INTRODUCTION TO HEALTH

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Book: Introduction to Health (Falcone)

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About this Book

This compilation has been developed by Kelly Falcone, Professor of Kinesiology and Health at Palomar College and adapted from SUNY OER book *Disease Prevention and Healthy Lifestyle* by Trina DiGregorio, M.S., Adjunct Professor at Monroe Community College. Professor DiGregorio created the framework for this online textbook by adapting *Contemporary Health Issues* by Judy Baker, Ph.D., Dean of Foothill Global Access at Foothill College.

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CHAPTER OVERVIEW

1: INTRODUCTION TO HEALTH AND WELLNESS

1.1: DIMENSIONS OF WELLNESS

Wellness is being in good physical and mental health. Because mental health and physical health are linked, problems in one area can impact the other. At the same time, improving your physical health can also benefit your mental health, and vice versa. It is important to make healthy choices for both your physical and mental well-being. Remember that wellness is not just the absence of illness or stress. You can still strive for wellness even if you are experiencing these challenges in your lif

1.1: Dimensions of Wellness

What is Wellness?

Wellness is being in good physical and mental health. Because mental health and physical health are linked, problems in one area can impact the other. At the same time, improving your physical health can also benefit your mental health, and vice versa. It is important to make healthy choices for both your physical and mental well-being.

Remember that wellness is not just the absence of illness or stress. You can still strive for wellness even if you are experiencing these challenges in your life.

What are the Nine Dimensions of Wellness?

Learning about the Nine Dimensions of Wellness can help you choose how to make wellness a part of your everyday life. Wellness strategies are practical ways to start developing healthy habits that can have a positive impact on your physical and mental health.

The Nine Dimensions of Wellness are:

1. **Emotional**: Coping effectively with life and expressing emotions in an appropriate manner.
2. **Environmental**: Occupying pleasant, healthy, and safe environments that support well-being; positively impacting the quality of our surroundings (including protecting and preserving nature).
3. **Financial**: Achieving satisfaction with current and future financial situations; handling finances wisely.
4. **Intellectual**: Recognizing creative abilities and finding ways to expand knowledge and skills; being open-minded.
5. **Occupational**: Personal fulfillment and enrichment from one's work and/or responsibilities.
6. **Physical**: Recognizing the need for physical activity, healthy foods, and adequate sleep; avoiding unhealthy habits.
7. **Social**: Developing a sense of connection, belonging, and sustained support system; having positive relationships.
8. **Spiritual**: Having a sense of purpose and meaning in life; establishing peace, harmony, and balance in our lives.
9. ***Cultural**: The way you interact with others who are different than you; understanding and celebrating our differences. (*recently added).

Learn more about the Eight Dimensions of Wellness (does not include Cultural wellness) by watching the video below:

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

Your Own Views on Health and Wellness

Reflect on the following questions:

- What does health mean to you?
- How important is health to you?
- What are some of your healthy habits?
- Which dimensions of wellness do you need to work on the most?

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- Video - The Eight Dimensions of Wellness. **Authored by**: SAMHSA. **Provided by**: U.S. Department of Health and Human Services. **Located at**: https://www.youtube.com/watch?v=tDzQdRvLAfM&feature=youtu.be. **License**: *Public Domain: No Known Copyright*

1.2: Healthy People 2020

In December 2010, the Department of Health and Human Services launched Healthy People 2020, which has four overarching goals:

- Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death;
- Achieve health equity, eliminate disparities, and improve the health of all groups;
- Create social and physical environments that promote good health for all; and
- Promote quality of life, healthy development, and healthy behaviors across all life stages.

Healthy People 2020 tracks approximately 1,200 objectives organized into 42 topic areas, each of which represents an important public health area. At the time of the December 2010 launch 911 objectives were measurable with baseline data and established targets. A few objectives that have achieved high levels of success are being tracked without a target for informational purposes. Targets will be set during the decade for these objectives if warranted. The rest of the objectives did not have baseline data and were considered developmental. Targets for the developmental objectives will be set when baseline data become available. Healthy People 2020 also includes a new Foundation section which addresses several important health topics: General Health Status, Health-Related Quality of Life and Well-Being, Determinants of Health, and Disparities.

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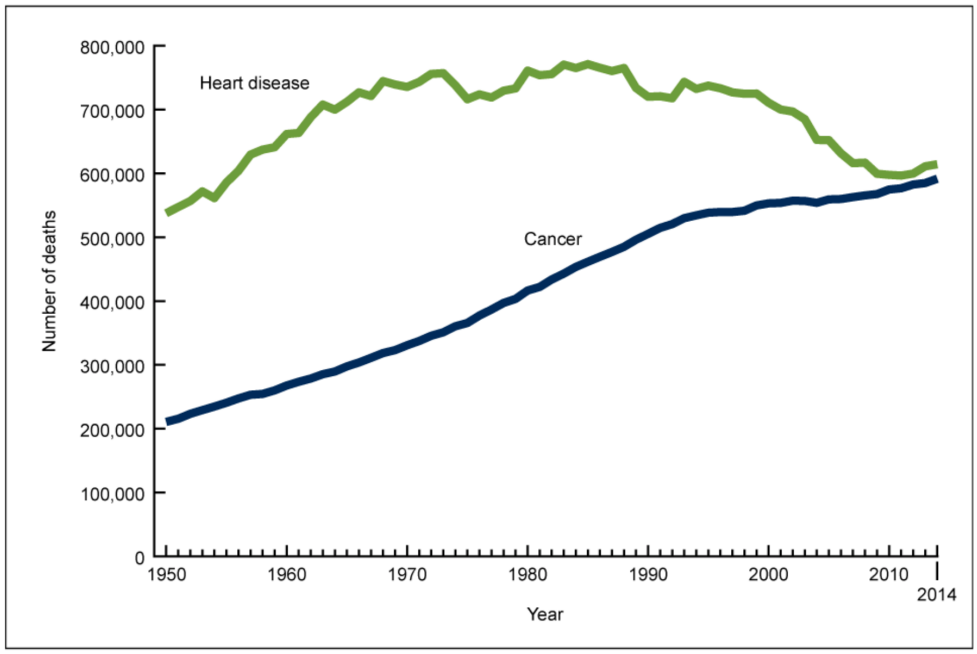
1.3: Major Health Concerns

Leading Causes of Death in the United States

Do you know what the top two leading causes of death are for Americans? Heart disease takes the number one spot, followed by cancer. As you can see by the graph below, cancer death rates have been steadily increasing throughout the years. What does this potentially mean for the future? Is cancer going to take over as the number one leading cause of death? It certainly appears to be headed in that direction.

