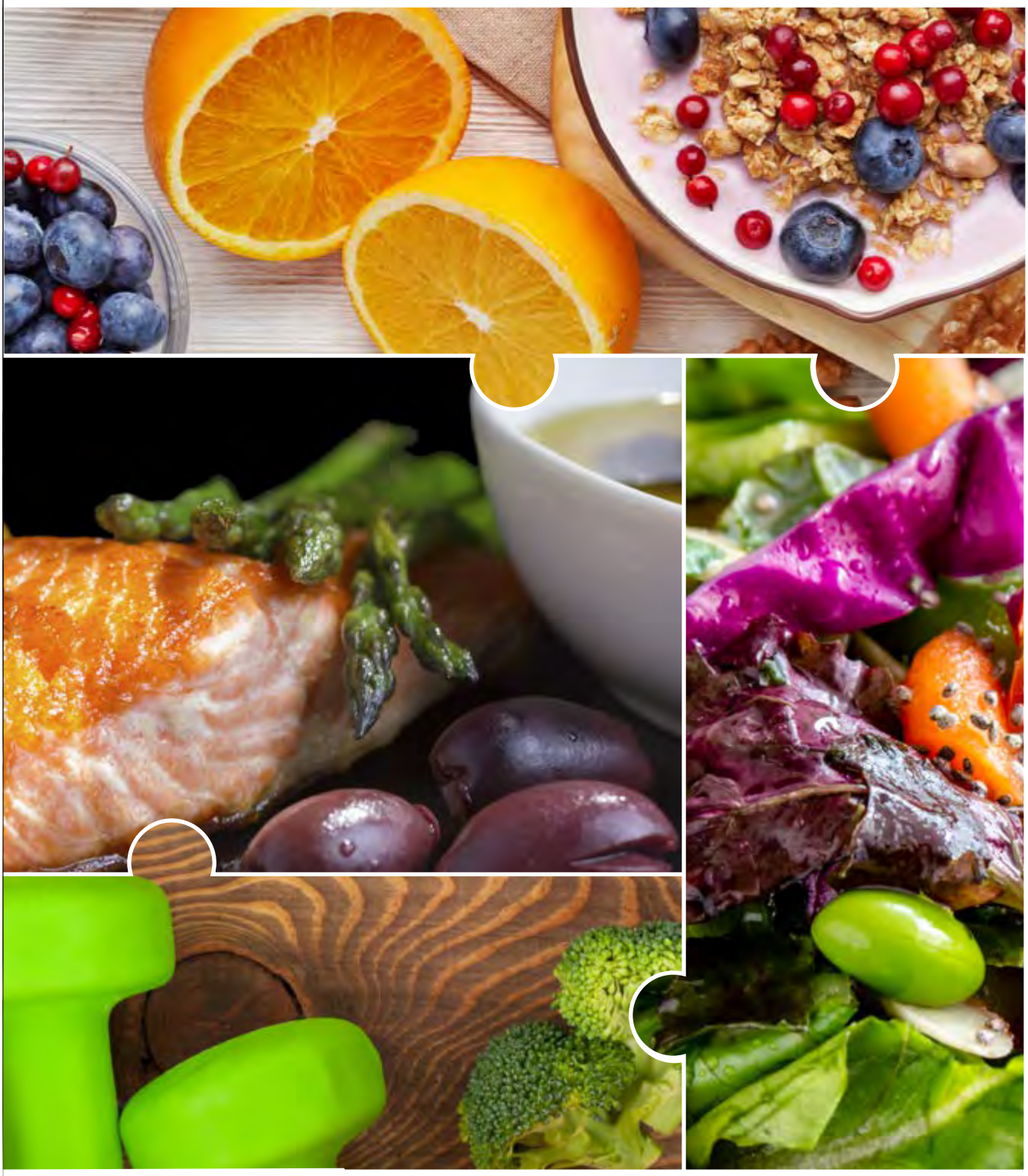
Eating Pattern—The combination of foods and beverages that constitute an individual's complete dietary intake over time. Often referred to as a "dietary pattern," an eating pattern may describe a customary way of eating or a combination of foods recommended for consumption. Specific examples include USDA Food Patterns and the Dietary Approaches to Stop Hypertension (DASH) Eating Plan.

Nutrient Dense—A characteristic of foods and beverages that provide vitamins, minerals, and other substances that contribute to adequate nutrient intakes or may have positive health effects, with little or no solid fats and added sugars, refined starches, and sodium. Ideally, these foods and beverages also are in forms that retain naturally occurring components, such as dietary fiber. All vegetables, fruits, whole grains, seafood, eggs, beans and peas, unsalted nuts and seeds, fat-free and low-fat dairy products, and lean meats and poultry—when prepared with little or no added solid fats, sugars, refined starches, and sodium—are nutrient-dense foods. These foods contribute to meeting food group recommendations within calorie and sodium limits. The term "nutrient dense" indicates the nutrients and other beneficial substances in a food have not been "diluted" by the addition of calories from added solid fats, sugars, or refined starches, or by the solid fats naturally present in the food.

Variety—A diverse assortment of foods and beverages across and within all food groups and subgroups selected to fulfill the recommended amounts without exceeding the limits for calories and other dietary components. For example, in the vegetables food group, selecting a variety of foods could be accomplished over the course of a week by choosing from all subgroups, including dark green, red and orange, legumes (beans and peas), starchy, and other vegetables.

CHAPTER

1 Key Elements of Healthy Eating Patterns



Introduction

Over the course of any given day, week, or year, individuals consume foods and beverages[1] in combination—an eating pattern. An eating pattern is more than the sum of its parts; it represents the totality of what individuals habitually eat and drink, and these dietary components act synergistically in relation to health. As a result, the eating pattern may be more predictive of overall health status and disease risk than individual foods or nutrients. Thus, eating patterns, and their food and nutrient components, are at the core of the *2015-2020 Dietary Guidelines for Americans*. The goal of the *Dietary Guidelines* is for individuals throughout all stages of the lifespan to have eating patterns that promote overall health and help prevent chronic disease.

About This Chapter

This chapter defines the core concepts of healthy eating and physical activity patterns and focuses on the first three Guidelines:

1. **Follow a healthy eating pattern across the lifespan.** All food and beverage choices matter. Choose a healthy eating pattern at an appropriate calorie level to help achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease.
2. **Focus on variety, nutrient density, and amount.** To meet nutrient needs within calorie limits, choose a variety of nutrient-dense foods across and within all food groups in recommended amounts.
3. **Limit calories from added sugars and saturated fats and reduce sodium intake.** Consume an eating pattern low in added sugars, saturated fats, and sodium. Cut back on foods and beverages higher in these components to amounts that fit within healthy eating patterns.
4. **Shift to healthier food and beverage choices.** Choose nutrient-dense foods and beverages across and within all food groups in place of less healthy choices. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.
5. **Support healthy eating patterns for all.** Everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities.

The chapter first presents Key Recommendations, which describe the elements of a healthy eating pattern and provide detail on how individuals can follow the Guidelines, followed by a description of the science supporting healthy eating patterns. Then, the Healthy U.S.-Style Eating Pattern at the 2,000-calorie level is provided as an example. A Closer Look Inside a Healthy Eating Pattern provides details on each of the food groups and other dietary components of public health importance in the United States. In addition, the chapter provides two variations of the Healthy U.S.-Style Eating Pattern as examples of additional healthy eating patterns—the Healthy Mediterranean-Style Eating Pattern and the Healthy Vegetarian Eating Pattern. Both of these patterns align with the Guidelines. Finally, this chapter provides an overview of healthy physical activity patterns.

[1] If not specified explicitly, references to "foods" refer to "foods and beverages."

Key Recommendations: Components of Healthy Eating Patterns

The *Dietary Guidelines*' Key Recommendations for healthy eating patterns should be applied in their entirety, given the interconnected relationship that each dietary component can have with others. As illustrated later in this chapter, there is more than one way to put these Key Recommendations into action; this is exemplified by the three eating patterns that translate and integrate the Key Recommendations into an overall healthy way to eat.

Key Recommendations:

Consume a healthy eating pattern that accounts for all foods and beverages within an appropriate calorie level.

A healthy eating pattern includes:[2]

- A variety of vegetables from all of the subgroups—dark green, red and orange, legumes (beans and peas), starchy, and other
- Fruits, especially whole fruits
- Grains, at least half of which are whole grains
- Fat-free or low-fat dairy, including milk, yogurt, cheese, and/or fortified soy beverages
- A variety of protein foods, including seafood, lean meats and poultry, eggs, legumes (beans and peas), and nuts, seeds, and soy products
- Oils

A healthy eating pattern limits:

- Saturated fats and *trans* fats, added sugars, and sodium

Key Recommendations that are quantitative are provided for several components of the diet that should be limited. These components are of particular public health concern in the United States, and the specified limits can help individuals achieve healthy eating patterns within calorie limits:

- Consume less than 10 percent of calories per day from added sugars[3]
- Consume less than 10 percent of calories per day from saturated fats[4]
- Consume less than 2,300 milligrams (mg) per day of sodium[5]
- If alcohol is consumed, it should be consumed in moderation—up to one drink per day for women and up to two drinks per day for men—and only by adults of legal drinking age.[6]

[2] Definitions for each food group and subgroup are provided throughout the chapter and are compiled in Appendix 3. USDA Food Patterns: Healthy U.S.-Style Eating Pattern.

[3] The recommendation to limit intake of calories from added sugars to less than 10 percent per day is a target based on food pattern modeling and national data on intakes of calories from added sugars that demonstrate the public health need to limit calories from added sugars to meet food group and nutrient needs within calorie limits. The limit on calories from added sugars is not a Tolerable Upper Intake Level (UL) set by the Institute of Medicine (IOM). For most calorie levels, there are not enough calories available after meeting food group needs to consume 10 percent of calories from added sugars and 10 percent of calories from saturated fats and still stay within calorie limits.

[4] The recommendation to limit intake of calories from saturated fats to less than 10 percent per day is a target based on evidence that replacing saturated fats with unsaturated fats is associated with reduced risk of cardiovascular disease. The limit on calories from saturated fats is not a UL set by the IOM. For most calorie levels, there are not enough calories available after meeting food group needs to consume 10 percent of calories from added sugars and 10 percent of calories from saturated fats and still stay within calorie limits.

[5] The recommendation to limit intake of sodium to less than 2,300 mg per day is the UL for individuals ages 14 years and older set by the IOM. The recommendations for children younger than 14 years of age are the IOM age- and sex-appropriate ULs (see Appendix 7. Nutritional Goals for Age-Sex Groups Based on Dietary Reference Intakes and Dietary Guidelines Recommendations).

[6] It is not recommended that individuals begin drinking or drink more for any reason. The amount of alcohol and calories in beverages varies and should be accounted for within the limits of healthy eating patterns. Alcohol should be consumed only by adults of legal drinking age. There are many circumstances in which individuals should not drink, such as during pregnancy. See Appendix 9. Alcohol for additional information.

Healthy Eating Patterns: Dietary Principles

Healthy eating patterns support a healthy body weight and can help prevent and reduce the risk of chronic disease throughout periods of growth, development, and aging as well as during pregnancy. The following principles apply to meeting the Key Recommendations:

An eating pattern represents the totality of all foods and beverages consumed. All foods consumed as part of a healthy eating pattern fit together like a puzzle to meet nutritional needs without exceeding limits, such as those for saturated fats, added sugars, sodium, and total calories. All forms of foods, including fresh, canned, dried, and frozen, can be included in healthy eating patterns.

Nutritional needs should be met primarily from foods. Individuals should aim to meet their nutrient needs through healthy eating patterns that include nutrient-dense foods. Foods in nutrient-dense forms contain essential vitamins and minerals and also dietary fiber and other naturally occurring substances that may have positive health effects. In some cases, fortified foods and dietary supplements may be useful in providing one or more nutrients that otherwise may be consumed in less than recommended amounts (see Chapter 2. Shifts Needed To Align With Healthy Eating Patterns).

Healthy eating patterns are adaptable. Individuals have more than one way to achieve a healthy eating pattern. Any eating pattern can be tailored to the individual's socio-cultural and personal preferences.

Healthy Physical Activity Patterns

Key Recommendation:

Meet the *Physical Activity Guidelines for Americans*

In addition to consuming a healthy eating pattern, individuals in the United States should meet the *Physical Activity Guidelines for Americans*.[7] Regular physical activity is one of the most important things individuals can do to improve their health. The *Physical Activity Guidelines*, released by the U.S. Department of Health and Human Services, provides a comprehensive set of recommendations for Americans on the amounts and types of physical activity needed each day (see Appendix 1. *Physical Activity Guidelines for Americans*). Adults need at least 150 minutes of moderate intensity physical activity and should perform muscle-strengthening exercises on 2 or more days each week. Youth ages 6 to 17 years need at least 60 minutes of physical activity per day, including aerobic, muscle-strengthening, and bone-strengthening activities. Establishing and maintaining a regular physical activity pattern can provide many health benefits. Strong evidence shows that regular physical activity helps people maintain a healthy weight, prevent excessive weight gain, and lose weight when combined with a healthy eating pattern lower in calories. Strong evidence also demonstrates that regular physical activity lowers the risk of early death, coronary heart disease, stroke, high blood pressure, adverse blood lipid profile, type 2 diabetes, breast and colon cancer, and metabolic syndrome; it also reduces depression and prevents falls. People can engage in regular physical activity in a variety of ways throughout the day and by choosing activities they enjoy. The *Physical Activity Guidelines* provides additional details on the benefits of physical activity and strategies to incorporate regular physical activity into a healthy lifestyle.

[7] U.S. Department of Health and Human Services. 2008 *Physical Activity Guidelines for Americans.* Washington (DC): U.S. Department of Health and Human Services; 2008. ODPHP Publication No. U0036. Available at: http://www.health.gov/paguidelines. Accessed August 6, 2015.

The Science Behind Healthy Eating Patterns

The components of healthy eating patterns recommended in this edition of the *Dietary Guidelines* were developed by integrating findings from systematic reviews of scientific research, food pattern modeling, and analyses of current intake of the U.S. population:

- Systematic reviews of scientific research examine relationships between the overall diet, including its constituent foods, beverages, and nutrients, and health outcomes.
- Food pattern modeling assesses how well various combinations and amounts of foods from all food groups would result in healthy eating patterns that meet nutrient needs and accommodate limits, such as those for saturated fats, added sugars, and sodium.
- Analyses of current intakes identify areas of potential public health concern.

Together, these complementary approaches provide a robust evidence base for healthy eating patterns that both reduce risk of diet-related chronic disease and ensure nutrient adequacy.

Scientific evidence supporting dietary guidance has grown and evolved over the decades. Previous editions of the *Dietary Guidelines* relied on the evidence of relationships between individual nutrients, foods, and food groups and health outcomes. Although this evidence base continues to be substantial, foods are not consumed in isolation, but rather in various combinations over time—an "eating pattern." As previously noted, dietary components of an eating pattern can have interactive, synergistic, and potentially cumulative relationships, such that the eating pattern may be more predictive of overall health status and disease risk than individual foods or nutrients. However, each identified component of an eating pattern does not necessarily have the same independent relationship to health outcomes as the total eating pattern, and each identified component may not equally contribute (or may be a marker for other factors) to the associated health outcome. An evidence base is now available that evaluates overall eating patterns and various health outcomes.

Associations Between Eating Patterns & Health

Evidence shows that healthy eating patterns, as outlined in the Guidelines and Key Recommendations, are associated with positive health outcomes. The evidence base for associations between eating patterns and specific health outcomes continues to grow. Strong evidence shows that healthy eating patterns are associated with a reduced risk of cardiovascular disease (CVD). Moderate evidence indicates that healthy eating patterns also are associated with a reduced risk of type 2 diabetes, certain types of cancers (such as colorectal and postmenopausal breast cancers), overweight, and obesity. Emerging evidence also suggests that relationships may exist between eating patterns and some neurocognitive disorders and congenital anomalies.

Within this body of evidence, higher intakes of vegetables and fruits consistently have been identified as characteristics of healthy eating patterns; whole grains have been identified as well, although with slightly less consistency. Other characteristics of healthy eating patterns have been identified with less consistency and include fat-free or low-fat dairy, seafood, legumes, and nuts. Lower intakes of meats, including processed meats; processed poultry; sugar-sweetened foods, particularly beverages; and refined grains have often been identified as characteristics of healthy eating patterns. Additional information about how food groups and dietary components fit within healthy eating patterns is discussed throughout the *2015-2020 Dietary Guidelines*. For example, as discussed later in this chapter in the section About Meats and Poultry, evidence from food pattern modeling has demonstrated that lean meats can be part of a healthy eating pattern, but as discussed in Chapter 2, average intakes of meats, poultry, and eggs, a subgroup of the protein foods group, are above recommendations in the Healthy U.S.-Style Eating Pattern for teen boys and adult men.

Associations Between Dietary Components & Health

The evidence on food groups and various health outcomes that is reflected in this 2015-2020 edition of the *Dietary Guidelines* complements and builds on the evidence of the previous 2010 edition. For example, research has shown that vegetables and fruits are associated with a reduced risk of many chronic diseases, including CVD, and may be protective against certain types of cancers. Additionally, some evidence indicates that whole grain intake may reduce risk for CVD and is associated with lower body weight. Research also has linked dairy intake to improved bone health, especially in children and adolescents.

A Closer Look Inside Healthy Eating Patterns

The following sections describe a healthy eating pattern and how following such a pattern can help people meet the Guidelines and its Key Recommendations. Throughout, it uses the Healthy U.S.-Style Eating Pattern as an example to illustrate the specific amounts and limits for food groups and other dietary components that make up healthy eating patterns. The Healthy U.S.-Style Eating Pattern is one of three USDA Food Patterns and is based on the types and proportions of foods Americans typically consume, but in nutrient-dense forms and appropriate amounts. Because calorie needs vary based on age, sex, height, weight, and level of physical activity (see Appendix 2. Estimated Calorie Needs per Day, by Age, Sex, and Physical Activity Level), the pattern has been provided at 12 different calorie levels (see Appendix 3. USDA Food Patterns: Healthy U.S.-Style Eating Pattern). The 2,000-calorie level of the Pattern is shown in Table 1-1.

The Healthy U.S.-Style Eating Pattern is the same as the primary USDA Food Patterns of the *2010 Dietary Guidelines*. Two additional USDA Food Patterns—the Healthy Mediterranean-Style Eating Pattern and the Healthy Vegetarian Eating Pattern—are found at the end of this chapter and reflect other styles of eating (see Appendix 4. USDA Food Patterns: Healthy Mediterranean-Style Eating Pattern and Appendix 5. USDA Food Patterns: Healthy Vegetarian Eating Pattern). These three patterns are examples of healthy eating patterns that can be adapted based on cultural and personal preferences. The USDA Food Patterns also can be used as guides to plan and serve meals not only for the individual and household but in a variety of other settings, including schools, worksites, and other community settings.

Table 1-1.

Healthy U.S.-Style Eating Pattern at the 2,000-Calorie Level, With Daily or Weekly Amounts From Food Groups, Subgroups, & Components

Food Group[a]	Amount[b] in the 2,000-Calorie-Level Pattern
Vegetables	**2½ c-eq/day**
Dark Green	1½ c-eq/wk
Red & Orange	5½ c-eq/wk
Legumes (Beans & Peas)	1½ c-eq/wk
Starchy	5 c-eq/wk
Other	4 c-eq/wk
Fruits	**2 c-eq/day**
Grains	**6 oz-eq/day**
Whole Grains	≥ 3 oz-eq/day
Refined Grains	≤ 3 oz-eq/day
Dairy	**3 c-eq/day**
Protein Foods	**5½ oz-eq/day**
Seafood	8 oz-eq/wk
Meats, Poultry, Eggs	26 oz-eq/wk
Nuts, Seeds, Soy Products	5 oz-eq/wk
Oils	**27 g/day**
Limit on Calories for Other Uses (% of Calories)[c]	**270 kcal/day (14%)**

[a] Definitions for each food group and subgroup are provided throughout the chapter and are compiled in Appendix 3.

[b] Food group amounts shown in cup-(c) or ounce-(oz) equivalents (eq). Oils are shown in grams (g). Quantity equivalents for each food group are defined in Appendix 3. Amounts will vary for those who need less than 2,000 or more than 2,000 calories per day. See Appendix 3 for all 12 calorie levels of the pattern.

[c] Assumes food choices to meet food group recommendations are in nutrient-dense forms. Calories from added sugars, added refined starches, solid fats, alcohol, and/or to eat more than the recommended amount of nutrient-dense foods are accounted for under this category.

NOTE: The total eating pattern should not exceed *Dietary Guidelines* limits for intake of calories from added sugars and saturated fats and alcohol and should be within the Acceptable Macronutrient Distribution Ranges for calories from protein, carbohydrate, and total fats. Most calorie patterns do not have enough calories available after meeting food group needs to consume 10 percent of calories from added sugars and 10 percent of calories from saturated fats and still stay within calorie limits. Values are rounded.

The Healthy U.S.-Style Eating Pattern is designed to meet the Recommended Dietary Allowances (RDA) and Adequate Intakes for essential nutrients, as well as Acceptable Macronutrient Distribution Ranges (AMDR) set by the Food and Nutrition Board of the IOM. This eating pattern also conforms to limits set by the IOM or *Dietary Guidelines* for other nutrients or food components (see Appendix 6. Glossary of Terms and Appendix 7. Nutritional Goals for Age-Sex Groups Based on Dietary Reference Intakes and Dietary Guidelines Recommendations). Nutritional goals for almost all nutrients are met (see Appendix 3 for additional information).

Importance of Calorie Balance Within Healthy Eating Patterns

Managing calorie intake is fundamental to achieving and maintaining calorie balance—the balance between the calories taken in from foods and the calories expended from metabolic processes and physical activity. The best way to determine whether an eating pattern is at an appropriate number of calories is to monitor body weight and adjust calorie intake and expenditure in physical activity based on changes in weight over time.

All foods and many beverages contain calories, and the total number of calories varies depending on the macronutrients in a food. On average, carbohydrates and protein contain 4 calories per gram, fats contain 9 calories per gram, and alcohol has 7 calories per gram. The total number of calories a person needs each day varies depending on a number of factors, including the person's age, sex, height, weight, and level of physical activity (see Appendix 2). In addition, a need to lose, maintain, or gain weight and other factors affect how many calories should be consumed.

All Americans—children, adolescents, adults, and older adults—are encouraged to achieve and/or maintain a healthy body weight. General guidance for achieving and maintaining a healthy body weight is provided below, and Appendix 8. Federal Resources for Information on Nutrition and Physical Activity provides additional resources, including an evolving array of tools to facilitate Americans' adoption of healthy choices.

- Children and adolescents are encouraged to maintain calorie balance to support normal growth and development without promoting excess weight gain. Children and adolescents who are overweight or obese should change their eating and physical activity behaviors to maintain or reduce their rate of weight gain while linear growth occurs, so that they can reduce body mass index (BMI) percentile toward a healthy range.

- Before becoming pregnant, women are encouraged to achieve and maintain a healthy weight, and women who are pregnant are encouraged to gain weight within gestational weight gain guidelines.[8]

- Adults who are obese should change their eating and physical activity behaviors to prevent additional weight gain and/or promote weight loss. Adults who are overweight should not gain additional weight, and those with one or more CVD risk factors (e.g., hypertension and hyperlipidemia) should change their eating and physical activity behaviors to lose weight. To lose weight, most people need to reduce the number of calories they get from foods and beverages and increase their physical activity. For a weight loss of 1 to 1½ pounds per week, daily intake should be reduced by 500 to 750 calories. Eating patterns that contain 1,200 to 1,500 calories each day can help most women lose weight safely, and eating patterns that contain 1,500 to 1,800 calories each day are suitable for most men for weight loss. In adults who are overweight or obese, if reduction in total calorie intake is achieved, a variety of eating patterns can produce weight loss, particularly in the first 6 months to 2 years;[9] however, more research is needed on the health implications of consuming these eating patterns long-term.

- Older adults, ages 65 years and older, who are overweight or obese are encouraged to prevent additional weight gain. Among older adults who are obese, particularly those with CVD risk factors, intentional weight loss can be beneficial and result in improved quality of life and reduced risk of chronic diseases and associated disabilities.

[8] Institute of Medicine (IOM) and National Research Council (NRC). Weight gain during pregnancy: Reexamining the guidelines. Washington (DC): The National Academies Press; 2009.

[9] Jensen MD, Ryan DH, Apovian CM, Ard JD, Comuzzie AG, Donato KA, et al. 2013 AHA/ACC/TOS guideline for the management of overweight and obesity in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and The Obesity Society. J Am Coll Cardiol. 2014;63(25 Pt B):2985-3023. PMID: 24239920. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24239920.

Food Groups

Eating an appropriate mix of foods from the food groups and subgroups—within an appropriate calorie level—is important to promote health. Each of the food groups and their subgroups provides an array of nutrients, and the amounts recommended reflect eating patterns that have been associated with positive health outcomes. Foods from all of the food groups should be eaten in nutrient-dense forms. The following sections describe the recommendations for each of the food groups, highlight nutrients for which the food group is a key contributor, and describe special considerations related to the food group.

Vegetables

Healthy Intake: Healthy eating patterns include a variety of vegetables from all of the five vegetable subgroups—dark green, red and orange, legumes (beans and peas), starchy, and other.[10] These include all fresh, frozen, canned, and dried options in cooked or raw forms, including vegetable juices. The recommended amount of vegetables in the Healthy U.S.-Style Eating Pattern at the 2,000-calorie level is 2½ cup-equivalents of vegetables per day. In addition, weekly amounts from each vegetable subgroup are recommended to ensure variety and meet nutrient needs.

Key Nutrient Contributions: Vegetables are important sources of many nutrients, including dietary fiber, potassium, vitamin A,[11] vitamin C, vitamin K, copper, magnesium, vitamin E, vitamin B6, folate, iron, manganese, thiamin, niacin, and choline. Each of the vegetable subgroups contributes different combinations of nutrients, making it important for individuals to consume vegetables from all the subgroups. For example, dark-green vegetables provide the most vitamin K, red and orange vegetables the most vitamin A, legumes the most dietary fiber, and starchy vegetables the most potassium. Vegetables in the "other" vegetable subgroup provide a wide range of nutrients in varying amounts.

Considerations: To provide all of the nutrients and potential health benefits that vary across different types of vegetables, the Healthy U.S.-Style Eating Pattern includes weekly recommendations for each subgroup. Vegetable choices over time should vary and include many different vegetables. Vegetables should be consumed in a nutrient-dense form, with limited additions such as salt, butter, or creamy sauces. When selecting frozen or canned vegetables, choose those lower in sodium.

Fruits

Healthy Intake: Healthy eating patterns include fruits, especially whole fruits. The fruits food group includes whole fruits and 100% fruit juice. Whole fruits include fresh, canned, frozen, and dried forms. The recommended amount of fruits in the Healthy U.S.-Style Eating Pattern at the 2,000-calorie level is 2 cup-equivalents per day. One cup of 100% fruit juice counts as 1 cup of fruit. Although fruit juice can be part of healthy eating patterns, it is lower than whole fruit in dietary fiber and when consumed in excess can contribute extra calories. Therefore, at least half of the recommended amount of fruits should come from whole fruits. When juices are consumed, they should be 100% juice, without added sugars. Also, when selecting canned fruit, choose options that are lowest in added sugars. One-half cup of dried fruit counts as one cup-equivalent of fruit. Similar to juice, when consumed in excess, dried fruits can contribute extra calories.

Key Nutrient Contributions: Among the many nutrients fruits provide are dietary fiber, potassium, and vitamin C.

About Legumes (Beans & Peas)

Legumes include kidney beans, pinto beans, white beans, black beans, garbanzo beans (chickpeas), lima beans (mature, dried), split peas, lentils, and edamame (green soybeans).

Legumes are excellent sources of protein. In addition, they provide other nutrients that also are found in seafood, meats, and poultry, such as iron and zinc. They are excellent sources of dietary fiber and of nutrients, such as potassium and folate that also are found in other vegetables.

Because legumes have a similar nutrient profile to foods in both the protein foods group and the vegetable group, they may be thought of as either a vegetable or a protein food and thus, can be counted as a vegetable or a protein food to meet recommended intakes.

Green peas and green (string) beans are not counted in the legume subgroup, because their nutrient compositions are not similar to legumes. Green peas are similar to starchy vegetables and are grouped with them. Green beans are grouped with the other vegetables subgroup, which includes onions, iceberg lettuce, celery, and cabbage, because their nutrient content is not similar to legumes.

[10] Definitions for each food group and subgroup are provided throughout the chapter and are compiled in Appendix 3.

[11] In the form of provitamin A carotenoids

Considerations: Juices may be partially fruit juice, and only the proportion that is 100% fruit juice counts (e.g., 1 cup of juice that is 50% juice counts as ½ cup of fruit juice). The remainder of the product may contain added sugars. Sweetened juice products with minimal juice content, such as juice drinks, are considered to be sugar-sweetened beverages rather than fruit juice because they are primarily composed of water with added sugars (see the Added Sugars section). The percent of juice in a beverage may be found on the package label, such as "contains 25% juice" or "100% fruit juice." The amounts of fruit juice allowed in the USDA Food Patterns for young children align with the recommendation from the American Academy of Pediatrics that young children consume no more than 4 to 6 fluid ounces of 100% fruit juice per day.[12] Fruits with small amounts of added sugars can be accommodated in the diet as long as calories from added sugars do not exceed 10 percent per day and total calorie intake remains within limits.

Grains

Healthy Intake: Healthy eating patterns include whole grains and limit the intake of refined grains and products made with refined grains, especially those high in saturated fats, added sugars, and/or sodium, such as cookies, cakes, and some snack foods. The grains food group includes grains as single foods (e.g., rice, oatmeal, and popcorn), as well as products that include grains as an ingredient (e.g., breads, cereals, crackers, and pasta). Grains are either whole or refined. Whole grains (e.g., brown rice, quinoa, and oats) contain the entire kernel, including the endosperm, bran, and germ. Refined grains differ from whole grains in that the grains have been processed to remove the bran and germ, which removes dietary fiber, iron, and other nutrients. The recommended amount of grains in the Healthy U.S.-Style Eating Pattern at the 2,000-calorie level is 6 ounce-equivalents per day. At least half of this amount should be whole grains (see the How To Make at Least Half of Grains Whole Grains call-out box).

Key Nutrient Contributions: Whole grains are a source of nutrients, such as dietary fiber, iron, zinc, manganese, folate, magnesium, copper, thiamin, niacin, vitamin B6, phosphorus, selenium, riboflavin, and vitamin A.[13] Whole grains vary in their dietary fiber content. Most refined grains are enriched, a process that adds back iron and four B vitamins (thiamin, riboflavin, niacin, and folic acid). Because of this process, the term "enriched grains" is often used to describe these refined grains.

Considerations: Individuals who eat refined grains should choose enriched grains. Those who consume all of their grains as whole grains should include some grains, such as some whole-grain ready-to-eat breakfast cereals, that have been fortified with folic acid. This is particularly important for women who are or are capable of becoming pregnant, as folic acid fortification in the United States has been successful in reducing the incidence of neural tube defects during fetal development. Although grain products that are high in added sugars and saturated fats, such as cookies, cakes, and some snack foods, should be limited, as discussed in the Added Sugars and Saturated Fats sections, grains with some added sugars and saturated fats can fit within healthy eating patterns.

How To Make at Least Half of Grains Whole Grains

A food is a 100-percent whole-grain food if the only grains it contains are whole grains. One ounce-equivalent of whole grains has 16 g of whole grains. The recommendation to consume at least half of total grains as whole grains can be met in a number of ways.

The most direct way to meet the whole grain recommendation is to choose 100 percent whole-grain foods for at least half of all grains consumed. The relative amount of whole grain in the food can be inferred by the placement of the grain in the ingredients list. The whole grain should be the first ingredient—or the second ingredient, after water. For foods with multiple whole-grain ingredients, they should appear near the beginning of the ingredients list.

Many grain foods contain both whole grains and refined grains. These foods also can help people meet the whole grain recommendation, especially if a considerable proportion of the grain ingredients is whole grains. Another way to meet the recommendation to make at least half of grains whole grains is to choose products with at least 50 percent of the total weight as whole-grain ingredients.[14],[15] If a food has at least 8 g of whole grains per ounce-equivalent, it is at least half whole grains.[16] Some product labels show the whole grains health claim or the grams of whole grain in the product. This information may help people identify food choices that have a substantial amount of whole grains.

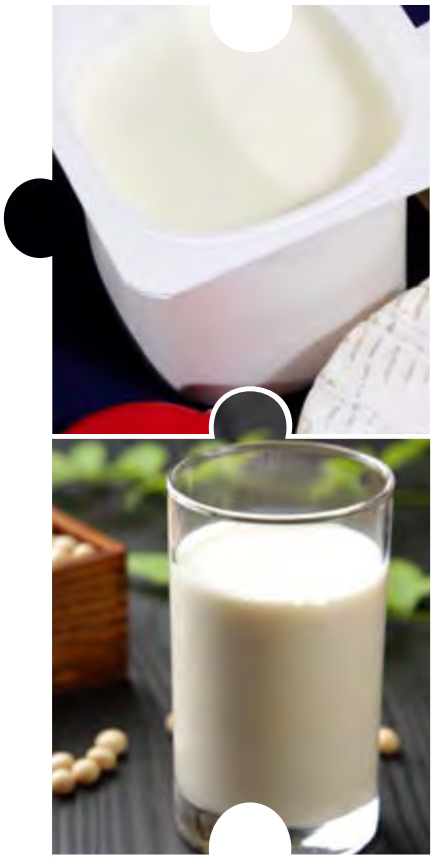
[12] American Academy of Pediatrics. Healthy Children, Fit Children: Answers to Common Questions From Parents About Nutrition and Fitness. 2011.

[13] In the form of provitamin A carotenoids

[14] Products that bear the U.S. Food and Drug Administration (FDA) health claim for whole grains have at least 51 percent of the total ingredients by weight as whole-grain ingredients; they also meet other criteria.

[15] Foods that meet the whole grain-rich criteria for the school meal programs contain 100 percent whole grain or a blend of whole-grain meal and/or flour and enriched meal and/or flour of which at least 50 percent is whole grain. The remaining 50 percent or less of grains, if any, must be enriched. http://www.fns.usda.gov/sites/default/files/WholeGrainResource.pdf. Accessed October 22, 2015.

[16] Adapted from the Food Safety and Inspection Service (FSIS) guidance on whole-grain claims. Available at: http://www.fsis.usda.gov/wps/portal/fsis/home. Accessed November 25, 2015.



Dairy

Healthy Intake: Healthy eating patterns include fat-free and low-fat (1%) dairy, including milk, yogurt, cheese, or fortified soy beverages (commonly known as "soymilk"). Soy beverages fortified with calcium, vitamin A, and vitamin D, are included as part of the dairy group because they are similar to milk based on nutrient composition and in their use in meals. Other products sold as "milks" but made from plants (e.g., almond, rice, coconut, and hemp "milks") may contain calcium and be consumed as a source of calcium, but they are not included as part of the dairy group because their overall nutritional content is not similar to dairy milk and fortified soy beverages (soymilk). The recommended amounts of dairy in the Healthy U.S.-Style Pattern are based on age rather than calorie level and are 2 cup-equivalents per day for children ages 2 to 3 years, 2½ cup-equivalents per day for children ages 4 to 8 years, and 3 cup-equivalents per day for adolescents ages 9 to 18 years and for adults.

Key Nutrient Contributions: The dairy group contributes many nutrients, including calcium, phosphorus, vitamin A, vitamin D (in products fortified with vitamin D), riboflavin, vitamin B12, protein, potassium, zinc, choline, magnesium, and selenium.

Considerations: Fat-free and low-fat (1%) dairy products provide the same nutrients but less fat (and thus, fewer calories) than higher fat options, such as 2% and whole milk and regular cheese. Fat-free or low-fat milk and yogurt, in comparison to cheese, contain less saturated fats and sodium and more potassium, vitamin A, and vitamin D. Thus, increasing the proportion of dairy intake that is fat-free or low-fat milk or yogurt and decreasing the proportion that is cheese would decrease saturated fats and sodium and increase potassium, vitamin A, and vitamin D provided from the dairy group. Individuals who are lactose intolerant can choose low-lactose and lactose-free dairy products. Those who are unable or choose not to consume dairy products should consume foods that provide the range of nutrients generally obtained from dairy, including protein, calcium, potassium, magnesium, vitamin D, and vitamin A (e.g., fortified soy beverages [soymilk]). Additional sources of potassium, calcium, and vitamin D are found in Appendix 10, Appendix 11, and Appendix 12, respectively.

Protein Foods

Healthy Intake: Healthy eating patterns include a variety of protein foods in nutrient-dense forms. The protein foods group comprises a broad group of foods from both animal and plant sources and includes several subgroups: seafood; meats, poultry, and eggs; and nuts, seeds, and soy products. Legumes (beans and peas) may also be considered part of the protein foods group as well as the vegetables group (see the About Legumes (Beans and Peas) call-out box). Protein also is found in some foods from other food groups (e.g., dairy). The recommendation for protein foods in the Healthy U.S.-Style Eating Pattern at the 2,000-calorie level is 5½ ounce-equivalents of protein foods per day.

Key Nutrient Contributions: Protein foods are important sources of nutrients in addition to protein, including B vitamins (e.g., niacin, vitamin B_{12}, vitamin B_6, and riboflavin), selenium, choline, phosphorus, zinc, copper, vitamin D, and vitamin E). Nutrients provided by various types of protein foods differ. For example, meats provide the most zinc, while poultry provides the most niacin. Meats, poultry, and seafood provide heme iron, which is more bioavailable than the non-heme iron found in plant sources. Heme iron is especially important for young children and women who are capable of becoming pregnant or who are pregnant. Seafood provides the most vitamin B_{12} and vitamin D, in addition to almost all of the polyunsaturated omega-3 fatty acids, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA), in the Patterns (see the About Seafood call-out box). Eggs provide the most choline, and nuts and seeds provide the most vitamin E. Soy products are a source of copper, manganese, and iron, as are legumes.

Considerations: For balance and flexibility within the food group, the Healthy U.S.-Style Eating Pattern includes weekly recommendations for the subgroups: seafood; meats, poultry, and eggs; and nuts, seeds, and soy products. A specific

recommendation for at least 8 ounce-equivalents of seafood per week also is included for the 2,000-calorie level (see the About Seafood call-out box). One-half ounce of nuts or seeds counts as 1 ounce-equivalent of protein foods, and because they are high in calories, they should be eaten in small portions and used to replace other protein foods rather than being added to the diet. When selecting protein foods, nuts and seeds should be unsalted, and meats and poultry should be consumed in lean forms. Processed meats and processed poultry are sources of sodium and saturated fats, and intake of these products can be accommodated as long as sodium, saturated fats, added sugars, and total calories are within limits in the resulting eating pattern (see the About Meats and Poultry call-out box). The inclusion of protein foods from plants allows vegetarian options to be accommodated.

About Seafood

Seafood, which includes fish and shellfish, received particular attention in the *2010 Dietary Guidelines* because of evidence of health benefits for the general populations as well as for women who are pregnant or breastfeeding. For the general population, consumption of about 8 ounces per week of a variety of seafood, which provide an average consumption of 250 mg per day of EPA and DHA, is associated with reduced cardiac deaths among individuals with and without preexisting CVD. Similarly, consumption by women who are pregnant or breastfeeding of at least 8 ounces per week from seafood choices that are sources of DHA is associated with improved infant health outcomes.

The recommendation to consume 8 or more ounces per week (less for young children) of seafood is for the total package of nutrients that seafood provides, including its EPA and DHA content. Some seafood choices with higher amounts of EPA and DHA should be included.

Strong evidence from mostly prospective cohort studies but also randomized controlled trials has shown that eating patterns that include seafood are associated with reduced risk of CVD, and moderate evidence indicates that these eating patterns are associated with reduced risk of obesity. As described earlier, eating patterns consist of multiple, interacting food components and the relationships to health exist for the overall eating pattern, not necessarily to an isolated aspect of the diet.

Mercury is a heavy metal found in the form of methyl mercury in seafood in varying levels. Seafood choices higher in EPA and DHA but lower in methyl mercury are encouraged.[17] Seafood varieties commonly consumed in the United States that are higher in EPA and DHA and lower in methyl mercury include salmon, anchovies, herring, shad, sardines, Pacific oysters, trout, and Atlantic and Pacific mackerel (*not* king mackerel, which is high in methyl mercury). Individuals who regularly consume more than the recommended amounts of seafood that are in the Healthy U.S-Style Pattern should choose a mix of seafood that emphasizes choices relatively low in methyl mercury.

Some canned seafood, such as anchovies, may be high in sodium. To keep sodium intake below recommended limits, individuals can use the Nutrition Facts label to compare sodium amounts.

Women who are pregnant or breastfeeding should consume at least 8 and up to 12 ounces[18] of a variety of seafood per week, from choices that are lower in methyl mercury. Obstetricians and pediatricians should provide guidance on how to make healthy food choices that include seafood. Women who are pregnant or breastfeeding and young children should not eat certain types of fish that are high in methyl mercury.[19]

[17] State and local advisories provide information to guide consumers who eat fish caught from local waters. See the EPA website, "Fish Consumption Advisories, General Information." Available at: http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/general.cfm. Accessed September 26, 2015.

[18] Cooked, edible portion

[19] The U.S. Food and Drug Administration (FDA) and the U.S. Environmental Protection Agency (EPA) provide joint guidance regarding seafood consumption for women who are pregnant or breastfeeding and young children. For more information, see the FDA and EPA websites www.FDA.gov/fishadvice; www.EPA.gov/fishadvice.

About Meats & Poultry

Meat, also known as red meat, includes all forms of beef, pork, lamb, veal, goat, and non-bird game (e.g., venison, bison, and elk). Poultry includes all forms of chicken, turkey, duck, geese, guineas, and game birds (e.g., quail and pheasant). Meats and poultry vary in fat content and include both fresh and processed forms. Lean meats and poultry contain less than 10 g of fat, 4.5 g or less of saturated fats, and less than 95 mg of cholesterol per 100 g and per labeled serving size (e.g., 95% lean ground beef, pork tenderloin, and skinless chicken or turkey breast). Processed meats and processed poultry (e.g., sausages, luncheon meats, bacon, and beef jerky) are products preserved by smoking, curing, salting, and/or the addition of chemical preservatives.