Figure 1. Number of deaths due to heart disease and cancer: United States, 1950–2014



NOTES: Leading cause is based on number of deaths. Access data table for Figure 1 at: http://www.cdc.gov/nchs/data/databriefs/db254_table.pdf#1.
SOURCE: NCHS, National Vital Statistics System, Mortality.

The 10 Leading Causes of Death in the United States:

1. Heart disease: 614,348
2. Cancer: 591,699
3. Chronic lower respiratory diseases: 147,101
4. Accidents (unintentional injuries): 136,053
5. Stroke (cerebrovascular diseases): 133,103
6. Alzheimer's disease: 93,541
7. Diabetes: 76,488
8. Influenza and Pneumonia: 55,227
9. Nephritis, nephrotic syndrome and nephrosis: 48,146
10. Intentional self-harm (suicide): 42,773

CDC Winnable Battles

To keep pace with emerging public health challenges and to address the leading causes of death and disability, CDC initiated an effort called Winnable Battles to achieve measurable impact quickly. Winnable Battles are public health priorities with large-scale impact on health and known effective strategies to address them. By identifying priority strategies, defining clear targets and working closely with our public health partners, we are making significant progress in reducing health disparities and the overall health burden from these diseases and conditions.

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1.4: Risk Factors and Levels of Disease Prevention

What is a Risk Factor?

Part of learning how to take charge of your health requires understanding your risk factors for different diseases. Risk factors are things in your life that increase your chances of getting a certain disease. Some risk factors are beyond your control. You may be born with them or exposed to them through no fault of your own.

Some risk factors that you have little or no control over include your:

- Family history of a disease
- Sex/gender — male or female
- Ancestry

Some risk factors you can control include:

- What you eat
- How much physical activity you get
- Whether you use tobacco
- How much alcohol you drink
- Whether you misuse drugs

In fact, it has been estimated that almost 35 percent of all U.S. early deaths in 2000 could have been avoided by changing just three behaviors:

- Stopping smoking
- Eating a healthy diet (for example, eating more fruits and vegetables and less red meat)
- Getting more physical activity

You can have one risk factor for a disease or you can have many. The more risk factors you have, the more likely you are to get the disease. For example, if you eat healthy, exercise on a regular basis, and control your blood pressure, your chances of getting heart disease are less than if you are diabetic, a smoker, and inactive. To lower your risks, take small steps toward engaging in a healthy lifestyle, and you'll see big rewards.

People with a family health history of chronic disease may have the most to gain from making lifestyle changes. You can't change your genes, but you can change behaviors that affect your health, such as smoking, inactivity, and poor eating habits. In many cases, making these changes can reduce your risk of disease even if the disease runs in your family. Another change you can make is to have screening tests, such as mammograms and colorectal cancer screening. These screening tests help detect disease early. People who have a family health history of a chronic disease may benefit the most from screening tests that look for risk factors or early signs of disease. Finding disease early, before symptoms appear, can mean better health in the long run.

Levels of Disease Prevention

Prevention includes a wide range of activities — known as "interventions" — aimed at reducing risks or threats to health. You may have heard researchers and health experts talk about three categories of prevention: primary, secondary and tertiary. What do they mean by these terms?

Primary prevention aims to prevent disease or injury before it ever occurs. This is done by preventing exposures to hazards that cause disease or injury, altering unhealthy or unsafe behaviors that can lead to disease or injury, and increasing resistance to disease or injury should exposure occur. Examples include:

- legislation and enforcement to ban or control the use of hazardous products (e.g. asbestos) or to mandate safe and healthy practices (e.g. use of seatbelts and bike helmets)
- education about healthy and safe habits (e.g. eating well, exercising regularly, not smoking)
- immunization against infectious diseases.

Secondary prevention aims to reduce the impact of a disease or injury that has already occurred. This is done by detecting and treating disease or injury as soon as possible to halt or slow its progress, encouraging personal strategies to prevent

reinjury or recurrence, and implementing programs to return people to their original health and function to prevent long-term problems. Examples include:

- regular exams and screening tests to detect disease in its earliest stages (e.g. mammograms to detect breast cancer)
- daily, low-dose aspirins and/or diet and exercise programs to prevent further heart attacks or strokes
- suitably modified work so injured or ill workers can return safely to their jobs.

Tertiary prevention aims to soften the impact of an ongoing illness or injury that has lasting effects. This is done by helping people manage long-term, often-complex health problems and injuries (e.g. chronic diseases, permanent impairments) in order to improve as much as possible their ability to function, their quality of life and their life expectancy. Examples include:

- cardiac or stroke rehabilitation programs, chronic disease management programs (e.g. for diabetes, arthritis, depression, etc.)
- support groups that allow members to share strategies for living well
- vocational rehabilitation programs to retrain workers for new jobs when they have recovered as much as possible.

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1.5: Behavior Change and Goal Setting

Transtheoretical Model (Stages of Change)

The transtheoretical model of behavior change, developed by Prochaska and DiClemente, assesses an individual's readiness to implement a healthier behavior, and provides insight into the decision making process that leads to action. For many people, changing or modifying a behavior that is unhealthy or potentially harmful can be quite challenging. Here are the stages that lead to behavior change:

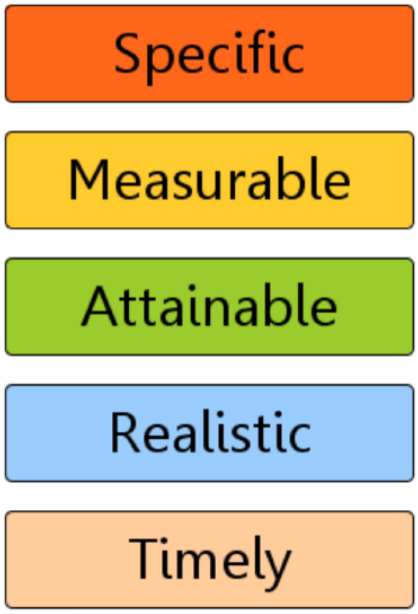
- **Precontemplation (Not Ready)** – You are not intending to take action in the foreseeable future, and can be unaware that your behavior is problematic
- **Contemplation (Getting Ready)** – You are beginning to recognize that your behavior is problematic, and start to look at the pros and cons of your continued actions
- **Preparation (Ready)** – You are intending to take action in the immediate future, and may begin taking small steps toward behavior change
- **Action** – You are making actual changes to your problem behavior by incorporating healthy choices/behaviors into your life
- **Maintenance** – You have been able to sustain action for at least six months and are working to prevent relapse into previous unhealthy behaviors