Strong evidence from mostly prospective cohort studies but also randomized controlled trials has shown that *eating patterns* that include lower intake of meats as well as processed meats and processed poultry are associated with reduced risk of CVD in adults. Moderate evidence indicates that these *eating patterns* are associated with reduced risk of obesity, type 2 diabetes, and some types of cancer in adults. As described earlier, eating patterns consist of multiple, interacting food components, and the relationships to health exist for the overall eating pattern, not necessarily to an isolated aspect of the diet. Much of this research on eating patterns has grouped together all meats and poultry, regardless of fat content or processing, though some evidence has identified lean meats and lean poultry in healthy eating patterns. In separate analyses, food pattern modeling has demonstrated that lean meats and lean poultry can contribute important nutrients within limits for sodium, calories from saturated fats and added sugars, and total calories when consumed in recommended amounts in healthy eating patterns, such as the Healthy U.S.-Style and Mediterranean-Style Eating Patterns.

The recommendation for the meats, poultry, and eggs subgroup in the Healthy U.S.-Style Eating Pattern at the 2,000-calorie level is 26 ounce-equivalents per week. This is the same as the amount that was in the primary USDA Food Patterns of the *2010 Dietary Guidelines*. As discussed in Chapter 2, average intakes of meats, poultry, and eggs for teen boys and adult men are above recommendations in the Healthy U.S.-Style Eating Pattern. For those who eat animal products, the recommendation for the protein foods subgroup of meats, poultry, and eggs can be met by consuming a variety of lean meats, lean poultry, and eggs. Choices within these eating patterns may include processed meats and processed poultry as long as the resulting eating pattern is within limits for sodium, calories from saturated fats and added sugars, and total calories.

Oils

Healthy Intake: Oils are fats that contain a high percentage of monounsaturated and polyunsaturated fats and are liquid at room temperature. Although they are not a food group, oils are emphasized as part of healthy eating patterns because they are the major source of essential fatty acids and vitamin E. Commonly consumed oils extracted from plants include canola, corn, olive, peanut, safflower, soybean, and sunflower oils. Oils also are naturally present in nuts, seeds, seafood, olives, and avocados. The fat in some tropical plants, such as coconut oil, palm kernel oil, and palm oil, are not included in the oils category because they do not resemble other oils in their composition. Specifically, they contain a higher percentage of saturated fats than other oils (see Dietary Fats: The Basics call-out box). The recommendation for oils in the Healthy U.S.-Style Eating Pattern at the 2,000-calorie level is 27 g (about 5 teaspoons) per day.

Key Nutrient Contributions: Oils provide essential fatty acids and vitamin E.

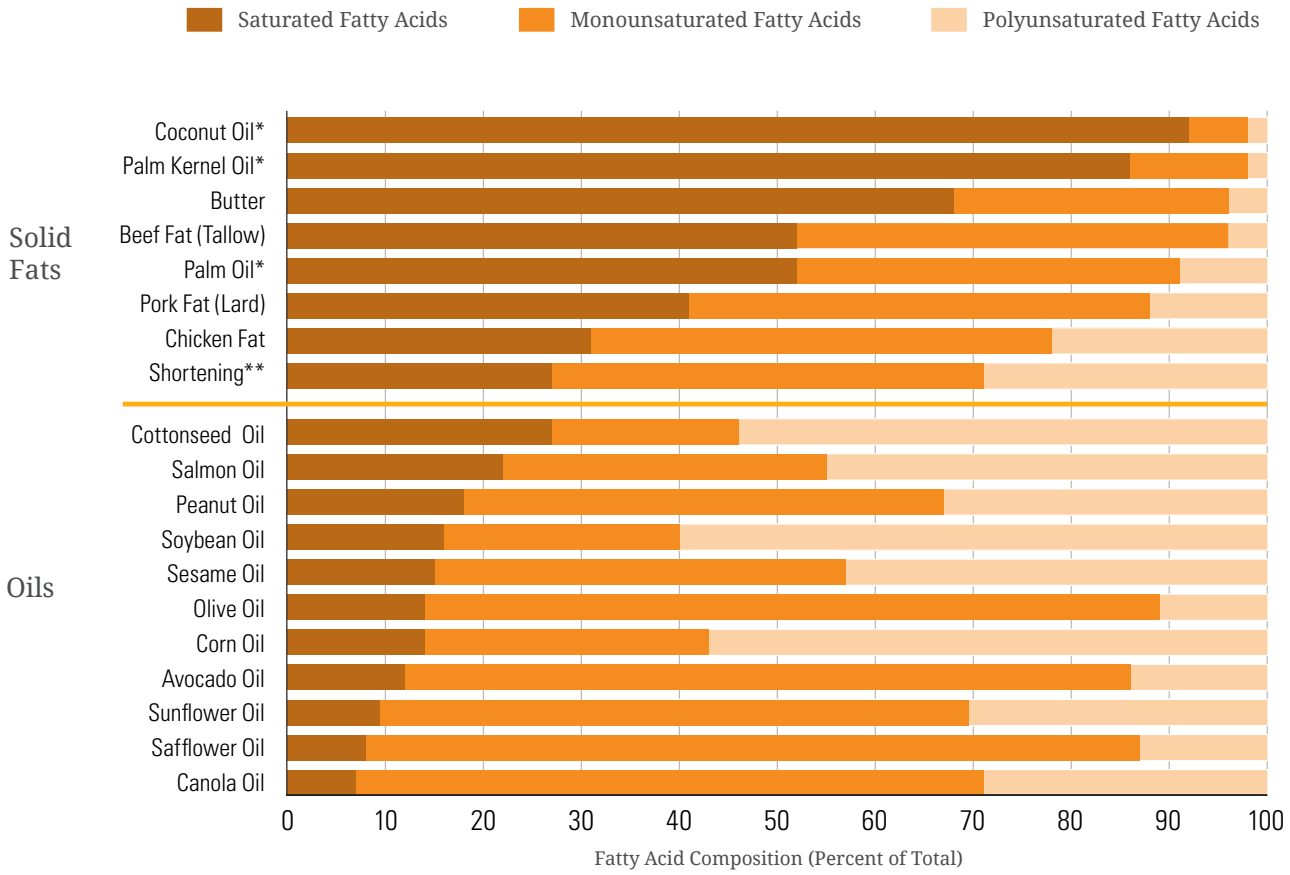
Considerations: Oils are part of healthy eating patterns, but because they are a concentrated source of calories, the amount consumed should be within the AMDR for total fats without exceeding calorie limits. Oils should replace solid fats rather than being added to the diet. More information on types of fats is provided in the Dietary Fats: The Basics call-out box, and information on the relationship between dietary fats and health is discussed in the Saturated Fats, *Trans* Fats, and Cholesterol section.

Dietary Fats: The Basics

Dietary fats are found in both plant and animal foods. They supply calories and help with the absorption of the fat-soluble vitamins A, D, E, and K. Some also are good sources of two essential fatty acids—linoleic acid and α-linolenic acid.

All dietary fats are composed of a mix of polyunsaturated, monounsaturated, and saturated fatty acids, in varied proportions (**Figure 1-2**). For example, most of the fatty acids in butter are saturated, but it also contains some monounsaturated and polyunsaturated fatty acids. Oils are mostly unsaturated fatty acids, though they have small amounts of saturated fatty acids.

Figure 1-2.
Fatty Acid Profiles of Common Fats & Oils



***** Coconut, palm kernel, and palm oil are called oils because they come from plants. However, they are solid or semi-solid at room temperature due to their high content of short-chain saturated fatty acids. They are considered solid fats for nutritional purposes.

****** Shortening may be made from partially hydrogenated vegetable oil, which contains *trans* fatty acids.

DATA SOURCES: U.S. Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. USDA National Nutrient Database for Standard Reference. Release 27, 2015. Available at: http://ndb.nal.usda.gov/. Accessed August 31, 2015.

Dietary Fats: The Basics *(continued...)*

- **Polyunsaturated fatty acids (polyunsaturated fats[20])** are found in greatest amounts in sunflower, corn, soybean, and cottonseed oils; walnuts; pine nuts; and sesame, sunflower, pumpkin, and flax seeds. Only small amounts of polyunsaturated fats are found in most animal fats. Omega-3 (*n*-3) fatty acids are a type of polyunsaturated fats found in seafood, such as salmon, trout, herring, tuna, and mackerel, and in flax seeds and walnuts. EPA and DHA are long chain *n*-3 fatty acids found in seafood.

- **Monounsaturated fatty acids (monounsaturated fats)** are found in greatest amounts in olive, canola, peanut, sunflower, and safflower oils, and in avocados, peanut butter, and most nuts. Monounsaturated fats also are part of most animal fats such as fats from chicken, pork, beef, and wild game.

- **Saturated fatty acids (saturated fats)** are found in the greatest amounts in coconut and palm kernel oils, in butter and beef fats, and in palm oil. They also are found in other animal fats, such as pork and chicken fats and in other plant fats, such as nuts.

- ***Trans* fatty acids (*trans* fats)** are unsaturated fats found primarily in partially hydrogenated vegetable oils and foods containing these oils and in ruminant (animal) fats. They are structurally different from the unsaturated fatty acids that occur naturally in plant foods and differ in their health effects.

The proportions of fatty acids in a particular fat determine the physical form of the fat:

- Fats with a higher amount of polyunsaturated and monounsaturated fatty acids are usually liquid at room temperature and are referred to as "oils."

- Fats with a higher amount of saturated fatty acids are usually solid at room temperature and are referred to as "solid fats." Fats containing *trans* fatty acids are also classified as solid fats, although they may or may not be solid at room temperature.

A relevant detail in the complexity of making food-based recommendations that consider nutrients is the difference between the terms "saturated fats" and "solid fats." Although they are closely related terms, saturated fats and solid fats are not synonymous. The term "saturated fats" refers to saturated fatty acids, a nutrient found in foods, while the term "solid fats" describes the physical manifestation of the fats in a food. Some solid fats, such as the strip of fat around a piece of meat, can easily be seen. Other solid fats are not so visible. For example, the solid fats in whole milk are suspended in the fluid milk by the process of homogenization.

Margarines and margarine-like vegetable oil spreads are food products composed of one or more oils or solid fats designed to replace butter, which is high in saturated fats. These products may be sold in sticks, tubs, bottles, or sprays. Margarine and vegetable oil spreads generally contain less saturated fats than butter. However, they vary in their total fat and calorie content and in the fat and oil blends used to make them and, thus, in the proportions of saturated, unsaturated, and *trans* fats they contain. It is important to read the Nutrition Facts label to identify the calorie and saturated and *trans* fats content of the spread and choose foods with no *trans* fats and lower amounts of saturated fats.

The *Dietary Guidelines* provides recommendations on saturated fats as well as on solid fats because its aim is to improve the health of the U.S. population through food-based guidance. It includes recommendations on saturated fats because of the strong relationship of this nutrient to a health outcome (CVD risk). It includes recommendations on solid fats because, as discussed in Chapter 2, they are abundant in the diets of the U.S. population, and reducing solid fats when making food choices is an important way to reduce saturated fats and excess calories.

[20] The term "fats" rather than "fatty acids" is generally used in this document when discussing categories of fatty acids (e.g., unsaturated, saturated, trans) for consistency with the Nutrition Facts label and other Federal materials.

Limits on Calories That Remain After Food Group Needs Are Met in Nutrient-Dense Forms

The USDA Food Patterns are designed to meet food group and nutrient recommendations while staying within calorie needs. To achieve this goal, the Patterns are based on consuming foods in their nutrient-dense forms (i.e., without added sugars and in the leanest and lowest fat forms, see Appendix 6). For nearly all calorie levels, most of the calories in the USDA Food Patterns are needed for nutrient-dense food choices, and only a limited number remain for other uses. These calories are indicated in the USDA Food Patterns as "limits on calories for other uses." For example, after food group needs are met in the Healthy U.S.-Style Eating Pattern from 1,000 to 1,600 calories, only 100 to 170 calories per day remain within the limit for other uses. In the 2,000-calorie pattern, the limit for other uses is 270 calories and in the 2,800-calorie pattern, 400 calories (see Appendix 3, Appendix 4, and Appendix 5). Calories up to the limit for the specific pattern can be used to eat foods that are not in nutrient-dense forms (e.g., to accommodate calories from added sugars, added refined starches, or solid fats) or to eat more than the recommended amount of nutrient-dense foods. If alcohol is consumed, calories from alcoholic beverages should also be accounted for within this limit to keep total calorie intake at an appropriate level.

As discussed in Chapter 2, in contrast to the healthy choices that make up the Patterns, foods from most food groups as they are typically consumed in the United States are not in nutrient-dense forms. In addition, foods and beverages are consumed that are primarily composed of added sugars and/or solid fats, and provide excess calories without contributing to meeting food group recommendations. The excess calories consumed from these sources far exceed the limited number of calories available for choices other than nutrient-dense foods in each food group.

From a public health perspective, it is important to identify the calories that are needed to meet food group needs to help inform guidance on limits from calories from added sugars, solid fats, alcohol[21], or other sources, in order to help individuals move toward healthy eating patterns within calorie limits. The USDA Food Patterns can be used to plan and serve meals for individuals, households, and in a variety of organizational settings (e.g., schools, worksites, and other community settings). The limit on calories for other uses can assist in determining how to plan and select foods that can fit within healthy eating patterns, such as how many calories are available to select foods from a food group that are not in nutrient-dense forms. As discussed in the next portion of the chapter, additional constraints apply related to other dietary components when building healthy eating patterns.

Other Dietary Components

In addition to the food groups, it is important to consider other food components when making food and beverage choices. The components discussed here include added sugars, saturated fats, *trans* fats, cholesterol, sodium, alcohol, and caffeine. For each component, information is provided on how the component relates to eating patterns and outlines considerations related to the component. See Chapter 2 for a further discussion of each of these components, current intakes, and shifts that are needed to help individuals align with a healthy eating pattern.

Added Sugars

Healthy Intake: Added sugars include syrups and other caloric sweeteners. When sugars are added to foods and beverages to sweeten them, they add calories without contributing essential nutrients. Consumption of added sugars can make it difficult for individuals to meet their nutrient needs while staying within calorie limits. Naturally occurring sugars, such as those in fruit or milk, are not added sugars. Specific examples of added sugars that can be listed as an ingredient include brown sugar, corn sweetener, corn syrup, dextrose, fructose, glucose, high-fructose corn syrup, honey, invert sugar, lactose, malt syrup, maltose, molasses, raw sugar, sucrose, trehalose, and turbinado sugar.

Healthy eating patterns limit added sugars to less than 10 percent of calories per day. This recommendation is a target to help the public achieve a healthy eating pattern, which means meeting nutrient and food group needs through nutrient-dense food and beverage choices and staying within calorie limits. When added sugars in foods and beverages exceed 10 percent of calories, a healthy eating pattern may be difficult to achieve. This target also is informed by national data on intakes of calories from added sugars, which as discussed in Chapter 2, account on average for almost 270 calories, or more than 13 percent of calories per day in the U.S. population.

[21] It is not recommended that individuals begin drinking or drink more for any reason. The amount of alcohol and calories in beverages varies and should be accounted for within the limits of healthy eating patterns. Alcohol should be consumed only by adults of legal drinking age. There are many circumstances in which individuals should not drink, such as during pregnancy. See Appendix 9. Alcohol for additional information.

Figure 1-3.

Hidden Components in Eating Patterns

Many of the foods and beverages we eat contain sodium, saturated fats, and added sugars. Making careful choices, as in this example, keeps amounts of these components within their limits while meeting nutrient needs to achieve a healthy eating pattern.

** Foods very low in sodium not marked*

Contributes:

● Sodium* ● Saturated Fats ● Added Sugars

Dinner

Spaghetti & Meatballs ●●●

Spaghetti	1 cup, cooked
Spaghetti Sauce ●●	¼ cup
Diced Tomatoes (canned, no salt added)	¼ cup
Meatballs ●●	3 medium meatballs
Parmesan Cheese ●●	1 tablespoon

Apple, Raw ½ medium

Water, Tap 1 cup

Garden Salad ●●●

Mixed Greens	1 cup
Cucumber	3 slices
Avocado ●	¼ cup, cubed
Garbanzo Beans ● (canned, low sodium)	¼ cup
Cheddar Cheese ● (reduced fat)	3 tablespoons, shredded
Ranch Salad ●●● Dressing	1 tablespoon

761 Calories

Total

Sodium: 2,253 mg
less than or equal to 2,300 mg

Calories From Saturated Fats: 153 (8% of Total Calories)
less than or equal to 10% of calories

Calories From Added Sugars: 164 (8% of Total Calories)
less than or equal to 10% of calories

1,995 Calories

** Foods very low in sodium not marked*

The USDA Food Patterns show that an eating pattern with enough foods from all food groups to meet nutrient needs without eating too many calories has only limited room for calories from added sugars. At most lower calorie levels (i.e., 1,200 to 1,800 calories), the calories that remain after meeting food group recommendations in nutrient-dense forms ("limits on calories for other uses") are less than 10 percent per day of calories; however, at higher calorie levels, the limits on calories for other uses are more than 10 percent per day. The recommendation to limit added sugars to no more than 10 percent of calories is a target that applies to all calorie levels to help individuals move toward healthy eating patterns within calorie limits.

Although the evidence for added sugars and health outcomes is still developing, the recommendation to limit calories from added sugars is consistent with research examining *eating patterns* and health. Strong evidence from mostly prospective cohort studies but also randomized controlled trials has shown that *eating patterns* that include lower intake of sources of added sugars are associated with reduced risk of CVD in adults, and moderate evidence indicates that these *eating patterns* are associated with reduced risk of obesity, type 2 diabetes, and some types of cancer in adults. As described earlier, eating patterns consist of multiple, interacting food components, and the relationships to health exist for the overall eating pattern, not necessarily to an isolated aspect of the diet. Moderate evidence indicates a relationship between added sugars and dental caries in children and adults.

Considerations: Added sugars provide sweetness that can help improve the palatability of foods, help with preservation, and/or contribute to functional attributes such as viscosity, texture, body, color, and browning capability. As discussed in Chapter 2, the two main sources of added sugars in U.S. diets are sugar-sweetened beverages and snacks and sweets. Many foods high in calories from added sugars provide few or no essential nutrients or dietary fiber and, therefore, may contribute to excess calorie intake without contributing to diet quality; intake of these foods should be limited to help achieve healthy eating patterns within calorie limits. There is room for Americans to include limited amounts of added sugars in their eating patterns, including to improve the palatability of some nutrient-dense foods, such as fruits and vegetables that are naturally tart (e.g., cranberries and rhubarb). Healthy eating patterns can accommodate other nutrient-dense foods with small amounts of added sugars, such as whole-grain breakfast cereals or fat-free yogurt, as long as calories from added sugars do not exceed 10 percent per day, total carbohydrate intake remains within the AMDR, and total calorie intake remains within limits.

It should be noted that replacing added sugars with high-intensity sweeteners may reduce calorie intake in the short-term, yet questions remain about their effectiveness as a long-term weight management strategy. High-intensity sweeteners that have been approved by the U.S. Food and Drug Administration (FDA) include saccharin, aspartame, acesulfame potassium (Ace-K), and sucralose.[22] Based on the available scientific evidence, these high-intensity sweeteners have been determined to be safe for the general population. This means that there is reasonable certainty of no harm under the intended conditions of use because the estimated daily intake is not expected to exceed the acceptable daily intake for each sweetener. The FDA has determined that the estimated daily intake of these high-intensity sweeteners would not exceed the acceptable daily intake, even for high consumers of each substance.

Saturated Fats, *Trans* Fats, & Cholesterol

Saturated Fats

Healthy Intake: Intake of saturated fats should be limited to less than 10 percent of calories per day by replacing them with unsaturated fats and while keeping total dietary fats within the age-appropriate AMDR. The human body uses some saturated fats for physiological and structural functions, but it makes more than enough to meet those needs. Individuals 2 years and older therefore have no dietary requirement for saturated fats.

Strong and consistent evidence shows that replacing saturated fats with unsaturated fats, especially polyunsaturated fats, is associated with reduced blood levels of total cholesterol and of low-density lipoprotein-cholesterol (LDL-cholesterol). Additionally, strong and consistent evidence shows that replacing saturated fats with polyunsaturated fats is associated with a reduced risk of CVD events (heart attacks) and CVD-related deaths.

Some evidence has shown that replacing saturated fats with plant sources of monounsaturated fats, such as olive oil and nuts, may be associated with a reduced risk of CVD. However, the evidence base

[22] For more information, see: FDA. High-Intensity Sweeteners. May 19, 2014. [Updated November 5, 2014.] Available at: http://www.fda.gov/food/ingredientspackaginglabeling/foodadditivesingredients/ucm397716.htm. Accessed October 19, 2015. This page provides a link to "Additional Information about High-Intensity Sweeteners Permitted for use in Food in the United States" which includes more information on types and uses of high-intensity sweeteners and the scientific evidence evaluated by the FDA for safety for the general population.

for monounsaturated fats is not as strong as the evidence base for replacement with polyunsaturated fats. Evidence has also shown that replacing saturated fats with carbohydrates reduces blood levels of total and LDL-cholesterol, but increases blood levels of triglycerides and reduces high-density lipoprotein-cholesterol (HDL-cholesterol). Replacing total fat or saturated fats with carbohydrates is not associated with reduced risk of CVD. Additional research is needed to determine whether this relationship is consistent across categories of carbohydrates (e.g., whole versus refined grains; intrinsic versus added sugars), as they may have different associations with various health outcomes. Therefore, saturated fats in the diet should be replaced with polyunsaturated and monounsaturated fats.

Considerations: As discussed in Chapter 2, the main sources of saturated fats in the U.S. diet include mixed dishes containing cheese, meat, or both, such as burgers, sandwiches, and tacos; pizza; rice, pasta, and grain dishes; and meat, poultry, and seafood dishes. Although some saturated fats are inherent in foods, others are added. Healthy eating patterns can accommodate nutrient-dense foods with small amounts of saturated fats, as long as calories from saturated fats do not exceed 10 percent per day, intake of total fats remains within the AMDR, and total calorie intake remains within limits. When possible, foods high in saturated fats should be replaced with foods high in unsaturated fats, and other choices to reduce solid fats should be made (see Chapter 2).

Trans Fats

Individuals should limit intake of *trans* fats to as low as possible by limiting foods that contain synthetic sources of *trans* fats, such as partially hydrogenated oils in margarines, and by limiting other solid fats. A number of studies have observed an association between increased intake of *trans* fats and increased risk of CVD. This increased risk is due, in part, to its LDL-cholesterol-raising effect.

Trans fats occur naturally in some foods and also are produced in a process called hydrogenation. Hydrogenation is used by food manufacturers to make products containing unsaturated fatty acids solid at room temperature (i.e., more saturated) and therefore more resistant to becoming spoiled or rancid. Partial hydrogenation means that some, but not all, unsaturated fatty acids are converted to saturated fatty acids; some of the unsaturated fatty acids are changed from a *cis* to *trans* configuration. *Trans* fatty acids produced this way are referred to as "artificial" or "industrially produced" trans fatty acids. Artificial *trans* fatty acids are found in the partially hydrogenated oils[23] used in some margarines, snack foods, and prepared desserts as a replacement for saturated fatty acids. Although food manufacturers and restaurants have reduced the amounts of artificial *trans* fats in many foods in recent years, these fats can still be found in some processed foods, such as some desserts, microwave popcorn, frozen pizza, margarines, and coffee creamers.

Naturally occurring *trans* fats, known as "natural" or "ruminant" *trans* fats, are produced by ruminant animals. Natural *trans* fats are present in small quantities in dairy products and meats, and consuming fat-free or low-fat dairy products and lean meats and poultry will reduce the intake of natural *trans* fats from these foods. Because natural *trans* fats are present in dairy products and meats in only small quantities and these foods can be important sources of nutrients, these foods do not need to be eliminated from the diet.

Dietary Cholesterol

The body uses cholesterol for physiological and structural functions but makes more than enough for these purposes. Therefore, people do not need to obtain cholesterol through foods.

The Key Recommendation from the *2010 Dietary Guidelines* to limit consumption of dietary cholesterol to 300 mg per day is not included in the 2015 edition, but this change does not suggest that dietary cholesterol is no longer important to consider when building healthy eating patterns. As recommended by the IOM,[24] individuals should eat as little dietary cholesterol as possible while consuming a healthy eating pattern. In general, foods that are higher in dietary cholesterol, such as fatty meats and high-fat dairy products, are also higher in saturated fats. The USDA Food Patterns are limited in saturated fats, and because of the commonality of food sources of saturated fats and dietary cholesterol, the Patterns are also low in dietary cholesterol. For example, the Healthy U.S.-Style Eating Pattern contains approximately 100 to 300 mg of cholesterol across the 12 calorie levels. Current average intake of dietary cholesterol among those 1 year and older in the United States is approximately 270 mg per day.

Strong evidence from mostly prospective cohort studies but also randomized controlled trials has shown that *eating patterns* that include lower intake of dietary cholesterol are associated with reduced risk of CVD, and moderate evidence indicates that these eating patterns are associated with reduced risk of obesity. As described earlier, *eating patterns* consist of multiple, interacting food components and the relationships to health exist for the overall *eating pattern*, not necessarily to an isolated aspect of the diet. More research is needed

[23] The FDA has determined that partially hydrogenated oils, which are the primary dietary source of industrially produced trans fats, are no longer generally recognized as safe (GRAS), with compliance expected by June 18, 2018. FDA. Final Determination Regarding Partionally Hydrogenated Oils. Federal Register. June 17, 2015;80(116):34650-34670. Available at: https://www.federalregister.gov/articles/2015/06/17/2015-14883/final-determination-regarding-partially-hydrogenated-oils. Accessed October 20, 2015.

[24] Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington (DC): The National Academies Press; 2002.

Dietary Approaches to Stop Hypertension (DASH)

The DASH dietary pattern is an example of a healthy eating pattern and has many of the same characteristics as the Healthy U.S.-Style Eating Pattern. The DASH dietary pattern and several variations have been tested in randomized controlled clinical trials to study the effect of the DASH dietary pattern on CVD risk factors. The original DASH trial demonstrated that the DASH dietary pattern lowered blood pressure and LDL-cholesterol levels, resulting in reduced CVD risk, compared to diets that resembled a typical American diet. The DASH-Sodium trial confirmed the beneficial blood pressure and LDL-cholesterol effects of the DASH eating pattern at three levels of dietary sodium intake and also demonstrated a step-wise lowering of blood pressure as sodium intake was reduced. The OmniHeart Trial found that replacing some of the carbohydrates in DASH with the same amount of either protein or unsaturated fats lowered blood pressure and LDL-cholesterol levels more than the original DASH dietary pattern.

The DASH Eating Plan is high in vegetables, fruits, low-fat dairy products, whole grains, poultry, fish, beans, and nuts and is low in sweets, sugar-sweetened beverages, and red meats. It is low in saturated fats and rich in potassium, calcium, and magnesium, as well as dietary fiber and protein. It also is lower in sodium than the typical American diet, and includes menus with two levels of sodium, 2,300 and 1,500 mg per day. Additional details on DASH are available at http://www.nhlbi.nih.gov/health/health-topics/topics/dash.

Caffeine

Caffeine is not a nutrient; it is a dietary component that functions in the body as a stimulant. Caffeine occurs naturally in plants (e.g., coffee beans, tea leaves, cocoa beans, kola nuts). It also is added to foods and beverages (e.g., caffeinated soda, energy drinks). If caffeine is added to a food, it must be included in the listing of ingredients on the food label.[25] Most intake of caffeine in the United States comes from coffee, tea, and soda. Caffeinated beverages vary widely in their caffeine content. Caffeinated coffee beverages include drip/brewed coffee (12 mg/fl oz), instant coffee (8 mg/fl oz), espresso (64 mg/fl oz), and specialty beverages made from coffee or espresso, such as cappuccinos and lattes. Amounts of caffeine in other beverages such as brewed black tea (6 mg/fl oz), brewed green tea (2-5 mg/fl oz), and caffeinated soda[26] (1-4 mg/fl oz) also vary. Beverages within the energy drinks category have the greatest variability (3-35 mg/fl oz).

Much of the available evidence on caffeine focuses on coffee intake. Moderate coffee consumption (three to five 8-oz cups/day or providing up to 400 mg/day of caffeine) can be incorporated into healthy eating patterns. This guidance on coffee is informed by strong and consistent evidence showing that, in healthy adults, moderate coffee consumption is not associated with an increased risk of major chronic diseases (e.g., cancer) or premature death, especially from CVD. However, individuals who do not consume caffeinated coffee or other caffeinated beverages are not encouraged to incorporate them into their eating pattern. Limited and mixed evidence is available from randomized controlled trials examining the relationship between those energy drinks which have high caffeine content and cardiovascular risk factors and other health outcomes. In addition, caffeinated beverages, such as some sodas or energy drinks, may include calories from added sugars, and although coffee itself has minimal calories, coffee beverages often contain added calories from cream, whole or 2% milk, creamer, and added sugars, which should be limited. The same considerations apply to calories added to tea or other similar beverages.

Those who choose to drink alcohol should be cautious about mixing caffeine and alcohol together or consuming them at the same time; see Appendix 9. Alcohol for additional discussion. In addition, women who are capable of becoming pregnant or who are trying to, or who are pregnant, and those who are breastfeeding should consult their health care providers for advice concerning caffeine consumption.

[25] Some dietary supplements such as energy shots also contain caffeine, but the amount of caffeine in these products is not required to be disclosed

[26] Caffeine is a substance that is generally recognized as safe (GRAS) in cola-type beverages by the U.S. Food and Drug Administration for use by adults and children. Code of Federal Regulation Title 21, Subchapter B, Part 182, Subpart B. Caffeine. U.S. Government Printing Office. November 23, 2015. Available at: http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=f8c3068e9ec0062a3b4078cfa6361cf6&ty=HTML&h=L&mc=true&r=SECTION&n=se21.3.182_11180.

regarding the dose-response relationship between dietary cholesterol and blood cholesterol levels. Adequate evidence is not available for a quantitative limit for dietary cholesterol specific to the *Dietary Guidelines*.

Dietary cholesterol is found only in animal foods such as egg yolk, dairy products, shellfish, meats, and poultry. A few foods, notably egg yolks and some shellfish, are higher in dietary cholesterol but not saturated fats. Eggs and shellfish can be consumed along with a variety of other choices within and across the subgroup recommendations of the protein foods group.

Sodium

Healthy Intake: The scientific consensus from expert bodies, such as the IOM, the American Heart Association, and Dietary Guidelines Advisory Committees, is that average sodium intake, which is currently 3,440 mg per day (see Chapter 2), is too high and should be reduced. Healthy eating patterns limit sodium to less than 2,300 mg per day for adults and children ages 14 years and older and to the age- and sex-appropriate Tolerable Upper Intake Levels (UL) of sodium for children younger than 14 years (see Appendix 7). Sodium is an essential nutrient and is needed by the body in relatively small quantities, provided that substantial sweating does not occur.[27] Sodium is primarily consumed as salt (sodium chloride).

The limits for sodium are the age- and sex-appropriate ULs. The UL is the highest daily nutrient intake level that is likely to pose no risk of adverse health effects to almost all individuals in the general population. The recommendation for adults and children ages 14 years and older to limit sodium intake to less than 2,300 mg per day is based on evidence showing a linear dose-response relationship between increased sodium intake and increased blood pressure in adults. In addition, moderate evidence suggests an association between increased sodium intake and increased risk of CVD in adults. However, this evidence is not as consistent as the evidence on blood pressure, a surrogate indicator of CVD risk.

Calorie intake is highly associated with sodium intake (i.e., the more foods and beverages people consume, the more sodium they tend to consume). Because children have lower calorie needs than adults, the IOM established lower ULs for children younger than 14 years of age based on median intake of calories. Similar to adults, moderate evidence also indicates that the linear dose-response relationship between sodium intake and blood pressure is found in children as well.

Adults with prehypertension and hypertension would particularly benefit from blood pressure lowering. For these individuals, further reduction to 1,500 mg per day can result in even greater blood pressure reduction. Because of the linear dose-response relationship between sodium intake and blood pressure, every incremental decrease in sodium intake that moves toward recommended limits is encouraged. Even without reaching the limits for sodium intake, strong evidence indicates that reductions in sodium intake can lower blood pressure among people with prehypertension and hypertension. Further, strong evidence has demonstrated that adults who would benefit from blood pressure lowering should combine the Dietary Approaches to Stop Hypertension (DASH) dietary pattern with lower sodium intake (see Dietary Approaches to Stop Hypertension call-out box).

Considerations: As a food ingredient, sodium has multiple uses, such as in curing meat, baking, thickening, enhancing flavor (including the flavor of other ingredients), as a preservative, and in retaining moisture. For example, some fresh meats have sodium solutions added to help retain moisture in cooking. As discussed in Chapter 2, sodium is found in foods across the food supply, including mixed dishes such as burgers, sandwiches, and tacos; rice, pasta, and grain dishes; pizza; meat, poultry, and seafood dishes; and soups. Multiple strategies should be implemented to reduce sodium intake to the recommended limits (see Chapter 3. Everyone Has a Role in Supporting Healthy Eating Patterns).

Alcohol

Alcohol is not a component of the USDA Food Patterns. The *Dietary Guidelines* does not recommend that individuals who do not drink alcohol start drinking for any reason. If alcohol is consumed, it should be in moderation—up to one drink per day for women and up to two drinks per day for men—and only by adults of legal drinking age.[6] There are also many circumstances in which individuals should not drink, such as during pregnancy. For the purposes of evaluating amounts of alcohol that may be consumed, the *Dietary Guidelines* includes drink-equivalents. One alcoholic drink-equivalent is described as containing 14 g (0.6 fl oz) of pure alcohol.[28] The following are reference beverages that are one alcoholic drink-equivalent: 12 fluid ounces of regular beer (5% alcohol), 5 fluid ounces of wine (12% alcohol), or 1.5 fluid ounces of 80 proof distilled spirits (40% alcohol).[29] The amount of alcohol and calories in beverages varies and should be accounted for within the limits of healthy eating patterns so that calorie limits are not exceeded. See Appendix 9. Alcohol for additional information.

[27] The IOM set an Adequate Intake (AI) level for sodium to meet the sodium needs of healthy and moderately active individuals. Because of increased loss of sodium from sweat, the AI does not apply to highly active individuals and workers exposed to extreme heat stress, estimated to be less than 1 percent of the U.S. population. Institute of Medicine. Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate. Washington (DC): The National Academies Press; 2005.

[28] Bowman SA, Clemens JC, Friday JE, Thoerig RC, and Moshfegh AJ. 2014. Food Patterns Equivalents Database 2011-12: Methodology and User Guide [Online]. Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland. Available at: http://www.ars.usda.gov/nea/bhnrc/fsrg. Accessed November 3, 2015. For additional information, see the National Institute on Alcohol Abuse and Alcoholism (NIAAA) webpage available at: http://rethinkingdrinking.niaaa.nih.gov/.

[29] Drink-equivalents are not intended to serve as a standard drink definition for regulatory purposes.

Examples of Other Healthy Eating Patterns

The U.S. population consumes many different styles of eating patterns other than the "typical American pattern" that provides the basis for the Healthy U.S.-Style Eating Pattern (see Appendix 3 and Table 1-1). There are many ways to consume a healthy eating pattern, and the evidence to support multiple approaches has expanded over time. The Healthy Mediterranean-Style Eating Pattern and Healthy Vegetarian Eating Pattern, which were developed by modifying the Healthy U.S.-Style Eating Pattern, are two examples of healthy eating patterns individuals may choose based on personal preference. Similar to the Healthy U.S.-Style Eating Pattern, these patterns were designed to consider the types and proportions of foods Americans typically consume, but in nutrient-dense forms and appropriate amounts, which result in eating patterns that are attainable and relevant in the U.S. population. Additionally, healthy eating patterns can be flexible with respect to the intake of carbohydrate, protein, and fat within the context of the AMDR.[30]

As with the Healthy U.S.-Style Eating Pattern, each provides recommended intakes at 12 different calorie levels (see Appendix 4 and Appendix 5). The 2,000 calorie level for each Pattern is shown here as an example (Table 1-2).

Healthy Mediterranean-Style Eating Pattern

A Healthy Mediterranean-Style Eating Pattern (Appendix 4) was designed by modifying the Healthy U.S.-Style Eating

[30] Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington (DC): The National Academies Press; 2002.

Table 1-2.

Composition of the Healthy Mediterranean-Style & Healthy Vegetarian Eating Patterns at the 2,000-Calorie Level,[a] With Daily or Weekly Amounts From Food Groups, Subgroups, & Components

Food Group[b]	Healthy Mediterranean-Style Eating Pattern	Healthy Vegetarian Eating Pattern
Vegetables	**2½ c-eq/day**	**2½ c-eq/day**
Dark Green	1½ c-eq/week	1½ c-eq/week
Red & Orange	5½ c-eq/week	5½ c-eq/week
Legumes (Beans & Peas)	1½ c-eq/week	3 c-eq/week[c]
Starchy	5 c-eq/week	5 c-eq/week
Other	4 c-eq/week	4 c-eq/week
Fruits	**2½ c-eq/day**	**2 c-eq/day**
Grains	**6 oz-eq/day**	**6½ oz-eq/day**
Whole Grains	≥3 oz-eq/day	≥3½ oz-eq/day
Refined Grains	≤3 oz-eq/day	≤3 oz-eq/day
Dairy	**2 c-eq/day**	**3 c-eq/day**
Protein Foods	**6½ oz-eq/day**	**3½ oz-eq/day[c]**
Seafood	15 oz-eq/week[d]	—
Meats, Poultry, Eggs	26 oz-eq/week	3 oz-eq/week (eggs)
Nuts, Seeds, Soy Products	5 oz-eq/week	14 oz-eq/week
Oils	**27 g/day**	**27 g/day**
Limit on Calories for Other Uses (% of Calories)[e]	**260 kcal/day (13%)**	**290 kcal/day (15%)**

[a] Food group amounts shown in cup- (c) or ounce- (oz) equivalents (eq). Oils are shown in grams (g). Quantity equivalents for each food group are defined in Appendix 3. Amounts will vary for those who need less than 2,000 or more than 2,000 calories per day. See Appendix 4 and Appendix 5 for all 12 calorie levels of the patterns.

[b] Definitions for each food group and subgroup are provided throughout the chapter and are compiled in Appendix 3.

[c] Vegetarian patterns include 1½ cups per week of legumes as a vegetable subgroup, and an additional 6 oz-eq (1½ cups) per week of legumes as a protein food. The total amount is shown here as legumes in the vegetable group.

[d] The FDA and EPA provide additional guidance regarding seafood consumption for women who are pregnant or breastfeeding and young children. For more information, see the FDA or EPA websites www.FDA.gov/fishadvice; www.EPA.gov/fishadvice.

[e] Assumes food choices to meet food group recommendations are in nutrient-dense forms. Calories from added sugars, solid fats, added refined starches, alcohol, and/or to eat more than the recommended amount of nutrient-dense foods are accounted for under this category.

NOTE: The total eating pattern should not exceed *Dietary Guidelines* limits for intake of calories from added sugars and saturated fats and alcohol and should be within the Acceptable Macronutrient Distribution Ranges for calories from protein, carbohydrate, and total fats. Most calorie patterns do not have enough calories available after meeting food group needs to consume 10 percent of calories from added sugars and 10 percent of calories from saturated fats and still stay within calorie limits. Values are rounded.

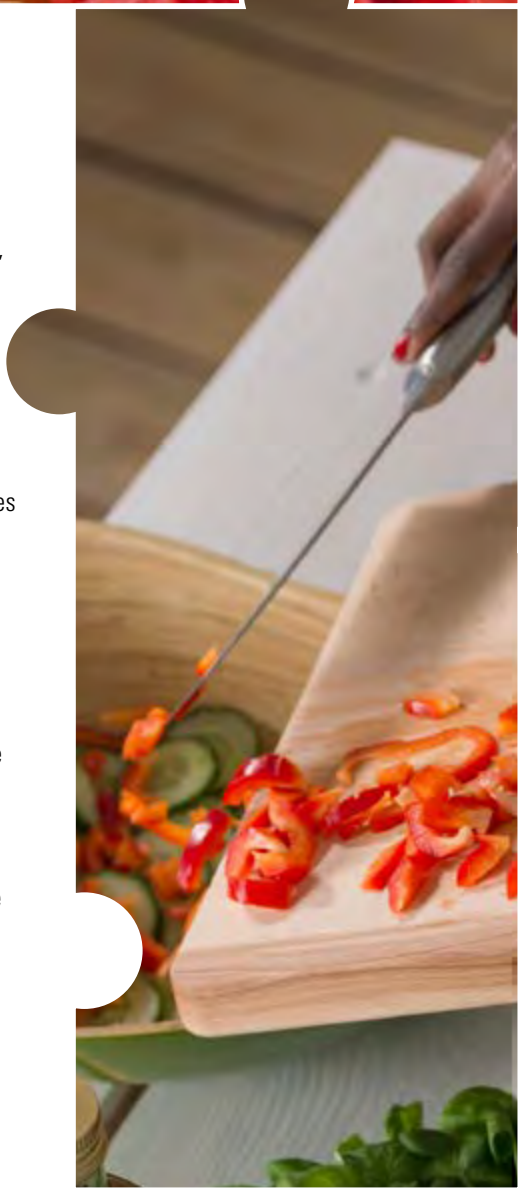
Pattern, taking into account food group intakes from studies examining the associations between Mediterranean-Style eating patterns and health.

The Healthy Mediterranean-Style Eating Pattern contains more fruits and seafood and less dairy than does the Healthy U.S.-Style Eating Pattern. The healthfulness of the Healthy Mediterranean-Style Pattern was evaluated based on its similarity to Mediterranean-Style patterns described in studies with positive health outcomes rather than on meeting specified nutrient standards. However, nutrient content of the Pattern was assessed and found to be similar to the Healthy U.S.-Style Eating Pattern, except for calcium and vitamin D. Calcium and vitamin D are lower because the amounts of dairy were decreased, as shown in Appendix 4, to more closely match data from studies of Mediterranean-Style eating patterns.