Check out this supplemental video to review the main concepts of the Transtheoretical Model:

YouTube Video: Improve Your Life Using the Stages of Change (Transtheoretical) Model - Dr Wendy Guess (https://www.youtube.com/watch?v=Twlow2pXsv0)

SMART Goal Setting

Have you ever said to yourself that you need to "eat healthier" or "exercise more" to improve your overall health? How well did that work for you? In most cases, probably not very well. That's because these statements are too vague and do not give us any direction for what truly needs to be done to achieve such goals. To have a better chance at being successful, try using the SMART acronym for setting your goals (S= Specific, M= Measurable, A=Attainable, R= Realistic, T= Time-oriented):



Specific – Create a goal that has a focused and clear path for what you actually need to do. Examples:

- I will drink 8 ounces of water 3 times per day
- I will walk briskly for 30 minutes, 5 times per week
- I will reduce my soda intake to no more than 2 cans of soda per week

Do you see how that is more helpful than just saying you will eat healthier or exercise more? It gives you direction.

Measurable – This enables you to track your progress, and ties in with the "specific" component. The above examples all have actual numbers associated with the behavior change that let you know whether or not it has been met.

Attainable – Make sure that your goal is within your capabilities and not too far out of reach. For example, if you have not been physically active for a number of years, it would be highly unlikely that you would be able to achieve a goal of running a marathon within the next month.

Realistic – Try to ensure that your goal is something you will be able to continue doing and incorporate as part of your regular routine/lifestyle. For example, if you made a goal to kayak 2 times each week, but don't have the financial resources to purchase or rent the equipment, no way to transport it, or are not close enough to a body of water in which to partake in kayaking, then this is not going to be feasible.

Time-oriented – Give yourself a target date or deadline in which the goal needs to be met. This will keep you on track and motivated to reach the goal, while also evaluating your progress.

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CHAPTER OVERVIEW

2: EXERCISE AND PHYSICAL ACTIVITY

2.1: Health Benefits of Physical Activity

Regular physical activity is one of the most important things you can do for your 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. Exercise is a form of physical activity that is planned, structured, repetitive, and performed with the goal of improving health or fitness. So, ***although all exercise is physical activity, not all physical activity is exercise***. Being more physically active and also doing more exercise can help to:

- Control your weight
- Reduce your risk of cardiovascular disease
- Reduce your risk for type 2 diabetes and metabolic syndrome
- Reduce your risk of some cancers
- Strengthen your bones and muscles
- Improve your mental health and mood
- Improve your ability to do daily activities and prevent falls
- Increase your chances of living longer

Begin Taking Steps to be More Physically Active Everyday

If you're not sure about becoming active or boosting your level of physical activity because you're afraid of getting hurt, the good news is that moderate-intensity aerobic activity, like brisk walking, is generally safe for most people.

Start slowly. Cardiac events, such as a heart attack, are rare during physical activity. But the risk does go up when you suddenly become much more active than usual. For example, you can put yourself at risk if you don't usually get much physical activity and then all of a sudden do vigorous-intensity aerobic activity, like shoveling snow. That's why it's important to start slowly and gradually increase your level of activity.

If you have a chronic health condition such as arthritis, diabetes, or heart disease, talk with your doctor to find out if your condition limits, in any way, your ability to be active. Then, work with your doctor to come up with a physical activity plan that matches your abilities. If your condition stops you from meeting the minimum Guidelines, try to do as much as you can. What's important is that you avoid being inactive. Even 60 minutes a week of moderate-intensity aerobic activity is good for you.

The bottom line is – the health benefits of physical activity far outweigh the risks of getting hurt. The following list explains how being more active can positively impact your health:

Control Your Weight

Looking to get to or stay at a healthy weight? Both diet and physical activity play a critical role in controlling your weight. You gain weight when the calories you burn, including those burned during physical activity, are less than the calories you eat or drink. When it comes to weight management, people vary greatly in how much physical activity they need. You may need to be more active than others to achieve or maintain a healthy weight.

To maintain your weight: Work your way up to 150 minutes of moderate-intensity aerobic activity, 75 minutes of vigorous-intensity aerobic activity, or an equivalent mix of the two each week. Strong scientific evidence shows that physical activity can help you maintain your weight over time. However, the exact amount of physical activity needed to do this is not clear since it varies greatly from person to person. It's possible that you may need to do more than the equivalent of 150 minutes of moderate-intensity activity a week to maintain your weight.
To lose weight and keep it off: You will need a high amount of physical activity unless you also adjust your diet and reduce the amount of calories you're eating and drinking. Getting to and staying at a healthy weight requires both regular physical activity and a healthy eating plan. The CDC has some great tools and information about nutrition, physical activity and weight loss. For more information, visit Healthy Weight.

Reduce Your Risk of Cardiovascular Disease

Heart disease and stroke are two of the leading causes of death in the United States. But following the Guidelines and getting at least 150 minutes a week (2 hours and 30 minutes) of moderate-intensity aerobic activity can put you at a lower

risk for these diseases. You can reduce your risk even further with more physical activity. Regular physical activity can also lower your blood pressure and improve your cholesterol levels.

Reduce Your Risk of Type 2 Diabetes and Metabolic Syndrome

Regular physical activity can reduce your risk of developing type 2 diabetes and metabolic syndrome. Metabolic syndrome is a condition in which you have some combination of too much fat around the waist, high blood pressure, low HDL cholesterol, high triglycerides, or high blood sugar. Research shows that lower rates of these conditions are seen with 120 to 150 minutes (2 hours to 2 hours and 30 minutes) a week of at least moderate-intensity aerobic activity. And the more physical activity you do, the lower your risk will be.

Already have type 2 diabetes? Regular physical activity can help control your blood glucose levels. To find out more, visit Managing Diabetes.

Reduce Your Risk of Some Cancers

Being physically active lowers your risk for two types of cancer: colon and breast. Research shows that:

- Physically active people have a lower risk of colon cancer than do people who are not active.
- Physically active women have a lower risk of breast cancer than do people who are not active.