Healthy Vegetarian Eating Pattern

A Healthy Vegetarian Eating Pattern (Appendix 5) replaces the previous Lacto-ovo Vegetarian Adaptation of the USDA Food Patterns from the *2010 Dietary Guidelines*. The Healthy Vegetarian Eating Pattern was developed taking into account food choices of self-identified vegetarians in the National Health and Nutrition Examination Survey (NHANES) and provides recommendations to meet the *Dietary Guidelines* for those who follow a vegetarian pattern.

In comparison to the Healthy U.S.-Style Eating Pattern, the Healthy Vegetarian Eating Pattern includes more legumes (beans and peas), soy products, nuts and seeds, and whole grains. It contains no meats, poultry, or seafood, and is identical to the Healthy U.S.-Style Eating Pattern in amounts of all other food groups. The Pattern is similar in meeting nutrient standards to the Healthy U.S.-Style Pattern, but is somewhat higher in calcium and dietary fiber and lower in vitamin D, due to differences in the foods included in the protein foods group, specifically more tofu and beans and no seafood, as shown in Appendix 5.



Summary

The *2015-2020 Dietary Guidelines* provides Guidelines and Key Recommendations with clear guidance for individuals to enhance eating and physical activity patterns. Implementation of these Guidelines will help promote health and prevent chronic disease in the United States. At the core of this guidance is the importance of consuming overall healthy eating patterns, including vegetables, fruits, grains, dairy, protein foods, and oils—eaten within an appropriate calorie level and in forms with limited amounts of saturated fats, added sugars, and sodium. Examples of how to put this guidance into practice are provided by the Healthy U.S.-Style Eating Pattern and its two variations, a Healthy Mediterranean-Style Eating Pattern and a Healthy Vegetarian Eating Pattern.

CHAPTER 2

Shifts Needed To Align With Healthy Eating Patterns

Introduction

Following healthy eating patterns is vital to health. This chapter provides a snapshot of current eating patterns of people in the United States in comparison to the recommendations in Chapter 1. Key Elements of Healthy Eating Patterns and describes ***shifts*** that are needed to align current intakes to recommendations. In some cases, the news is good—for certain aspects of eating patterns, some individuals are following the guidance or are close to meeting the recommendations. However, other aspects of the diet are far from the recommendations. Most Americans would benefit from shifting food choices both within and across food groups and from current food choices to nutrient-dense choices. Some shifts that are needed are minor and can be accomplished by making simple substitutions, while others will require greater effort to accomplish.

About This Chapter

This chapter focuses on the fourth Dietary Guideline:

1. **Follow a healthy eating pattern across the lifespan.** All food and beverage choices matter. Choose a healthy eating pattern at an appropriate calorie level to help achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease.

2. **Focus on variety, nutrient density, and amount.** To meet nutrient needs within calorie limits, choose a variety of nutrient-dense foods across and within all food groups in recommended amounts.

3. **Limit calories from added sugars and saturated fats and reduce sodium intake.** Consume an eating pattern low in added sugars, saturated fats, and sodium. Cut back on foods and beverages higher in these components to amounts that fit within healthy eating patterns.

4. ***Shift* to healthier food and beverage choices.** Choose nutrient-dense foods and beverages across and within all food groups in place of less healthy choices. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.

5. **Support healthy eating patterns for all.** Everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities.

The chapter includes quantitative information on intakes and common sources of food groups, their subgroups, and other dietary components, including nutrients. The chapter also includes strategies to help shift current eating patterns toward the healthy patterns described in Chapter 1. Complementary strategies to support individuals in their effort to make shifts are discussed in greater detail in Chapter 3. Everyone Has a Role in Supporting Healthy Eating Patterns.

Current Eating Patterns in the United States

The typical eating patterns currently consumed by many in the United States do not align with the *Dietary Guidelines*. As shown in Figure 2-1, when compared to the Healthy U.S.-Style Pattern:

- About three-fourths of the population has an eating pattern that is low in vegetables, fruits, dairy, and oils.
- More than half of the population is meeting or exceeding total grain and total protein foods recommendations, but, as discussed later in the chapter, are not meeting the recommendations for the subgroups within each of these food groups.
- Most Americans exceed the recommendations for added sugars, saturated fats, and sodium.

In addition, the eating patterns of many are too high in calories. Calorie intake over time, in comparison to calorie needs, is best evaluated by measuring body weight status. The high percentage of the population that is overweight or obese suggests that many in the United States overconsume calories. As documented in the Introduction, Table I-1, more than two-thirds of all adults and nearly one-third of all children and youth in the United States are either overweight or obese.

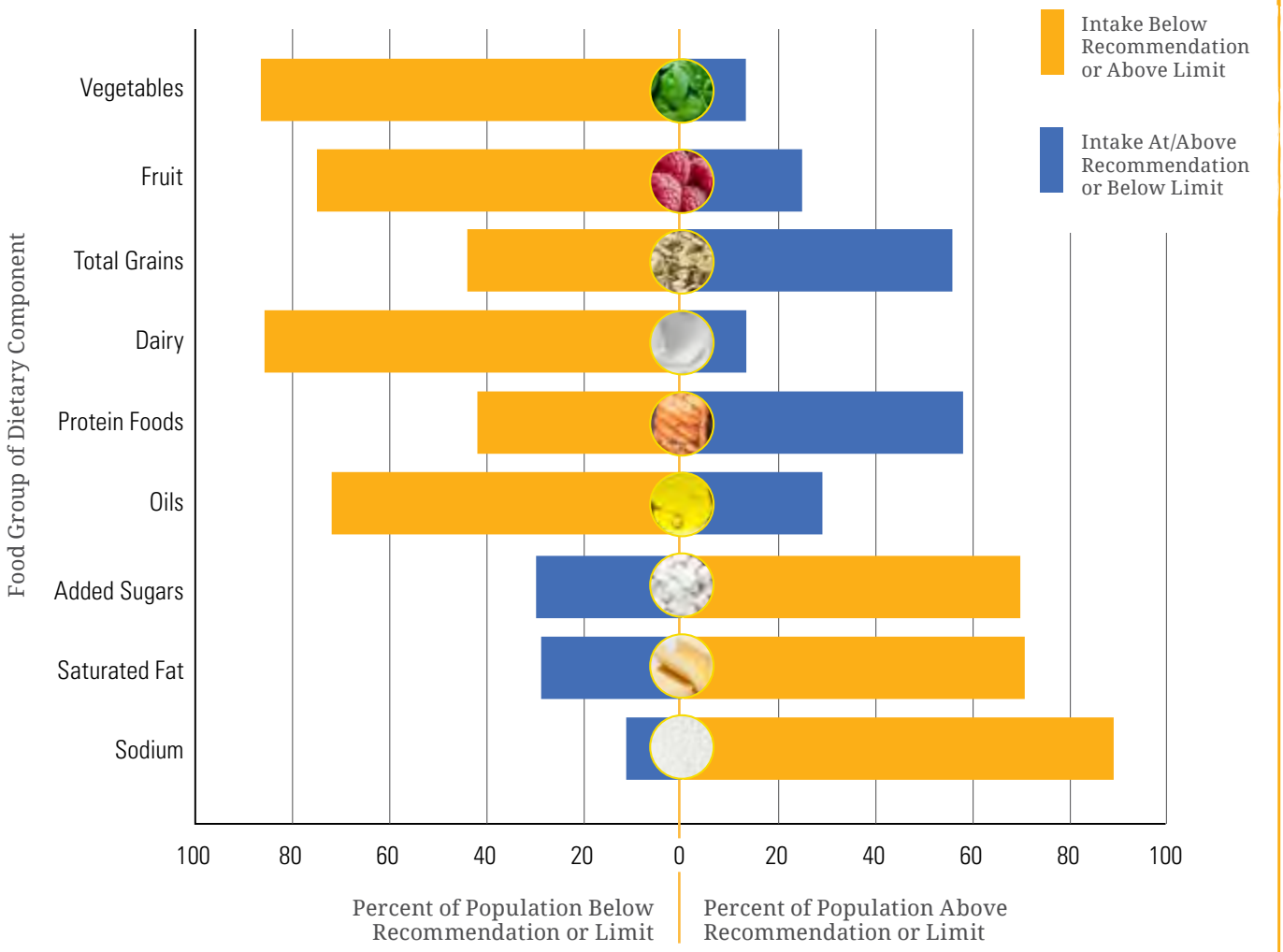
Current eating patterns can be moved toward healthier eating patterns by making shifts in food choices over time. Making these shifts can help support a healthy body weight, meet nutrient needs, and lessen the risk for chronic disease.

The following sections highlight average intakes of the food groups and other dietary components for age-sex groups and show that, in some cases, individuals are close to meeting recommendations, but in others, more substantial change is needed. They also provide examples of foods commonly consumed. Understanding what current intakes are and how food groups and other dietary components are consumed can help inform shifts that are needed to support healthy eating patterns.

In this chapter, intakes of food groups and other dietary components are described in two ways:

1. the total amount consumed from all sources in comparison to recommendations or limits, and **2.** the proportion of this intake that comes from different food categories based on the form in which foods are eaten—such as soups, sandwiches, or burritos. The What We Eat in American (WWEIA) Food Categories[1] provide insight into the sources of food group and nutrient intakes and are therefore useful in identifying strategies to improve eating patterns.

Figure 2-1.
Dietary Intakes Compared to Recommendations. Percent of the U.S. Population Ages 1 Year & Older Who Are Below, At, or Above Each Dietary Goal or Limit



NOTE: The center (0) line is the goal or limit. For most, those represented by the orange sections of the bars, shifting toward the center line will improve their eating pattern.

DATA SOURCES: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Healthy U.S.-Style Food Patterns, which vary based on age, sex, and activity level, for recommended intakes and limits.

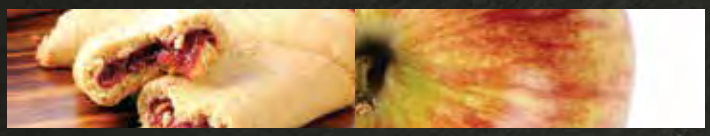
[1] The What We Eat in America (WWEIA) Food Categories provide an application to analyze foods and beverages as consumed. Each of the food and beverage items that can be reported in WWEIA, National Health and Nutrition Examination Survey, are placed in one of the mutually exclusive food categories. More information about the WWEIA Food Categories is available at: http://www.ars.usda.gov/Services/docs.htm?docid=23429. Accessed November 25, 2015.

Figure 2-2.

Empower People To Make Healthy Shifts

Making changes to eating patterns can be overwhelming. That's why it's important to emphasize that every food choice is an opportunity to move toward a healthy eating pattern. Small shifts in food choices—over the course of a week, a day, or even a meal—can make a big difference. Here are some ideas for realistic, small shifts that can help people adopt healthy eating patterns.

High Calorie Snacks → Nutrient-Dense Snacks

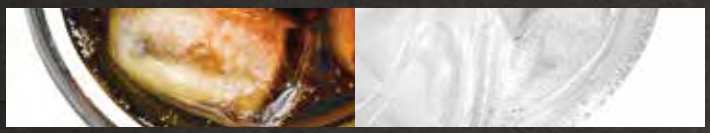


Fruit Products with Added Sugars → Fruit

Refined Grains → Whole Grains

Snacks with Added Sugars → Unsalted Snacks

Solid Fats → Oils



Beverages with Added Sugars → No-Sugar-Added Beverages

Changing Physical Activity Patterns for a Healthy Lifestyle

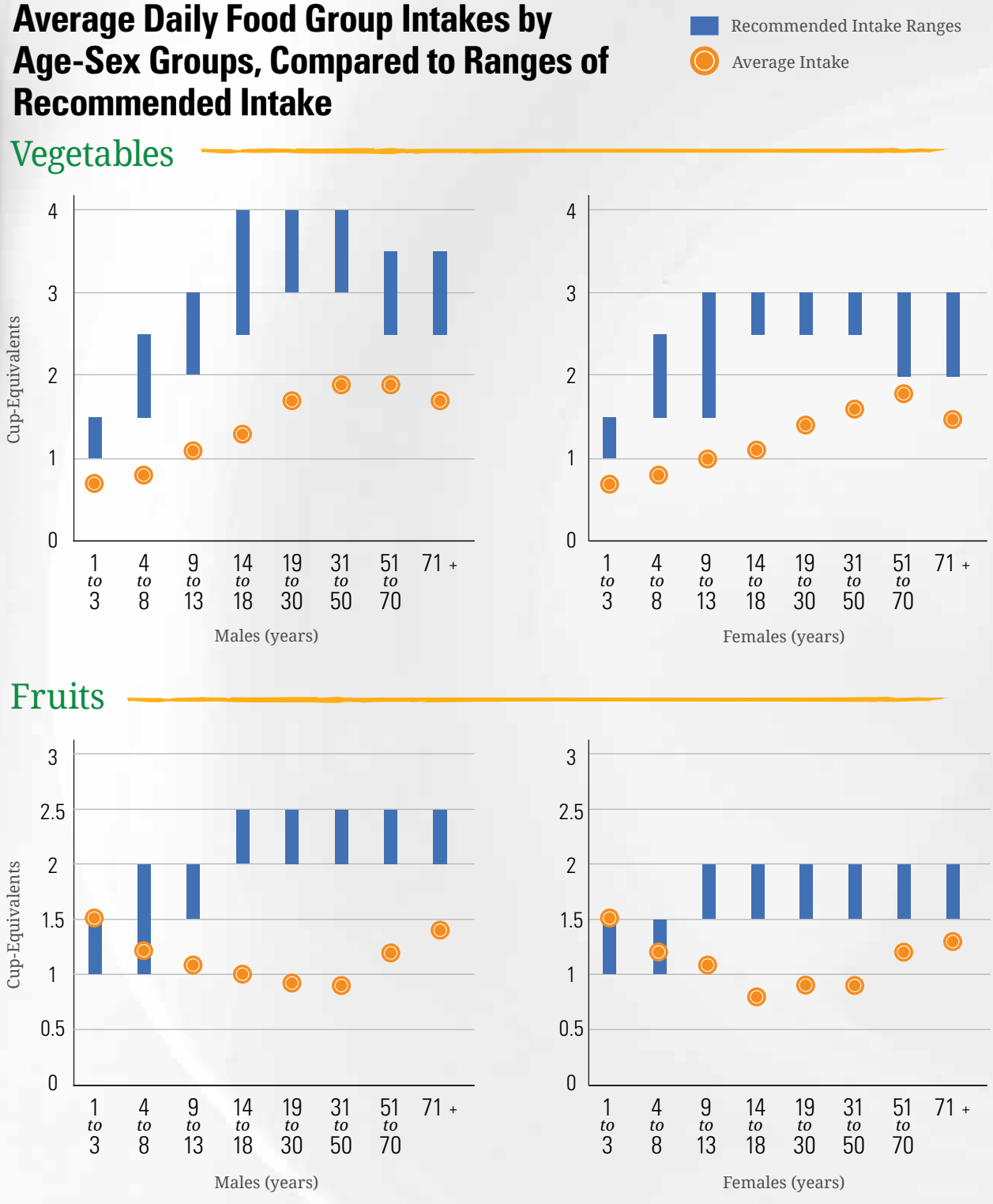
Current Physical Activity:
Only 20 percent of adults meet the Physical Activity Guidelines for aerobic and muscle-strengthening activity. Males are more likely to report doing regular physical activity compared to females (24% of males versus 17% of females meet recommendations), and this difference is more pronounced between adolescent boys and girls (30% of males versus 13% of females meet recommendations). Despite evidence that increments of physical activity as short as 10 minutes at a time can be beneficial, about 30 percent of adults report engaging in no leisure time physical activity. Disparities also exist; individuals with lower income and those with lower educational attainment have lower rates of physical activity and are more likely to not engage in leisure time physical activity.

Overall, physical activity associated with work, home, and transportation has declined in recent decades and can be attributed to less active occupations; reduced physical activity for commuting to work, school, or for errands; and increased sedentary behavior often associated with television viewing and other forms of screen time.

***Shift* Physical Activity Choices:**
Most individuals would benefit from making shifts to increase the amount of physical activity they engage in each week. Individuals would also benefit from limiting screen time and decreasing the amount of time spent being sedentary.

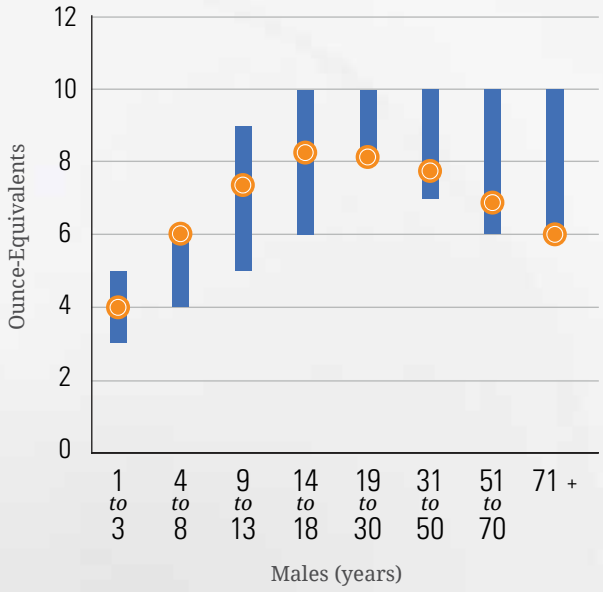
Figure 2-3.

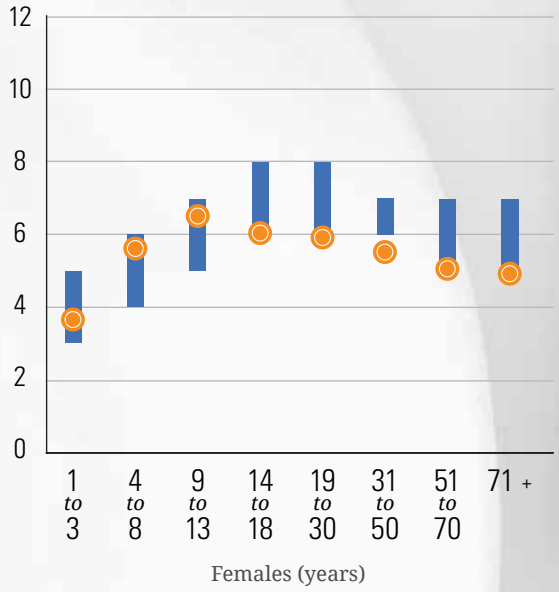
Average Daily Food Group Intakes by Age-Sex Groups, Compared to Ranges of Recommended Intake



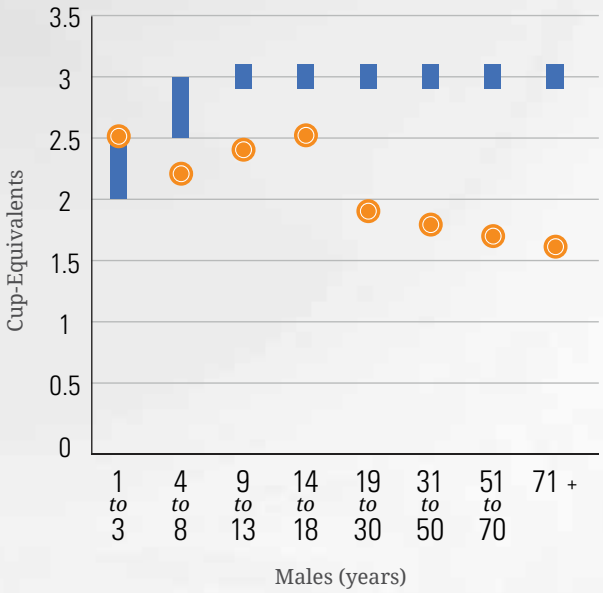
Recommended Intake Ranges Average Intake

Total Grains





Dairy



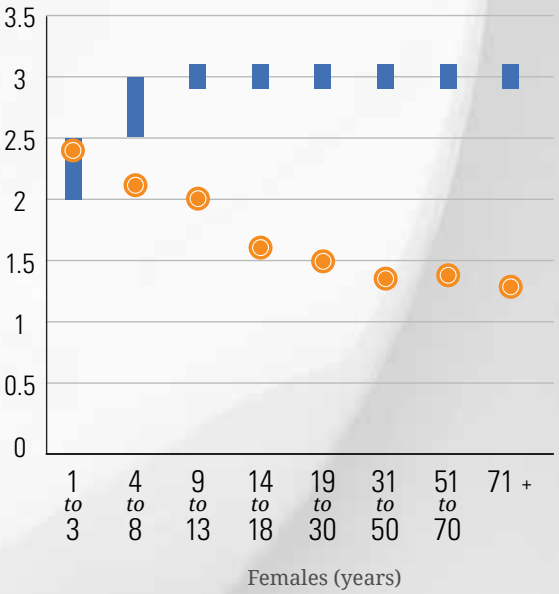
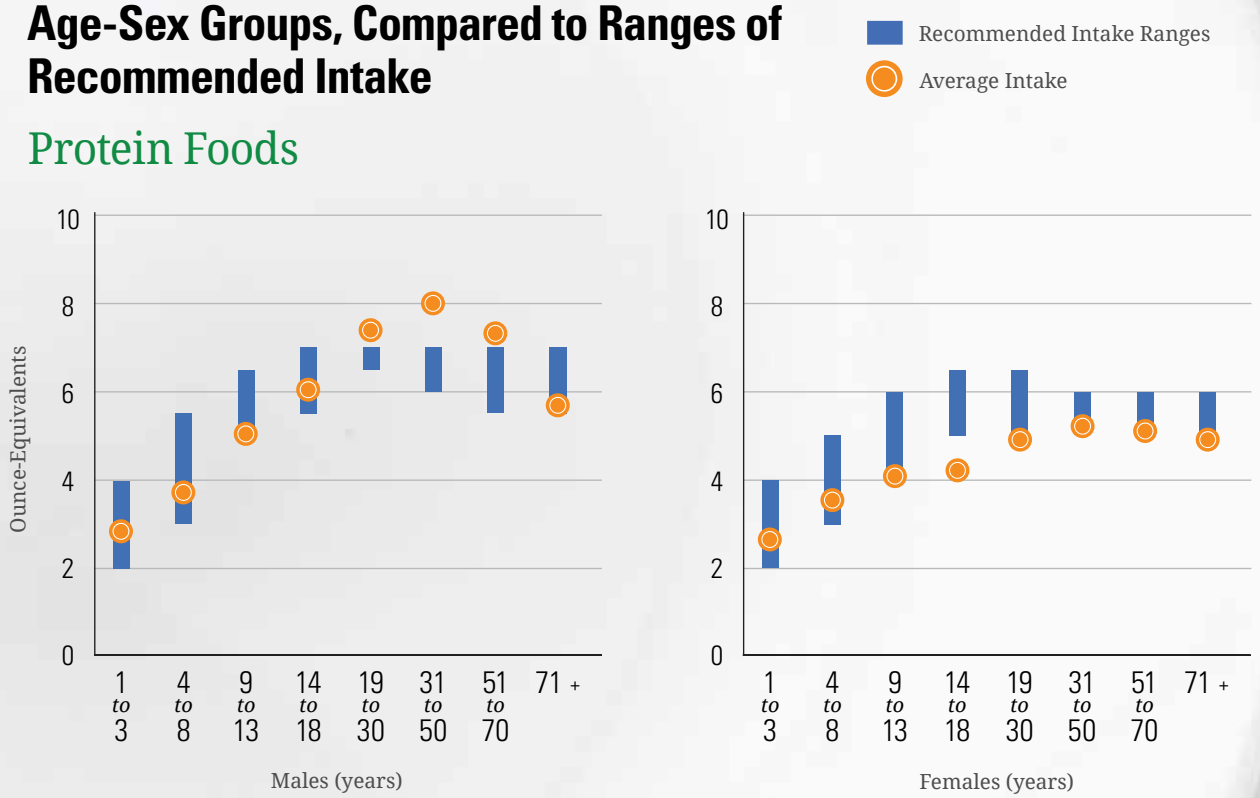


Figure 2-3. *(continued...)*

Average Daily Food Group Intakes by Age-Sex Groups, Compared to Ranges of Recommended Intake

Protein Foods



DATA SOURCES: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Healthy U.S.-Style Food Patterns, which vary based on age, sex, and activity level, for recommended intake ranges.

A Closer Look at Current Intakes & Recommended Shifts

As described in Chapter 1, most foods in healthy eating patterns should come from the food groups. As Figure 2-3 shows, across the U.S. population, average intakes of foods from the food groups are far from amounts recommended in the Healthy U.S.-Style Eating Pattern.

Food Groups

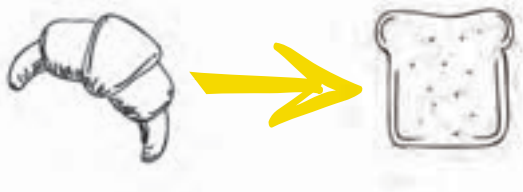
The following sections describe total current intakes for each of the food groups and for oils, and the leading food categories contributing to this total. They also describe the shifts in food choices that are needed to meet recommendations and provide strategies that can help individuals make these shifts.

Vegetables

Current Intakes: Figure 2-3 shows the low average intakes of vegetables across age-sex groups in comparison to recommended intake levels. Vegetable consumption relative to recommendations is lowest among boys ages 9 to 13 years and girls ages 14 to 18 years. Vegetable intakes relative to recommendations are slightly higher during the adult years, but intakes are still below recommendations. In addition, with few exceptions, the U.S. population does not meet intake recommendations for any of the vegetable subgroups (Figure 2-4).

Calories in Nutrient-Dense Versus Current Typical Choices in the Food Groups

To stay within energy requirements while meeting nutritional needs, food choices in each food group should be in nutrient-dense forms. However, in many food groups, foods as they are typically eaten are not in nutrient-dense forms—they contain additional calories from components such as added sugars, added refined starches, solid fats, or a combination. For example, in the dairy group, nutrient-dense choices such as fat-free milk, plain fat-free yogurt, and low-fat cheese contain an average of about 80 calories per cup-equivalent. In contrast, many dairy products that are typically consumed, such as whole milk, sweetened yogurt, and regular cheese, contain almost 150 calories per cup-equivalent.[2] Similarly, in the protein foods group, nutrient-dense (lean) choices of meats and poultry contain an average of about 50 calories per ounce-equivalent, but the higher fat choices that are typically consumed contain about 80 to 100 calories per ounce-equivalent. Grains and vegetables also are often consumed in forms that contain additional calories from added sugars or solid fats that are added in processing or preparing the food, rather than in nutrient-dense forms.

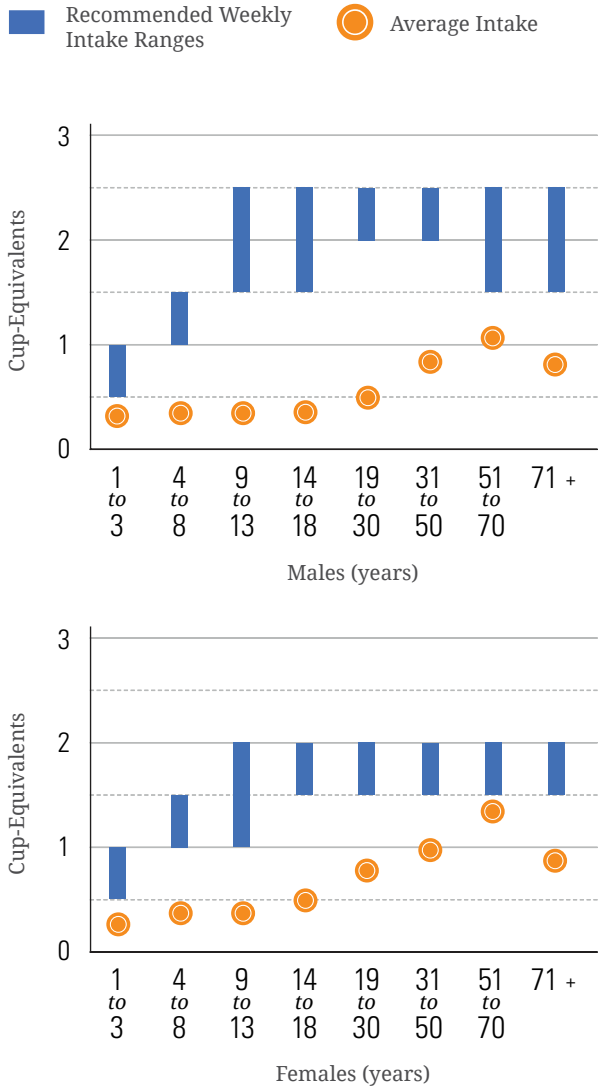


When typical instead of nutrient-dense choices are made in each food group, individuals consume extra calories when meeting their food group recommendations. Shifting from typical choices to nutrient-dense options is an important principle for maintaining calorie balance in a healthy eating pattern. A related principle, reducing the portion size of foods and beverages that are not in nutrient-dense forms, also can help to maintain calorie balance.

Figure 2-4.

Average Vegetable Subgroup Intakes in Cup-Equivalents per Week by Age-Sex Groups, Compared to Ranges of Recommended Intakes per Week

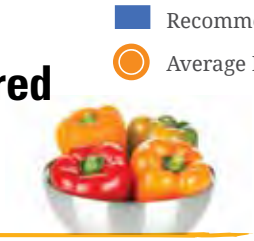
Dark Green Vegetables



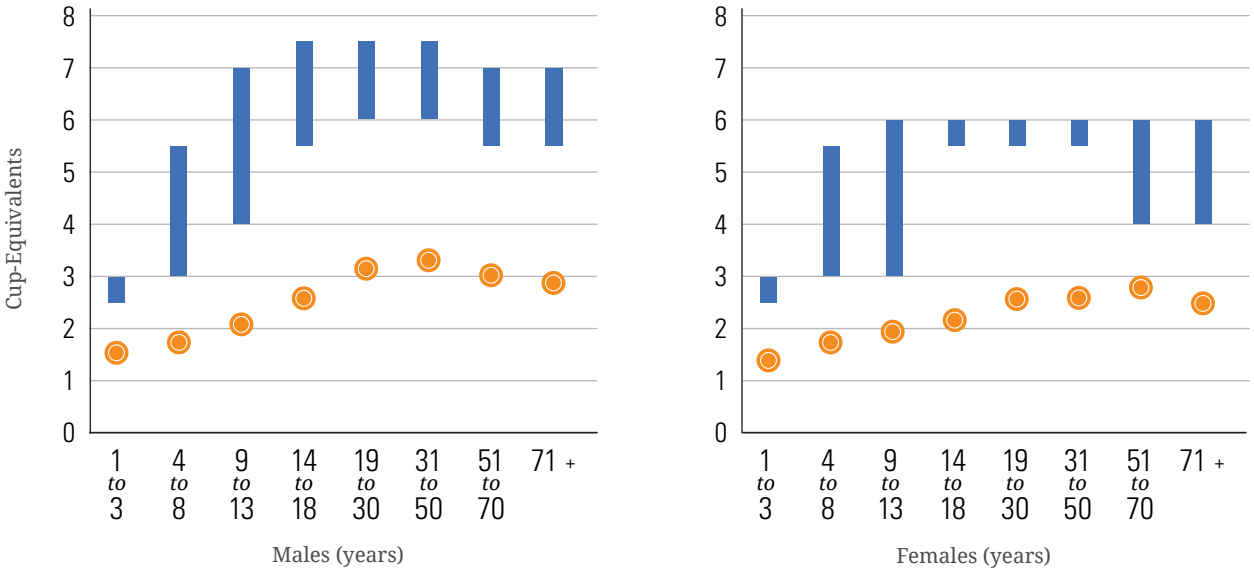
[2] Britten P, Cleveland LE, Koegel KL, Kuczynski KJ, and Nickols-Richardson MS. Impact of typical rather than nutrient dense food choices in the US Department of Agriculture Food Patterns. *J Acad Nutr Diet.* 2012;112 (10):1560-1569.

Figure 2-4. *(continued...)*

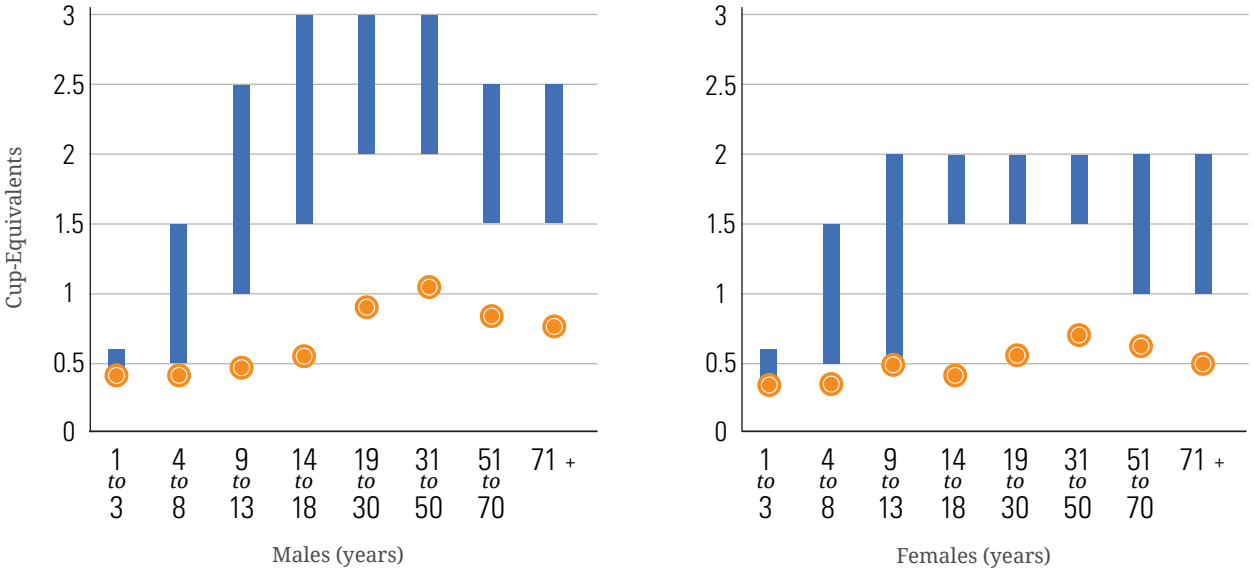
Average Vegetable Subgroup Intakes in Cup-Equivalents per Week by Age-Sex Groups, Compared to Ranges of Recommended Intakes per Week



Red & Orange Vegetables

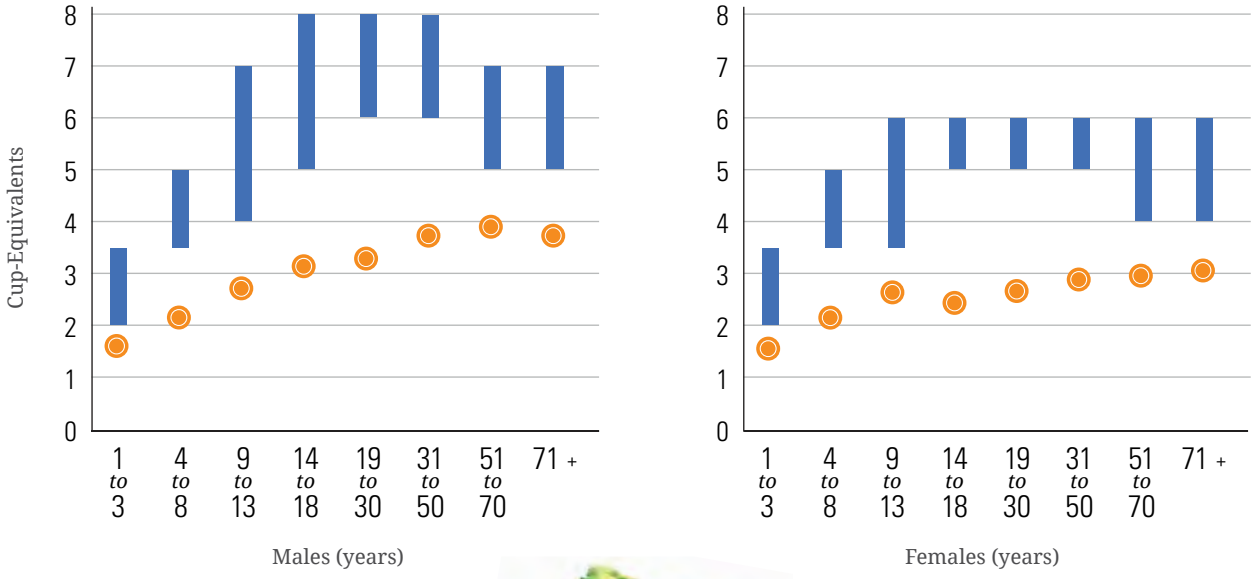


Legumes (Beans & Peas)

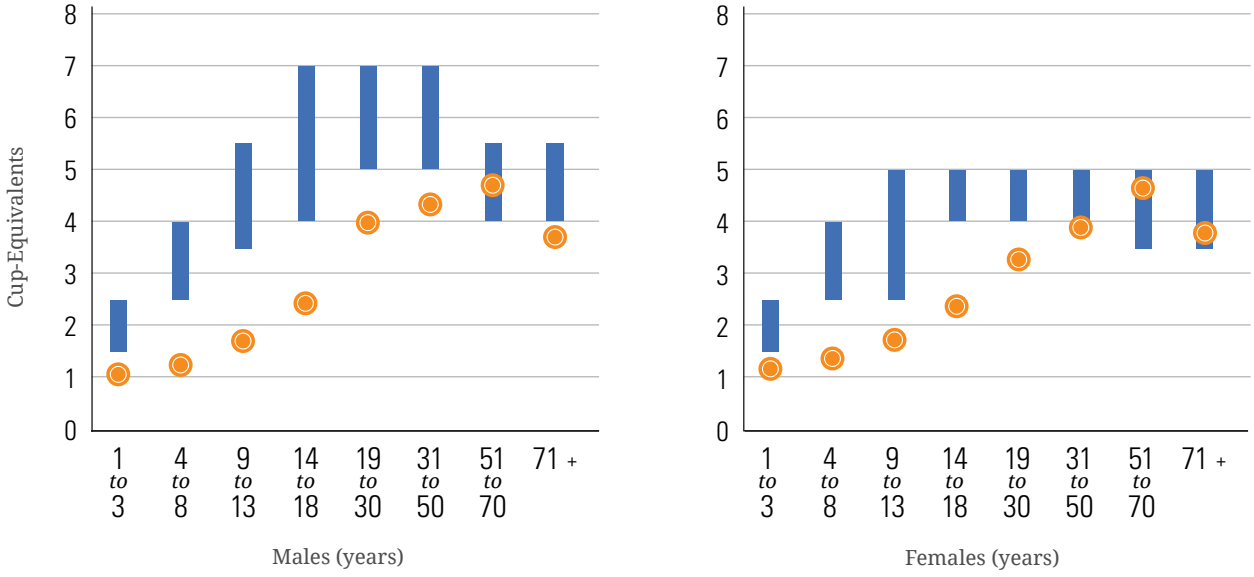


Recommended Intake Ranges Average Intake

Starchy Vegetables



Other Vegetables



DATA SOURCES: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Healthy U.S.-Style Food Patterns, which vary based on age, sex, and activity level, for recommended intake ranges.

Potatoes and tomatoes are the most commonly consumed vegetables, accounting for 21 percent and 18 percent of all vegetable consumption, respectively. Lettuce and onions are the only other vegetables that make up more than 5 percent each of total vegetable group consumption. Table 2-1 lists additional examples of vegetables in each of the subgroups. About 60 percent of all vegetables are eaten as a separate food item, about 30 percent as part of a mixed dish, and the remaining 10 percent as part of snack foods, condiments, and gravies. Vegetables are part of many types of mixed dishes, from burgers, sandwiches, and tacos to pizza, meat stews, pasta dishes, grain-based casseroles, and soups.

Shift To Consume More Vegetables:

For most individuals, following a healthy eating pattern would include an increase in total vegetable intake from all vegetable subgroups, in nutrient-dense forms, and an increase in the variety of different vegetables consumed over time (see Table 2-1). Strategies to increase vegetable intake include choosing more vegetables—from all subgroups—in place of foods high in calories, saturated fats, or sodium such as some meats, poultry, cheeses, and snack foods. One realistic option is to increase the vegetable content of mixed dishes while decreasing the amounts of other food components that are often overconsumed, such as refined grains or meats high in saturated fat and/or sodium. Other strategies include always choosing a green salad or a vegetable as a side dish and incorporating vegetables into most meals and snacks.