Reduce your risk of endometrial and lung cancer. Although the research is not yet final, some findings suggest that your risk of endometrial cancer and lung cancer may be lower if you get regular physical activity compared to people who are not active.

Improve your quality of life. If you are a cancer survivor, research shows that getting regular physical activity not only helps give you a better quality of life, but also improves your physical fitness.

Strengthen Your Bones and Muscles

As you age, it's important to protect your bones, joints and muscles. Not only do they support your body and help you move, but keeping bones, joints and muscles healthy can help ensure that you're able to do your daily activities and be physically active. Research shows that doing aerobic, muscle-strengthening and bone-strengthening physical activity of at least a moderately-intense level can slow the loss of bone density that comes with age.

Hip fracture is a serious health condition that can have life-changing negative effects, especially if you're an older adult. But research shows that people who do 120 to 300 minutes of at least moderate-intensity aerobic activity each week have a lower risk of hip fracture.

Regular physical activity helps with arthritis and other conditions affecting the joints. If you have arthritis, research shows that doing 130 to 150 (2 hours and 10 minutes to 2 hours and 30 minutes) a week of moderate-intensity, low-impact aerobic activity can not only improve your ability to manage pain and do everyday tasks, but it can also make your quality of life better.

Build strong, healthy muscles. Muscle-strengthening activities can help you increase or maintain your muscle mass and strength. Slowly increasing the amount of weight and number of repetitions you do will give you even more benefits, no matter your age

Improve Your Mental Health and Mood

Regular physical activity can help keep your thinking, learning, and judgment skills sharp as you age. It can also reduce your risk of depression and may help you sleep better. Research has shown that doing aerobic or a mix of aerobic and muscle-strengthening activities 3 to 5 times a week for 30 to 60 minutes can give you these mental health benefits. Some scientific evidence has also shown that even lower levels of physical activity can be beneficial.

Improve Your Ability to do Daily Activities and Prevent Falls

A functional limitation is a loss of the ability to do everyday activities such as climbing stairs, grocery shopping, or playing with your grandchildren.

How does this relate to physical activity? If you're a physically active middle-aged or older adult, you have a lower risk of functional limitations than people who are inactive

Already have trouble doing some of your everyday activities? Aerobic and muscle-strengthening activities can help improve your ability to do these types of tasks.

Are you an older adult who is at risk for falls? Research shows that doing balance and muscle-strengthening activities each week along with moderate-intensity aerobic activity, like brisk walking, can help reduce your risk of falling.

Increase Your Chances of Living Longer

Science shows that physical activity can reduce your risk of dying early from the leading causes of death, like heart disease and some cancers. This is remarkable in two ways:

1. Only a few lifestyle choices have as large an impact on your health as physical activity. People who are physically active for about 7 hours a week have a 40 percent lower risk of dying early than those who are active for less than 30 minutes a week.
2. You don't have to do high amounts of activity or vigorous-intensity activity to reduce your risk of premature death. You can put yourself at lower risk of dying early by doing at least 150 minutes a week of moderate-intensity aerobic activity.

Everyone can gain the health benefits of physical activity – age, ethnicity, shape or size do not matter.

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2.2: Physical Activity Guidelines for Adults

Adults who are physically active are healthier and less likely to develop many chronic diseases than adults who are inactive. They also have better fitness, including a healthier body size and composition. These benefits are gained by men and women and people of all races and ethnicities who have been studied.

Overall Components of Physical Fitness:

- **Cardiorespiratory fitness** – ability to sustain aerobic activity for a prolonged period of time
- **Muscular strength** – amount of force a muscle is able to exert in one contraction
- **Muscular endurance** – ability of the muscle to continue to perform without fatigue
- **Flexibility** – ability to move joints freely through their full range of motion
- **Body Composition** – the relative proportions of fat mass and lean mass in the body

The Physical Activity Guidelines for Adults include three main recommendations: Avoid inactivity, do aerobic activity, and strengthen muscles.

Avoid Inactivity

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.

Do Aerobic Activity

In this kind of physical activity (also called cardiorespiratory fitness), 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 than usual.

Aerobic physical activity has three components:

- **Intensity**, or how hard a person works to do the activity. The intensities most often examined are moderate intensity (equivalent in effort to brisk walking) and vigorous intensity (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.

For substantial health benefits, adults should do at least one of the following:

- 150 minutes (2 hours and 30 minutes) each week of moderate-intensity aerobic physical activity (such as brisk walking or tennis)
- 75 minutes (1 hour and 15 minutes) each week of vigorous-intensity aerobic physical activity (such as jogging or swimming laps)
- An equivalent combination of moderate- and vigorous-intensity aerobic physical activity

For additional and more extensive health benefits, adults should increase their aerobic physical activity to one of the following:

- Increase moderate-intensity aerobic physical activity to 300 minutes (5 hours) each week
- Increase vigorous-intensity aerobic physical activity for 150 minutes (2 hours and 30 minutes) each week
- An equivalent combination of moderate- and vigorous-intensity activity

Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week.

Examples of Different Aerobic Physical Activities and Intensities

Moderate Intensity	Vigorous Intensity
• Walking briskly (3 miles per hour or faster, but not race-walking) • Water aerobics • Bicycling slower than 10 miles per hour • Tennis (doubles) • Ballroom dancing • General gardening	• Racewalking, jogging, or running • Swimming laps • Tennis (singles) • Aerobic dancing • Bicycling 10 miles per hour or faster • Jumping rope • Heavy gardening (continuous digging or hoeing, with heart rate increases) • Hiking uphill or with a heavy backpack

Aerobic Intensity: Target Heart Rate Zone

One way of monitoring physical activity intensity is to determine whether a person's pulse or heart rate is within the target zone during physical activity.

When starting an exercise program, calculating a target heart rate zone can be very beneficial to ensure that you are exercising safely and effectively. Heart rates are referred to as “beats per minute” or bpm. The maximum rate is based on the person’s age. An estimate of a person’s maximum age-related heart rate can be obtained by subtracting the person’s age from 220.

220 – Age = Maximum Heart Rate

For moderate-intensity physical activity, a person’s target heart rate should be 50 to 70% of his or her maximum heart rate. For vigorous-intensity physical activity, a person’s target heart rate should be 70 to 85% of his or her maximum heart rate.

Example of Target Heart Rate for a 50 year old adult:

220 – 50 years = 170 beats per minute (bpm).
The 50% and 70% levels would be:

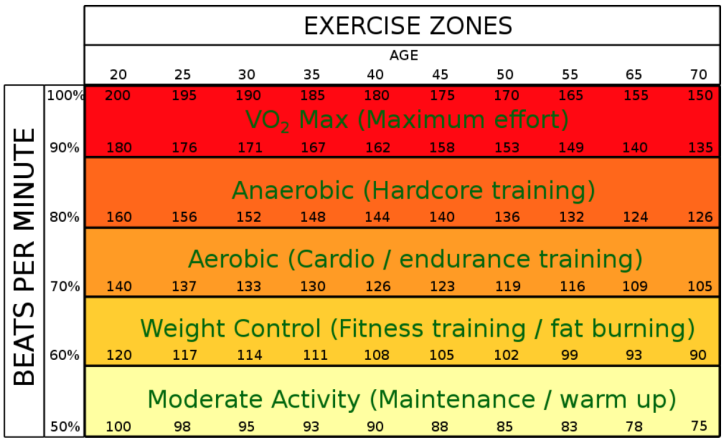
- 50% level: 170 x 0.50 = 85 bpm
- 70% level: 170 x 0.70 = 119 bpm
- 85% level: 170 x .85 = 145 bpm

Thus, moderate-intensity physical activity for a 50-year-old person will require that the heart rate remains between 85 and 119 bpm during physical activity. Vigorous intensity for a 50-year old adult would be a heart rate between 119 - 145 bpm.

Taking Your Heart Rate

Generally, to determine whether you are exercising within the heart rate target zone, you must stop exercising briefly to take your pulse. You can take the pulse at the neck, the wrist, or the chest. We recommend the wrist. You can feel the radial pulse on the artery of the wrist in line with the thumb. Place the tips of the index and middle fingers over the artery and press lightly. Do not use the thumb. Take a full 60-second count of the heartbeats, or take for 30 seconds and multiply by 2. Start the count on a beat, which is counted as “zero.” If this number falls between 85 and 119 bpm in the case of the 50-year-old person, he or she is active within the target range for moderate-intensity activity.

Find your Target Heart Rate Zone



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Strengthen Muscles

Do muscle-strengthening activities (such as lifting weights or using resistance bands) that are moderate or high intensity and involve all major muscle groups on 2 or more days a week.

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 a program of weight loss.

Muscle-strengthening activities make muscles do more work than they are accustomed to doing. That is, they overload the muscles. Resistance training, including weight training, is a familiar example of muscle-strengthening activity. Other examples include working with resistance bands, doing calisthenics that use body weight for resistance (such as push-ups, pull-ups, and sit-ups), carrying heavy loads, and heavy gardening (such as digging or hoeing).

Muscle-strengthening activities count if they involve a moderate to high 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.

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 without help. When resistance training is used to enhance muscle strength, one set of 8 to 12 repetitions of each exercise is effective, although two or three sets may be more effective. Development of muscle strength and endurance is progressive over time. Increases in the amount of weight or the days a week of exercising will result in stronger muscles.

Muscle-strengthening activity also 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
- **Repetitions,** or how many times a person lifts a weight (analogous to duration for aerobic activity). The effects of muscle-strengthening activity are limited to the muscles doing the work. It's 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 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.

Click here to view a summary

To review the key recommendations, as well as learn more about "what counts" as moderate or vigorous intensity aerobic activity, watch the videos below:

You Tube Video: Physical Activity Guidelines -- Introduction (https://youtu.be/nhECLmOznoM)

You Tube Video: Physical Activity Guidelines - What Counts As Aerobic? (https://www.youtube.com/watch?v=GEvJlmpZCoM)

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2.3: Developing a Personal Exercise Program

To help you follow the guidelines for physical activity use the FITT chart to design your weekly exercise routine. FITT stands for Frequency, Intensity, Time, and Type.

	CRE: cardiorespiratory endurance (Aerobic exercises)	MS/ME: Muscular strength /Endurance	FL: Flexibility
F (Frequency)	3-5 days/week	2-3 days/week	Most if not all days/week
I (Intensity)	Keep heart rate in the Target heart rate zone. 50-70% of HRmax for moderate intensity and 70-85% for vigorous intensity	Sufficient resistance to fatigue muscles. Ensure the last repetitions are difficult.	To the point of tension.
T (Time)	At least 10 minutes at a time and for a total of 2:30 hours/week of moderate activity or 1:15 minutes/week of vigorous activity.	For general fitness do 1-2 sets of 8-12 repetitions.	2-4 reps of each exercise held for 15-30 seconds
T (Type)	Continuous rhythmic activities that keep the heart rate elevated. Example: running, walking, swimming, cycling	Choose a strength training exercises that target all major muscle groups.	Stretching exercises that target all major muscle groups.

Make Physical Activity a Regular Part of the Day

Choose activities that you enjoy and can do regularly. Fitting activity into a daily routine can be easy — such as taking a brisk 10 minute walk to and from the parking lot, bus stop, or subway station. Or, join an exercise class. Keep it interesting by trying something different on alternate days. Every little bit adds up and doing something is better than doing nothing.

Be physically active at least 10 minutes at a time, because shorter bursts of activity will not have the same health benefits. For example, walk your dog for 10 minutes before and after work, and go for a 10-minute walk at lunchtime. That adds up to 30 minutes of moderate exercise for the day. If you don't have a dog to walk, then you could take a brisk 10-minute walk to and from the parking lot or bus stop before and after work or class.

Gradually Increase Your Level of Physical Activity

Inactive adults or those who don't yet do 150 minutes of physical activity a week 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. The good news is that "some is better than none."

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 (to ultimately meet the time and intensity guidelines).

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 level of effort (intensity) can be increased slightly until it becomes moderate to high.

Warm-up and Cool-down

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 activity 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. Stretching is often incorporated during the warm-up and cool-down, and is helpful for reducing the risk of injury, as well as improving flexibility.