Table 2-1. Examples of Vegetables in Each Vegetable Subgroup

Vegetable Subgroup	Examples
Dark-Green Vegetables	Broccoli, Spinach, Leafy Salad Greens (Including Romaine Lettuce), Collards, Bok Choy, Kale, Turnip Greens, Mustard Greens, Green Herbs (Parsley, Cilantro)
Red & Orange Vegetables	Tomatoes, Carrots, Tomato Juice, Sweet Potatoes, Red Peppers (Hot and Sweet), Winter Squash, Pumpkin
Legumes (Beans & Peas)	Pinto, White, Kidney, and Black Beans; Lentils; Chickpeas; Limas (Mature, Dried); Split Peas; Edamame (Green Soybeans)
Starchy Vegetables	Potatoes, Corn, Green Peas, Limas (Green, Immature), Plaintains, Cassava
Other Vegetables	Lettuce (Iceberg), Onions, Green Beans, Cucumbers, Celery, Green Peppers, Cabbage, Mushrooms, Avocado, Summer Squash (Includes Zucchini), Cauliflower, Eggplant, Garlic, Bean Sprouts, Olives, Asparagus, Peapods (Snowpeas), Beets

Fruits

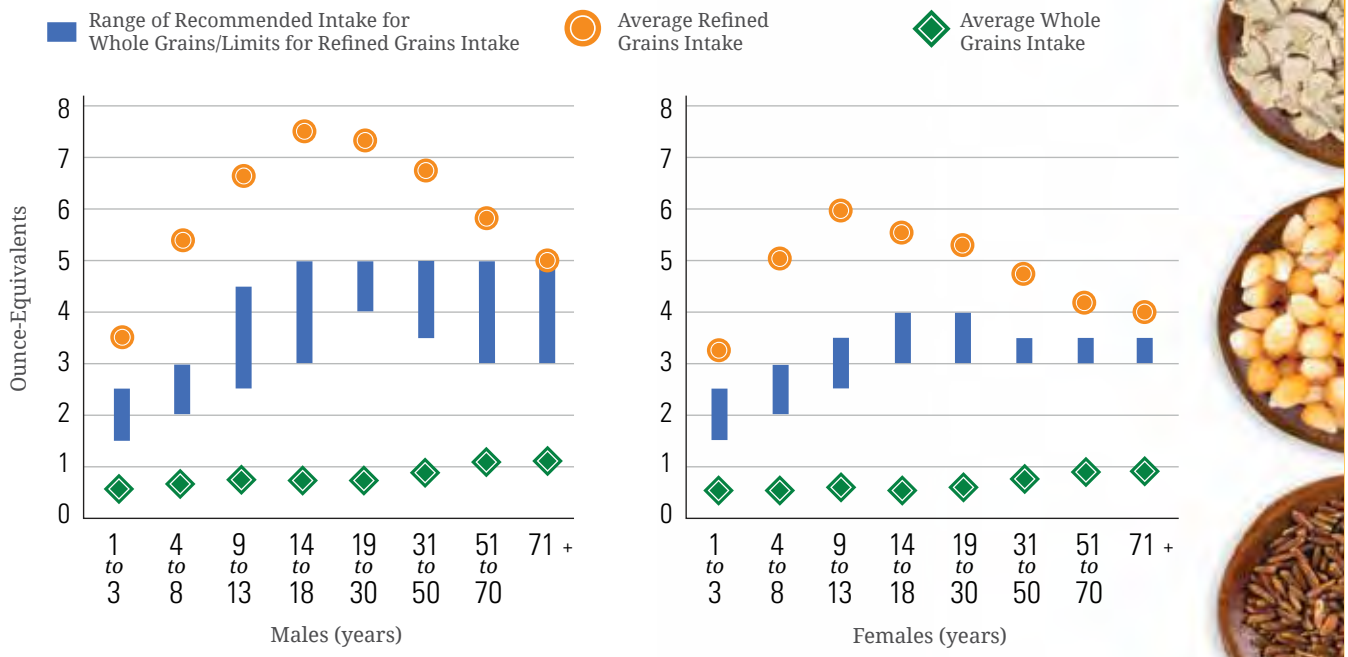
Current Intakes: As shown in Figure 2-3, average intake of fruits is below recommendations for almost all age-sex groups. Children ages 1 to 8 years differ from the rest of the population in that many do meet recommended intakes for total fruit. Average intakes of fruits, including juice, are lowest among girls ages 14 to 18 years and adults ages 19 to 50 years. Older women (ages 51 years and older) and young children consume fruits in amounts close to or meeting minimum recommended intakes (Figure 2-3).

About one-third of the intake of fruits in the U.S. population comes from fruit juice, and the remaining two-thirds from whole fruits (which includes cut up, cooked, canned, frozen, and dried fruits). The highest proportion of juice to whole fruits intake is among children ages 1 to 3 years, for whom about 47 percent of total fruit intake comes from fruit juice, and about 53 percent from whole fruits. Average juice intakes for young children are within the limits recommended by the American Academy of Pediatrics (see the Fruits section of Chapter 1).

Fruits and fruit juices are most likely to be consumed alone or in a mixture with other fruit, rather than as part of a mixed dish that includes foods from other food groups. Almost 90 percent of all fruit intake comes from single fruits, fruit salads, or fruit juices. The most commonly consumed fruits are apples, bananas, watermelon, grapes, strawberries, oranges, peaches, cantaloupe, pears, blueberries, raisins, and pineapple. Commonly consumed fruit juices are orange juice, apple juice, and grape juice.

Figure 2-5.

Average Whole & Refined Grain Intakes in Ounce-Equivalents per Day by Age-Sex Groups, Compared to Ranges of Recommended Daily Intake for Whole Grains & Limits for Refined Grains*



***NOTE:** Recommended daily intake of whole grains is to be at least half of total grain consumption, and the limit for refined grains is to be no more than half of total grain consumption. The blue vertical bars on this graph represent one half of the total grain recommendations for each age-sex group, and therefore indicate recommendations for the minimum amounts to consume of whole grains or maximum amounts of refined grains. To meet recommendations, whole grain intake should be within or above the blue bars and refined grain intake within or below the bars.

DATA SOURCES: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Healthy U.S.-Style Food Patterns, which vary based on age, sex, and activity level, for recommended intake ranges.

***Shift* To Consume More Fruits:**

To help support healthy eating patterns, most individuals in the United States would benefit from increasing their intake of fruits, mostly whole fruits, in nutrient-dense forms. A wide variety of fruits are available in the U.S. marketplace, some year-round and others seasonally. Strategies to help achieve this shift include choosing more fruits as snacks, in salads, as side dishes, and as desserts in place of foods with added sugars, such as cakes, pies, cookies, doughnuts, ice cream, and candies.

Grains

Current Intakes: Intakes of total grains are close to the target amounts (**Figure 2-3**) for all age-sex groups, but as shown in **Figure 2-5**, intakes do not meet the recommendations for whole grains and exceed limits for refined grains. Average intakes of whole grains are far below recommended levels across all age-sex groups, and average intakes of refined grains are well above recommended limits for most age-sex groups.

Examples of commonly consumed whole-grain foods are whole-wheat breads, rolls, bagels, and crackers; oatmeal; whole-grain ready-to-eat cereals (e.g., shredded wheat, oat rings); popcorn; brown rice; and whole-grain pasta. Examples of refined grain foods are white bread, rolls, bagels, and crackers; pasta; pizza crust; grain based

desserts; refined grain ready-to-eat cereals (e.g., corn flakes, crispy rice cereal); corn and wheat tortillas; white rice; and cornbread. As noted in Chapter 1, most refined grain foods in the United States are made from enriched grains. Almost half of all refined grains intake is from mixed dishes, such as burgers, sandwiches, tacos, pizza, macaroni and cheese, and spaghetti with meatballs. About 20 percent of refined grain intake comes from snacks and sweets, including cakes, cookies, and other grain desserts. The remaining 30 percent of refined grain intake is eaten as a separate food item, such as cereals, breads, or rice. About 60 percent of whole-grain intake in the United States is from individual food items, mostly cereals, rather than mixed dishes.

***Shift* To Make Half of All Grains Consumed Be Whole Grains:**

Shifting from refined to whole-grain versions of commonly consumed foods—such as from white to 100% whole-wheat breads, white to whole-grain pasta, and white to brown rice—would increase whole-grain intakes and lower refined grain intakes to help meet recommendations. Strategies to increase whole grains in place of refined grains include using the ingredient list on packaged foods to select foods that have whole grains listed as the first grain ingredient. Another strategy is to cut back on refined grain desserts and sweet snacks such as cakes, cookies, and pastries, which are high in added sugars, solid fats, or both, and are a common source of excess calories. Choosing both whole and refined grain foods in nutrient-dense forms, such as choosing plain popcorn instead of buttered, bread instead of croissants, and English muffins instead of biscuits also can help in meeting recommendations for a healthy eating pattern.

Dairy

Current Intakes: As shown in Figure 2-3, average intakes of dairy for most age-sex groups are far below recommendations of the Healthy U.S.-Style Pattern. Average dairy intake for most young children ages 1 to 3 years meets recommended amounts, but all other age groups have average intakes that are below recommendations. An age-related decline in dairy intake begins in childhood, and intakes persist at low levels for adults of all ages.

Fluid milk (51%) and cheese (45%) comprise most of dairy consumption. Yogurt (2.6%) and fortified soy beverages (commonly known as "soymilk") (1.5%) make up the rest of dairy intake. About three-fourths of all milk is consumed as a beverage or on cereal, but cheese is most commonly consumed as part of mixed dishes, such as burgers, sandwiches, tacos, pizza, and pasta dishes.

***Shift* To Consume More Dairy Products in Nutrient-Dense Forms:**

Most individuals in the United States would benefit by increasing dairy intake in fat-free or low-fat forms, whether from milk (including lactose-free milk), yogurt, and cheese or from fortified soy beverages (soymilk). Some sweetened milk and yogurt products may be included in a healthy eating pattern as long as the total amount of added sugars consumed does not exceed the limit for added sugars, and the eating pattern does not exceed calorie limits. Because most cheese contains more sodium and saturated fats, and less potassium, vitamin A, and vitamin D than milk or yogurt, increased intake of dairy products would be most beneficial if more fat-free or low-fat milk and yogurt were selected rather than cheese. Strategies to increase dairy intake include drinking fat-free or low-fat milk (or a fortified soy beverage) with meals, choosing yogurt as a snack, or using yogurt as an ingredient in prepared dishes such as salad dressings or spreads. Strategies for choosing dairy products in nutrient-dense forms include choosing lower fat versions of milk, yogurt, and cheese in place of whole milk products and regular cheese.

Protein Foods

Current Intakes: Overall, average intakes of protein foods are close to amounts recommended for all age-sex groups (Figure 2-3). However, Figure 2-6 shows that the average intakes of protein foods subgroups vary in comparison to the range of intake recommendations. Overall, average intakes of seafood are low for all age-sex groups; average intakes of nuts, seeds, and soy products are close to recommended levels; and average intakes of meats, poultry, and eggs are high for teen boys and adult men. Legumes (beans and peas), a vegetables subgroup, also may be considered as part of the protein foods group (see the About Legumes (Beans and Peas) call-out box in Chapter 1). As shown in Figure 2-4, intakes of legumes are below vegetable group recommendations.

Commonly consumed protein foods include beef (especially ground beef), chicken, pork, processed meats (e.g., hot dogs, sausages, ham, luncheon meats), and eggs. The most common seafood choices are shrimp, tuna, and salmon; and the most common nut choices are peanuts, peanut butter, almonds, and mixed nuts. Slightly less than half (49%) of all protein foods are consumed as a separate food item, such as a chicken breast, a steak, an egg, a fish filet, or peanuts. About the same proportion are consumed as part of a mixed dish (45%), with the largest amount from burgers, sandwiches, and tacos.

Figure 2-6.

Average Protein Foods Subgroup Intakes in Ounce-Equivalents per Week by Age-Sex Groups, Compared to Ranges of Recommended Intake

Meats, Poultry, & Eggs

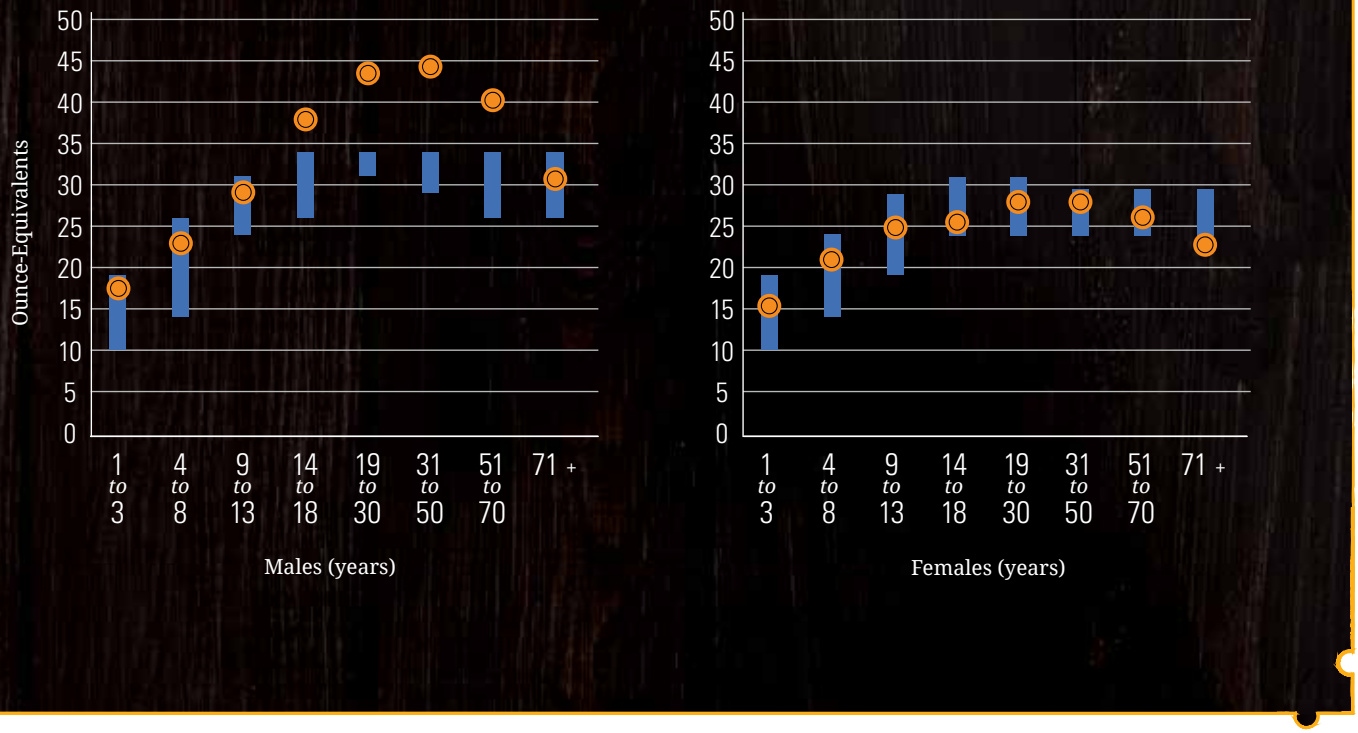
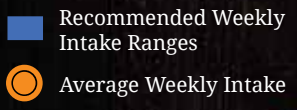
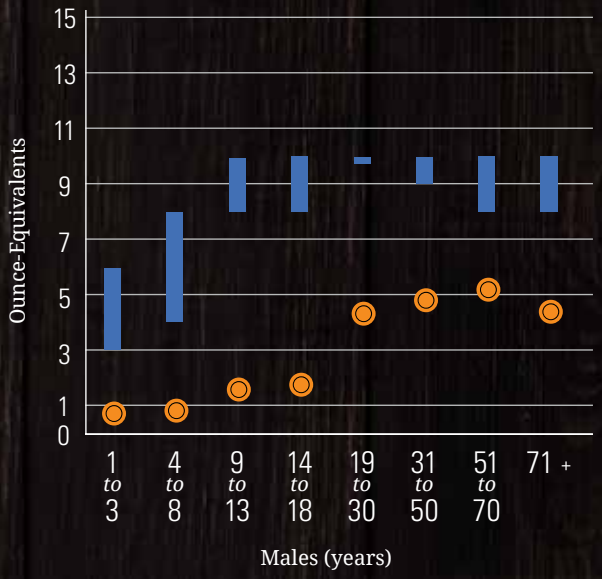


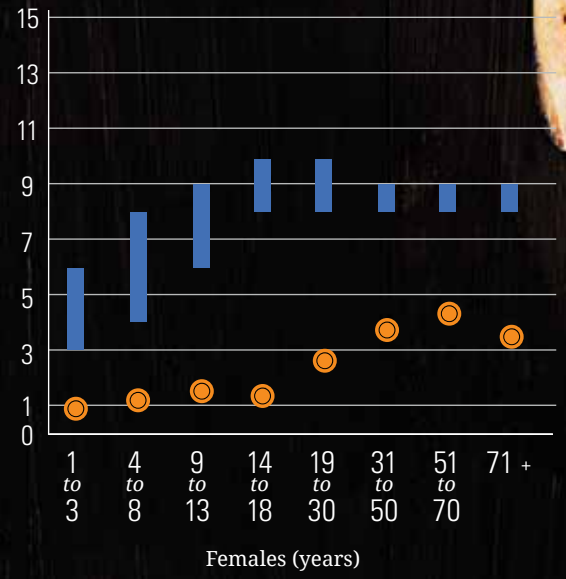
Figure 2-6. *(continued...)*

Average Protein Foods Subgroup Intakes in Ounce-Equivalents per Week by Age-Sex Groups, Compared to Ranges of Recommended Intake

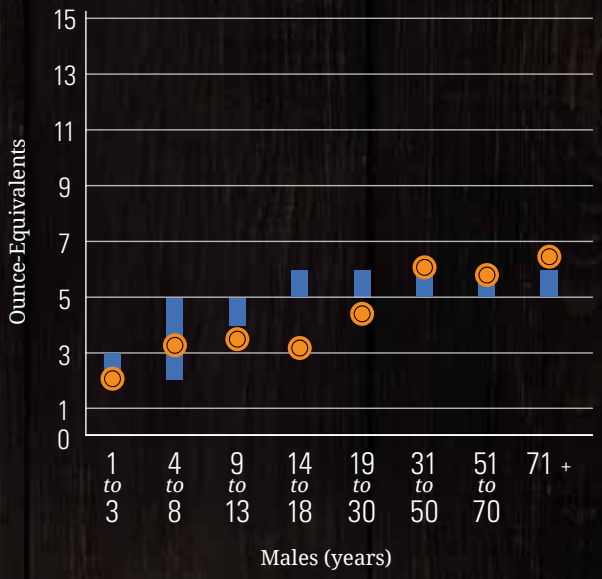


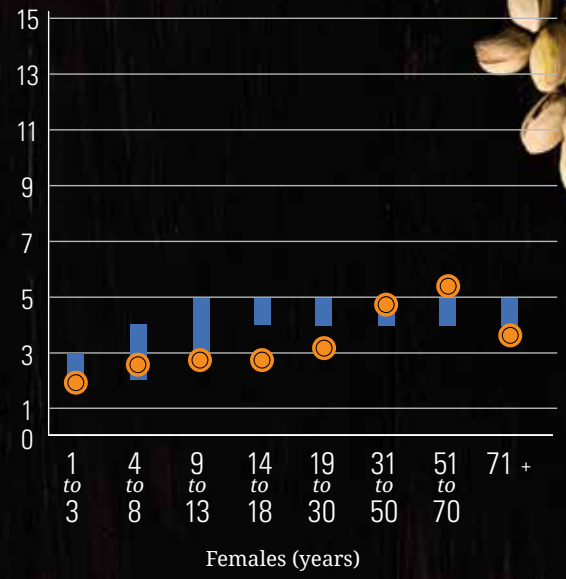
Seafood





Nuts, Seeds, & Soy Products





DATA SOURCES: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Healthy U.S.-Style Food Patterns, which vary based on age, sex, and activity level, for recommended intake ranges.

***Shift* To Increase Variety in Protein Foods Choices and To Make More Nutrient-Dense Choices:**

Average intake of total protein foods is close to recommendations, while average seafood intake is below recommendations for all age-sex groups. Shifts are needed within the protein foods group to increase seafood intake, but the foods to be replaced depend on the individual's current intake from the other protein subgroups. Strategies to increase the variety of protein foods include incorporating seafood as the protein foods choice in meals twice per week in place of meat, poultry, or eggs, and using legumes or nuts and seeds in mixed dishes instead of some meat or poultry. For example, choosing a salmon steak, a tuna sandwich, bean chili, or almonds on a main-dish salad could all increase protein variety.

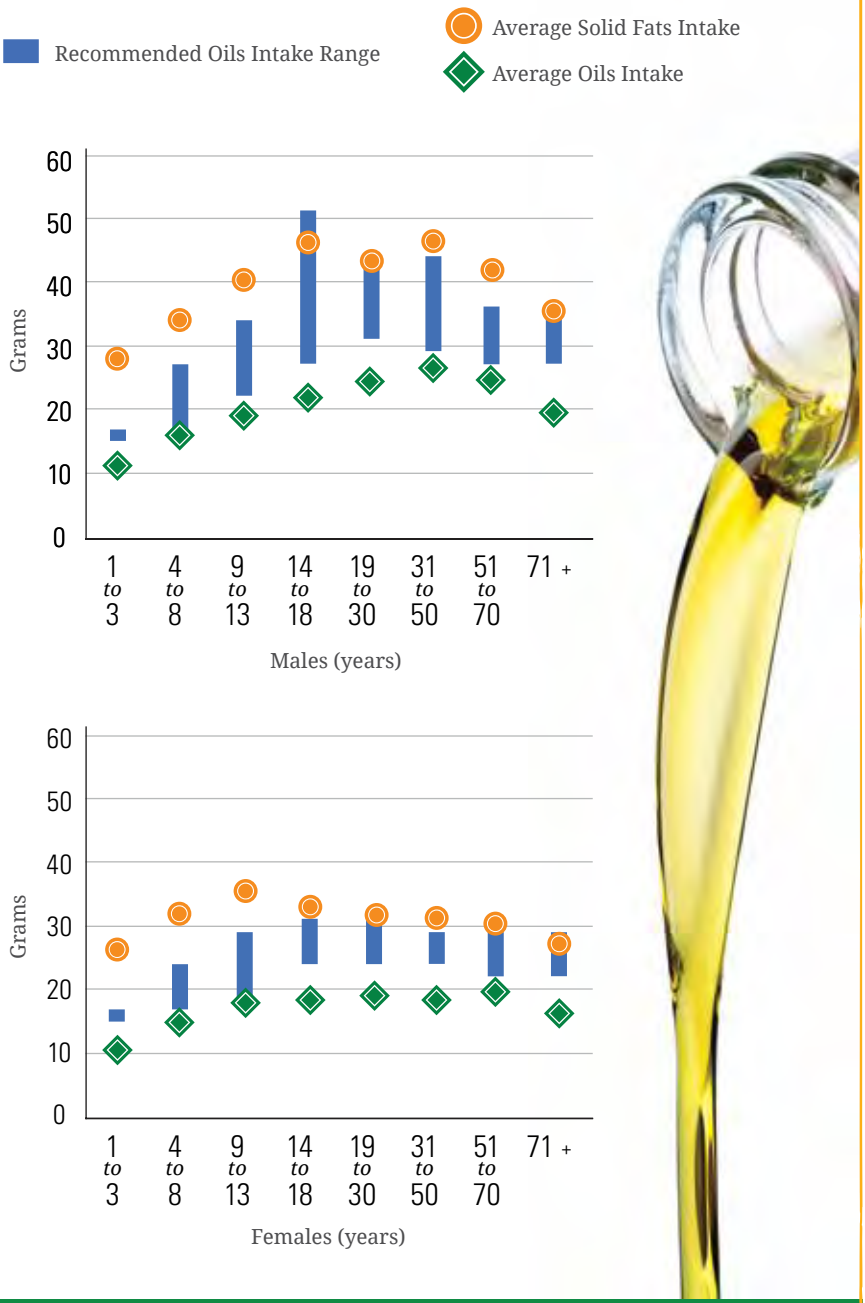
Shifting to nutrient-dense options, including lean and lower sodium options, will improve the nutritional quality of protein food choices and support healthy eating patterns. Some individuals, especially teen boys and adult men, also need to reduce overall intake of protein foods (see **Figure 2-3**) by decreasing intakes of meats, poultry, and eggs and increasing amounts of vegetables or other underconsumed food groups.

Oils

Current Intakes: Average intakes of oils are below the recommendations for almost every age-sex group (**Figure 2-7**). However, intakes are not far from recommendations. In the United States, most oils are consumed in packaged foods, such as salad dressings, mayonnaise,

Figure 2-7.

Average Intakes of Oils & Solid Fats in Grams per Day by Age-Sex Group, in Comparison to Ranges of Recommended Intake for Oils



DATA SOURCES: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Healthy U.S. Style Food Patterns, which vary based on age, sex, and activity level, for recommended intake ranges.

prepared vegetables, snack chips (corn and potato), and as part of nuts and seeds. Oils also can be used in preparing foods such as stir-fries and sautés. The most commonly used oil in the United States is soybean oil. Other commonly used oils include canola, corn, olive, cottonseed, sunflower, and peanut oil. Oils also are found in nuts, avocados, and seafood. Coconut, palm, and palm kernel oils (tropical oils) are solid at room temperature because they have high amounts of saturated fatty acids and are therefore classified as a solid fat rather than as an oil. (See Chapter 1 for more information on tropical oils.)

***Shift* From Solid Fats to Oils:**

To move the intake of oils to recommended levels, individuals should use oils rather than solid fats in food preparation where possible. Strategies to shift intake include using vegetable oil in place of solid fats (butter, stick margarine, shortening, lard, coconut oil) when cooking, increasing the intake of foods that naturally contain oils, such as seafood and nuts, in place of some meat and poultry, and choosing other foods, such as salad dressings and spreads, made with oils instead of solid fats.

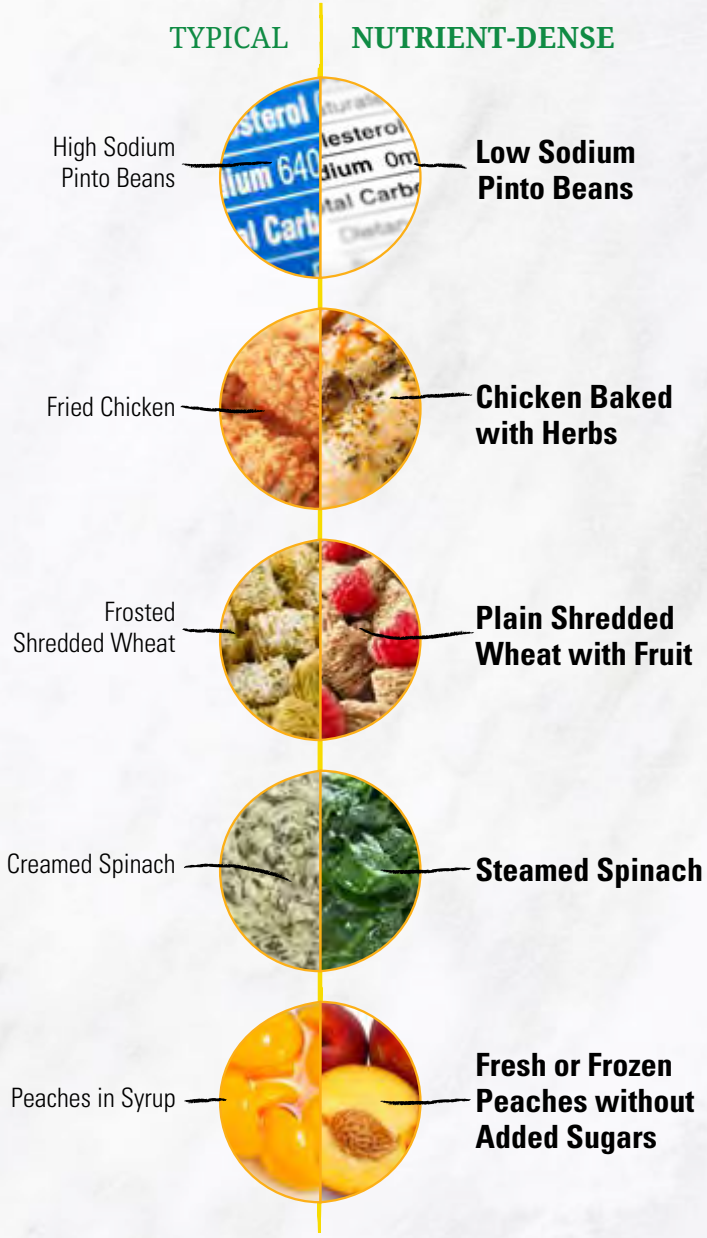
Other Dietary Components

As described in Chapter 1, in addition to the food groups, other components also should be considered when building healthy eating patterns, including limiting the amounts of added sugars, saturated fats, and sodium consumed. Additionally, for adults who choose to drink alcohol, drinking should not exceed moderate intake, and the calories from alcoholic beverages should be considered within overall calorie limits.[3]

Figure 2-8.

Typical Versus Nutrient-Dense Foods & Beverages

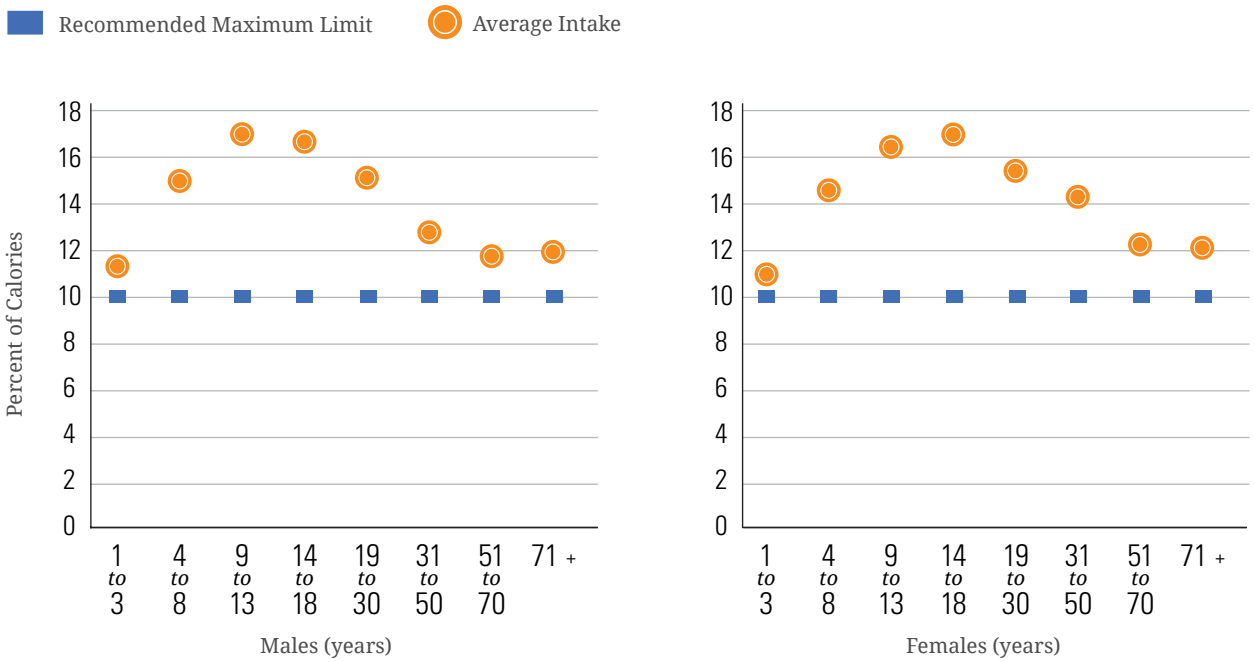
Achieving a healthy eating pattern means shifting typical food choices to more nutrient-dense options—that is, foods with important nutrients that aren't packed with extra calories or sodium. Nutrient-dense foods and beverages are naturally lean or low in solid fats and have little or no **added** solid fats, sugars, refined starches, or sodium.



[3] It is not recommended that individuals begin drinking or drink more for any reason. The amount of alcohol and calories in beverages varies and should be accounted for within the limits of healthy eating patterns. Alcohol should be consumed only by adults of legal drinking age. There are many circumstances in which individuals should not drink, such as during pregnancy. See Appendix 9. Alcohol for additional information.

Figure 2-9.

Average Intakes of Added Sugars as a Percent of Calories per Day by Age-Sex Group, in Comparison to the *Dietary Guidelines* Maximum Limit of Less than 10 Percent of Calories



NOTE: The maximum amount of added sugars allowable in a Healthy U.S.-Style Eating Pattern at the 1,200-to-1,800 calorie levels is less than the *Dietary Guidelines* limit of 10 percent of calories. Patterns at these calorie levels are appropriate for many children and older women who are not physically active.

DATA SOURCE: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group.

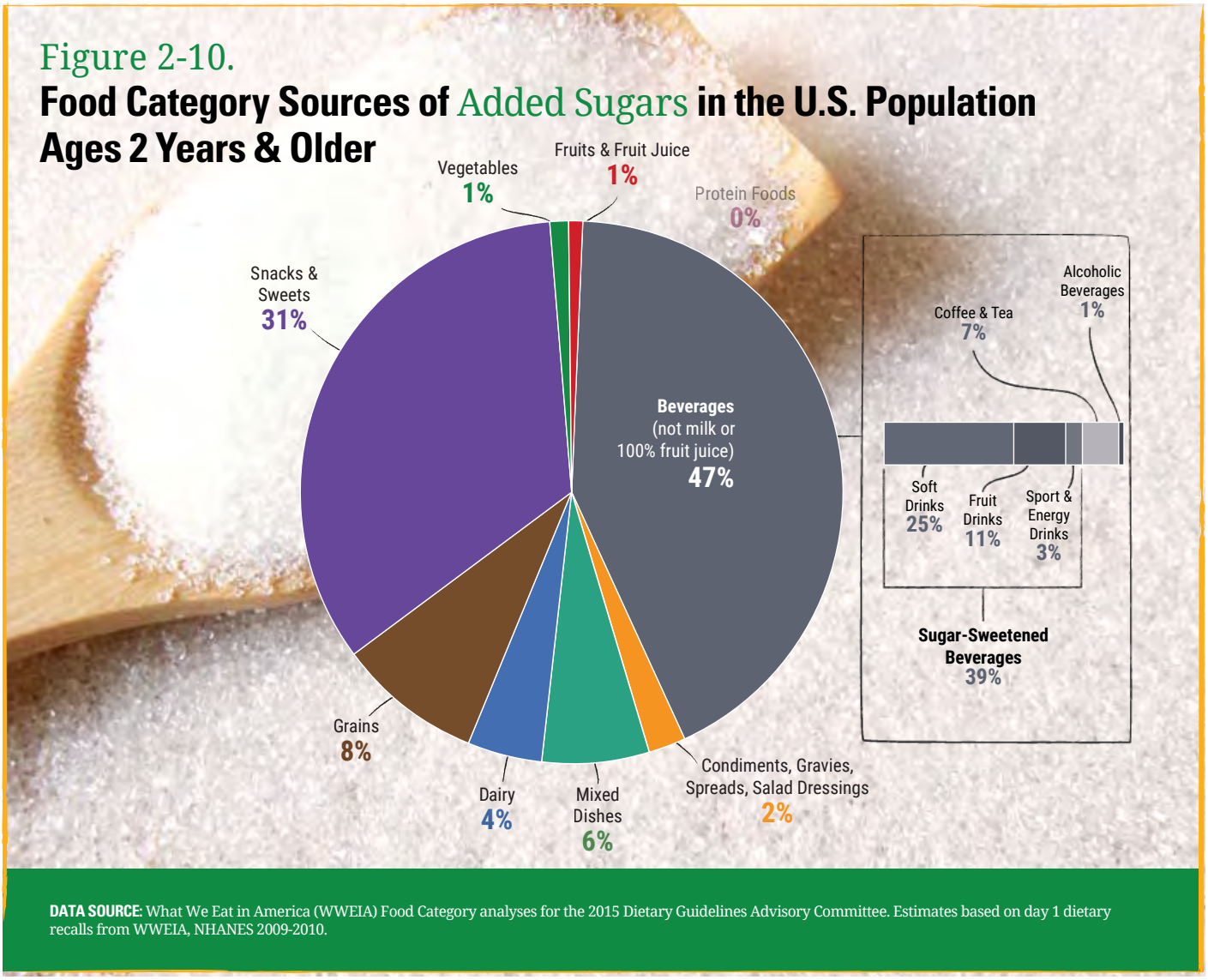
The following sections describe total intakes compared to limits for these components, and the leading food categories contributing to this total.

Added Sugars

Current Intakes: Added sugars account on average for almost 270 calories, or more than 13 percent of calories per day in the U.S. population. As shown in Figure 2-9, intakes as a percent of calories are particularly high among children, adolescents, and young adults. The major source of added sugars in typical U.S. diets is beverages, which include soft drinks, fruit drinks, sweetened coffee and tea, energy drinks, alcoholic beverages, and flavored waters (Figure 2-10). Beverages account for almost half (47%) of all added sugars consumed by the U.S. population (Figure 2-10). The other major source of added sugars is snacks and sweets, which includes grain-based desserts such as cakes, pies, cookies, brownies, doughnuts, sweet rolls, and pastries; dairy desserts such as ice cream, other frozen desserts, and puddings; candies; sugars; jams; syrups; and sweet toppings. Together, these food categories make up more than 75 percent of intake of all added sugars.

Figure 2-10.

Food Category Sources of Added Sugars in the U.S. Population Ages 2 Years & Older



DATA SOURCE: What We Eat in America (WWEIA) Food Category analyses for the 2015 Dietary Guidelines Advisory Committee. Estimates based on day 1 dietary recalls from WWEIA, NHANES 2009-2010.

Shift **To Reduce Added Sugars Consumption to Less Than 10 Percent of Calories per Day:**[4]

Individuals have many potential options for reducing the intake of added sugars. Strategies include choosing beverages with no added sugars, such as water, in place of sugar-sweetened beverages, reducing portions of sugar-sweetened beverages, drinking these beverages less often, and selecting beverages low in added sugars. Low-fat or fat-free milk or 100% fruit or vegetable juice also can be consumed within recommended amounts in place of sugar-sweetened beverages. Additional strategies include limiting or decreasing portion size of grain-based and dairy desserts and sweet snacks and choosing unsweetened or no-sugar-added versions of canned fruit, fruit sauces (e.g., applesauce), and yogurt. The use of high-intensity sweeteners as a replacement for added sugars is discussed in Chapter 1 in the Added Sugars section.

Saturated Fats

Current Intakes: Current average intakes of saturated fats are 11 percent of calories. Only 29 percent of individuals in the United States

[4] See Added Sugars section of Chapter 1 for more information and Appendix 3. USDA Food Patterns: Healthy U.S.-Style Eating Patterns for specific limits on calories that remain after meeting food group recommendation in nutrient-dense forms ("calorie limits for other uses").

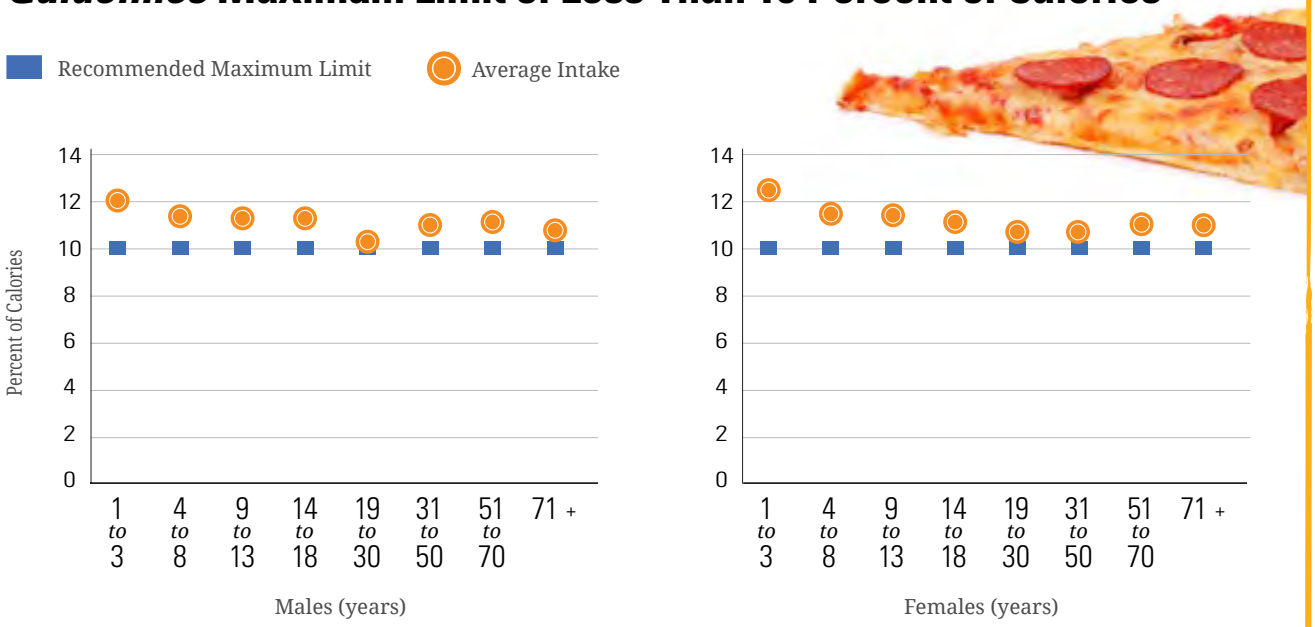
consume amounts of saturated fats consistent with the limit of less than 10 percent of calories (see **Figure 2-1**). As shown in **Figure 2-11**, average intakes do not vary widely across age-sex groups. Average intakes for both adult men and adult women are at 10.9 percent, and the average intake for children ranges from 11.1 percent up to 12.6 percent of calories.

The mixed dishes food category is the major source of saturated fats in the United States (**Figure 2-12**), with 35 percent of all saturated fats coming from mixed dishes, especially those dishes containing cheese, meat, or both. These include burgers, sandwiches, and tacos; pizza; rice, pasta, and grain dishes; and meat, poultry, and seafood dishes. The other food categories that provide the most saturated fats in current diets are snacks and sweets, protein foods, and dairy products.

Shift To Reduce Saturated Fats Intake to Less Than 10 Percent of Calories Per Day:

Individuals should aim to shift food choices from those high in saturated fats to those high in polyunsaturated and monounsaturated fats. Strategies to lower saturated fat intake include reading food labels to choose packaged foods lower in saturated fats and higher in polyunsaturated and monounsaturated fats, choosing lower fat forms of foods and beverages that contain solid fats (e.g., fat-free or low-fat milk instead of 2% or whole milk; low-fat cheese instead of regular cheese; lean rather than fatty cuts of meat), and consuming smaller portions of foods higher in saturated fats or consuming them less often. One realistic option is to change ingredients in mixed dishes to increase the amounts of vegetables, whole grains, lean meat, and low-fat or fat-free cheese, in place of some of the fatty meat and/or regular cheese in the dish. Additional strategies include preparing foods using oils that are high in polyunsaturated and monounsaturated fats, rather than solid fats, which are high in saturated fats (see Chapter 1, **Figure 1-2**), and using oil-based dressings and spreads on foods instead of those made from solid fats (e.g., butter, stick margarine, cream cheese) (see Solid Fats call-out box).

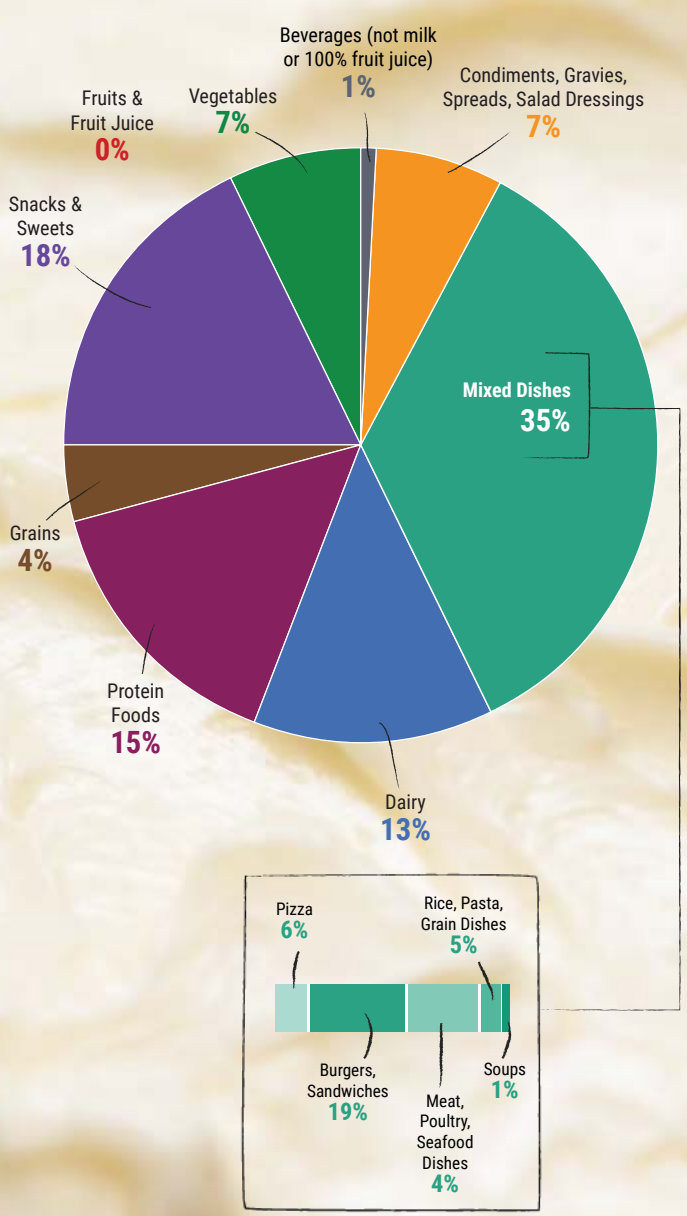
Figure 2-11.
Average Intakes of Saturated Fats as a Percent of Calories per Day by Age-Sex Groups, in Comparison to the *Dietary Guidelines* Maximum Limit of Less Than 10 Percent of Calories



DATA SOURCE: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group.

Figure 2-12.

Food Category Sources of Saturated Fats in the U.S. Population Ages 2 Years & Older



DATA SOURCE: What We Eat in America (WWEIA) Food Category analyses for the 2015 Dietary Guidelines Advisory Committee. Estimates based on day 1 dietary recalls from WWEIA, NHANES 2009-2010.

Solid Fats

Solid fats are the fats found in meats, poultry, dairy products, hydrogenated vegetable oils, and some tropical oils. They contain more saturated fatty acids and less mono- and polyunsaturated fatty acids, compared to oils (see Chapter 1, **Figure 1-2**). Solid fats, including the tropical oils, are solid at room temperature. In some foods, such as whole milk, the solid fat (butterfat) is suspended in the fluid milk by the process of homogenization.

The purpose of discussing solid fats in addition to saturated fats is that, apart from the effects of saturated fats on cardiovascular disease risk, solid fats are abundant in diets in the United States and contribute substantially to excess calorie intake. Solid fats, consumed as part of foods or added to foods, account for more than 325 calories or more than 16 percent of calories per day, on average, for the U.S. population but provide few nutrients. Food category sources of solid fats are similar to those for saturated fats: mixed dishes, snacks and sweets, protein foods, and dairy. Because solid fats are the major source of saturated fats, the strategies for reducing the intake of solid fats parallel the recommendations for reducing saturated fats. These strategies include choosing packaged foods lower in saturated fats; shifting from using solid fats to oils in preparing foods; choosing dressings and spreads that are made from oils rather than solid fats; reducing overall intake of solid fats by choosing lean or low-fat versions of meats, poultry, and dairy products; and consuming smaller portions of foods higher in solid fats or consuming them less often.

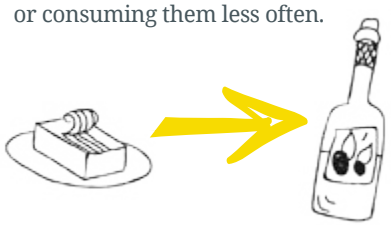
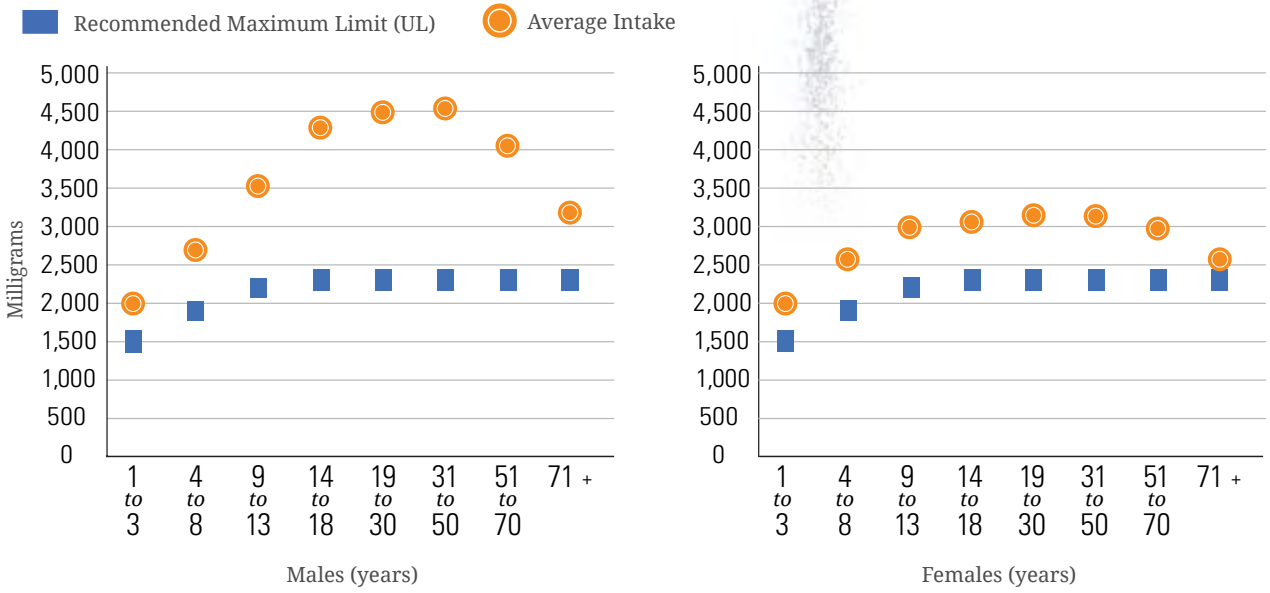


Figure 2-13.

Average Intake of Sodium in Milligrams per Day by Age-Sex Groups, Compared to Tolerable Upper Intake Levels (UL)



DATA SOURCES: What We Eat in America, NHANES 2007-2010 for average intakes by age-sex group. Institute of Medicine Dietary Reference Intakes for Tolerable Upper Intake Levels (UL).

Sodium

Current Intakes: As shown in Figure 2-13, average intakes of sodium are high across the U.S. population compared to the Tolerable Upper Intake Levels (ULs). Average intakes for those ages 1 year and older is 3,440 mg per day. Average intakes are generally higher for men than women. For all adult men, the average intake is 4,240 mg, and for adult women, the average is 2,980 mg per day. Only a small proportion of total sodium intake is from sodium inherent in foods or from salt added in home cooking or at the table. Most sodium consumed in the United States comes from salts added during commercial food processing and preparation.

Sodium is found in foods from almost all food categories (Figure 2-14). Mixed dishes—including burgers, sandwiches, and tacos; rice, pasta, and grain dishes; pizza; meat, poultry, and seafood dishes; and soups—account for almost half of the sodium consumed in the United States. The foods in many of these categories are often commercially processed or prepared.

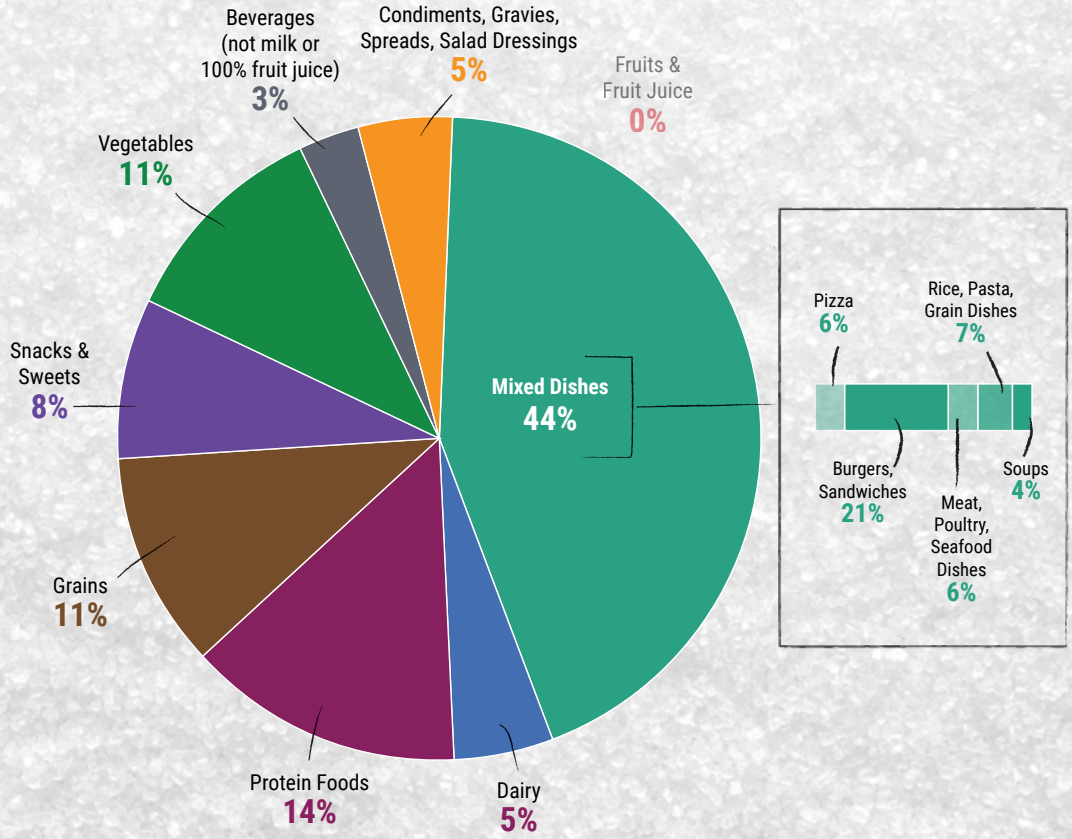
***Shift* Food Choices To Reduce Sodium Intake:**[5]

Because sodium is found in so many foods, careful choices are needed in all food groups to reduce intake. Strategies to lower sodium intake include using the Nutrition Facts label to compare sodium content of foods and choosing the product with less sodium and buying low-sodium, reduced sodium, or no-salt-added versions of products when available. Choose fresh, frozen (no sauce or seasoning), or no-salt-added canned vegetables, and fresh poultry, seafood, pork, and lean meat, rather than processed meat and poultry. Additional strategies include eating at home more often; cooking foods from scratch to control the sodium content of dishes; limiting sauces, mixes, and "instant" products, including flavored rice, instant noodles, and ready-made pasta; and flavoring foods with herbs and spices instead of salt.

[5] The recommendation to limit intake of sodium to less than 2,300 mg per day is the UL for individuals ages 14 years and older set by the IOM. The recommendations for children younger than 14 years of age are the IOM age- and sex-appropriate ULs (see Appendix 7. Nutritional Goals for Age-Sex Groups, Based on Dietary Reference Intakes and Dietary Guidelines Recommendations).

Figure 2-14.

Food Category Sources of Sodium in the U.S. Population Ages 2 Years & Older



DATA SOURCE: What We Eat in America (WWEIA) Food Category analyses for the 2015 Dietary Guidelines Advisory Committee. Estimates based on day 1 dietary recalls from WWEIA, NHANES 2009-2010.

Alcohol

In 2011, approximately 56 percent of U.S. adults 21 years of age and older were current drinkers, meaning that they had consumed alcohol in the past month; and 44 percent were not current drinkers. Current drinkers include 19 percent of all adults who consistently limited intake to moderate drinking, and 37 percent of all adults who did not. Drinking in greater amounts than moderation was more common among men, younger adults, and non-Hispanic whites. Two in three adult drinkers do not limit alcohol intake to moderate amounts one or more times per month.

The *Dietary Guidelines* does not recommend that individuals begin drinking or drink more for any reason. The amount of alcohol and calories in beverages varies and should be accounted for within the limits of healthy eating patterns. Alcohol should be consumed only by adults of legal drinking age. There are many circumstances in which individuals should not drink, such as during pregnancy. See Chapter 1 and Appendix 9. Alcohol for additional information.

Caffeine

More than 95 percent of all adults consume caffeine from foods and/or beverages.[6] Average intakes of caffeine among adults, by age-sex group, range from 110 mg (females ages 19 to 30 years) up to 260 mg (males ages 51 to 70 years) per day. These amounts are substantially less than 400 mg per day, which is the upper amount associated with moderate coffee consumption that can be incorporated into healthy eating patterns. However, daily intakes of caffeine exceed 400 mg per day for a small percent of the adult population. The 90th percentile of caffeine intake for men ages 31 to 70 years, and the 95th percentile of caffeine intake for women ages 31 years and older, is greater than 400 mg per day. Caffeine sources for adults are largely from coffee and tea, which provide about 70 to 90 percent of total caffeine intake across all adult age groups.

Average intakes for children (5 to 32 mg/d) and adolescents (63 to 80 mg/d) are low. Caffeine sources for children and adolescents are distributed among coffee, tea, and sugar-sweetened beverages in roughly equal amounts. For young children, desserts and sweets also are a notable source of caffeine from certain ingredients such as chocolate, but intake of caffeine is low from all sources.

Underconsumed Nutrients & Nutrients of Public Health Concern

In addition to helping reduce chronic disease risk, the shifts in eating patterns described in this chapter can help individuals meet nutrient needs. This is especially important for nutrients that are currently underconsumed. Although the majority of Americans consume sufficient amounts of most nutrients, some nutrients are consumed by many individuals in amounts below the Estimated Average Requirement or Adequate Intake levels. These include potassium, dietary fiber, choline, magnesium, calcium, and vitamins A, D, E, and C. Iron also is underconsumed by adolescent girls and women ages 19 to 50 years. Low intakes for most of these nutrients occur within the context of unhealthy overall eating patterns, due to low intakes of the food groups—vegetables, fruits, whole grains, and dairy—that contain these nutrients. Shifts to increase the intake of these food groups can move intakes of these underconsumed nutrients closer to recommendations.

Of the underconsumed nutrients, calcium, potassium, dietary fiber, and vitamin D are considered nutrients of public health concern because low intakes are associated with health concerns. For young children, women capable of becoming pregnant, and women who are pregnant, low intake of iron also is of public health concern.

***Shift* to eating more vegetables, fruits, whole grains, and dairy to increase intake of nutrients of public health concern.**

Low intakes of dietary fiber are due to low intakes of vegetables, fruits, and whole grains. Low intakes of potassium are due to low intakes of vegetables, fruits, and dairy. Low intakes of calcium are due to low intakes of dairy. If a healthy eating pattern, such as the Healthy U.S.-Style Eating Pattern, is consumed, amounts of calcium and dietary fiber will meet recommendations. Amounts of potassium will increase but depending on food choices may not meet the Adequate Intake recommendation. To increase potassium, focus on food choices with the most potassium, listed in Appendix 10. Food Sources of Potassium, such as white potatoes, beet greens, white beans, plain yogurt, and sweet potato.

Although amounts of vitamin D in the USDA Food Patterns are less than recommendations, vitamin D is unique in that sunlight on the skin enables the body to make vitamin D. Recommendations for vitamin D assume minimum sun exposure. Strategies to achieve higher levels of intake of dietary vitamin D include consuming seafood with higher amounts of vitamin D, such as salmon, herring, mackerel, and tuna, and more foods fortified with vitamin D, especially fluid milk, soy beverage (soymilk), yogurt, orange juice, and breakfast cereals. In some cases, taking a vitamin D supplement may be appropriate, especially when sunshine exposure is limited due to climate or the use of sunscreen.

The best food sources of potassium, calcium, vitamin D, and dietary fiber are found in Appendix 10, Appendix 11, Appendix 12, and Appendix 13, respectively.

Substantial numbers of women who are capable of becoming pregnant, including adolescent girls, are at risk of iron-deficiency anemia due to low intakes of

[6] Caffeine is a substance that is generally recognized as safe (GRAS) in cola-type beverages by the Food and Drug Administration for use by adults and children. For more information, see: Code of Federal Regulation Title 21, subchapter B, Part 182, Subpart B. Caffeine. U.S. Government Printing Office. November 23, 2015. Available at: http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=f8c3068e9ec0062a3b4078cfa6361cf6&ty=HTML&h=L&mc=true&r=SECTION&n=se21.3.182_11180. Accessed October 22, 2015.

iron. To improve iron status, women and adolescent girls should consume foods containing heme iron, such as lean meats, poultry, and seafood, which is more readily absorbed by the body. Additional iron sources include legumes (beans and peas) and dark-green vegetables, as well as foods enriched or fortified with iron, such as many breads and ready-to-eat cereals. Absorption of iron from non-heme sources is enhanced by consuming them along with vitamin C-rich foods. Women who are pregnant are advised to take an iron supplement when recommended by an obstetrician or other health care provider.

Beverages

Beverages are not always remembered or considered when individuals think about overall food intake. However, they are an important component of eating patterns. In addition to water, the beverages that are most commonly consumed include sugar-sweetened beverages, milk and flavored milk, alcoholic beverages, fruit and vegetable juices, and coffee and tea. Beverages vary in their nutrient and calorie content. Some, like water, do not contain any calories. Some, like soft drinks, contain calories but little nutritional value. Finally, some, like milk and fruit and vegetable juices, contain important nutrients such as calcium, potassium, and vitamin D, in addition to calories.

Beverages make a substantial contribution to total water needs as well as to nutrient and calorie intakes in most typical eating patterns. In fact, they account for almost 20 percent of total calorie intake. Within beverages, the largest source of calories is sweetened beverages, accounting for 35 percent of calories from beverages. Other major sources of calories from beverages are milk and milk drinks, alcoholic beverages, fruit and vegetable juices, and coffee and tea.

When choosing beverages, both the calories and nutrients they may provide are important considerations. Beverages that are calorie-free—especially water—or that contribute beneficial nutrients, such as fat-free and low-fat milk and 100% juice, should be the primary beverages consumed. Milk and 100% fruit juice should be consumed within recommended food group amounts and calorie limits. Sugar-sweetened beverages, such as soft drinks, sports drinks, and fruit drinks that are less than 100% juice, can contribute excess calories while providing few or no key nutrients. If they are consumed, amounts should be within overall calorie limits and limits for calories from added sugars (see Chapter 1). The use of high-intensity sweeteners, such as those used in "diet" beverages, as a replacement for added sugars is discussed in Chapter 1 in the Added Sugars section.

For adults who choose to drink alcohol, limits of only moderate intake (see Appendix 9) and overall calorie limits apply.[8] Coffee, tea, and flavored waters also can be selected, but calories from cream, added sugars, and other additions should be accounted for within the eating pattern.

Opportunities for Shifts in Food Choices

To support a healthy body weight, meet nutrient needs, and lessen the risk of chronic disease, shifts are needed in

Folic Acid for Women Capable of Becoming Pregnant & Who Are Pregnant

The RDAs for folate are based on the prevention of folate deficiency, not on the prevention of neural tube defects. The RDA for adult women is 400 micrograms (mcg) Dietary Folate Equivalents (DFE)[7] and for women during pregnancy, 600 mcg DFE daily from all sources.

Folic acid fortification of enriched grain products in the United States has been successful in reducing the incidence of neural tube defects. Therefore, to prevent birth defects, all women capable of becoming pregnant are advised to consume 400 mcg of synthetic folic acid daily, from fortified foods and/or supplements. This recommendation is for an intake of synthetic folic acid in addition to the amounts of food folate contained in a healthy eating pattern. All enriched grains are fortified with synthetic folic acid. Sources of food folate include beans and peas, oranges and orange juice, and dark-green leafy vegetables, such as spinach and mustard greens.

[7] Dietary Folate Equivalents (DFE) adjust for the difference in bioavailability of food folate compared with synthetic folic acid. Food folate, measured as micrograms DFE, is less bioavailable than folic acid. 1 DFE = 1 mcg food folate = 0.6 mcg folic acid from supplements and fortified foods taken with meals.

[8] It is not recommended that individuals begin drinking or drink more for any reason. The amount of alcohol and calories in beverages varies and should be accounted for within the limits of healthy eating patterns. Alcohol should be consumed only by adults of legal drinking age. There are many circumstances in which individuals should not drink, such as during pregnancy. See Appendix 9 for additional information.

overall eating patterns—across and within food groups and from current typical choices to nutrient-dense options. Eating patterns are the result of choices on multiple eating occasions over time, both at home and away from home. As a result, individuals have many opportunities to make shifts to improve eating patterns.

The majority of the U.S. population consumes three meals a day plus more than one snack. Children ages 2 to 5 years are most likely to consume three meals a day, with 84 percent consuming three meals and most often, two or more snacks. In contrast, only half of adolescent females and young adult males consume three meals a day, but most also have two or more snacks per day. Also, among most age groups, 40 to 50 percent consume two to three snacks a day, and about one-third consume four or more snacks a day.

About two-thirds (67%) of the calories consumed by the U.S. population are purchased at a store, such as a grocery store or supermarket, and consumed in the home. However, Americans have increased the proportion of food they consume away from home from 18 percent in 1977-1978 to 33 percent in 2009-2010.

These data suggest that multiple opportunities to improve food choices exist throughout the day and in varied settings where food is obtained and consumed. Small shifts made at each of these many eating occasions over time can add up to real improvements in eating patterns.

Summary

The U.S. population, across almost every age and sex group, consumes eating patterns that are low in vegetables, fruits, whole grains, dairy, seafood, and oil and high in refined grains, added sugars, saturated fats, sodium, and for some age-sex groups, high in the meats, poultry, and eggs subgroup. Although most Americans urgently need to shift intakes to achieve the healthy eating patterns described in Chapter 1, young children and older Americans generally are closer to the recommendations than are adolescents and young adults. For some aspects of eating patterns, maintaining the intake levels of young children as they grow into adolescence and adulthood could result in healthy eating patterns across the lifespan and improved health over time.

CHAPTER

3

Everyone Has a Role in Supporting Healthy Eating Patterns

Introduction

The previous chapters describe the characteristics of healthy eating and physical activity patterns, and it is clear that across all population groups, the vast majority of people in the United States are not meeting these recommendations. In general, Americans are consuming too many calories, are not meeting food group and nutrient recommendations, and are not getting adequate physical activity. In practice, aligning with the *Dietary Guidelines* (see Aligning With the *Dietary Guidelines for Americans*: What Does This Mean in Practice? in the Introduction) at the population level requires broad, multisectoral coordination and collaboration. This collective action is needed to create a new paradigm in which healthy lifestyle choices at home, school, work, and in the community are easy, accessible, affordable, and normative. Everyone has a role in helping individuals shift their everyday food,[1] beverage, and physical activity choices to align with the *Dietary Guidelines*.

The *Dietary Guidelines* provides recommendations that professionals, especially policymakers, can translate into action to support individuals. This chapter discusses a number of considerations related to translating the *Dietary Guidelines* into action, including the significance of using multiple strategies across all segments of society to promote healthy eating and physical activity behaviors; the development of educational resources that deliver information in a way that is compelling, inspiring, empowering, and actionable for individuals; and the need to focus on individuals where they are making food and beverage choices.

About This Chapter

This chapter focuses on the fifth Guideline:

1. **Follow a healthy eating pattern across the lifespan.** All food and beverage choices matter. Choose a healthy eating pattern at an appropriate calorie level to help achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease.

2. **Focus on variety, nutrient density, and amount.** To meet nutrient needs within calorie limits, choose a variety of nutrient-dense foods across and within all food groups in recommended amounts.

3. **Limit calories from added sugars and saturated fats and reduce sodium intake.** Consume an eating pattern low in added sugars, saturated fats, and sodium. Cut back on foods and beverages higher in these components to amounts that fit within healthy eating patterns.

4. **Shift to healthier food and beverage choices.** Choose nutrient-dense foods and beverages across and within all food groups in place of less healthy choices. Consider cultural and personal preferences to make these shifts easier to accomplish and maintain.

5. **Support healthy eating patterns for all.** Everyone has a role in helping to create and support healthy eating patterns in multiple settings nationwide, from home to school to work to communities.

The Social-Ecological Model (Figure 3-1) is used as a framework to illustrate how sectors, settings, social and cultural norms, and individual factors converge to influence food and physical activity choices. The chapter describes contextual factors that influence eating as well as physical activity behaviors and identifies opportunities for professionals, including policymakers, to implement strategies that can help individuals align with the *Dietary Guidelines*.

Creating & Supporting Healthy Choices

As shown in the Social-Ecological Model, a multitude of choices, messages, individual resources, and other factors affect the food and physical activity choices an individual makes, and these decisions are rarely made in isolation. The following section describes the various components in the Social-Ecological Model and how they play a role in influencing the decisions individuals make about foods and physical activity. Ideas for engaging these components in collaborative ways to influence individual decisions, and ultimately social and cultural norms and values to align with the *Dietary Guidelines*, are provided.

The Social-Ecological Model

Consistent evidence shows that implementing multiple changes at various levels of the Social-Ecological Model is effective in improving eating and physical activity behaviors. For example, strong evidence from studies with varying designs and generally consistent findings demonstrates that school policies designed to enhance the school food setting leads to improvements in the purchasing behavior of children, resulting in higher dietary quality of the food consumed during the school day. For adults, moderate evidence indicates

[1] If not specified explicitly, references to "foods" refer to "foods and beverages."

that worksite nutrition policies can improve dietary intake, and approaches targeting dietary intake and physical activity can favorably affect weight-related outcomes. These examples demonstrate how support and active engagement from various segments of society are needed to help individuals change their eating and physical activity behaviors and achieve positive outcomes. Approaches like these have the potential to improve population health if they can be incorporated into existing organizational structures and maintained over time. Among the components of the Social-Ecological Model, sectors and settings influence change at the population level and are addressed first in this discussion.

Sectors

Sectors include systems (e.g., governments, education, health care, and transportation), organizations (e.g., public health, community, and advocacy), and businesses and industries (e.g., planning and development, agriculture, food and beverage, retail, entertainment, marketing, and media).

Figure 3-1.
A Social-Ecological Model for Food & Physical Activity Decisions

The Social-Ecological Model can help health professionals understand how layers of influence intersect to shape a person's food and physical activity choices. The model below shows how various factors influence food and beverage intake, physical activity patterns, and ultimately health outcomes.

DATA SOURCES: Adapted from: (1) Centers for Disease Control and Prevention. Division of Nutrition, Physical Activity, and Obesity. National Center for Chronic Disease Prevention and Health Promotion. Addressing Obesity Disparities: Social Ecological Model. Available at: http://www.cdc.gov/obesity/health_equity/addressingtheissue.html. Accessed October 19, 2015. (2) Institute of Medicine. Preventing Childhood Obesity: Health in the Balance, Washington (DC): The National Academies Press; 2005, page 85. (3) Story M, Kaphingst KM, Robinson O Brien R, Glanz K. Creating healthy food and eating environments: Policy and environmental approaches. Annu Rev Public Health 2008; 29:253-272.

These sectors all have an important role in helping individuals make healthy choices because they either influence the degree to which people have access to healthy food and/or opportunities to be physically active, or they influence social norms and values. Positive influences on social norms and values can occur through effective health promotion and marketing strategies.

Professionals in these sectors have many opportunities to identify and develop strategies that help individuals align their choices with the *Dietary Guidelines*. Strategies could include supporting policy and/or program changes, fostering coalitions and networks, developing or modifying products and menus, and/or creating opportunities to be physically active. To ensure widespread adoption of these sectoral efforts, complementary efforts can include training, education, and/or motivational strategies.

Settings

Individuals make choices in a variety of settings, both at home and away from home. Away-from-home settings include early care and education programs (e.g., child care, preschool), schools, worksites, community centers, and food retail and food service establishments. These organizational settings determine what foods are offered and what opportunities for physical activity are provided. Strategies to align with the *Dietary Guidelines* that are implemented in these settings can influence individual choices and have the potential for broader population-level impact if they are integrated with strategies by multiple sectors. In combination, sectors and settings can influence social norms and values.

Social & Cultural Norms & Values

Social and cultural *norms* are rules that govern thoughts, beliefs, and behaviors. They are shared assumptions of appropriate behaviors, based on the values of a society, and are reflected in everything from laws to personal expectations. With regard to nutrition and physical activity, examples of norms include preferences for certain types of foods, attitudes about acceptable ranges of body weight, and values placed on physical activity and health. Because norms and values are prevalent within a community or setting, changing them can be difficult. However, changes to sectors and settings—as previously discussed—can have a powerful effect on social and cultural norms and values over time and can align with the *Dietary Guidelines*.

Individual Factors

Individual factors are those that are unique to the individual, such as age, sex, socioeconomic status, race/ethnicity, the presence of a disability, as well as other influences, such as physical health, knowledge and skills, and personal preferences. Education to improve individual food and physical activity choices can be delivered by a wide variety of nutrition and physical activity professionals working alone or in multidisciplinary teams. Resources based on systematic reviews of scientific evidence, such as the *Dietary Guidelines* and the *Physical Activity Guidelines for Americans*, provide the foundation for nutrition and public health professionals to develop programs and materials that can help individuals enhance their knowledge, attitudes, and motivation to make healthy choices.

All food and beverage choices are part of an individual's eating pattern. Professionals can work with individuals in a variety of settings to adapt their choices to develop a healthy eating pattern tailored to accommodate physical health, cultural, ethnic, traditional, and personal preferences, as well as personal food budgets and other issues of accessibility. Eating patterns tailored to the individual are more likely to be motivating, accepted, and maintained over time, thereby having the potential to lead to meaningful shifts in dietary intake, and consequently, improved health.

Opportunities To Align Food Products & Menus With the *Dietary Guidelines*

During the past few decades, food products and menus have notably evolved in response to consumer demands and public health concerns. The food and beverage and food service sectors and settings have a unique opportunity to continue to evolve and better align with the *Dietary Guidelines*. Reformulation and menu and retail modification opportunities that align with the *Dietary Guidelines* include offering more vegetables, fruits, whole grains, low-fat and fat-free dairy, and a greater variety of protein foods that are nutrient dense, while also reducing sodium and added sugars, reducing saturated fats and replacing them with unsaturated fats, and reducing added refined starches. Portion sizes also can be adapted to help individuals make choices that align with the *Dietary Guidelines*. Food manufacturers are encouraged to consider the entire composition of the food, and not just individual nutrients or ingredients when developing or reformulating products. Similarly, when developing or modifying menus or retail settings, establishments can consider the range of offerings both within and across food groups and other dietary components to determine whether the healthy options offered reflect the proportions in healthy eating patterns. In taking these actions, care should be taken to assess any potential unintended consequences so that as changes are made to better align with the *Dietary Guidelines*, undesirable changes are not introduced.

Meeting People Where They Are: Contextual Factors & Healthy Eating Patterns

As previously described, the Social-Ecological Model provides a framework for how individuals make food and physical activity choices (where, what, when, why, and how much) each day. Understanding individual choices and motivators and the context that affects them can help professionals identify which strategies are most likely to be effective to promote healthy choices aligned with the *Dietary Guidelines*.

The scientific literature has described a number of specific circumstances that can limit an individual's or family's capacity to choose a healthy diet. These contextual factors—food access, household food insecurity, and acculturation—are particularly important for millions of individuals living in the United States. As appropriate, professionals can consider these critical factors when developing strategies and providing education to enhance interventions.

Food Access

Having access to healthy, safe,[2] and affordable food choices is crucial for an individual to achieve a healthy eating pattern. Food access is influenced by diverse factors, including proximity to food retail outlets (e.g., distance to a store or the number of stores in an area), individual resources (e.g., income or personal transportation), and neighborhood-level resources (e.g., average income of the neighborhood and availability of public transportation). Race/ethnicity, socioeconomic status, geographic location, and the presence of a disability also may affect an individual's ability to access foods to support healthy eating patterns.

Innovative approaches are emerging to improve food access within communities. These include creating financing programs to incentivize grocery store development; increasing the availability of foods to support healthy eating patterns in retail outlets, including corner stores, bodegas, farmers markets, mobile markets, shelters, food banks, and community gardens/cooperatives; and creating new pathways for wholesale distribution through food hubs.

Food access is important in all settings where people make choices. Improving food access in settings, such as schools, worksites, early care and education programs, and food retail, may include changing organizational policies to improve the availability and provision of healthy food choices, developing or updating nutrition standards for food service operations, and educating customers about how to identify healthy choices, such as through point-of-purchase information. Changes to food options within a setting should not be done in isolation but with consideration of the overall mix of foods provided (e.g., in cafeterias, at meetings, in vending machines, concession stands and elsewhere).

To help everyone make choices that align with the *Dietary Guidelines*, professionals are encouraged to identify ways to improve food access. Ultimately, individual choices will be enhanced when sectors and settings ensure the accessibility of safe, affordable, and healthy food choices.

Household Food Insecurity

In the United States, about 48 million individuals live in households that experience food insecurity, which occurs when access to nutritionally adequate and safe food is limited or uncertain. Food insecurity can be temporary or persist over time. Living with food insecurity challenges a household's ability to obtain food and make healthy choices and can exacerbate stress and chronic disease risk. Government and nongovernment nutrition assistance programs play an essential role in providing food and educational resources to help participants make healthy food choices within their budget. Food insecurity persists in the United States, and maintaining current programs, networks, and partnerships is crucial in addressing the problem. Exploring innovative new strategies could provide opportunities to reach more individuals, families, and households experiencing food insecurity. For example, sectors can create networks and partnerships to deliver food and other resources to reach people who are in need and when community services are scarce. Individuals who are supported in this way are better able to obtain and make healthy food choices that align with the *Dietary Guidelines*.

Acculturation

The United States continues to evolve as a nation of individuals and families who emigrate from other countries. Individuals who come to this country may adopt the attitudes, values, customs, beliefs, and behaviors of a new culture as well as its dietary habits. Healthy eating patterns are designed to be flexible in order to accommodate traditional and cultural foods. Individuals are encouraged to retain the healthy aspects of their eating and physical activity patterns and avoid adopting behaviors that are less healthy. Professionals can help individuals or population groups by recognizing cultural diversity and developing programs and materials that are responsive and appropriate to their belief systems, lifestyles and practices, traditions, and other needs.

[2] See Appendix 14. Food Safety Principles and Guidance for guidance on food safety principles and practices.

Multi-Component Versus Multi-Level Strategies To Influence Food & Physical Activity Choices

Evidence demonstrates that both multi-component and multi-level changes must be implemented to effectively influence public health. Multi-component changes are those that use a *combination of strategies* to promote behavior change. These strategies can be employed across or within different settings. For example, a multi-component obesity prevention program at an early care and education center could target classroom education around nutrition and physical activity, ensure the continued nutritional quality of meals and snacks served, make improvements to the mealtime setting, increase opportunities for active play, and initiate active outreach to parents about making positive changes at home.

Multi-level changes are those that *target change at the individual level as well as additional levels*, such as in community, school, and retail settings. For example, strategies to reduce sodium intake could include providing individual education on how to interpret sodium information on food labels or restaurant menus (e.g., sodium versus salt), reformulating foods and meals to reduce sodium content in retail and food service establishments, and conducting public health campaigns to promote the importance of reducing sodium intake.

Many strategies for implementing these types of multi-component and multi-level actions have shown promise to positively influence food and physical activity choices. For example, moderate evidence indicates that multi-component school-based programs can improve dietary intake and weight status of school-aged children. Fundamental to the success of such actions is tailoring programs to meet the needs of the individual, the community, and/or the organization so as to increase the chances of affecting social and cultural norms and values over time.

Strategies for Action

To shift from current eating patterns to those that align with the *Dietary Guidelines*, collective action across all segments of society is needed. As previously described, these actions must involve a broad range of sectors, occur across a variety of settings, and address the needs of individuals, families, and communities. These actions include identifying and addressing successful approaches for change; improving knowledge of what constitutes healthy eating and physical activity patterns; enhancing access to adequate amounts of healthy, safe, and affordable food choices; and promoting change in social and cultural norms and values to embrace, support, and maintain healthy eating and physical activity behaviors.

The following examples of strategies exemplify the concerted action needed. It is important to note that no one strategy is likely to be the primary driver to improve individual and population lifestyle choices. Evidence demonstrates that multiple changes both within and across all levels of the Social-Ecological Model are needed to increase the effectiveness of interventions.

Sectors—Examples Include:

- Foster partnerships with food producers, suppliers, and retailers to increase access to foods that align with the *Dietary Guidelines*.
- Promote the development and availability of food products that align with the *Dietary Guidelines* in food retail and food service establishments.
- Identify and support policies and/or programs that promote healthy eating and physical activity patterns.
- Encourage participation in physical activity programs offered in various settings.

Settings—Examples Include:

- Expand access to healthy, safe, and affordable food choices that align with the *Dietary Guidelines* and provide opportunities for engaging in physical activity.
- Adopt organizational changes and practices, including those that increase the availability, accessibility, and consumption of foods that align with the *Dietary Guidelines*.
- Provide nutrition assistance programs that support education and promotional activities tailored to the needs of the community.
- Implement educational programs tailored to individuals and change organization practices, approaches, and/or policies to support healthy food choices where food decisions are being made, including at early care and education programs, schools, worksites, and other community settings.
- Encourage opportunities in the workplace for regular physical activity through active commuting, activity breaks, and walking meetings.

Using MyPlate as a Guide To Support Healthy Eating Patterns

The *Dietary Guidelines* is developed and written for a professional audience. Therefore, its translation into actionable consumer messages and resources is crucial to help individuals, families, and communities achieve healthy eating patterns. MyPlate is one such example (**Figure 3-2**). MyPlate is used by professionals across multiple sectors to help individuals become more aware of and educated about making healthy food and beverage choices over time. Created to be used in various settings and to be adaptable to the needs of specific population groups, the MyPlate symbol and its supporting consumer resources at ChooseMyPlate.gov bring together the key elements of healthy eating patterns, translating the *Dietary Guidelines* into key consumer messages that are used in educational materials and tools for the public.

Figure 3-2. Implementation of the *Dietary Guidelines* Through MyPlate

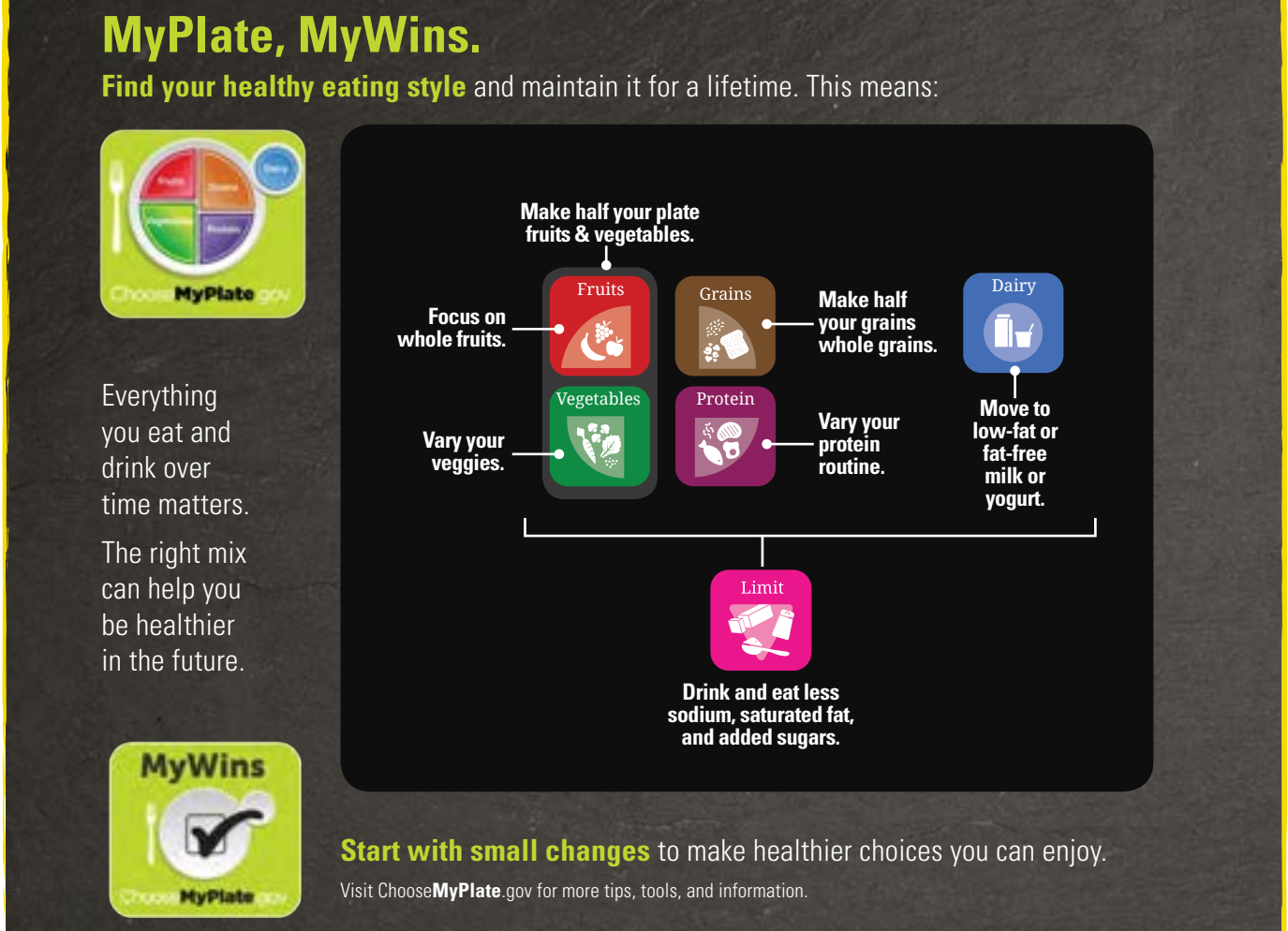


Figure 3-3.