Ways to Get Moving

- Many activities can be worked into your daily routine so that you don't have to go to the gym or an exercise class.
- Always be prepared. Keep a pair of walking or running shoes and some comfortable clothes readily available.
- Walk (briskly)! Do it in your neighborhood, find a local trail, or go to the mall and walk around before you shop. Walk during your lunch break, in between classes, or to do your errands. Take the stairs instead of the elevator. Park in the farthest parking spot and take an extended route to your classroom, office, or store.
- Make exercise a social event. Walk with friends, a family member, or even join a walking group to make it more fun. Take dancing lessons, or a Zumba class.
- Get a jump rope! Jumping rope is an inexpensive exercise that can be done anywhere.
- Add calisthenics (jumping jacks, push-ups, squats, crunches, etc.) to the mix for muscle strengthening.
- Participate in a sport such as tennis, softball, basketball or touch football. Play golf, but push or carry your golf bag rather than ride in a golf cart. Keep your activities interesting by trying something different on alternate days.
- Do household chores that increase your heart rate. Vacuuming, mopping, and sweeping can get your heart pumping. Mow the lawn with a push mower, garden/shovel, rake leaves, or wash and wax your car.
- Make exercise a family activity. Get outdoors and hike, ride bikes, skate, swim, go canoeing, kayaking, or just take a brisk walk together.

Achieving Target Levels of Physical Activity

Key Points:

- Going to the gym is NOT required for achieving the recommended guidelines
- Incorporating more brisk walking throughout the day can add up to reaching your goals – just be sure it occurs for at least 10 minutes at a time
- Getting started is the first important step – gradually work your way to the recommended levels

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CHAPTER OVERVIEW

3: NUTRITION

3.1: Nutrition Basics

What is your food made of?

Food provides the energy and nutrients you need to be healthy.

Nutrients include:

- protein
- carbohydrates
- fats
- vitamins
- minerals
- water

Energy of Food

When energy is used to describe the foods you consume, energy is referring to calories. Calories are what provides the body with the energy it needs to survive and stay healthy. Our body uses calories to breathe, think, and talk. We also use calories to exercise! The three categories of nutrients that provide us with calories, or energy, are Proteins, Carbohydrates, and Fats. If you were to go to McDonalds and eat a Big Mac you would be consuming 540 calories. How much of those calories come from Proteins, Carbohydrates, and Fats?

Protein

Protein is in every cell in the body. Our bodies need protein from the foods we eat to build and maintain bones, muscles and skin. We get proteins in our diet from meat, dairy products, nuts, and certain grains and beans. Proteins from meat and other animal products are complete proteins. This means they supply all of the amino acids the body can't make on its own. Most plant proteins are incomplete. You should eat different types of plant proteins every day to get all of the amino acids your body needs.

It is important to get enough dietary protein. You need to eat protein every day, because your body doesn't store it the way it stores fats or carbohydrates. How much you need depends on your age, sex, health, and level of physical activity. Most Americans eat enough protein in their diet.

Protein provides us with 4 calories per gram consumed. If you eat a Big Mac from McDonald's, it will provide you with 25 grams of protein. 25 grams of protein is equal to 100 calories, therefore 100 calories of the 540 total calories from a Big Mac come from proteins. Big Mac's are 19% protein.

Carbohydrates

Carbohydrates are one of the main types of nutrients. They are the most important source of energy for your body. Your digestive system changes carbohydrates into glucose (blood sugar). Your body uses this sugar for energy for your cells, tissues and organs. It stores any extra sugar in your liver and muscles for when it is needed.

Carbohydrates are called simple or complex, depending on their chemical structure. Simple carbohydrates include sugars found naturally in foods such as fruits, vegetables, milk, and milk products. They also include sugars added during food

processing and refining. Complex carbohydrates include whole grain breads and cereals, starchy vegetables and legumes. Many of the complex carbohydrates are good sources of fiber.

Fiber is commonly classified as soluble, which dissolves in water, or insoluble, which doesn't dissolve.

- **Soluble fiber.** This type of fiber dissolves in water to form a gel-like material. It can help lower blood cholesterol and glucose levels. Soluble fiber is found in oats, barley, nuts, seeds, beans, lentils, peas, and some fruits and vegetables.
- **Insoluble fiber.** This type of fiber promotes the movement of material through your digestive system and adds bulk to the stool, so it can be of benefit to those who struggle with constipation or irregular stools. Insoluble fiber is found in foods such as wheat bran, vegetables, and whole grains.

For a healthy diet, limit the amount of added sugar that you eat and choose whole grains over refined grains.

Carbohydrates provide us with 4 calories per gram consumed. If you eat a Big Mac from McDonald's, it will provide you with 46 grams of carbohydrates. 46 grams of protein is equal to 184 calories, therefore 184 calories of the 540 total calories from a Big Mac come from carbohydrates. Big Mac's are 34% carbohydrates.

Fats

We need a certain amount of fat in our diets to stay healthy. Fats provide needed energy in the form of calories. Fats help our bodies absorb important vitamins—called fat-soluble vitamins—including vitamins A, D and E. Fats also make foods more flavorful and help us feel full. Fats are especially important for infants and toddlers, because dietary fat contributes to proper growth and development.

Problems arise, though, if we eat too much fat. Dietary fats have more than twice as many calories per gram as either proteins or carbohydrates like sugar and starch. Excess calories, of course, can pack on the pounds and raise your risk for diabetes, cancer and other conditions.

Foods can contain a mixture of different fats. Unsaturated fats are considered "good" fats. They're sometimes listed as "monounsaturated" and "polyunsaturated" fat on Nutrition Facts labels. These can promote health if eaten in the right amounts. They are generally liquid at room temperature, and are known as oils. You'll find healthful unsaturated fats in fish, nuts and most vegetable oils, including canola, corn, olive and safflower oils.

The so-called "bad" fats are saturated fats and trans fats. They tend to be solid at room temperature. Solid fats include butter, meat fats, stick margarine, shortening, and coconut and palm oils. They're often found in chocolates, baked goods, and deep-fried and processed foods.

Fats provide us with 9 calories per gram consumed. If you eat a Big Mac from McDonald's, it will provide you with 28 grams of fats. 28 grams of fat is equal to 252 calories, therefore 252 calories of the 540 total calories from a Big Mac come from fats. Big Mac's are 47% fats.

Example: McDonald's Big Mac

540 total calories

- Proteins = 25 grams = 100 calories = 19%
- Carbohydrates = 46 grams = 184 calories = 34%
- Fats = 28 grams = 252 calories = 47%

**Note: Many times the total calories from breaking down the macronutrients will not match the total calories and this is due to rounding the numbers.*

We know the Big Mac provides us with a lot of Fat, but what kind of Fat is it? Is it good fat or bad fat? We can try to determine this by looking at the breakdown of Fats. The nutrition label tells us that 10 grams of the 28 grams comes from Saturated Fat and 1 grams comes from trans Fats.