Strategies To Align Settings With the *2015-2020 Dietary Guidelines*

Americans make food and beverage choices in a variety of settings at home, at work, and at play. Aligning these settings with the *2015-2020 Dietary Guidelines* will not only influence individual choices—it can also have broader population level impact when multiple sectors commit to make changes together.

Figure 3-3. *(continued...)*

Strategies To Align Settings With the *2015-2020 Dietary Guidelines*

Americans make food and beverage choices in a variety of settings at home, at work, and at play. Aligning these settings with the *2015-2020 Dietary Guidelines* will not only influence individual choices—it can also have broader population level impact when multiple sectors commit to make changes together.

Professionals Working With Individuals—Examples Include:

- Help individuals become more aware of the foods and beverages that make up their own or their family's eating patterns and identify areas, such as modifying recipes and/or food selections, where they can make shifts to align with the *Dietary Guidelines*.
- Teach skills like gardening, cooking, meal planning, and label reading that help support healthy eating patterns.
- Suggest ways that individuals can model healthy eating behaviors for friends and family members.
- Develop plans to help individuals limit screen time and time spent being sedentary and increase physical activity to meet the *Physical Activity Guidelines for Americans*.

This is not an all-inclusive list; many strategies are available that can result in shifts to improve dietary intake and, ultimately, improve health. Professionals should help individuals understand that they can adapt their choices to create healthy eating patterns that encompass all foods and beverages, meet food group and nutrient needs, and stay within calorie limits.

Summary

Concerted efforts among professionals within communities, businesses and industries, organizations, governments, and other segments of society are needed to support individuals and families in making lifestyle choices that align with the *Dietary Guidelines*. Professionals have an important role in leading disease-prevention efforts within their organizations and communities to make healthy eating and regular physical activity an organizational and societal norm. Changes at multiple levels of the Social-Ecological Model are needed, and these changes, in combination and over time, can have a meaningful impact on the health of current and future generations.

Appendix 1.

Physical Activity Guidelines for Americans

In addition to consuming a healthy eating pattern, regular physical activity is one of the most important things Americans can do to improve their health. The *Physical Activity Guidelines for Americans*,[1] released by the U.S. Department of Health and Human Services, provides a comprehensive set of recommendations for Americans on the amounts and types of physical activity needed each day. Adults need at least 150 minutes of moderate-intensity physical activity and should perform muscle-strengthening exercises on 2 or more days each week. Youth ages 6 to 17 years need at least 60 minutes of physical activity per day, including aerobic, muscle-strengthening, and bone-strengthening activities (see Table A1-1 for additional details). Just as individuals can achieve a healthy eating pattern in a variety of ways that meet their personal and cultural preferences, they can engage in regular physical activity in a variety of ways throughout the day and by choosing activities they enjoy. Table A1-2 provides a list of Federal resources, including handouts, online assessments, trackers, and interactive websites. These can be used to help motivate consumer audiences to make healthy physical activity choices.

Table A1-1.
Physical Activity Guidelines for Americans
Recommendations

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

[1] U.S. Department of Health and Human Services. *2008 Physical Activity Guidelines for Americans*. Washington (DC): U.S. Department of Health and Human Services; 2008. ODPHP Publication No. U0036. Available at: http://www.health.gov/paguidelines. Accessed August 6, 2015.

Age	Recommendations
18 to 64 Years	• All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits. • For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week. • For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes (5 hours) a week of moderate-intensity, or 150 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity. Additional health benefits are gained by engaging in physical activity beyond this amount. • Adults should also include muscle-strengthening activities that involve all major muscle groups on 2 or more days a week.
65 Years & Older	• Older adults should follow the adult guidelines. When older adults cannot meet the adult guidelines, they should be as physically active as their abilities and conditions will allow. • Older adults should do exercises that maintain or improve balance if they are at risk of falling. • 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.

[a] Moderate-intensity physical activity: Aerobic activity that increases a person's heart rate and breathing to some extent. On a scale relative to a person's capacity, moderate-intensity activity is usually a 5 or 6 on a 0 to 10 scale. Brisk walking, dancing, swimming, or bicycling on a level terrain are examples.

[b] Vigorous-intensity physical activity: Aerobic activity that greatly increases a person's heart rate and breathing. On a scale relative to a person's capacity, vigorous-intensity activity is usually a 7 or 8 on a 0 to 10 scale. Jogging, singles tennis, swimming continuous laps, or bicycling uphill are examples.

[c] Muscle-strengthening activity: Physical activity, including exercise that increases skeletal muscle strength, power, endurance, and mass. It includes strength training, resistance training, and muscular strength and endurance exercises.

[d] Bone-strengthening activity: Physical activity that produces an impact or tension force on bones, which promotes bone growth and strength. Running, jumping rope, and lifting weights are examples.

SOURCE: Adapted from U.S. Department of Health and Human Services. *2008 Physical Activity Guidelines for Americans*. Washington (DC): U.S. Department of Health and Human Services; 2008. Available at: http://www.health.gov/paguidelines. Accessed August 6, 2015.

Table A1-2.

Federal Physical Activity Resources

Program/Initiative	Lead Office	Website
Physical Activity Guidelines for Americans	Office of Disease Prevention and Health Promotion (ODPHP)	www.health.gov/paguidelines
Healthfinder.gov (Consumer Resources)	ODPHP	www.healthfinder.gov
Healthy People 2020 (Physical Activity National Objectives)	ODPHP	www.healthypeople.gov
Let's Move!	Office of the First Lady	www.letsmove.gov
Step it Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities	Office of the Surgeon General	www.surgeongeneral.gov
I Can Do It, You Can Do It	President's Council on Fitness, Sports & Nutrition (PCFSN)	www.fitness.gov
Presidential Youth Fitness Program	PCFSN	www.pyfp.org/index.shtml
The President's Challenge	PCFSN	www.presidentschallenge.org
The President's Challenge Adult Fitness Test	PCFSN	www.adultfitnesstest.org
***Physical Activity Guidelines for Americans* Youth Toolkit**	U.S. Centers for Disease Control and Prevention (CDC)	www.cdc.gov/healthyschools/physicalactivity/guidelines.htm
BAM! Body and Mind (Focused on Tweens)	CDC	www.cdc.gov/bam

Program/Initiative	Lead Office	Website
We Can! (Ways to Enhance Childhood Nutrition and Physical Activity)	National Institutes of Health (NIH) National Heart, Lung, and Blood Institute	www.nhlbi.nih.gov/health/educational/wecan
Go4Life (Focused on Older Adults)	NIH National Institute on Aging	https://go4life.nia.nih.gov/
SuperTracker	U.S. Department of Agriculture	www.supertracker.usda.gov
National Physical Activity Plan (NPAP)*	NPAP Alliance	www.physicalactivityplan.org

* The National Physical Activity Plan is not a product of the Federal Government. However, a number of Federal officers were involved in the development of the Plan.

Appendix 2.

Estimated Calorie Needs per Day, by Age, Sex, & Physical Activity Level

The total number of calories a person needs each day varies depending on a number of factors, including the person's age, sex, height, weight, and level of physical activity. In addition, a need to lose, maintain, or gain weight and other factors affect how many calories should be consumed. Estimated amounts of calories needed to maintain calorie balance for various age and sex groups at three different levels of physical activity are provided in Table A2-1. These estimates are based on the Estimated Energy Requirements (EER) equations, using reference heights (average) and reference weights (healthy) for each age-sex group. For children and adolescents, reference height and weight vary. For adults, the reference man is 5 feet 10 inches tall and weighs 154 pounds. The reference woman is 5 feet 4 inches tall and weighs 126 pounds.

Estimates range from 1,600 to 2,400 calories per day for adult women and 2,000 to 3,000 calories per day for adult men. Within each age and sex category, the low end of the range is for sedentary individuals; the high end of the range is for active individuals. Due to reductions in basal metabolic rate that occur with aging, calorie needs generally decrease for adults as they age. Estimated needs for young children range from 1,000 to 2,000 calories per day, and the range for older children and adolescents varies substantially from 1,400 to 3,200 calories per day, with boys generally having higher calorie needs than girls. These are only estimates, and approximations of individual calorie needs can be aided with online tools such as those available at www.supertracker.usda.gov.

Table A2-1.
Estimated Calorie Needs per Day, by Age, Sex, & Physical Activity Level

Males

Age	Sedentary[a]	Moderately Active[b]	Active[c]
2	1,000	1,000	1,000
3	1,000	1,400	1,400
4	1,200	1,400	1,600
5	1,200	1,400	1,600
6	1,400	1,600	1,800
7	1,400	1,600	1,800
8	1,400	1,600	2,000

Females[d]

Age	Sedentary[a]	Moderately Active[b]	Active[c]
2	1,000	1,000	1,000
3	1,000	1,200	1,400
4	1,200	1,400	1,400
5	1,200	1,400	1,600
6	1,200	1,400	1,600
7	1,200	1,600	1,800
8	1,400	1,600	1,800

Males

Age	Sedentary[a]	Moderately Active[b]	Active[c]
9	1,600	1,800	2,000
10	1,600	1,800	2,200
11	1,800	2,000	2,200
12	1,800	2,200	2,400
13	2,000	2,200	2,600
14	2,000	2,400	2,800
15	2,200	2,600	3,000
16	2,400	2,800	3,200
17	2,400	2,800	3,200
18	2,400	2,800	3,200
19-20	2,600	2,800	3,000
21-25	2,400	2,800	3,000
26-30	2,400	2,600	3,000
31-35	2,400	2,600	3,000
36-40	2,400	2,600	2,800
41-45	2,200	2,600	2,800
46-50	2,200	2,400	2,800
51-55	2,200	2,400	2,800
56-60	2,200	2,400	2,600
61-65	2,000	2,400	2,600
66-70	2,000	2,200	2,600
71-75	2,000	2,200	2,600
76 & Up	2,000	2,200	2,400

Females[d]

Age	Sedentary[a]	Moderately Active[b]	Active[c]
9	1,400	1,600	1,800
10	1,400	1,800	2,000
11	1,600	1,800	2,000
12	1,600	2,000	2,200
13	1,600	2,000	2,200
14	1,800	2,000	2,400
15	1,800	2,000	2,400
16	1,800	2,000	2,400
17	1,800	2,000	2,400
18	1,800	2,000	2,400
19-20	2,000	2,200	2,400
21-25	2,000	2,200	2,400
26-30	1,800	2,000	2,400
31-35	1,800	2,000	2,200
36-40	1,800	2,000	2,200
41-45	1,800	2,000	2,200
46-50	1,800	2,000	2,200
51-55	1,600	1,800	2,200
56-60	1,600	1,800	2,200
61-65	1,600	1,800	2,000
66-70	1,600	1,800	2,000
71-75	1,600	1,800	2,000
76 & Up	1,600	1,800	2,000

[a] Sedentary means a lifestyle that includes only the physical activity of independent living.

[b] Moderately Active means a lifestyle that includes physical activity equivalent to walking about 1.5 to 3 miles per day at 3 to 4 miles per hour, in addition to the activities of independent living.

[c] Active means a lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour, in addition to the activities of independent living.

[d] Estimates for females do not include women who are pregnant or breastfeeding.

SOURCE: Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington (DC): The National Academies Press; 2002.

Appendix 3.

USDA Food Patterns: Healthy U.S.-Style Eating Pattern

The Healthy U.S.-Style Pattern is based on the types and proportions of foods Americans typically consume, but in nutrient-dense forms and appropriate amounts. It is designed to meet nutrient needs while not exceeding calorie requirements and while staying within limits for overconsumed dietary components.

The methodology used to develop and update this Pattern continues to be grounded in that of the food guides USDA has developed for the last 30 years. This methodology includes using current food consumption data to determine the mix and proportions of foods to include in each group, using current food composition data to select a nutrient-dense representative for each food, and calculating nutrient profiles for each food group using these nutrient-dense representative foods. As would be expected, most foods in their nutrient-dense forms do contain some sodium and saturated fatty acids. In a few cases, such as whole-wheat bread, the most appropriate representative in current Federal databases contains a small amount of added sugars. Detailed information about the representative foods, nutrient profiles, and Patterns is available on the USDA Center for Nutrition Policy and Promotion website.[1]

Amounts of each food group and subgroup are adjusted as needed, within the limits of the range of typical consumption when possible, to meet nutrient and *Dietary Guidelines* standards while staying within the limits for calories and overconsumed dietary components. Standards for nutrient adequacy aim to meet the Recommended Dietary Allowances (RDA), which are designed to cover the needs of 97 percent of the population, and Adequate Intakes (AI), which are used when an average nutrient requirement cannot be determined. The Patterns meet these standards for almost all nutrients. For a few nutrients (vitamin D, vitamin E, potassium, choline), amounts in the Patterns are marginal or below the RDA or AI standard for many or all age-sex groups. In most cases, an intake of these nutrients below the RDA or AI is not considered to be of public health concern. For more information on potassium and vitamin D, see Chapter 2, Underconsumed Nutrients and Nutrients of Public Health Concern.

The Healthy U.S.-Style Pattern is the base USDA Food Pattern. While the Healthy U.S.-Style Pattern is substantially unchanged from the base USDA Food Pattern of the 2010 edition of the *Dietary Guidelines*, small changes in the recommended amounts reflect updating the Patterns based on current food consumption and composition data. The Healthy U.S.-Style Pattern includes 12 calorie levels to meet the needs of individuals across the lifespan. To follow this Pattern, identify the appropriate calorie level, choose a variety of foods in each group and subgroup over time in recommended amounts, and limit choices that are not in nutrient-dense forms so that the overall calorie limit is not exceeded.

[1] For additional information and technical tables, see: U.S. Department of Agriculture. Center for Nutrition Policy and Promotion. USDA Food Patterns. Available at: http://www.cnpp.usda.gov/USDAFoodPatterns.

Table A3-1.

Healthy U.S.-Style Eating Pattern: Recommended Amounts of Food From Each Food Group at 12 Calorie Levels

Calorie Level of Pattern[a]	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group[b]	**Daily Amount[c]** of Food From Each Group (vegetable and protein foods subgroup amounts are per week)											
Vegetables	**1 c-eq**	**1½ c-eq**	**1½ c-eq**	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**3 c-eq**	**3 c-eq**	**3½ c-eq**	**3½ c-eq**	**4 c-eq**	**4 c-eq**
Dark-Green Vegetables (c-eq/wk)	½	1	1	1½	1½	1½	2	2	2½	2½	2½	2½
Red & Orange Vegetables (c-eq/wk)	2½	3	3	4	5½	5½	6	6	7	7	7½	7½
Legumes (Beans & Peas) (c-eq/wk)	½	½	½	1	1½	1½	2	2	2½	2½	3	3
Starchy Vegetables (c-eq/wk)	2	3½	3½	4	5	5	6	6	7	7	8	8
Other Vegetables (c-eq/wk)	1½	2½	2½	3½	4	4	5	5	5½	5½	7	7
Fruits	**1 c-eq**	**1 c-eq**	**1½ c-eq**	**1½ c-eq**	**1½ c-eq**	**2 c-eq**	**2 c-eq**	**2 c-eq**	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**2½ c-eq**
Grains	**3 oz-eq**	**4 oz-eq**	**5 oz-eq**	**5 oz-eq**	**6 oz-eq**	**6 oz-eq**	**7 oz-eq**	**8 oz-eq**	**9 oz-eq**	**10 oz-eq**	**10 oz-eq**	**10 oz-eq**
Whole Grains[d] (oz-eq/day)	1½	2	2½	3	3	3	3½	4	4½	5	5	5
Refined Grains (oz-eq/day)	1½	2	2½	2	3	3	3½	4	4½	5	5	5

Table A3-1. *(continued...)*

Healthy U.S.-Style Eating Pattern: Recommended Amounts of Food From Each Food Group at 12 Calorie Levels

Calorie Level of Pattern[a]	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group[b]	**Daily Amount[c]** of Food From Each Group (vegetable and protein foods subgroup amounts are per week)											
Dairy	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**
Protein Foods	**2 oz-eq**	**3 oz-eq**	**4 oz-eq**	**5 oz-eq**	**5 oz-eq**	**5½ oz-eq**	**6 oz-eq**	**6½ oz-eq**	**6½ oz-eq**	**7 oz-eq**	**7 oz-eq**	**7 oz-eq**
Seafood (oz-eq/wk)	3	4	6	8	8	8	9	10	10	10	10	10
Meats, Poultry, Eggs (oz-eq/wk)	10	14	19	23	23	26	28	31	31	33	33	33
Nuts Seeds, Soy Products (oz-eq/wk)	2	2	3	4	4	5	5	5	5	6	6	6
Oils	**15 g**	**17 g**	**17 g**	**22 g**	**24 g**	**27 g**	**29 g**	**31 g**	**34 g**	**36 g**	**44 g**	**51 g**
Limit on Calories for Other Uses, Calories (% of Calories)[e,f]	**150 (15%)**	**100 (8%)**	**110 (8%)**	**130 (8%)**	**170 (9%)**	**270 (14%)**	**280 (13%)**	**350 (15%)**	**380 (15%)**	**400 (14%)**	**470 (16%)**	**610 (19%)**

[a] Food intake patterns at 1,000, 1,200, and 1,400 calories are designed to meet the nutritional needs of 2- to 8-year-old children. Patterns from 1,600 to 3,200 calories are designed to meet the nutritional needs of children 9 years and older and adults. If a child 4 to 8 years of age needs more calories and, therefore, is following a pattern at 1,600 calories or more, his/her recommended amount from the dairy group should be 2.5 cups per day. Children 9 years and older and adults should not use the 1,000-, 1,200-, or 1,400-calorie patterns.

[b] Foods in each group and subgroup are:

- Vegetables
  - Dark-green vegetables: All fresh, frozen, and canned dark-green leafy vegetables and broccoli, cooked or raw: for example, broccoli; spinach; romaine; kale; collard, turnip, and mustard greens.
  - Red and orange vegetables: All fresh, frozen, and canned red and orange vegetables or juice, cooked or raw: for example, tomatoes, tomato juice, red peppers, carrots, sweet potatoes, winter squash, and pumpkin.
  - Legumes (beans and peas): All cooked from dry or canned beans and peas: for example, kidney beans, white beans, black beans, lentils, chickpeas, pinto beans, split peas, and edamame (green soybeans). Does not include green beans or green peas.

- Starchy vegetables: All fresh, frozen, and canned starchy vegetables: for example, white potatoes, corn, green peas, green lima beans, plantains, and cassava.
- Other vegetables: All other fresh, frozen, and canned vegetables, cooked or raw: for example, iceberg lettuce, green beans, onions, cucumbers, cabbage, celery, zucchini, mushrooms, and green peppers.

- Fruits
  - All fresh, frozen, canned, and dried fruits and fruit juices: for example, oranges and orange juice, apples and apple juice, bananas, grapes, melons, berries, and raisins.
- Grains
  - Whole grains: All whole-grain products and whole grains used as ingredients: for example, whole-wheat bread, whole-grain cereals and crackers, oatmeal, quinoa, popcorn, and brown rice.
  - Refined grains: All refined-grain products and refined grains used as ingredients: for example, white breads, refined grain cereals and crackers, pasta, and white rice. Refined grain choices should be enriched.
- Dairy
  - All milk, including lactose-free and lactose-reduced products and fortified soy beverages (soymilk), yogurt, frozen yogurt, dairy desserts, and cheeses. Most choices should be fat-free or low-fat. Cream, sour cream, and cream cheese are not included due to their low calcium content.
- Protein Foods
  - All seafood, meats, poultry, eggs, soy products, nuts, and seeds. Meats and poultry should be lean or low-fat and nuts should be unsalted. Legumes (beans and peas) can be considered part of this group as well as the vegetable group, but should be counted in one group only.

[c] Food group amounts shown in cup-(c) or ounce-equivalents (oz-eq). Oils are shown in grams (g). Quantity equivalents for each food group are:

- Vegetables and fruits, 1 cup-equivalent is: 1 cup raw or cooked vegetable or fruit, 1 cup vegetable or fruit juice, 2 cups leafy salad greens, ½ cup dried fruit or vegetable.
- Grains, 1 ounce-equivalent is: ½ cup cooked rice, pasta, or cereal; 1 ounce dry pasta or rice; 1 medium (1 ounce) slice bread; 1 ounce of ready-to-eat cereal (about 1 cup of flaked cereal).
- Dairy, 1 cup-equivalent is: 1 cup milk, yogurt, or fortified soymilk; 1½ ounces natural cheese such as cheddar cheese or 2 ounces of processed cheese.
- Protein Foods, 1 ounce-equivalent is: 1 ounce lean meat, poultry, or seafood; 1 egg; ¼ cup cooked beans or tofu; 1 Tbsp peanut butter; ½ ounce nuts or seeds.

[d] Amounts of whole grains in the Patterns for children are less than the minimum of 3 oz-eq in all Patterns recommended for adults.

[e] All foods are assumed to be in nutrient-dense forms, lean or low-fat and prepared without added fats, sugars, refined starches, or salt. If all food choices to meet food group recommendations are in nutrient-dense forms, a small number of calories remain within the overall calorie limit of the Pattern (i.e., limit on calories for other uses). The number of these calories depends on the overall calorie limit in the Pattern and the amounts of food from each food group required to meet nutritional goals. Nutritional goals are higher for the 1,200- to 1,600-calorie Patterns than for the 1,000-calorie Pattern, so the limit on calories for other uses is lower in the 1,200- to 1,600-calorie Patterns. Calories up to the specified limit can be used for added sugars, added refined starches, solid fats, alcohol, or to eat more than the recommended amount of food in a food group. The overall eating Pattern also should not exceed the limits of less than 10 percent of calories from added sugars and less than 10 percent of calories from saturated fats. At most calorie levels, amounts that can be accommodated are less than these limits. For adults of legal drinking age who choose to drink alcohol, a limit of up to 1 drink per day for women and up to 2 drinks per day for men within limits on calories for other uses applies (see Appendix 9. Alcohol for additional guidance); and calories from protein, carbohydrate, and total fats should be within the Acceptable Macronutrient Distribution Ranges (AMDRs).

[f] Values are rounded.

Appendix 4.

USDA Food Patterns: Healthy Mediterranean-Style Eating Pattern

The Healthy Mediterranean-Style Pattern is adapted from the Healthy U.S.-Style Pattern, modifying amounts recommended from some food groups to more closely reflect eating patterns that have been associated with positive health outcomes in studies of Mediterranean-Style diets. Food group intakes from the studies that provided quantified data were compared to amounts in the Healthy U.S.-Style Pattern and adjustments were made to better reflect intakes of groups with Mediterranean-Style diets. The healthfulness of the Pattern was evaluated based on its similarity to food group intakes reported for groups with positive health outcomes in these studies rather than on meeting specified nutrient standards.

The Healthy Mediterranean-Style Pattern contains more fruits and seafood and less dairy than does the Healthy U.S.-Style Pattern. The changes in these amounts were limited to calorie levels appropriate for adults, because children were not part of the studies used in modifying the Pattern. The amounts of oils in the Pattern were not adjusted because the Healthy U.S.-Style Pattern already contains amounts of oils that are similar to amounts associated with positive health outcomes in the studies, and higher than typical intakes in the United States. Similarly, amounts of meat and poultry in the Healthy U.S.-Style Pattern are less than typical intakes in the United States and also similar to amounts associated with positive health outcomes in the studies.

While not evaluated on nutrient-adequacy standards, nutrient levels in the Pattern were assessed. The Pattern is similar to the Healthy U.S.-Style Pattern in nutrient content, with the exception of calcium and vitamin D. Levels of calcium and vitamin D in the Pattern are lower because less dairy is included for adults. See table footnotes for amounts of dairy recommended for children and adolescents.

To follow this Pattern, identify the appropriate calorie level, choose a variety of foods in each group and subgroup over time in recommended amounts, and limit choices that are not in nutrient-dense forms so that the overall calorie limit is not exceeded.

Table A4-1.

Healthy Mediterranean-Style Eating Pattern: Recommended Amounts of Food From Each Food Group at 12 Calorie Levels

Calorie Level of Pattern[a]	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group[b]	**Daily Amount[c]** of Food From Each Group (vegetable and protein foods subgroup amounts are per week)											
Vegetables	**1 c-eq**	**1½ c-eq**	**1½ c-eq**	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**3 c-eq**	**3 c-eq**	**3½ c-eq**	**3½ c-eq**	**4 c-eq**	**4 c-eq**
Dark-Green Vegetables (c-eq/wk)	½	1	1	1½	1½	1½	2	2	2½	2½	2½	2½
Red & Orange Vegetables (c-eq/wk)	2½	3	3	4	5½	5½	6	6	7	7	7½	7½
Legumes (Beans & Peas) (c-eq/wk)	½	½	½	1	1½	1½	2	2	2½	2½	3	3
Starchy Vegetables (c-eq/wk)	2	3½	3½	4	5	5	6	6	7	7	8	8
Other Vegetables (c-eq/wk)	1½	2½	2½	3½	4	4	5	5	5½	5½	7	7
Fruits	**1 c-eq**	**1 c-eq**	**1½ c-eq**	**2 c-eq**	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**2½ c-eq**	**2½ c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**
Grains	**3 oz-eq**	**4 oz-eq**	**5 oz-eq**	**5 oz-eq**	**6 oz-eq**	**6 oz-eq**	**7 oz-eq**	**8 oz-eq**	**9 oz-eq**	**10 oz-eq**	**10 oz-eq**	**10 oz-eq**
Whole Grains[d] (oz-eq/day)	1½	2	2½	3	3	3	3½	4	4½	5	5	5
Refined Grains (oz-eq/day)	1½	2	2½	2	3	3	3½	4	4½	5	5	5

Table A4-1. *(continued...)*

Healthy Mediterranean-Style Eating Pattern: Recommended Amounts of Food From Each Food Group at 12 Calorie Levels

Calorie Level of Pattern[a]	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group[b]	**Daily Amount[c]** of Food From Each Group (vegetable and protein foods subgroup amounts are per week)											
Dairy[e]	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**2 c-eq**	**2 c-eq**	**2 c-eq**	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**2½ c-eq**	**2½ c-eq**	**2½ c-eq**
Protein Foods	**2 oz-eq**	**3 oz-eq**	**4 oz-eq**	**5½ oz-eq**	**6 oz-eq**	**6½ oz-eq**	**7 oz-eq**	**7½ oz-eq**	**7½ oz-eq**	**8 oz-eq**	**8 oz-eq**	**8 oz-eq**
Seafood (oz-eq/wk)[f]	3	4	6	11	15	15	16	16	17	17	17	17
Meats, Poultry, Eggs (oz-eq/wk)	10	14	19	23	23	26	28	31	31	33	33	33
Nuts Seeds, Soy Products (oz-eq/wk)	2	2	3	4	4	5	5	5	5	6	6	6
Oils	**15 g**	**17 g**	**17 g**	**22 g**	**24 g**	**27 g**	**29 g**	**31 g**	**34 g**	**36 g**	**44 g**	**51 g**
Limit on Calories for Other Uses, Calories (% of Calories)[g,h]	**150 (15%)**	**100 (8%)**	**110 (8%)**	**140 (9%)**	**160 (9%)**	**260 (13%)**	**270 (12%)**	**300 (13%)**	**330 (13%)**	**350 (13%)**	**430 (14%)**	**570 (18%)**

[a, b, c, d] See Appendix 3. USDA Food Patterns: Healthy U.S.-Style Eating Pattern, notes a through d.

[e] Amounts of dairy recommended for children and adolescents are as follows, regardless of the calorie level of the Pattern: For 2 year-olds, 2 cup-eq per day; for 3 to 8 year-olds, 2 ½ cup-eq per day; for 9 to 18 year-olds, 3 cup-eq per day.

[f] The U.S. Food and Drug Administration (FDA) and the U.S. Environmental Protection Agency (EPA) provide joint guidance regarding seafood consumption for women who are pregnant or breastfeeding and young children. For more information, see the FDA or EPA websites www.FDA.gov/fishadvice; www.EPA.gov/fishadvice.

[g,h] See Appendix 3, notes e through f.

Appendix 5.

USDA Food Patterns: Healthy Vegetarian Eating Pattern

The Healthy Vegetarian Pattern is adapted from the Healthy U.S.-Style Pattern, modifying amounts recommended from some food groups to more closely reflect eating patterns reported by self-identified vegetarians in the National Health and Nutrition Examination Survey (NHANES). This analysis allowed development of a Pattern that is based on evidence of the foods and amounts consumed by vegetarians, in addition to meeting the same nutrient and Dietary Guidelines standards as the Healthy U.S.-Style Pattern. Based on a comparison of the food choices of these vegetarians to nonvegetarians in NHANES, amounts of soy products (particularly tofu and other processed soy products), legumes, nuts and seeds, and whole grains were increased, and meat, poultry, and seafood were eliminated. Dairy and eggs were included because they were consumed by the majority of these vegetarians. This Pattern can be vegan if all dairy choices are comprised of fortified soy beverages (soymilk) or other plant-based dairy substitutes. Note that vegetarian adaptations of the USDA Food Patterns were included in the *2010 Dietary Guidelines*. However, those adaptations did not modify the underlying structure of the Patterns, but substituted the same amounts of plant foods for animal foods in each food group. In contrast, the current Healthy Vegetarian Pattern includes changes in food group composition and amounts, based on assessing the food choices of vegetarians. The Pattern is similar in meeting nutrient standards to the Healthy U.S.-Style Pattern, but somewhat higher in calcium and fiber and lower in vitamin D due to differences in the foods included.

To follow this Pattern, identify the appropriate calorie level, choose a variety of foods in each group and subgroup over time in recommended amounts, and limit choices that are not in nutrient-dense forms so that the overall calorie limit is not exceeded.

Table A5-1.

Healthy Vegetarian Eating Pattern: Recommended Amounts of Food From Each Food Group at 12 Calorie Levels

Calorie Level of Pattern[a]	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group[b]	**Daily Amount[c]** of Food From Each Group (vegetable and protein foods subgroup amounts are per week)											
Vegetables	**1 c-eq**	**1½ c-eq**	**1½ c-eq**	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**3 c-eq**	**3 c-eq**	**3½ c-eq**	**3½ c-eq**	**4 c-eq**	**4 c-eq**
Dark-Green Vegetables (c-eq/wk)	½	1	1	1½	1½	1½	2	2	2½	2½	2½	2½
Red & Orange Vegetables (c-eq/wk)	2½	3	3	4	5½	5½	6	6	7	7	7½	7½
Legumes (Beans & Peas) (c-eq/wk)[d]	½	½	½	1	1½	1½	2	2	2½	2½	3	3
Starchy Vegetables (c-eq/wk)	2	3½	3½	4	5	5	6	6	7	7	8	8
Other Vegetables (c-eq/wk)	1½	2½	2½	3½	4	4	5	5	5½	5½	7	7
Fruits	**1 c-eq**	**1 c-eq**	**1½ c-eq**	**1½ c-eq**	**1½ c-eq**	**2 c-eq**	**2 c-eq**	**2 c-eq**	**2 c-eq**	**2½ c-eq**	**2½ c-eq**	**2½ c-eq**
Grains	**3 oz-eq**	**4 oz-eq**	**5 oz-eq**	**5½ oz-eq**	**6½ oz-eq**	**6½ oz-eq**	**7½ oz-eq**	**8½ oz-eq**	**9½ oz-eq**	**10½ oz-eq**	**10½ oz-eq**	**10½ oz-eq**
Whole Grains[e] (oz-eq/day)	1½	2	2½	3	3½	3½	4	4½	5	5½	5½	5½
Refined Grains (oz-eq/day)	1½	2	2½	2½	3	3	3 ½	4	4 ½	5	5	5
Dairy	**2 c-eq**	**2.5 c-eq**	**2.5 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**	**3 c-eq**

Calorie Level of Pattern[a]	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group[b]	**Daily Amount[c]** of Food From Each Group (vegetable and protein foods subgroup amounts are per week)											
Protein Foods	**1 oz-eq**	**1½ oz-eq**	**2 oz-eq**	**2½ oz-eq**	**3 oz-eq**	**3½ oz-eq**	**3½ oz-eq**	**4 oz-eq**	**4½ oz-eq**	**5 oz-eq**	**5½ oz-eq**	**6 oz-eq**
Eggs (oz-eq/wk)	2	3	3	3	3	3	3	3	3	4	4	4
Legumes (Beans & Peas) (oz-eq/wk)[d]	1	2	4	4	6	6	6	8	9	10	11	12
Soy Products (oz-eq/wk)	2	3	4	6	6	8	8	9	10	11	12	13
Nuts & Seeds (oz-eq/wk)	2	2	3	5	6	7	7	8	9	10	12	13
Oils	**15 g**	**17 g**	**17 g**	**22 g**	**24 g**	**27 g**	**29 g**	**31 g**	**34 g**	**36 g**	**44 g**	**51 g**
Limit on Calories for Other Uses, Calories (% of Calories)[f,g]	**190 (19%)**	**170 (14%)**	**190 (14%)**	**180 (11%)**	**190 (11%)**	**290 (15%)**	**330 (15%)**	**390 (16%)**	**390 (15%)**	**400 (14%)**	**440 (15%)**	**550 (17%)**

[a, b, c] See Appendix 3. USDA Food Patterns: Healthy U.S.-Style Eating Pattern, notes a through c.

[d] About half of total legumes are shown as vegetables, in cup-eq, and half as protein foods, in oz-eq. Total legumes in the Patterns, in cup-eq, is the amount in the vegetable group plus the amount in protein foods group (in oz-eq) divided by 4:

Calorie Level of Pattern[a]	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Total Legumes (Beans & Peas) (c-eq/wk)	**1**	**1**	**1½**	**2**	**3**	**3**	**3½**	**4**	**5**	**5**	**6**	**6**

[e, f, g] See Appendix 3, notes d through f.

Appendix 6.

Glossary of Terms

A

Acculturation—The process by which individuals who immigrate into a new country adopt the attitudes, values, customs, beliefs, and behaviors of the new culture. Acculturation is the gradual exchange between the original attitudes and behaviors associated with the originating country and those of the host culture.

Added Refined Starch—The starch constituent (see Carbohydrates) of a grain, such as corn, or of a vegetable, such as potato, used as an ingredient in another food. Starches have been refined to remove other components of the food, such as fiber, protein, and minerals. Refined starches can be added to foods as a thickener, a stabilizer, a bulking agent, or an anti-caking agent. While refined starches are made from grains or vegetables, they contain little or none of the many other components of these foods that together create a nutrient-dense food. They are a source of calories but few or no other nutrients.

Added Sugars—Syrups and other caloric sweeteners used as a sweetener in other food products. Naturally occurring sugars such as those in fruit or milk are not added sugars. Specific examples of added sugars that can be listed as an ingredient include brown sugar, corn sweetener, corn syrup, dextrose, fructose, glucose, high-fructose corn syrup, honey, invert sugar, lactose, malt syrup, maltose, molasses, raw sugar, sucrose, trehalose, and turbinado sugar. (See Carbohydrates, Sugars.)

B

Body Mass Index (BMI)—A measure of weight in kilograms (kg) relative to height in meters squared (m^2). BMI is considered a reasonably reliable indicator of total body fat, which is related to the risk of disease and death. BMI status categories include underweight, healthy weight, overweight, and obese (Table A6-1). Overweight and obese describe ranges of weight that are greater than what is considered healthy

Table A6-1.

Body Mass Index (BMI) & Corresponding Body Weight Categories for Children & Adults

Body Weight Category	Children & Adolescents (Ages 2 to 19 Years) (BMI-for-Age Percentile Range)	Adults (BMI)
Underweight	Less than the 5th percentile	Less than 18.5 kg/m^2
Normal Weight	5th percentile to less than the 85th percentile	18.5 to 24.9 kg/m^2
Overweight	85th to less than the 95th percentile	25.0 to 29.9 kg/m^2
Obese	Equal to or greater than the 95th percentile	30.0 kg/m^2 & greater

for a given height, while underweight describes a weight that is lower than what is considered healthy. Because children and adolescents are growing, their BMI is plotted on growth charts for sex and age. The percentile indicates the relative position of the child's BMI among children of the same sex and age.

C

Calorie Balance—The balance between calories consumed through eating and drinking and calories expended through physical activity and metabolic processes.

- **Calorie**—A unit commonly used to measure energy content of foods and beverages as well as energy use (expenditure) by the body. A kilocalorie is equal to the amount of energy (heat) required to raise the temperature of 1 kilogram of water 1 degree centigrade. Energy is required to sustain the body's various functions, including metabolic processes and physical activity. Carbohydrate, fat, protein, and alcohol provide all of the energy supplied by foods and beverages. If not specified explicitly, references to "calories" refer to "kilocalories."

Carbohydrates—One of the macronutrients and a source of energy. They include sugars, starches, and fiber:

- **Fiber**—Total fiber is the sum of *dietary fiber* and *functional fiber*. Dietary fiber consists of nondigestible carbohydrates and lignin that are intrinsic and intact in plants (i.e., the fiber naturally occurring in foods). Functional fiber consists of isolated, nondigestible carbohydrates that have beneficial physiological effects in humans. Functional fibers are either extracted from natural sources or are synthetically manufactured and added to foods, beverages, and supplements.
- **Starches**—Many glucose units linked together into long chains. Examples of foods containing starch include vegetables (e.g., potatoes, carrots), grains (e.g., brown rice, oats, wheat, barley, corn), and legumes (beans and peas; e.g., kidney beans, garbanzo beans, lentils, split peas).
- **Sugars**—Composed of one unit (a monosaccharide, such as glucose or fructose) or two joined units (a disaccharide, such as lactose or sucrose). Sugars include those occurring naturally in foods and beverages, those added to foods and beverages during processing and preparation, and those consumed separately. (See Added Sugars.)

Cardiovascular Disease (CVD)—Heart disease as well as diseases of the blood vessel system (arteries, capillaries, veins) that can lead to heart attack, chest pain (angina), or stroke.

Cholesterol—A natural sterol present in all animal tissues. Free cholesterol is a component of cell membranes and serves as a precursor for steroid hormones (estrogen, testosterone, aldosterone), and for bile acids. Humans are able to synthesize sufficient cholesterol to meet biologic requirements, and there is no evidence for a dietary requirement for cholesterol.

- **Blood Cholesterol**—Cholesterol that travels in the serum of the blood as distinct particles containing both lipids and proteins (lipoproteins). Also referred to as serum cholesterol. Two kinds of lipoproteins are:
  - **High-Density Lipoprotein (HDL-cholesterol)**—Blood cholesterol often called "good" cholesterol; carries cholesterol from tissues to the liver, which removes it from the body.
  - **Low-Density Lipoprotein (LDL-Cholesterol)**—Blood cholesterol often called "bad" cholesterol; carries cholesterol to arteries and tissues. A high LDL-cholesterol level in the blood leads to a buildup of cholesterol in arteries.
- **Dietary Cholesterol**—Cholesterol found in foods of animal origin, including meat, seafood, poultry, eggs, and dairy products. Plant foods, such as grains, vegetables, fruits, and oils do not contain dietary cholesterol.

Cup-Equivalent (cup-eq or c-eq)—The amount of a food or beverage product that is considered equal to 1 cup from the vegetables, fruits, or dairy food groups. A cup-eq for some foods or beverages may differ from a measured cup in volume because the foods have been concentrated (such as raisins or tomato paste), the foods are airy in their raw form and do not compress well into a cup (such as salad greens), or the foods are measured in a different form (such as cheese).

D

DASH Eating Plan—The DASH (Dietary Approaches to Stop Hypertension) Eating Plan exemplifies healthy eating. It was designed to increase intake of foods expected to lower blood pressure while being heart healthy and meeting Institute of Medicine (IOM) nutrient recommendations. It is available at specific calorie levels. It was adapted from the dietary pattern developed for the Dietary Approaches to Stop Hypertension (DASH) research trials. In the trials, the DASH dietary pattern lowered blood pressure and LDL-cholesterol levels, resulting in reduced cardiovascular disease risk. The DASH Eating Plan is low in saturated fats and rich in potassium, calcium, and magnesium, as well as fiber and protein. It also is lower in sodium than the typical American diet,

and includes menus with two levels of sodium, 2,300 and 1,500 mg per day. It meets the Dietary Reference Intakes for all essential nutrients and stays within limits for overconsumed nutrients, while allowing adaptable food choices based on food preferences, cost, and availability.

Diabetes—A disorder of metabolism—the way the body uses digested food (specifically carbohydrate) for growth and energy. In diabetes, the pancreas either produces little or no insulin (a hormone that helps glucose, the body's main source of fuel, get into cells), or the cells do not respond appropriately to the insulin that is produced, which causes too much glucose to be released in the blood. The three main types of diabetes are type 1, type 2, and gestational diabetes. If not controlled, diabetes can lead to serious complications.

Dietary Reference Intakes (DRIs)—A set of nutrient-based reference values that are quantitative estimates of nutrient intakes to be used for planning and assessing diets for healthy people. DRIs expand on the periodic reports called Recommended Dietary Allowances (RDAs), which were first published by the Institute of Medicine in 1941.

- **Acceptable Macronutrient Distribution Ranges (AMDR)**—Range of intake for a particular energy source (i.e., carbohydrate, fat, and protein) that is associated with reduced risk of chronic disease while providing intakes of essential nutrients. If an individual's intake is outside of the AMDR, there is a potential of increasing the risk of chronic diseases and/or insufficient intakes of essential nutrients.
- **Adequate Intakes (AI)**—A recommended average daily nutrient intake level based on observed or experimentally determined approximations or estimates of mean nutrient intake by a group (or groups) of apparently healthy people. An AI is used when the Recommended Dietary Allowance cannot be determined.
- **Estimated Average Requirements (EAR)**—The average daily nutrient intake level estimated to meet the requirement of half the healthy individuals in a particular life stage and sex group.
- **Recommended Dietary Allowances (RDA)**—The average daily dietary intake level that is sufficient to meet the nutrient requirement of nearly all (97 to 98%) healthy individuals in a particular life stage and sex group.
- **Tolerable Upper Intake Levels (UL)**—The highest average daily nutrient intake level likely to pose no risk of adverse health effects for nearly all individuals in a particular life stage and sex group. As intake increases above the UL, the potential risk of adverse health effects increases.

E

Eating Behaviors—Individual behaviors that affect food and beverage choices and intake patterns, such as what, where, when, why, and how much people eat.

Eating Pattern (also called "dietary pattern")—The combination of foods and beverages that constitute an individual's complete dietary intake over time. This may be a description of a customary way of eating or a description of a combination of foods recommended for consumption. Specific examples include USDA Food Patterns and the Dietary Approaches to Stop Hypertension (DASH) Eating Plan. (See USDA Food Patterns and DASH Eating Plan.)

Energy Drink—A beverage that contains caffeine as an ingredient, along with other ingredients, such as taurine, herbal supplements, vitamins, and added sugars. It is usually marketed as a product that can improve perceived energy, stamina, athletic performance, or concentration.

Enrichment—The addition of specific nutrients (i.e., iron, thiamin, riboflavin, and niacin) to refined grain products in order to replace losses of the nutrients that occur during processing. Enrichment of refined grains is not mandatory; however, those that are labeled as enriched (e.g., enriched flour) must meet the standard of identity for enrichment set by the FDA. When cereal grains are labeled as enriched, it is mandatory that they be fortified with folic acid. (The addition of specific nutrients to whole-grain products is referred to as fortification; see Fortification.)

Essential Nutrient—A vitamin, mineral, fatty acid, or amino acid required for normal body functioning that either cannot be synthesized by the body at all, or cannot be synthesized in amounts adequate for good health, and thus must be obtained from a dietary source. Other food components, such as dietary fiber, while not essential, also are considered to be nutrients.

Existing Report—An existing systematic review, meta-analysis, or report by a Federal agency or leading scientific organization examined by the 2015 Dietary Guidelines Advisory Committee in its review of the scientific evidence. A systematic process was used by the Advisory Committee to assess the quality and comprehensiveness of the review for addressing the question of interest. (See Nutrition Evidence Library (NEL) systematic review.)

F

Fats—One of the macronutrients and a source of energy. (See Solid Fats and Oils.)

- **Monounsaturated Fatty Acids (MUFAs)**—Fatty acids that have one double bond and are usually liquid at room temperature. Plant sources rich in MUFAs include vegetable oils (e.g., canola, olive, high oleic safflower and sunflower), as well as nuts.

- **Polyunsaturated Fatty Acids (PUFAs)**—Fatty acids that have two or more double bonds and are usually liquid at room temperature. Primary sources are vegetable oils and some nuts and seeds. PUFAs provide essential fats such as *n*-3 and *n*-6 fatty acids.

- ***n*-3 PUFAs**—A carboxylic acid with an 18-carbon chain and three cis double bonds, Alpha-linolenic acid (ALA) is an *n*-3 fatty acid that is essential in the diet because it cannot be synthesized by humans. Primary sources include soybean oil, canola oil, walnuts, and flaxseed. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are very long chain *n*-3 fatty acids that are contained in fish and shellfish. Also called omega-3 fatty acids.

- ***n*-6 PUFAs**—A carboxylic acid with an 18-carbon chain and two cis double bonds, Linoleic acid (LA), one of the *n*-6 fatty acids, is essential in the diet because it cannot be synthesized by humans. Primary sources are nuts and liquid vegetable oils, including soybean oil, corn oil, and safflower oil. Also called omega-6 fatty acids.

- **Saturated Fatty Acids**—Fatty acids that have no double bonds. Fats high in saturated fatty acids are usually solid at room temperature. Major sources include animal products such as meats and dairy products, and tropical oils such as coconut or palm oils.

- ***Trans* Fatty Acids**—Unsaturated fatty acids that are structurally different from the unsaturated fatty acids that occur naturally in plant foods. Sources of *trans* fatty acids include partially hydrogenated vegetable oils used in processed foods such as desserts, microwave popcorn, frozen pizza, some margarines, and coffee creamer. *Trans* fatty acids also are present naturally in foods that come from ruminant animals (e.g., cattle and sheep), such as dairy products, beef, and lamb.

Food Access—Ability to obtain and maintain levels of sufficient amounts of healthy, safe, and affordable food for all family members in various settings including where they live, learn, work and play. Food access is often measured by distance to a store or the number of stores in an area; individual-level resources such as family income or vehicle availability; and neighborhood-level indicators of resources, such as average income of the neighborhood and the availability of public transportation.

Food Categories—A method of grouping similar foods in their as-consumed forms, for descriptive purposes. The USDA's Agricultural Research Service (ARS) has created 150 mutually exclusive food categories to account for each food or beverage item reported in What We Eat in America (WWEIA), the food intake survey component of the National Health and Nutrition Examination Survey (for more information, visit: http://seprl.ars.usda.gov/Services/docs.htm?docid=23429). Examples of WWEIA Food Categories include soups, nachos, and yeast breads. In contrast to food groups, items are not disaggregated into their component parts for assignment to food categories. For example, all pizzas are put into the pizza category.

Food Hub—A community space anchored by a food store with adjacent social and financial services where businesses or organizations can actively manage the aggregation, distribution, and marketing of source-identified food products to strengthen their ability to satisfy wholesale, retail, and institutional demand.

Food Groups—A method of grouping similar foods for descriptive and guidance purposes. Food groups in the USDA Food Patterns are defined as vegetables, fruits, grains, dairy, and protein foods. Some of these groups are divided into subgroups, such as dark-green vegetables or whole grains, which may have intake goals or limits. Foods are grouped within food groups based on their similarity in nutritional composition and other dietary benefits. For assignment to food groups, mixed dishes are disaggregated into their major component parts.

Food Pattern Modeling—The process of developing and adjusting daily intake amounts from food categories or groups to meet specific criteria, such as meeting nutrient intake goals, limiting nutrients or other food components, or varying proportions or amounts of specific food categories or groups. This methodology includes using current food consumption data to determine the mix and proportions of foods to include in each group, using current food composition data to select a nutrient-dense representative for each food, calculating nutrient profiles for each food group using these nutrient-dense representative foods, and modeling various combinations of foods and amounts to meet specific criteria. (See USDA Food Patterns.)

Food & Nutrition Policies—Regulations, laws, policymaking actions, or formal or informal rules established by formal organizations or government units. Food and nutrition policies are those that influence food settings and/or

eating behaviors to improve food and/or nutrition choices, and potentially, health outcomes (e.g., body weight).

Fortification—As defined by the U.S. Food and Drug Administration (FDA), the deliberate addition of one or more essential nutrients to a food, whether or not it is normally contained in the food. Fortification may be used to prevent or correct a demonstrated deficiency in the population or specific population groups; restore naturally occurring nutrients lost during processing, storage, or handling; or to add a nutrient to a food at the level found in a comparable traditional food. When cereal grains are labeled as enriched, it is mandatory that they be fortified with folic acid.

H

Health—A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

Healthy Eating Index (HEI)—A measure of diet quality that assesses adherence to the *Dietary Guidelines*. The HEI is used to monitor diet quality in the United States and to examine relationships between diet and health-related outcomes. The HEI is a scoring metric that can be applied to any defined set of foods, such as previously collected dietary data, a defined menu, or a market basket. Thus, the HEI can be used to assess the quality of food assistance packages, menus, and the U.S. food supply.

High-Intensity Sweeteners—Ingredients commonly used as sugar substitutes or sugar alternatives to sweeten and enhance the flavor of foods and beverages. People may choose these sweeteners in place of sugar for a number of reasons, including that they contribute few or no calories to the diet. Because high-intensity sweeteners are many times sweeter than table sugar (sucrose), smaller amounts of high-intensity sweeteners are needed to achieve the same level of sweetness as sugar in food and beverages. (Other terms commonly used to refer to sugar substitutes or alternatives include non-caloric, low-calorie, no-calorie, and artificial sweeteners, which may have different definitions and applications. A high-intensity sweetener may or may not be non-caloric, low-calorie, no-calorie, or artificial sweeteners.)

Household Food Insecurity—Circumstances in which the availability of nutritionally adequate and safe food, or the ability to acquire acceptable foods in socially acceptable ways, is limited or uncertain.

Hypertension—A condition, also known as high blood pressure, in which blood pressure remains elevated over time. Hypertension makes the heart work too hard, and the high force of the blood flow can harm arteries and organs, such as the heart, kidneys, brain, and eyes. Uncontrolled hypertension can lead to heart attacks, heart failure, kidney disease, stroke, and blindness. Prehypertension is defined as blood pressure that is higher than normal but not high enough to be defined as hypertension.

M

Macronutrient—A dietary component that provides energy. Macronutrients include protein, fats, carbohydrates, and alcohol.

Meats & Poultry—Foods that come from the flesh of land animals and birds. In the USDA Food Patterns, organs (such as liver) are also considered to be meat or poultry.

- **Meat** (also known as "red meat")—All forms of beef, pork, lamb, veal, goat, and non-bird game (e.g., venison, bison, elk).
- **Poultry**—All forms of chicken, turkey, duck, geese, guineas, and game birds (e.g., quail, pheasant).
- **Lean Meat & Lean Poultry**—Any meat or poultry that contains less than 10 g of fat, 4.5 g or less of saturated fats, and less than 95 mg of cholesterol per 100 g and per labeled serving size, based on USDA definitions for food label use. Examples include 95% lean cooked ground beef, beef top round steak or roast, beef tenderloin, pork top loin chop or roast, pork tenderloin, ham or turkey deli slices, skinless chicken breast, and skinless turkey breast.
- **Processed Meat & Processed Poultry**—All meat or poultry products preserved by smoking, curing, salting, and/or the addition of chemical preservatives. Processed meats and poultry include all types of meat or poultry sausages (bologna, frankfurters, luncheon meats and loaves, sandwich spreads, viennas, chorizos, kielbasa, pepperoni, salami, and summer sausages), bacon, smoked or cured ham or pork shoulder, corned beef, pastrami, pig's feet, beef jerky, marinated chicken breasts, and smoked turkey products.

Mixed Dishes—Savory food items eaten as a single entity that include foods from more than one food group. These foods often are mixtures of grains, protein foods, vegetables, and/or dairy. Examples of mixed dishes include burgers, sandwiches, tacos, burritos, pizzas, macaroni and cheese, stir-fries, spaghetti and meatballs, casseroles, soups, egg rolls, and Caesar salad.

Moderate Alcohol Consumption—Up to one drink per day for women and up to two drinks per day for men. One drink-equivalent is described using the reference beverages of 12 fl oz of

regular beer (5% alcohol), 5 fl oz of wine (12% alcohol), or 1.5 fl oz of 80 proof (40%) distilled spirits. One drink-equivalent is described as containing 14 g (0.6 fl oz) of pure alcohol.[1]

Multi-Component Intervention—Interventions that use a combination of strategies to promote behavior change. These strategies can be employed across or within different settings or levels of influence.

Multi-Level Intervention—Interventions are those that target change at the individual level as well as additional levels, such as in the community (e.g., public health campaigns), schools (e.g., education), and food service (e.g., menu modification).

N

Nutrient Dense—A characteristic of foods and beverages that provide vitamins, minerals, and other substances that contribute to adequate nutrient intakes or may have positive health effects, with little or no solid fats and added sugars, refined starches, and sodium. Ideally, these foods and beverages also are in forms that retain naturally occurring components, such as dietary fiber. All vegetables, fruits, whole grains, seafood, eggs, beans and peas, unsalted nuts and seeds, fat-free and low-fat dairy products, and lean meats and poultry—when prepared with little or no added solid fats, sugars, refined starches, and sodium—are nutrient-dense foods. These foods contribute to meeting food group recommendations within calorie and sodium limits. The term "nutrient dense" indicates the nutrients and other beneficial substances in a food have not been "diluted" by the addition of calories from added solid fats, sugars, or refined starches, or by the solid fats naturally present in the food.

Nutrient of Concern—Nutrients that are overconsumed or underconsumed and current intakes may pose a substantial public health concern. Data on nutrient intake, corroborated with biochemical markers of nutritional status where available, and association with health outcomes are all used to establish a nutrient as a nutrient of concern. Underconsumed nutrients, or "shortfall nutrients," are those with a high prevalence of inadequate intake either across the U.S. population or in specific groups, relative to IOM-based standards, such as the Estimated Average Requirement (EAR) or the Adequate Intake (AI). Overconsumed nutrients are those with a high prevalence of excess intake either across the population or in specific groups, related to IOM-based standards such as the Tolerable Upper Intake Level (UL) or other expert group standards.

Nutrition Evidence Library (NEL) Systematic Review—A process that uses state-of-the-art methods to identify, evaluate, and synthesize research to provide timely answers to important food and nutrition-related questions to inform U.S. Federal nutrition policies, programs, and recommendations. This rigorous, protocol-driven methodology is designed to minimize bias, maximize transparency, and ensure the use of all available relevant and high-quality research. The NEL is a program within the USDA Center for Nutrition Policy and Promotion. For more detailed information, visit: www.NEL.gov.

O

Oils—Fats that are liquid at room temperature. Oils come from many different plants and some fish. Some common oils include canola, corn, olive, peanut, safflower, soybean, and sunflower oils. A number of foods are naturally high in oils such as nuts, olives, some fish, and avocados. Foods that are mainly made up of oil include mayonnaise, certain salad dressings, and soft (tub or squeeze) margarine with no *trans* fats. Oils are high in monounsaturated or polyunsaturated fats, and lower in saturated fats than solid fats. A few plant oils, termed tropical oils, including coconut oil, palm oil and palm kernel oil, are high in saturated fats and for nutritional purposes should be considered as solid fats. Partially hydrogenated oils that contain *trans* fats should also be considered as solid fats for nutritional purposes. (See Fats.)

Ounce-Equivalent (oz-eq)—The amount of a food product that is considered equal to 1 ounce from the grain or protein foods food group. An oz-eq for some foods may be less than a measured ounce in weight if the food is concentrated or low in water content (nuts, peanut butter, dried meats, flour) or more than a measured ounce in weight if the food contains a large amount of water (tofu, cooked beans, cooked rice or pasta).

P

Physical Activity—Any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level; generally refers to the subset of physical activity that enhances health.

Point-of-Purchase—A place where sales are made. Various intervention strategies have been proposed to affect individuals' purchasing decisions at the point of purchase, such as board or menu labeling with various amounts of nutrition information or shelf tags in grocery stores.

Portion Size—The amount of a food served or consumed in one eating

[1] Drink-equivalents are not intended to serve as a standard drink definition for regulatory purposes.

occasion. A portion is not a standardized amount, and the amount considered to be a portion is subjective and varies.

Prehypertension—See Hypertension.

Protein—One of the macronutrients; a major functional and structural component of every animal cell. Proteins are composed of amino acids, nine of which are indispensable (essential), meaning they cannot be synthesized by humans and therefore must be obtained from the diet. The quality of dietary protein is determined by its amino acid profile relative to human requirements as determined by the body's requirements for growth, maintenance, and repair. Protein quality is determined by two factors: digestibility and amino acid composition.

R

Refined Grains—Grains and grain products with the bran and germ removed; any grain product that is not a whole-grain product. Many refined grains are low in fiber but enriched with thiamin, riboflavin, niacin, and iron, and fortified with folic acid.

S

Screen Time—Time spent in front of a computer, television, video or computer game system, smart phone or tablet, or related device.

Seafood—Marine animals that live in the sea and in freshwater lakes and rivers. Seafood includes fish (e.g., salmon, tuna, trout, and tilapia) and shellfish (e.g., shrimp, crab, and oysters).

Sedentary Behavior—Any waking activity predominantly done while in a sitting or reclining posture. A behavior that expends energy at or minimally above a person's resting level (between 1.0 and 1.5 metabolic equivalents) is considered sedentary behavior.

Serving Size—A standardized amount of a food, such as a cup or an ounce, used in providing information about a food within a food group, such as in dietary guidance. Serving size on the Nutrition Facts label is determined based on the Reference Amounts Customarily Consumed (RACC) for foods that have similar dietary usage, product characteristics, and customarily consumed amounts for consumers to make "like product" comparisons. (See Portion Size.)

Shortfall Nutrient—See Nutrient of Concern.

Social-Ecological Model—A framework developed to illustrate how sectors, settings, social and cultural norms, and individual factors converge to influence individual food and physical activity choices.

Solid Fats—Fats that are usually not liquid at room temperature. Solid fats are found in animal foods, except for seafood, and can be made from vegetable oils through hydrogenation. Some tropical oil plants, such as coconut and palm, are considered as solid fats due to their fatty acid composition. The fat component of milk and cream (butter) is solid at room temperature. Solid fats contain more saturated fats and/or *trans* fats than liquid oils (e.g., soybean, canola, and corn oils), with lower amounts of monounsaturated or polyunsaturated fatty acids. Common fats considered to be solid fats include: butter, beef fat (tallow), chicken fat, pork fat (lard), shortening, coconut oil, palm oil and palm kernel oil. Foods high in solid fats include: full-fat (regular) cheeses, creams, whole milk, ice cream, marbled cuts of meats, regular ground beef, bacon, sausages, poultry skin, and many baked goods made with solid fats (such as cookies, crackers, doughnuts, pastries, and croissants). (See Fats and Nutrient Dense)

Sugar-Sweetened Beverages—Liquids that are sweetened with various forms of added sugars. These beverages include, but are not limited to, soda (regular, not sugar-free), fruitades, sports drinks, energy drinks, sweetened waters, and coffee and tea beverages with added sugars. Also called calorically sweetened beverages. (See Added Sugars and Carbohydrates: Sugars.)

U

USDA Food Patterns—A set of eating patterns that exemplify healthy eating, which all include recommended intakes for the five food groups (vegetables, fruits, grains, dairy, and protein foods) and for subgroups within the vegetables, grains, and protein foods groups. They also recommend an allowance for intake of oils. Patterns are provided at 12 calorie levels from 1,000 to 3,200 calories to meet varied calorie needs. The Healthy U.S.-Style Pattern is the base USDA Food Pattern.

- **Healthy U.S.-Style Eating Pattern**—A pattern that exemplifies healthy eating based on the types and proportions of foods Americans typically consume, but in nutrient-dense forms and appropriate amounts, designed to meet nutrient needs while not exceeding calorie requirements. It is substantially unchanged from the primary USDA Food Patterns of the *2010 Dietary Guidelines*. This pattern is evaluated in comparison to meeting Dietary Reference Intakes for essential nutrients and staying within limits set by the IOM or *Dietary Guidelines* for overconsumed food components. It aligns closely with the Dietary Approaches to Stop Hypertension

(DASH) Eating Plan, a guide for healthy eating based on the DASH diet which was tested in clinical trials. (See Nutrient Dense and DASH Eating Plan.)

- **Healthy Mediterranean-Style Eating Pattern**—A pattern that exemplifies healthy eating, designed by modifying the Healthy U.S.-Style Pattern to more closely reflect eating patterns that have been associated with positive health outcomes in studies of Mediterranean-Style diets. This pattern is evaluated based on its similarity to food group intakes of groups with positive health outcomes in these studies rather than on meeting specified nutrient standards. It differs from the Healthy U.S.-Style Pattern in that it includes more fruits and seafood and less dairy.
- **Healthy Vegetarian Eating Pattern**—A pattern that exemplifies healthy eating, designed by modifying the Healthy U.S.-Style Pattern to more closely reflect eating patterns reported by self-identified vegetarians. This pattern is evaluated in comparison to meeting Dietary Reference Intakes for essential nutrients and staying within limits set by the IOM or *Dietary Guidelines* for overconsumed food components. It differs from the Healthy U.S.-Style Pattern in that it includes more legumes, soy products, nuts and seeds, and whole grains, and no meat, poultry, or seafood.

V

Variety—A diverse assortment of foods and beverages across and within all food groups and subgroups selected to fulfill the recommended amounts without exceeding the limits for calories and other dietary components. For example, in the vegetables food group, selecting a variety of foods could be accomplished over the course of a week by choosing from all subgroups, including dark green, red and orange, legumes (beans and peas), starchy, and other vegetables.

W

Whole Fruits—All fresh, frozen, canned, and dried fruit but not fruit juice.

Whole Grains—Grains and grain products made from the entire grain seed, usually called the kernel, which consists of the bran, germ, and endosperm. If the kernel has been cracked, crushed, or flaked, it must retain the same relative proportions of bran, germ, and endosperm as the original grain in order to be called whole grain. Many, but not all, whole grains are also sources of dietary fiber.

Appendix 7.

Nutritional Goals for Age-Sex Groups Based on Dietary Reference Intakes & *Dietary Guidelines* Recommendations

Table A7-1.

Daily Nutritional Goals for Age-Sex Groups Based on Dietary Reference Intakes & *Dietary Guidelines* Recommendations

	Source of Goal[a]	Child 1-3	Female 4-8	Male 4-8	Female 9-13	Male 9-13	Female 14-18	Male 14-18	Female 19-30	Male 19-30	Female 31-50	Male 31-50	Female 51+	Male 51+
Calorie Level(s) Assessed		1,000	1,200	1,400, 1,600	1,600	1,800	1,800	2,200, 2,800, 3,200	2,000	2,400, 2,600, 3,000	1,800	2,200	1,600	2,000
Macronutrients														
Protein, g	RDA	13	19	19	34	34	46	52	46	56	46	56	46	56
Protein, % kcal	AMDR	5-20	10-30	10-30	10-30	10-30	10-30	10-30	10-35	10-35	10-35	10-35	10-35	10-35
Carbohydrate, g	RDA	130	130	130	130	130	130	130	130	130	130	130	130	130
Carbohydrate, % kcal	AMDR	45-65	45-65	45-65	45-65	45-65	45-65	45-65	45-65	45-65	45-65	45-65	45-65	45-65
Dietary Fiber, g	14 g/ 1,000 kcal	14	16.8	19.6	22.4	25.2	25.2	30.8	28	33.6	25.2	30.8	22.4	28
Added Sugars, % kcal	DGA	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%
Total Fat, % kcal	AMDR	30-40	25-35	25-35	25-35	25-35	25-35	25-35	20-35	20-35	20-35	20-35	20-35	20-35
Saturated Fat, % kcal	DGA	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%	<10%
Linoleic Acid, g	AI	7	10	10	10	12	11	16	12	17	12	17	11	14
Linolenic Acid, g	AI	0.7	0.9	0.9	1	1.2	1.1	1.6	1.1	1.6	1.1	1.6	1.1	1.6

	Source of Goal[a]	Child 1-3	Female 4-8	Male 4-8	Female 9-13	Male 9-13	Female 14-18	Male 14-18	Female 19-30	Male 19-30	Female 31-50	Male 31-50	Female 51+	Male 51+
Calorie Level(s) Assessed		1,000	1,200	1,400, 1,600	1,600	1,800	1,800	2,200, 2,800, 3,200	2,000	2,400, 2,600, 3,000	1,800	2,200	1,600	2,000
Minerals														
Calcium, mg	RDA	700	1,000	1,000	1,300	1,300	1,300	1,300	1,000	1,000	1,000	1,000	1,200	1,000[b]
Iron, mg	RDA	7	10	10	8	8	15	11	18	8	18	8	8	8
Magnesium, mg	RDA	80	130	130	240	240	360	410	310	400	320	420	320	420
Phosphorus, mg	RDA	460	500	500	1,250	1,250	1,250	1,250	700	700	700	700	700	700
Potassium, mg	AI	3,000	3,800	3,800	4,500	4,500	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700
Sodium, mg	UL	1,500	1,900	1,900	2,200	2,200	2,300	2,300	2,300	2,300	2,300	2,300	2,300	2,300
Zinc, mg	RDA	3	5	5	8	8	9	11	8	11	8	11	8	11
Copper, mcg	RDA	340	440	440	700	700	890	890	900	900	900	900	900	900
Manganese, mg	AI	1.2	1.5	1.5	1.6	1.9	1.6	2.2	1.8	2.3	1.8	2.3	1.8	2.3
Selenium, mcg	RDA	20	30	30	40	40	55	55	55	55	55	55	55	55
Vitamins														
Vitamin A, mg RAE	RDA	300	400	400	600	600	700	900	700	900	700	900	700	900
Vitamin E, mg AT	RDA	6	7	7	11	11	15	15	15	15	15	15	15	15
Vitamin D, IU	RDA	600	600	600	600	600	600	600	600	600	600	600	600[c]	600[c]
Vitamin C, mg	RDA	15	25	25	45	45	65	75	75	90	75	90	75	90
Thiamin, mg	RDA	0.5	0.6	0.6	0.9	0.9	1	1.2	1.1	1.2	1.1	1.2	1.1	1.2
Riboflavin, mg	RDA	0.5	0.6	0.6	0.9	0.9	1	1.3	1.1	1.3	1.1	1.3	1.1	1.3
Niacin, mg	RDA	6	8	8	12	12	14	16	14	16	14	16	14	16
Vitamin B_6, mg	RDA	0.5	0.6	0.6	1	1	1.2	1.3	1.3	1.3	1.3	1.3	1.5	1.7
Vitamin B_{12}, mcg	RDA	0.9	1.2	1.2	1.8	1.8	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Choline, mg	AI	200	250	250	375	375	400	550	425	550	425	550	425	550
Vitamin K, mcg	AI	30	55	55	60	60	75	75	90	120	90	120	90	120
Folate, mcg DFE	RDA	150	200	200	300	300	400	400	400	400	400	400	400	400

[a] RDA = Recommended Dietary Allowance, AI = Adequate Intake, UL = Tolerable Upper Intake Level, AMDR = Acceptable Macronutrient Distribution Range, DGA = *2015-2020 Dietary Guidelines* recommended limit; 14 g fiber per 1,000 kcal = basis for AI for fiber.

[b] Calcium RDA for males ages 71+ years is 1,200 mg.

[c] Vitamin D RDA for males and females ages 71+ years is 800 IU.

SOURCES: Institute of Medicine. Dietary Reference Intakes: The essential guide to nutrient requirements. Washington (DC): The National Academies Press; 2006.

Institute of Medicine. Dietary Reference Intakes for Calcium and Vitamin D. Washington (DC): The National Academies Press; 2010.

Appendix 8.

Federal Resources for Information on Nutrition & Physical Activity

Table A8-1.

Federal Nutrition & Physical Activity Resources

The following Federal Government resources provide reliable, science-based information on nutrition and physical activity, as well as an evolving array of tools to facilitate Americans' adoption of healthy choices.	
Dietary Guidelines for Americans	www.dietaryguidelines.gov
Physical Activity Guidelines for Americans	www.health.gov/paguidelines
MyPlate	www.choosemyplate.gov
SuperTracker	www.supertracker.usda.gov
U.S. Department of Health and Human Services	www.hhs.gov
Office of Disease Prevention and Health Promotion	www.health.gov
Healthy People	www.healthypeople.gov
Healthfinder	www.healthfinder.gov
Food and Drug Administration	www.fda.gov

The following Federal Government resources provide reliable, science-based information on nutrition and physical activity, as well as an evolving array of tools to facilitate Americans' adoption of healthy choices.	
Centers for Disease Control and Prevention	www.cdc.gov
National Institutes of Health	www.nih.gov
Rethinking Drinking Alcoholic Beverage Calculators	http://rethinkingdrinking.niaaa.nih.gov/ToolsResources/CalculatorsMain.asp
President's Council on Fitness, Sports & Nutrition	www.fitness.gov
U.S. Department of Agriculture (USDA)	www.usda.gov
Center for Nutrition Policy and Promotion	www.cnpp.usda.gov
Food and Nutrition Service	www.fns.usda.gov
Food and Nutrition Information Center	http://fnic.nal.usda.gov
National Institute of Food and Agriculture	www.nifa.usda.gov
Let's Move!	www.letsmove.gov
U.S. National Physical Activity Plan[a]	www.physicalactivityplan.org

[a] Note: The U.S. National Physical Activity Plan is not a product of the Federal Government. However, a number of Federal offices were involved in the development of the Plan.

Appendix 9.

Alcohol

If alcohol is consumed, it should be in moderation—up to one drink per day for women and up to two drinks per day for men—and only by adults of legal drinking age. For those who choose to drink, moderate alcohol consumption can be incorporated into the calorie limits of most healthy eating patterns. The *Dietary Guidelines* does not recommend that individuals who do not drink alcohol start drinking for any reason; however, it does recommend that all foods and beverages consumed be accounted for within healthy eating patterns. Alcohol is not a component of the USDA Food Patterns. Thus, if alcohol is consumed, the calories from alcohol should be accounted for so that the limits on calories for other uses and total calories are not exceeded (see the Other Dietary Components section of Chapter 1. Key Elements of Healthy Eating Patterns for further discussion of limits on alcohol and calories for other uses within healthy eating patterns).

For the purposes of evaluating amounts of alcohol that may be consumed, the *Dietary Guidelines* includes drink-equivalents (Table A9-1). One alcoholic drink-equivalent is described as containing 14 g (0.6 fl oz) of pure alcohol.[1] The following are reference beverages that are one alcoholic drink-equivalent: 12 fluid ounces of regular beer (5% alcohol), 5 fluid ounces of wine (12% alcohol), or 1.5 fluid ounces of 80 proof distilled spirits (40% alcohol).[2]

Packaged (e.g., canned beer, bottled wine) and mixed beverages (e.g., margarita, rum and soda, mimosa, sangria) vary in alcohol content. For this reason it is important to determine how many alcoholic drink-equivalents are in the beverage and limit intake. Table A9-1 lists reference beverages that are one drink-equivalent and provides examples of alcoholic drink-equivalents in other alcoholic beverages.

When determining the number of drink-equivalents in an alcoholic beverage, the variability in alcohol content and portion size must be considered together. As an example, the amount of alcohol in a beer may be higher than 5 percent and, thus, 12 ounces would be greater than one drink-equivalent. In addition to the alcohol content, the portion size may be many times larger than the reference beverage. For example, portion sizes for beer may be higher than 12 ounces and, thus, even if the alcohol content is 5 percent, the beverage would be greater than one drink-equivalent (see Table A9-1 for additional examples). The same is true for wine and mixed drinks with distilled spirits.

Alcoholic Beverages & Calories

Alcoholic beverages may contain calories from both alcohol and other ingredients. If they are consumed, the contributions from calories from alcohol and other dietary components (e.g., added sugars, solid fats) from alcoholic beverages should be within the various limits of healthy eating patterns described in Chapter 1. One drink-equivalent contains 14 grams of pure alcohol, which contributes 98 calories to the beverage. The total calories in a beverage may be more than those from alcohol alone, depending on the type, brand, ingredients, and portion size. For example, 12 ounces of regular beer (5% alcohol) may have about 150 calories, 5 ounces of wine (12% alcohol) may have about 120 calories, and 7 ounces of a rum (40% alcohol) and cola may have about 155 calories, each with 98 calories coming from pure alcohol.[3]

Excessive Drinking

In comparison to moderate alcohol consumption, high-risk drinking is the consumption of 4 or more drinks on any day or 8 or more drinks per week for women and 5 or more drinks on any day or 15 or more drinks per week for men.

[1] Bowman SA, Clemens JC, Friday JE, Thoerig RC, and Moshfegh AJ. 2014. Food Patterns Equivalents Database 2011-12: Methodology and User Guide [Online]. Food Surveys Research Group, Beltsville Human Nutrition Research Center, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland. Available at: http://www.ars.usda.gov/nea/bhnrc/fsrg. Accessed November 3, 2015. For additional information see the National Institute on Alcohol Abuse and Alcoholism (NIAAA) webpage available at: http://rethinkingdrinking.niaaa.nih.gov/.

[2] Drink-equivalents are not intended to serve as a standard drink definition for regulatory purposes.

[3] Calorie values are estimates, as different brands and types of beverages differ in ingredients and portion sizes and vary in their actual calorie content. For calculators to evaluate the calorie and alcohol content of alcoholic beverages, see: National Institute on Alcohol Abuse and Alcoholism (NIAAA). National Institutes of Health. Rethinking drinking, alcohol, and your health. Calculators. Available at: http://rethinkingdrinking.niaaa.nih.gov/ToolsResources/CalculatorsMain.asp. Accessed September 14, 2015.

Table A9-1.
Alcoholic Drink-Equivalents[a] of Select Beverages

Drink Description	Drink-Equivalents[b]
Beer, Beer Coolers, & Malt Beverages	
12 fl oz at 4.2% Alcohol[c]	0.8
12 fl oz at 5% Alcohol (Reference Beverage)	1
16 fl oz at 5% Alcohol	1.3
12 fl oz at 7% Alcohol	1.4
12 fl oz at 9% Alcohol	1.8
Wine	
5 fl oz at 12% Alcohol (Reference Beverage)	1
9 fl oz at 12% Alcohol	1.8
5 fl oz at 15% Alcohol	1.3
5 fl oz at 17% Alcohol	1.4
Distilled Spirits	
1.5 fl oz 80 Proof Distilled Spirits (40% Alcohol) (Reference Beverage)	1
Mixed Drink With More Than 1.5 fl oz 80 Proof Distilled Spirits (40% Alcohol)	> 1[d]

[a] One alcoholic drink-equivalent is defined as containing 14 grams (0.6 fl oz) of pure alcohol. The following are reference beverages that are one alcoholic drink-equivalent: 12 fluid ounces of regular beer (5% alcohol), 5 fluid ounces of wine (12% alcohol), or 1.5 fluid ounces of 80 proof distilled spirits (40% alcohol). Drink-equivalents are not intended to serve as a standard drink definition for regulatory purposes.

[b] To calculate drink-equivalents, multiply the volume in ounces by the alcohol content in percent and divide by 0.6 ounces of alcohol per drink-equivalent. For example: 16 fl oz beer at 5% alcohol: (16 fl oz)(0.05)/0.6 fl oz = 1.3 drink-equivalents.

[c] Light beer represents a substantial proportion of alcoholic beverages consumed in the United States. Light beer is approximately 4.2% alcohol or 0.8 alcoholic drink-equivalents in 12 fluid ounces.

[d] Depending on factors, such as the type of spirits and the recipe, one mixed drink can contain a variable number of drink-equivalents.

Binge drinking is the consumption within about 2 hours of 4 or more drinks for women and 5 or more drinks for men.

Excessive alcohol consumption—which includes binge drinking (4 or more drinks for women and 5 or more drinks for men within about 2 hours); heavy drinking (8 or more drinks a week for women and 15 or more drinks a week for men); and any drinking by pregnant women or those under 21 years of age—has no benefits. Excessive drinking is responsible for 88,000 deaths in the United States each year, including 1 in 10 deaths among working age adults (age 20-64 years). In 2006, the estimated economic cost to the United States of excessive drinking was $224 billion.[4] Binge drinking accounts for over half of the deaths and three-fourths of the economic costs due to excessive drinking.[1],[5]

Excessive drinking increases the risk of many chronic diseases and violence[6] and, over time, can impair short- and long-term cognitive function.[7] Over 90 percent of U.S. adults who drink excessively report binge drinking, and about 90 percent of the alcohol consumed by youth under 21 years of age in the United States is in the form of binge drinks. Binge drinking is associated with a wide range of health and social problems, including sexually transmitted diseases, unintended pregnancy, accidental injuries, and violent crime.[8]

Those Who Should Not Consume Alcohol

Many individuals should not consume alcohol, including individuals who are taking certain over-the-counter or prescription medications or who have certain medical conditions, those who are recovering from alcoholism or are unable to control the amount they drink, and anyone younger than age 21 years. Individuals should not drink if they are driving, planning to drive, or are participating in other activities requiring skill, coordination, and alertness.[9]

Women who are or who may be pregnant should not drink. Drinking during pregnancy, especially in the first few months of pregnancy, may result in negative behavioral or neurological consequences in the offspring. No safe level of alcohol consumption during pregnancy has been established.[10] Women who are breastfeeding should consult with their health care provider regarding alcohol consumption.[11]

Alcohol & Caffeine

Mixing alcohol and caffeine is not generally recognized as safe by the FDA.[12] People who mix alcohol and caffeine may drink more alcohol and become more intoxicated than they realize, increasing the risk of alcohol-related adverse events. Caffeine does not change blood alcohol content levels, and thus, does not reduce the risk of harms associated with drinking alcohol.[13]

[4] Stahre M, Roeber J, Kanny D, Brewer RD, Zhang X. Contribution of excessive alcohol consumption to deaths and years of potential life lost in the United States. *Prev Chronic Dis* 2014;11:130293.

[5] Bouchery EE, Harwood HJ, Sacks JJ, Simon CJ, Brewer RD. Economic costs of excessive alcohol consumption in the United States, 2006. *Am J Prev Med.* 2011;41:516–24.

[6] For more information, see: Centers for Disease Control and Prevention. Alcohol use and your health. Available at: http://www.cdc.gov/alcohol/fact-sheets/alcohol-use.htm. Accessed August 26, 2015.

[7] For more information, see: National Institute on Alcohol Abuse and Alcoholism (NIAAA). National Institutes of Health. Alcohol's effects on the body. Available at: http://www.niaaa.nih.gov/alcohol-health/alcohols-effects-body. Accessed August 26, 2015.

[8] For more information, see: Centers for Disease Control and Prevention. Fact sheets - Binge drinking. January 16, 2014. [Updated October 16, 2015.] Available at: http://www.cdc.gov/alcohol/fact-sheets/binge-drinking.htm. Accessed August 26, 2015.

[9] For more information, see: Centers for Disease Control and Prevention. Alcohol use and your health. Available at: http://www.cdc.gov/alcohol/fact-sheets/alcohol-use.htm. Accessed August26, 2015.

[10] For more information, see: Centers for Disease Control and Prevention. What you should know about alcohol and pregnancy. August 28, 2014. Available at: http://www.cdc.gov/features/alcoholandpregnancy/. Accessed August 26, 2015.

[11] Section on Breastfeeding, American Academy of Pediatrics. AAP Policy Statement: Breastfeeding and the use of human milk. *Pediatrics* 2012;129(3):e827-e841. Available at: www.pediatrics.org/cgi/doi/10.1542/peds.2011-3552. Accessed September 15, 2015.

[12] For more information, see: Food and Drug Administration. Update on caffeinated alcoholic beverages. [Updated November 24, 2010.] Available at: http://www.fda.gov/NewsEvents/PublicHealthFocus/ucm234900.htm. Accessed September 16, 2015.

[13] For more information regarding caffeine and alcohol, see CDC's Alcohol and Public Health webpage. Available at: http://www.cdc.gov/alcohol/fact-sheets/caffeine-and-alcohol.htm. Accessed August 26, 2015.

Appendix 10.

Food Sources of Potassium

Table A10-1.

Potassium: Food Sources Ranked by Amounts of Potassium & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Potassium in Standard Portion (mg)[a]	Calories per 100 grams[a]	Potassium per 100 grams (mg)[a]
Potato, Baked, Flesh & Skin	1 medium	163	941	94	544
Prune Juice, Canned	1 cup	182	707	71	276
Carrot Juice, Canned	1 cup	94	689	40	292
Passion-Fruit Juice, Yellow or Purple	1 cup	126-148	687	51-60	278
Tomato Paste, Canned	¼ cup	54	669	82	1,014
Beet Greens, Cooked from Fresh	½ cup	19	654	27	909
Adzuki Beans, Cooked	½ cup	147	612	128	532
White Beans, Canned	½ cup	149	595	114	454
Plain Yogurt, Nonfat	1 cup	127	579	56	255
Tomato Puree	½ cup	48	549	38	439
Sweet Potato, Baked in Skin	1 medium	103	542	90	475
Salmon, Atlantic, Wild, Cooked	3 ounces	155	534	182	628

Table A10-1. *(continued...)*

Potassium: Food Sources Ranked by Amounts of Potassium & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Potassium in Standard Portion (mg)[a]	Calories per 100 grams[a]	Potassium per 100 grams (mg)[a]
Clams, Canned	3 ounces	121	534	142	628
Pomegranate Juice	1 cup	134	533	54	214
Plain Yogurt, Low-Fat	8 ounces	143	531	63	234
Tomato Juice, Canned	1 cup	41	527	17	217
Orange Juice, Fresh	1 cup	112	496	45	200
Soybeans, Green, Cooked	½ cup	127	485	141	539
Chard, Swiss, Cooked	½ cup	18	481	20	549
Lima Beans, Cooked	½ cup	108	478	115	508
Mackerel, Various Types, Cooked	3 ounces	114-171	443-474	134-201	521-558
Vegetable Juice, Canned	1 cup	48	468	19	185
Chili with Beans, Canned	½ cup	144	467	112	365
Great Northern Beans, Canned	½ cup	150	460	114	351
Yam, Cooked	½ cup	79	456	116	670
Halibut, Cooked	3 ounces	94	449	111	528
Tuna, Yellowfin, Cooked	3 ounces	111	448	130	527
Acorn Squash, Cooked	½ cup	58	448	56	437

Food	Standard Portion Size	Calories in Standard Portion[a]	Potassium in Standard Portion (mg)[a]	Calories per 100 grams[a]	Potassium per 100 grams (mg)[a]
Snapper, Cooked	3 ounces	109	444	128	522
Soybeans, Mature, Cooked	½ cup	149	443	173	515
Tangerine Juice, Fresh	1 cup	106	440	43	178
Pink Beans, Cooked	½ cup	126	430	149	508
Chocolate Milk (1%, 2% & Whole)	1 cup	178-208	418-425	71-83	167-170
Amaranth Leaves, Cooked	½ cup	14	423	21	641
Banana	1 medium	105	422	89	358
Spinach, Cooked from Fresh or Canned	½ cup	21-25	370-419	23	346-466
Black Turtle Beans, Cooked	½ cup	121	401	130	433
Peaches, Dried, Uncooked	¼ cup	96	399	239	996
Prunes, Stewed	½ cup	133	398	107	321
Rockfish, Pacific, Cooked	3 ounces	93	397	109	467
Rainbow Trout, Wild or Farmed, Cooked	3 ounces	128-143	381-383	150-168	448-450
Skim Milk (Nonfat)	1 cup	83	382	34	156
Refried Beans, Canned, Traditional	½ cup	106	380	89	319
Apricots, Dried, Uncooked	¼ cup	78	378	241	1162
Pinto Beans, Cooked	½ cup	123	373	143	436

Table A10-1. *(continued...)*

Potassium: Food Sources Ranked by Amounts of Potassium & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Potassium in Standard Portion (mg)[a]	Calories per 100 grams[a]	Potassium per 100 grams (mg)[a]
Lentils, Cooked	½ cup	115	365	116	369
Avocado	½ cup	120	364	160	485
Tomato Sauce, Canned	½ cup	30	364	24	297
Plantains, Slices, Cooked	½ cup	89	358	116	465
Kidney Beans, Cooked	½ cup	113	357	127	403
Navy Beans, Cooked	½ cup	128	354	140	389

[a] Source: U.S Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. 2014. USDA National Nutrient Database for Standard Reference, Release 27. Available at: http://www.ars.usda.gov/nutrientdata.

Appendix 11.

Food Sources of Calcium

Table A11-1.