Vitamins

Vitamins are substances that your body needs to grow and develop normally. There are 13 vitamins your body needs. They are:

- Vitamin A

- B vitamins (thiamine, riboflavin, niacin, pantothenic acid, biotin, vitamin B-6, vitamin B-12 and folate)
- Vitamin C
- Vitamin D
- Vitamin E
- Vitamin K

Vitamins are classified as either fat soluble (vitamins A, D, E and K) or water soluble (vitamins B and C). This difference between the two groups is very important as it determines how each vitamin acts within the body.

You can usually get all your vitamins from the foods you eat. Your body can also make vitamins D and K. People who eat a vegetarian diet may need to take a vitamin B12 supplement.

Each vitamin has specific jobs. If you have low levels of certain vitamins, you may get health problems. For example, if you don't get enough vitamin C, you could become anemic. Some vitamins may help prevent medical problems. Vitamin A prevents night blindness.

The best way to get enough vitamins is to eat a balanced diet with a variety of foods. In some cases, you may need to take vitamin supplements. It's a good idea to ask your healthcare provider first. High doses of some vitamins can cause problems.

Minerals

Minerals are important for your body to stay healthy. Your body uses minerals for many different jobs, including building bones, making hormones and regulating your heartbeat.
There are two kinds of minerals: macrominerals and trace minerals. Macrominerals are minerals your body needs in larger amounts. They include calcium, phosphorus, magnesium, sodium, potassium, chloride and sulfur. Your body needs just small amounts of trace minerals. These include iron, manganese, copper, iodine, zinc, cobalt, fluoride and selenium.

Water

Water is your body's principal chemical component and makes up about 60 percent of your body weight. Every system in your body depends on water. For example, water flushes toxins out of vital organs, carries nutrients to your cells, and provides a moist environment for ear, nose and throat tissues.

Lack of water can lead to dehydration, a condition that occurs when you don't have enough water in your body to carry out normal functions. Even mild dehydration can drain your energy and make you tired.

Every day you lose water through your breath, perspiration, urine and bowel movements. For your body to function properly, you must replenish its water supply by consuming beverages and foods that contain water.

What are Antioxidants?

Antioxidants are substances we consume that may help to reduce cell damage. Antioxidants may come from the foods we eat or from dietary supplements.

Examples of antioxidants include

- Beta-carotene
- Lutein
- Lycopene
- Selenium
- Vitamin A
- Vitamin C
- Vitamin E

Antioxidants may help to reduce cell damage caused by free radicals. **Free radicals** are highly unstable molecules that are naturally formed when you exercise and when your body converts food into energy. Free radicals have been shown to cause "oxidative stress" in the body thus damaging healthy cells. Although not conclusive, research shows that antioxidants work to reduce the chances of cellular damage. Because antioxidants help to reduce cell damage, it had been theorized that they in turn help to reduce chances of many diseases, including cancer.

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3.2: Dietary Guidelines for Americans

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.

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.

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

A healthy eating pattern includes:

- 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 (such as olive and canola oil)

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
- Consume less than 10 percent of calories per day from saturated fats
- Consume less than 2,300 milligrams (mg) per day of sodium
- 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

Implementation of the Dietary Guidelines Through Using MyPlate

MyPlate, MyWins

Click here to compare MyPlate to the Harvard Healthy Eating Plate.

Choose Nutrient Dense Foods!

To eat well, it's best to choose a mix of nutrient-dense foods every day. Nutrient-dense foods are foods that have a lot of nutrients but relatively few calories. Look for foods that contain vitamins, minerals, complex carbohydrates, lean protein, and healthy fats.

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3.3: Disease Risk and Nutrition

Nutrition and 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.

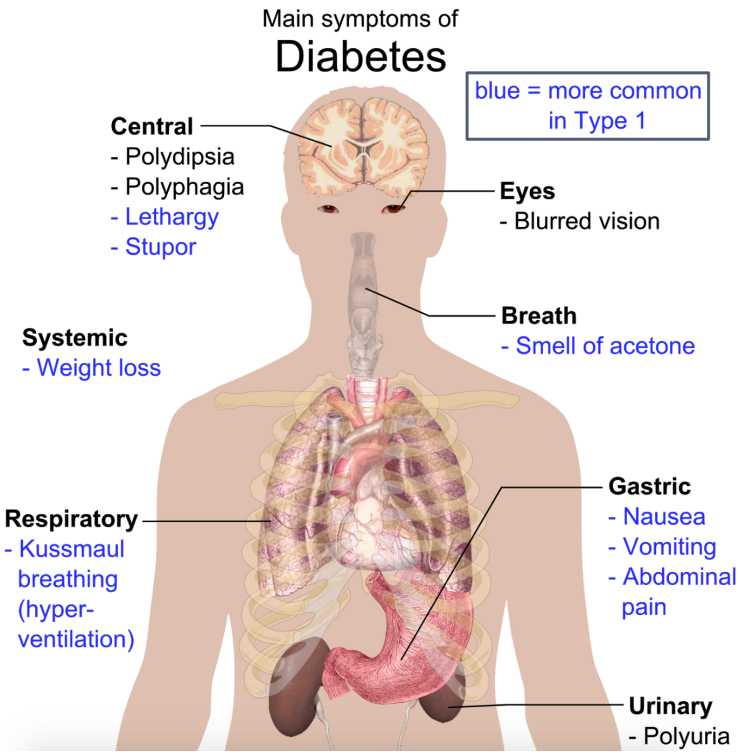
Type 2 Diabetes

Diabetes is a disease in which blood glucose levels are above normal. Most of the food we eat is turned into glucose, or sugar, for our bodies to use for energy. The pancreas, an organ that lies near the stomach, makes a hormone called insulin to help glucose get into the cells of our bodies. When you have diabetes, your body either doesn't make enough insulin or can't use its own insulin as well as it should. This causes sugar to build up in your blood.

Diabetes can cause serious health complications including heart disease, blindness, kidney failure, and lower-extremity amputations.

What is prediabetes?

Prediabetes is when the amount of glucose in your blood is above normal yet not high enough to be called diabetes. With prediabetes, your chances of getting type 2 diabetes, heart disease, and stroke are higher. With some weight loss and moderate physical activity, you can delay or prevent type 2 diabetes. You can even return to normal glucose levels, possibly without taking any medicines.



What are the signs and symptoms of diabetes?