Calcium: Food Sources Ranked by Amounts of Calcium & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Calcium in Standard Portion (mg)[a]	Calories per 100 grams[a]	Calcium per 100 grams (mg)[a]
Fortified Ready-to-Eat Cereals (Various)[b]	¾-1¼ cup	70-197	137-1,000	234-394	455-3,333
Pasteurized Processed American Cheese	2 ounces	210	593	371	1,045
Parmesan Cheese, Hard	1.5 ounces	167	503	392	1,184
Plain Yogurt, Nonfat	8 ounces	127	452	56	199
Romano Cheese	1.5 ounces	165	452	387	1,064
Almond Milk (All Flavors)[b]	1 cup	91-120	451	38-50	188
Pasteurized Processed Swiss Cheese	2 ounces	189	438	334	772
Tofu, Raw, Regular, Prepared with Calcium Sulfate	½ cup	94	434	76	350
Gruyere Cheese	1.5 ounces	176	430	413	1,011
Plain Yogurt, Low-Fat	8 ounces	143	415	63	183
Vanilla Yogurt, Low-Fat	8 ounces	193	388	85	171

Table A11-1. *(continued...)*

Calcium: Food Sources Ranked by Amounts of Calcium & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Calcium in Standard Portion (mg)[a]	Calories per 100 grams[a]	Calcium per 100 grams (mg)[a]
Pasteurized Processed American Cheese Food	2 ounces	187	387	330	682
Fruit Yogurt, Low-Fat	8 ounces	238	383	105	169
Orange Juice, Calcium Fortified[b]	1 cup	117	349	47	140
Soymilk (All Flavors)[b]	1 cup	109	340	45	140
Ricotta Cheese, Part Skim	½ cup	171	337	138	272
Swiss Cheese	1.5 ounces	162	336	380	791
Evaporated Milk	½ cup	170	329	135	261
Sardines, Canned in Oil, Drained	3 ounces	177	325	208	382
Provolone Cheese	1.5 ounces	149	321	351	756
Monterey Cheese	1.5 ounces	159	317	373	746
Mustard Spinach (Tendergreen), Raw	1 cup	33	315	22	210
Muenster Cheese	1.5 ounces	156	305	368	717
Low-Fat Milk (1%)	1 cup	102	305	42	125
Mozzarella Cheese, Part-Skim	1.5 ounces	128	304	301	716

Food	Standard Portion Size	Calories in Standard Portion[a]	Calcium in Standard Portion (mg)[a]	Calories per 100 grams[a]	Calcium per 100 grams (mg)[a]
Skim Milk (Nonfat)	1 cup	83	299	34	122
Reduced Fat Milk (2%)	1 cup	122	293	50	120
Colby Cheese	1.5 ounces	167	291	394	685
Low-Fat Chocolate Milk (1%)	1 cup	178	290	71	116
Cheddar Cheese	1.5 ounces	173	287	406	675
Rice Drink[b]	1 cup	113	283	47	118
Whole Buttermilk	1 cup	152	282	62	115
Whole Chocolate Milk	1 cup	208	280	83	112
Whole Milk	1 cup	149	276	61	113
Reduced Fat Chocolate Milk (2%)	1 cup	190	273	76	109
Ricotta Cheese, Whole Milk	½ cup	216	257	174	207

[a] Source: U.S Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. 2014. USDA National Nutrient Database for Standard Reference, Release 27. Available at: http://www.ars.usda.gov/nutrientdata.

[b] Calcium fortified.

Appendix 12.

Food Sources of Vitamin D

Table A12-1.

Vitamin D: Food Sources Ranked by Amounts of Vitamin D & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Vitamin D in Standard Portion (µg)[a,b]	Calories per 100 grams[a]	Vitamin D per 100 grams (µg)[a,b]
Salmon, Sockeye, Canned	3 ounces	142	17.9	167	21.0
Trout, Rainbow, Farmed, Cooked	3 ounces	143	16.2	168	19.0
Salmon, Chinook, Smoked	3 ounces	99	14.5	117	17.1
Swordfish, Cooked	3 ounces	146	14.1	172	16.6
Sturgeon, Mixed Species, Smoked	3 ounces	147	13.7	173	16.1
Salmon, Pink, Canned	3 ounces	117	12.3	138	14.5
Fish Oil, Cod Liver	1 tsp	41	11.3	902	250
Cisco, Smoked	3 ounces	150	11.3	177	13.3
Salmon, Sockeye, Cooked	3 ounces	144	11.1	169	13.1
Salmon, Pink, Cooked	3 ounces	130	11.1	153	13.0
Sturgeon, Mixed Species, Cooked	3 ounces	115	11.0	135	12.9

Food	Standard Portion Size	Calories in Standard Portion[a]	Vitamin D in Standard Portion (µg)[a,b]	Calories per 100 grams[a]	Vitamin D per 100 grams (µg)[a,b]
Whitefish, Mixed Species, Smoked	3 ounces	92	10.9	108	12.8
Mackerel, Pacific & Jack, Cooked	3 ounces	171	9.7	201	11.4
Salmon, Coho, Wild, Cooked	3 ounces	118	9.6	139	11.3
Mushrooms, Portabella, Exposed to Ultraviolet Light, Grilled	½ cup	18	7.9	29	13.1
Tuna, Light, Canned in Oil, Drained	3 ounces	168	5.7	198	6.7
Halibut, Atlantic & Pacific, Cooked	3 ounces	94	4.9	111	5.8
Herring, Atlantic, Cooked	3 ounces	173	4.6	203	5.4
Sardine, Canned in Oil, Drained	3 ounces	177	4.1	208	4.8
Rockfish, Pacific, Mixed Species, Cooked	3 ounces	93	3.9	109	4.6
Whole Milk[c]	1 cup	149	3.2	61	1.3
Whole Chocolate Milk[c]	1 cup	208	3.2	83	1.3
Tilapia, Cooked	3 ounces	109	3.1	128	3.7
Flatfish (Flounder & Sole), Cooked	3 ounces	73	3.0	86	3.5
Reduced Fat Chocolate Milk (2%)[c]	1 cup	190	3.0	76	1.2

Table A12-1. *(continued...)*

Vitamin D: Food Sources Ranked by Amounts of Vitamin D & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Vitamin D in Standard Portion (µg)[a,b]	Calories per 100 grams[a]	Vitamin D per 100 grams (µg)[a,b]
Yogurt (Various Types & Flavors)[c]	8 ounces	98-254	2.0-3.0	43-112	0.9-1.3
Milk (Non-Fat, 1% & 2%)[c]	1 cup	83-122	2.9	34-50	1.2
Soymilk[c]	1 cup	109	2.9	45	1.2
Low-Fat Chocolate Milk (1%)[c]	1 cup	178	2.8	71	1.1
Fortified Ready-to-Eat Cereals (Various)[c]	⅓-1¼ cup	74-247	0.2-2.5	248-443	0.8-8.6
Orange Juice, Fortified[c]	1 cup	117	2.5	47	1.0
Almond Milk (All Flavors)[c]	1 cup	91-120	2.4	38-50	1.0
Rice Drink[c]	1 cup	113	2.4	47	1.0
Pork, Cooked (Various Cuts)	3 ounces	122-390	0.2-2.2	143-459	0.2-2.6
Mushrooms, Morel, Raw	½ cup	10	1.7	31	5.1
Margarine (Various)[c]	1 Tbsp	75-100	1.5	533-717	10.7
Mushrooms, Chanterelle, Raw	½ cup	10	1.4	38	5.3
Egg, Hard-Boiled	1 large	78	1.1	155	2.2

[a] Source: U.S Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. 2014. USDA National Nutrient Database for Standard Reference, Release 27. Available at: http://www.ars.usda.gov/nutrientdata.

[b] 1 µg of vitamin D is equivalent to 40 IU.

[c] Vitamin D fortified.

Appendix 13.

Food Sources of Dietary Fiber

Table A13-1.

Dietary Fiber: Food Sources Ranked by Amounts of Dietary Fiber & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Dietary Fiber in Standard Portion (g)[a]	Calories per 100 grams[a]	Dietary Fiber per 100 grams (g)[a]
High Fiber Bran Ready-to-Eat Cereal	½-¾ cup	60-81	9.1-14.3	200-260	29.3-47.5
Navy Beans, Cooked	½ cup	127	9.6	140	10.5
Small White Beans, Cooked	½ cup	127	9.3	142	10.4
Yellow Beans, Cooked	½ cup	127	9.2	144	10.4
Shredded Wheat Ready-to-Eat Cereal (Various)	1-1¼ cup	155-220	5.0-9.0	321-373	9.6-15.0
Cranberry (Roman) Beans, Cooked	½ cup	120	8.9	136	10.0
Adzuki Beans, Cooked	½ cup	147	8.4	128	7.3
French Beans, Cooked	½ cup	114	8.3	129	9.4
Split Peas, Cooked	½ cup	114	8.1	116	8.3
Chickpeas, Canned	½ cup	176	8.1	139	6.4
Lentils, Cooked	½ cup	115	7.8	116	7.9

Table A13-1. *(continued...)*

Dietary Fiber: Food Sources Ranked by Amounts of Dietary Fiber & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Dietary Fiber in Standard Portion (g)[a]]	Calories per 100 grams[a]	Dietary Fiber per 100 grams (g)[a]
Pinto Beans, Cooked	½ cup	122	7.7	143	9.0
Black Turtle Beans, Cooked	½ cup	120	7.7	130	8.3
Mung Beans, Cooked	½ cup	106	7.7	105	7.6
Black Beans, Cooked	½ cup	114	7.5	132	8.7
Artichoke, Globe or French, Cooked	½ cup	45	7.2	53	8.6
Lima Beans, Cooked	½ cup	108	6.6	115	7.0
Great Northern Beans, Canned	½ cup	149	6.4	114	4.9
White Beans, Canned	½ cup	149	6.3	114	4.8
Kidney Beans, All Types, Cooked	½ cup	112	5.7	127	6.4
Pigeon Peas, Cooked	½ cup	102	5.6	121	6.7
Cowpeas, Cooked	½ cup	99	5.6	116	6.5
Wheat Bran Flakes Ready-to-Eat Cereal (Various)	¾ cup	90-98	4.9-5.5	310-328	16.9-18.3
Pear, Raw	1 medium	101	5.5	57	3.1
Pumpkin Seeds, Whole, Roasted	1 ounce	126	5.2	446	18.4

Food	Standard Portion Size	Calories in Standard Portion[a]	Dietary Fiber in Standard Portion (g)[a]	Calories per 100 grams[a]	Dietary Fiber per 100 grams (g)[a]
Baked Beans, Canned, Plain	½ cup	119	5.2	94	4.1
Soybeans, Cooked	½ cup	149	5.2	173	6.0
Plain Rye Wafer Crackers	2 wafers	73	5.0	334	22.9
Avocado	½ cup	120	5.0	160	6.7
Broadbeans (Fava Beans), Cooked	½ cup	94	4.6	110	5.4
Pink Beans, Cooked	½ cup	126	4.5	149	5.3
Apple, with Skin	1 medium	95	4.4	52	2.4
Green Peas, Cooked (Fresh, Frozen, Canned)	½ cup	59-67	3.5-4.4	69-84	4.1-5.5
Refried Beans, Canned	½ cup	107	4.4	90	3.7
Chia Seeds, Dried	1 Tbsp	58	4.1	486	34.4
Bulgur, Cooked	½ cup	76	4.1	83	4.5
Mixed Vegetables, Cooked from Frozen	½ cup	59	4.0	65	4.4
Raspberries	½ cup	32	4.0	52	6.5
Blackberries	½ cup	31	3.8	43	5.3
Collards, Cooked	½ cup	32	3.8	33	4.0
Soybeans, Green, Cooked	½ cup	127	3.8	141	4.2
Prunes, Stewed	½ cup	133	3.8	107	3.1

Table A13-1. *(continued...)*

Dietary Fiber: Food Sources Ranked by Amounts of Dietary Fiber & Energy per Standard Food Portions & per 100 Grams of Foods

Food	Standard Portion Size	Calories in Standard Portion[a]	Dietary Fiber in Standard Portion (g)[a]]	Calories per 100 grams[a]	Dietary Fiber per 100 grams (g)[a]
Sweet Potato, Baked in Skin	1 medium	103	3.8	90	3.3
Figs, Dried	¼ cup	93	3.7	249	9.8
Pumpkin, Canned	½ cup	42	3.6	34	2.9
Potato, Baked, with Skin	1 medium	163	3.6	94	2.1
Popcorn, Air-Popped	3 cups	93	3.5	387	14.5
Almonds	1 ounce	164	3.5	579	12.5
Pears, Dried	¼ cup	118	3.4	262	7.5
Whole Wheat Spaghetti, Cooked	½ cup	87	3.2	124	4.5
Parsnips, Cooked	½ cup	55	3.1	71	4.0
Sunflower Seed Kernels, Dry Roasted	1 ounce	165	3.1	582	11.1
Orange	1 medium	69	3.1	49	2.2
Banana	1 medium	105	3.1	89	2.6
Guava	1 fruit	37	3.0	68	5.4
Oat Bran Muffin	1 small	178	3.0	270	4.6
Pearled Barley, Cooked	½ cup	97	3.0	123	3.8

Food	Standard Portion Size	Calories in Standard Portion[a]	Dietary Fiber in Standard Portion (g)[a]	Calories per 100 grams[a]	Dietary Fiber per 100 grams (g)[a]
Winter Squash, Cooked	½ cup	38	2.9	37	2.8
Dates	¼ cup	104	2.9	282	8.0
Pistachios, Dry Roasted	1 ounce	161	2.8	567	9.9
Pecans, Oil Roasted	1 ounce	203	2.7	715	9.5
Hazelnuts or Filberts	1 ounce	178	2.7	628	9.7
Peanuts, Oil Roasted	1 ounce	170	2.7	599	9.4
Whole Wheat Paratha Bread	1 ounce	92	2.7	326	9.6
Quinoa, Cooked	½ cup	111	2.6	120	2.8

[a] Source: U.S Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. 2014. USDA National Nutrient Database for Standard Reference, Release 27. Available at: http://www.ars.usda.gov/nutrientdata.

Appendix 14.

Food Safety Principles & Guidance

An important part of healthy eating is keeping foods safe. It is estimated that foodborne illness affects about 1 in 6 Americans (or 48 million people), leading to 128,000 hospitalizations and 3,000 deaths every year.[1] Food may be handled numerous times as it moves from the farm to homes. Individuals in their own homes can reduce contaminants and help keep food safe to eat by following safe food handling practices. Four basic food safety principles work together to reduce the risk of foodborne illness—Clean, Separate, Cook, and Chill. These four principles are the cornerstones of Fight BAC!®, a national food safety education campaign aimed at consumers.

Clean

Microbes, such as bacteria and viruses, can be spread throughout the kitchen and get onto hands, cutting boards, utensils, countertops, reusable grocery bags, and foods. This is called "cross-contamination." Hand washing is important to prevent contamination of food with microbes from raw animal products (e.g., raw seafood, meat, poultry, and eggs) and from people (e.g., cold, flu, and Staph infections). Frequent cleaning of surfaces is essential in preventing cross-contamination. To reduce microbes and contaminants from foods, all produce, regardless of where it was grown or purchased, should be thoroughly rinsed. This is particularly important for produce that will be eaten raw.

Hands

Hands should be washed before and after preparing food, especially after handling raw seafood, meat, poultry, or eggs, and before eating. In addition, hand washing is recommended after going to the bathroom, changing diapers, coughing or sneezing, tending to someone who is sick or injured, touching animals, and handling garbage. Hands should be washed using soap and water. Soaps with antimicrobial agents are not needed for consumer hand washing, and their use over time can lead to growth of microbes resistant to these agents. Alcohol-based (≥ 60%), rinse-free hand sanitizers should be used when hand washing with soap is not possible. Hand sanitizers are not as effective when hands are visibly dirty or greasy.

Wash Hands With Soap & Water

- Wet hands with clean running water (warm or cold), turn off tap, and apply soap.
- Rub hands together to make lather and scrub the back of hands, between fingers, and under nails for at least 20 seconds. If you need a timer you can hum the "happy birthday" song from beginning to end twice.
- Rinse hands well under running water.
- Dry hands using a clean towel or air dry them.

Surfaces

Surfaces should be washed with hot, soapy water. A solution of 1 tablespoon of unscented, liquid chlorine bleach per gallon of water can be used to sanitize surfaces. All kitchen surfaces should be kept clean, including tables, countertops, sinks, utensils, cutting boards, and appliances. For example, the insides of microwaves easily become soiled with food, allowing microbes to grow. They should be cleaned often.

Keep Appliances Clean

- At least once a week, throw out refrigerated foods that should no longer be eaten.
- Cooked leftovers should be discarded after 4 days; raw poultry and ground meats, 1 to 2 days.
- Wipe up spills immediately—clean food-contact surfaces often.
- Clean the inside and the outside of appliances. Pay particular attention to buttons and handles where cross-contamination to hands can occur.

Foods

Vegetables & Fruits. All produce, regardless of where it was grown or purchased, should be thoroughly rinsed. However, any precut packaged items, like lettuce or baby carrots, are labeled as prewashed and ready-to-eat. These products can be eaten without further rinsing.

[1] http://www.cdc.gov/foodborneburden/. Accessed June 1, 2015.

- Rinse fresh vegetables and fruits under running water just before eating, cutting, or cooking.
- Do not use soap or detergent to clean produce; commercial produce washes are not needed.
- Even if you plan to peel or cut the produce before eating, it is still important to thoroughly rinse it first to prevent microbes from transferring from the outside to the inside of the produce.
- Scrub the skin or rind of firm produce, such as melons and cucumbers, with a clean produce brush while you rinse it.
- Dry produce with a clean cloth towel or paper towel to further reduce bacteria that may be present. Wet produce can allow remaining microbes to multiply faster.

Seafood, Meat, & Poultry. Raw seafood, meat, and poultry should not be rinsed. Bacteria in these raw juices can spread to other foods, utensils, and surfaces, leading to foodborne illness.

Separate

Separating foods that are ready-to-eat from those that are raw or that might otherwise contain harmful microbes is key to preventing foodborne illness. Attention should be given to separating foods at every step of food handling, from purchase to preparation to serving.

Separate Foods When Shopping

- Place raw seafood, meat, and poultry in plastic bags. Separate them from other foods in your grocery cart and bags.
- Store raw seafood, meat, and poultry below ready-to-eat foods in your refrigerator.
- Clean reusable grocery bags regularly. Wash canvas and cloth bags in the washing machine and wash plastic reusable bags with hot, soapy water.

Separate Foods When Preparing & Serving Food

- Always use a clean cutting board for fresh produce and a separate one for raw seafood, meat, and poultry.
- Always use a clean plate to serve and eat food.
- Never place cooked food back on the same plate or cutting board that previously held raw food.

Cook & Chill

Seafood, meat, poultry, and egg dishes should be cooked to the recommended safe minimum internal temperature to destroy harmful microbes (see Table A14-1). It is not always possible to tell whether a food is safe by how it looks. A food thermometer should be used to ensure that food is safely cooked and that cooked food is held at safe temperatures until eaten. In general, the food thermometer should be placed in the thickest part of the food, not touching bone, fat, or gristle. The manufacturer's instructions should be followed for the amount of time needed to measure the temperature of foods. Food thermometers should be cleaned with hot, soapy water before and after each use.

Temperature rules also apply to microwave cooking. Microwave ovens can cook unevenly and leave "cold spots" where harmful bacteria can survive. When cooking using a microwave, foods should be stirred, rotated, and/or flipped periodically to help them cook evenly. Microwave cooking instructions on food packages always should be followed.

Keep Foods at Safe Temperatures

- Hold cold foods at 40°F or below.
- Keep hot foods at 140°F or above.
- Foods are no longer safe to eat when they have been in the danger zone of 40-140°F for more than 2 hours (1 hour if the temperature was above 90°F).
    - When shopping, the 2-hour window includes the amount of time food is in the grocery basket, car, and on the kitchen counter.
    - As soon as frozen food begins to thaw and become warmer than 40°F, any bacteria that may have been present before freezing can begin to multiply. Use one of the three safe ways to thaw foods: (1) in the refrigerator, (2) in cold water (i.e., in a leak proof bag, changing cold water every 30 minutes), or (3) in the microwave. Never thaw food on the counter. Keep your refrigerator at 40°F or below.
- Keep your freezer at 0°F or below. Monitor these temperatures with appliance thermometers.

Table A14-1.

Recommended Safe Minimum Internal Temperatures

Consumers should cook foods to the minimum internal temperatures shown below. The temperature should be measured with a clean food thermometer before removing meat from the heat source. For safety and quality, allow meat to rest for at least 3 minutes before carving or consuming. For reasons of personal preference, consumers may choose to cook meat to higher temperatures.

Food	Degrees Fahrenheit
Ground Meat & Meat Mixtures	
Beef, Pork, Veal, Lamb	160
Turkey, Chicken	165
Fresh Beef, Pork, Veal, Lamb	
Steaks, Roasts, Chops	145
Poultry	
Chicken & Turkey, Whole	165
Poultry Breasts, Roasts	165
Poultry Thighs, Wings	165
Duck & Goose	165
Stuffing (Cooked Alone or in Bird)	165
Fresh Pork	160
Ham	
Fresh Ham (Raw)	145
Pre-cooked Ham (to Reheat)	140
Eggs & Egg Dishes	
Eggs	Cook until yolk and white are firm.
Egg Dishes	160
Fresh Seafood	
Finfish	145; Cook fish until it is opaque (milky white) and flakes with a fork.
Shellfish	Cook shrimp, lobster, and scallops until they reach their appropriate color. The flesh of shrimp and lobster should be an opaque (milky white) color. Scallops should be opaque (milky white) and firm. Cook clams, mussels, and oysters until their shells open. This means that they are done. Throw away the ones that didn't open. Shucked clams and shucked oysters are fully cooked when they are opaque (milky white) and firm.
Leftovers & Casseroles	165

Risky Eating Behaviors

Harmful bacteria, viruses, and parasites usually do not change the look or smell of food. This makes it impossible for consumers to know whether food is contaminated. Consumption of raw or undercooked animal food products increases the risk of contracting a foodborne illness. Raw or undercooked foods commonly eaten in the United States include eggs (e.g., eggs with runny yolks), ground beef (e.g., undercooked hamburger), dairy (e.g., cheese made from unpasteurized milk), and seafood (e.g., raw oysters). Cooking foods to recommended safe minimum internal temperatures and consuming only pasteurized dairy products are the best ways to reduce the risk of foodborne illness from animal products. Always use pasteurized eggs or egg products when preparing foods that are made with raw eggs (e.g., eggnog, smoothies and other drinks, hollandaise sauce, ice cream, and uncooked cookie dough). Consumers who choose to eat raw seafood despite the risks should choose seafood that has been previously frozen, which will kill parasites but not harmful microbes.

Specific Populations at Increased Risk of Foodborne Illness

Some individuals, including women who are pregnant and their unborn children, young children, older adults, and individuals with weakened immune systems (such as those living with HIV infection, cancer treatment, organ transplant, or liver disease), are more susceptible than the general population to the effects of foodborne illnesses such as listeriosis and salmonellosis. The outcome of contracting a foodborne illness for these individuals can be severe or even fatal. They need to take special care to keep foods safe and to not eat foods that increase the risk of foodborne illness. Women who are pregnant, infants and young children, older adults, and people with weakened immune systems should only eat foods containing seafood, meat, poultry, or eggs that have been cooked to recommended safe minimum internal temperatures. They also should take special precautions not to consume unpasteurized (raw) juice or milk or foods made from unpasteurized milk, like some soft cheeses (e.g., Feta, queso blanco, queso fresco, Brie, Camembert cheeses, blue-veined cheeses, and Panela). They should reheat deli and luncheon meats and hot dogs to steaming hot to kill Listeria, the bacteria that causes listeriosis, and not eat raw sprouts, which also can carry harmful bacteria.

Resources for Additional Food Safety Information

Federal Food Safety Gateway: www.foodsafety.gov

Fight BAC!®: www.fightbac.org

Be Food Safe: www.befoodsafe.gov

Is It Done Yet?: www.isitdoneyet.gov

Thermy™: http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/teach-others/fsis-educational-campaigns/thermy

For more information and answers to specific questions:

- Call the USDA Meat and Poultry Hotline 1-888-MPHotline (1-888-674-6854) TTY: 1-800- 256-7072. Hours: 10:00 a.m. to 4:00 p.m. Eastern time, Monday through Friday, in English and Spanish, or email: mphotline.fsis@usda.gov
- Visit "Ask Karen," FSIS's Web-based automated response system at www.fsis.usda.gov

Notes

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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
Secretary
U.S. Department of Health and Human Services

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U.S. Department of Health and Human Services. *Physical Activity Guidelines for Americans, 2nd edition*. Washington, DC: U.S. Department of Health and Human Services; 2018.

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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.

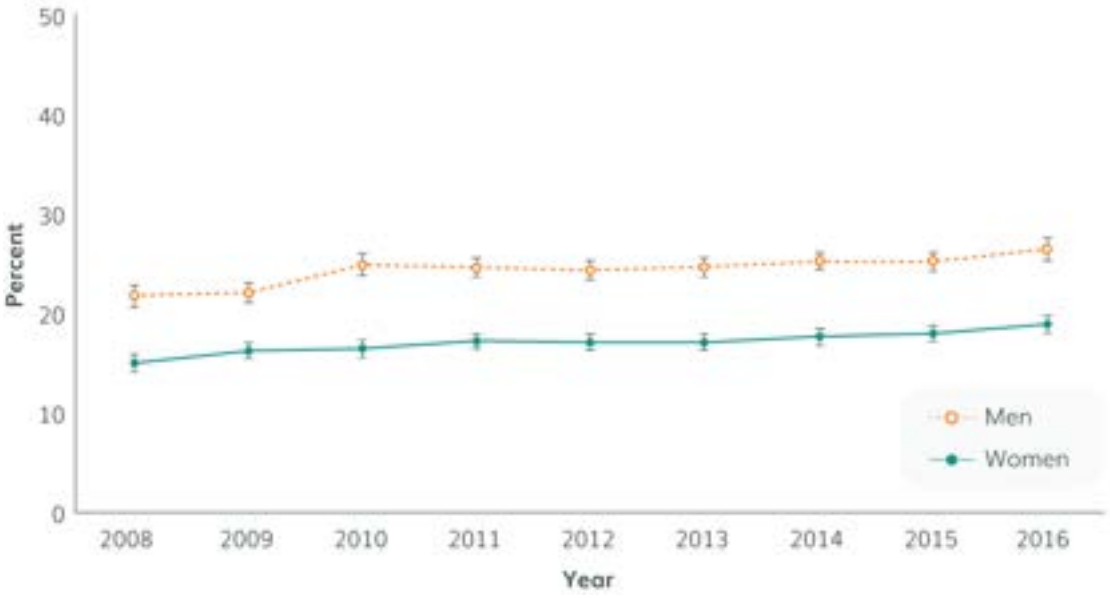
Learn More

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).

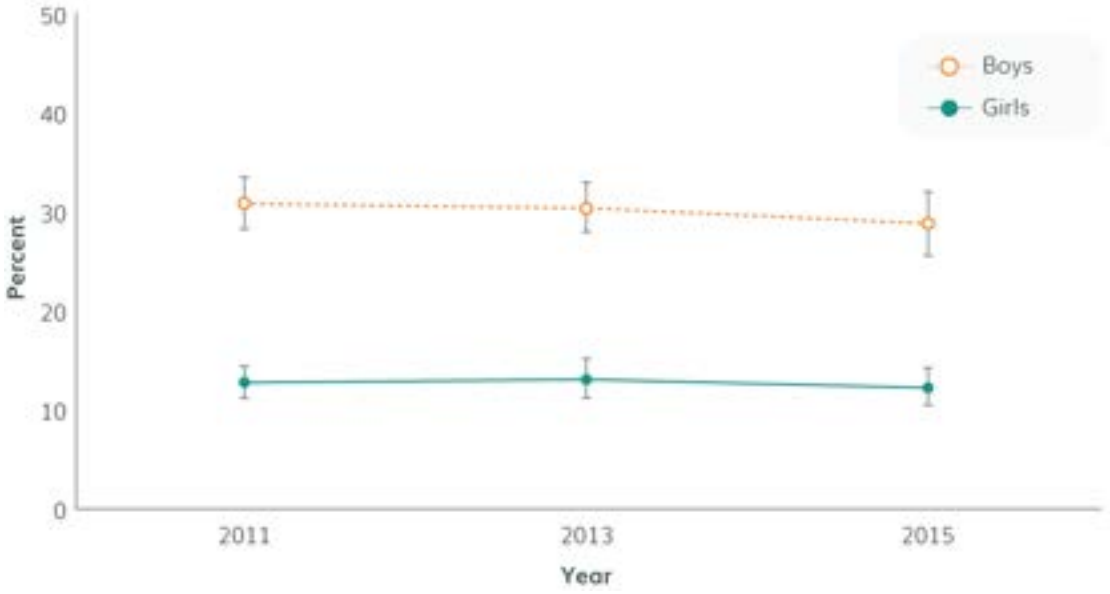
Figure 1-1. Percentage of U.S. Adults Ages 18 Years or Older Who Met the Aerobic and Muscle-Strengthening Guidelines, 2008–2016



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.

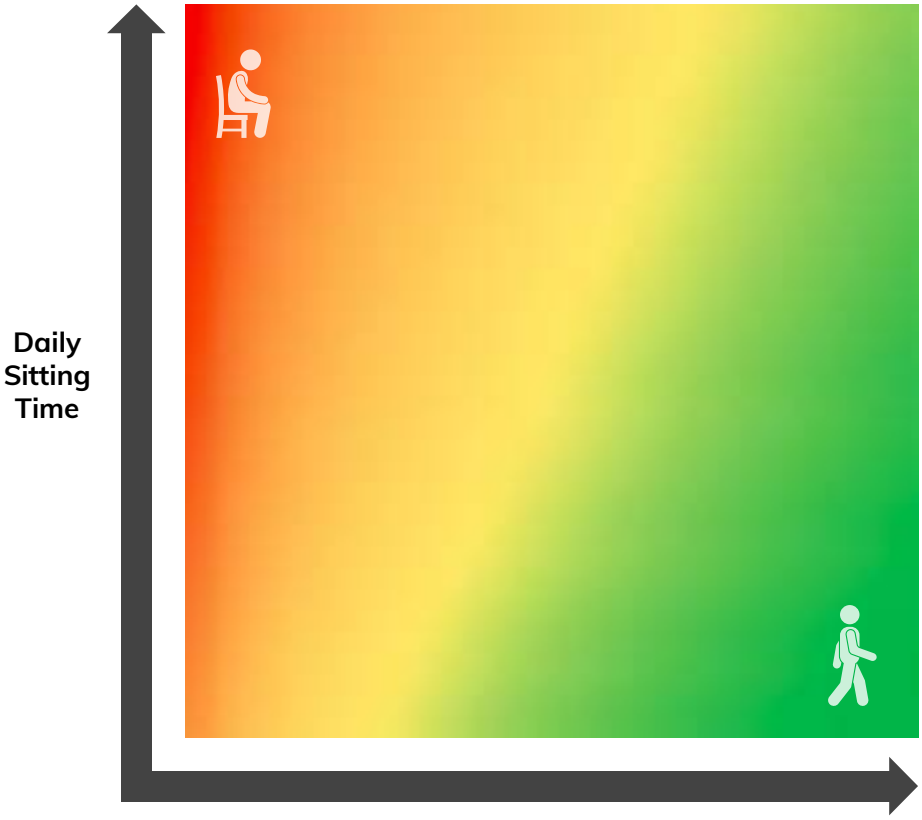
The 2018 Advisory Committee found a strong relationship between time in sedentary behavior and the risk of all-cause mortality and cardiovascular disease mortality in adults. However, the literature was insufficient to recommend a specific target for adults or youth for how many times during the day 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



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.

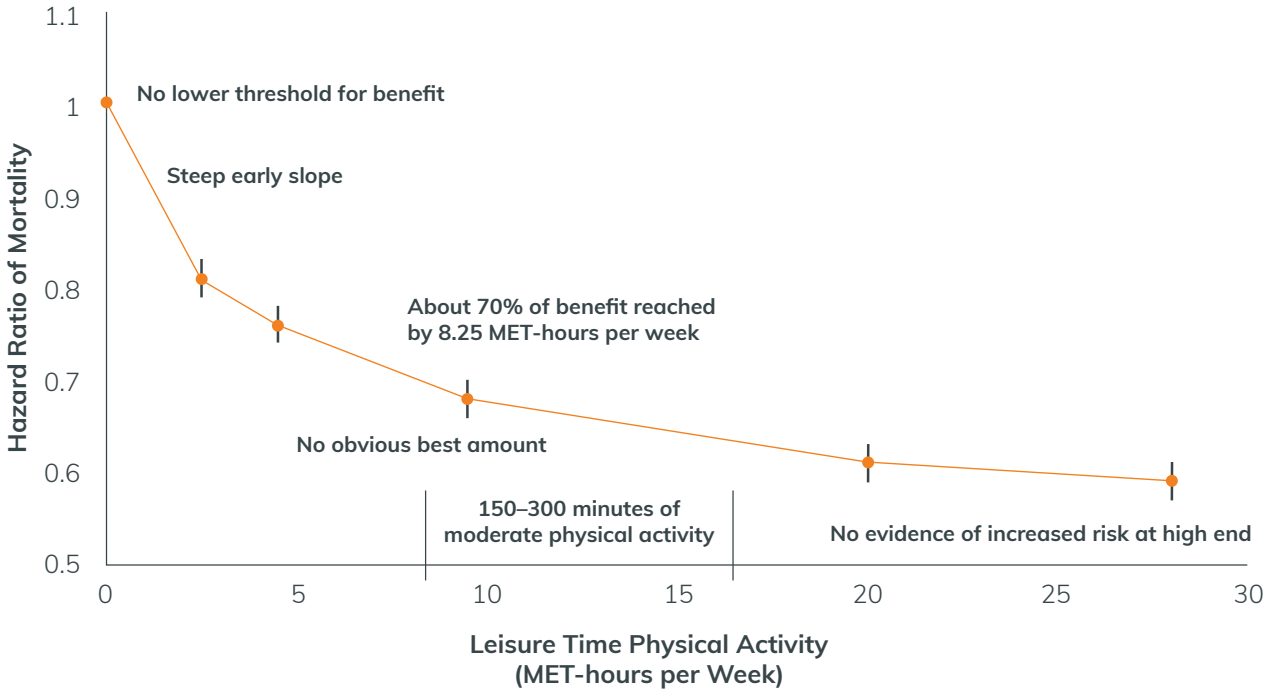
All-Cause Mortality

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

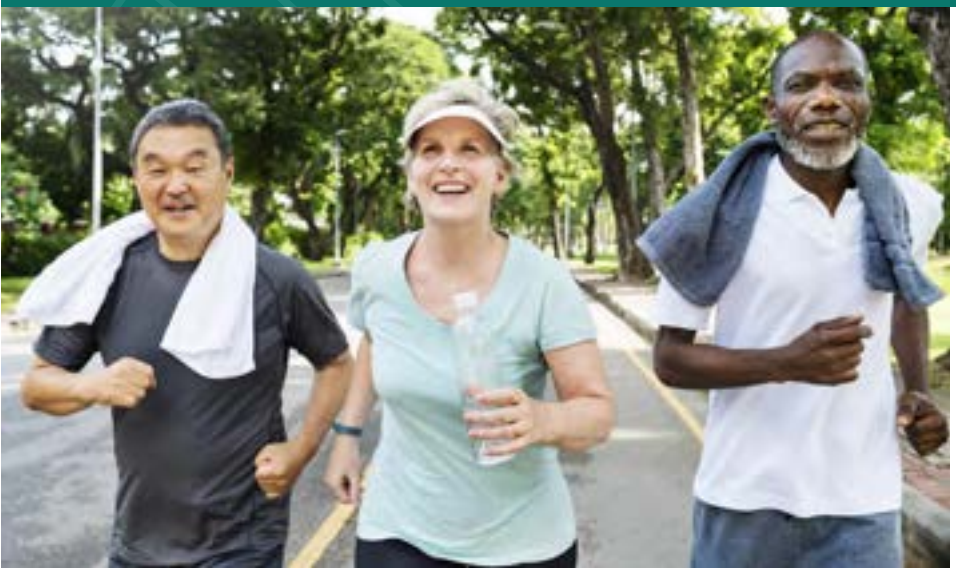
Darius does 60 or more minutes of daily physical activity that is at least moderate intensity. Here are the daily activities he participates in during a sample week when school is not in session:

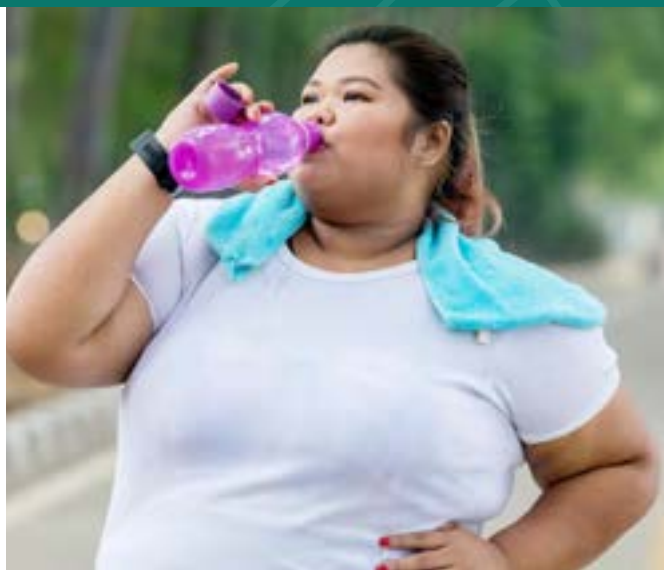
- **Monday and Wednesday:** Walks dog (10 minutes); plays basketball at a nearby school gym that has a shared-use agreement for community physical activity during the summer (50 minutes)
- **Tuesday and Thursday:** Walks dog (10 minutes); plays doubles tennis (30 minutes); does planks and push-ups (5 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.

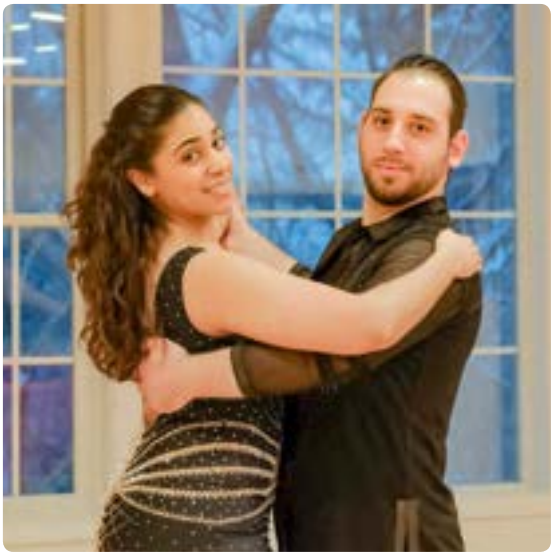
Muscle-Strengthening Activity

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.

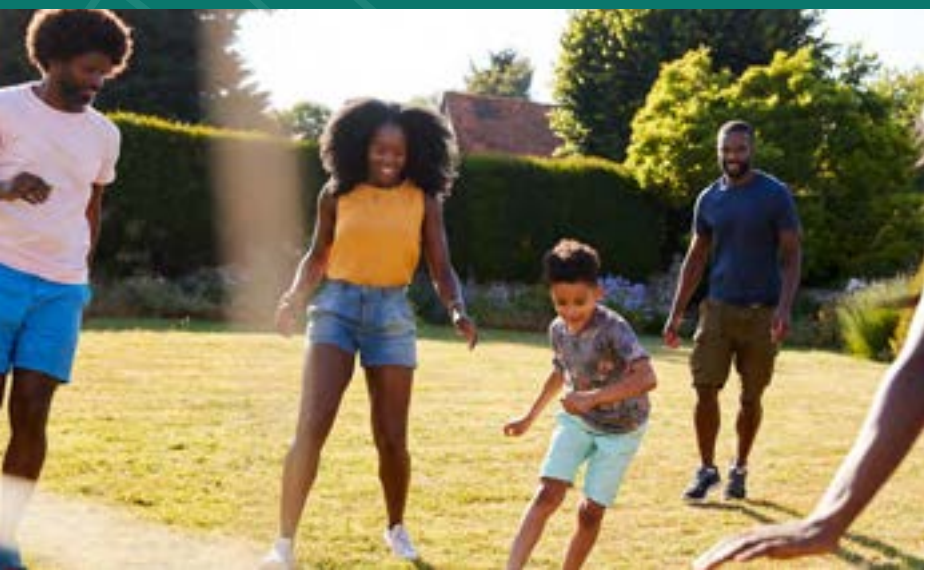
Learn More

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.

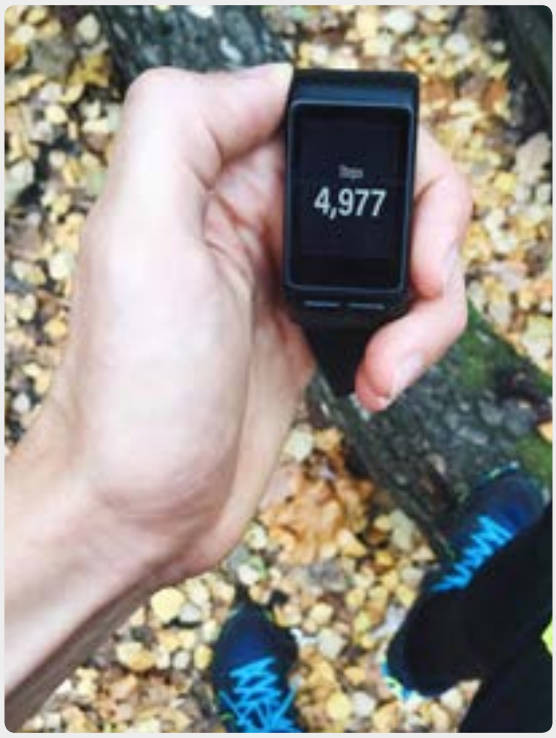
Over the past 10 years, expanding research and advances in technological approaches for measuring physical activity have led to examinations of the association of step counts with health outcomes and effective approaches to promoting regular physical activity. The research evidence on the influence of 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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