The signs and symptoms of diabetes are:

- being very thirsty
- urinating often
- feeling very hungry
- feeling very tired
- losing weight without trying
- sores that heal slowly
- dry, itchy skin
- feelings of pins and needles in your feet
- losing feeling in your feet
- blurry eyesight

Some people with diabetes don't have any of these signs or symptoms. The only way to know if you have diabetes is to have your doctor do a blood test.
Click here to see a Snapshot of Diabetes in the United States.

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3.4: Nutrition Facts Label

Changes to the Nutrition Facts Label

On May 20, 2016, the FDA announced the new Nutrition Facts label for packaged foods to reflect new scientific information, including the link between diet and chronic diseases such as obesity and heart disease. The new label will make it easier for consumers to make better informed food choices. FDA published the final rules in the Federal Register on May 27, 2016.

Highlights of the Final Nutrition Facts Label

1. Features a Refreshed Design
   - The "iconic" look of the label remains, but we are making important updates to ensure consumers have access to the information they need to make informed decisions about the foods they eat. These changes include increasing the type size for "Calories," "servings per container," and the "Serving size" declaration, and bolding the number of calories and the "Serving size" declaration to highlight this information.
   - Manufacturers must declare the actual amount, in addition to percent Daily Value of vitamin D, calcium, iron and potassium. They can voluntarily declare the gram amount for other vitamins and minerals.
   - The footnote is changing to better explain what percent Daily Value means. It will read: "*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice."

2. Reflects Updated Information about Nutrition Science
   - "Added sugars," in grams and as percent Daily Value, will be included on the label. Scientific data shows that it is difficult to meet nutrient needs while staying within calorie limits if you consume more than 10 percent of your total daily calories from added sugar, and this is consistent with the 2015-2020 Dietary Guidelines for Americans.
   - The list of nutrients that are required or permitted to be declared is being updated. Vitamin D and potassium will be required on the label. Calcium and iron will continue to be required. Vitamins A and C will no longer be required but can be included on a voluntary basis.
   - While continuing to require "Total Fat," "Saturated Fat," and "Trans Fat" on the label, "Calories from Fat" is being removed because research shows the type of fat is more important than the amount.

- Daily values for nutrients like sodium, dietary fiber and vitamin D are being updated based on newer scientific evidence from the Institute of Medicine and other reports such as the 2015 Dietary Guidelines Advisory Committee Report, which was used in developing the 2015-2020 Dietary Guidelines for Americans. Daily values are reference amounts of nutrients to consume or not to exceed and are used to calculate the percent Daily Value (% DV) that manufacturers include on the label. The %DV helps consumers understand the nutrition information in the context of a total daily diet.

3. Updates Serving Sizes and Labeling Requirements for Certain Package Sizes

- By law, serving sizes must be based on amounts of foods and beverages that people are actually eating, not what they should be eating. How much people eat and drink has changed since the previous serving size requirements were published in 1993. For example, the reference amount used to set a serving of ice cream was previously ½ cup but is changing to â…” cup. The reference amount used to set a serving of soda is changing from 8 ounces to 12 ounces.
- Package size affects what people eat. So for packages that are between one and two servings, such as a 20 ounce soda or a 15-ounce can of soup, the calories and other nutrients will be required to be labeled as one serving because people typically consume it in one sitting.
- For certain products that are larger than a single serving but that could be consumed in one sitting or multiple sittings, manufacturers will have to provide “dual column” labels to indicate the amount of calories and nutrients on both a “per serving” and “per package”/“per unit” basis. Examples would be a 24-ounce bottle of soda or a pint of ice cream. With dual-column labels available, people will be able to easily understand how many calories and nutrients they are getting if they eat or drink the entire package/unit at one time.

Compliance Date

Manufacturers will need to use the new label by July 26, 2018. However, manufacturers with less than $10 million in annual food sales will have an additional year to comply.

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3.5: Organic Foods

Organic 101: What the USDA Organic Label Means

Amidst nutrition facts, ingredients lists, and dietary claims on food packages, “organic” might appear as one more piece of information to decipher when shopping for foods. So understanding what “organic” really means can help shoppers make informed choices during their next visit to the store or farmers’ market.

USDA certified organic foods are grown and processed according to federal guidelines addressing, among many factors, soil quality, animal raising practices, pest and weed control, and use of additives. Organic producers rely on natural substances and physical, mechanical, or biologically based farming methods to the fullest extent possible.

Produce can be called organic if it’s certified to have grown on soil that had no prohibited substances applied for three years prior to harvest. Prohibited substances include most synthetic fertilizers and pesticides. In instances when a grower has to use a synthetic substance to achieve a specific purpose, the substance must first be approved according to criteria that examine its effects on human health and the environment (see other considerations in “Organic 101: Allowed and Prohibited Substances”).

As for organic meat, regulations require that animals are raised in living conditions accommodating their natural behaviors (like the ability to graze on pasture), fed 100% organic feed and forage, and not administered antibiotics or hormones.
When it comes to processed, multi-ingredient foods, the USDA organic standards specify additional considerations. Regulations prohibit organically processed foods from containing artificial preservatives, colors, or flavors and require that their ingredients are organic, with some minor exceptions. For example, processed

organic foods may contain some approved non-agricultural ingredients, like enzymes in yogurt, pectin in fruit jams, or baking soda in baked goods.

When packaged products indicate they are “made with organic [specific ingredient or food group],” this means they contain at least 70% organically produced ingredients. The remaining non-organic ingredients are produced without using prohibited practices (genetic engineering, for example) but can include substances that would not otherwise be allowed in 100% organic products. “Made with organic” products will not bear the USDA organic seal, but, as with all other organic products, must still identify the USDA-accredited certifier. You can look for the identity of the certifier on a packaged product for verification that the organic product meets USDA’s organic standards.

As with all organic foods, none of it is grown or handled using genetically modified organisms, which the organic standards expressly prohibit (see “Organic 101: What Organic Farming (and Processing) Doesn’t Allow”).

Becoming familiar with the USDA organic label and understanding its claims empower consumers to make informed decisions about the food they purchase. While there are many marketing claims that add value to foods, consumers can be assured that USDA organic products are verified organic at all steps between the farm and the store.

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CHAPTER OVERVIEW

4: WEIGHT MANAGEMENT

4.1: Prevalence of Overweight and Obesity

Overweight and Obesity in the United States

According to data from the National Health and Nutrition Examination Survey (NHANES):

- About 1 in 3 adults were considered to be overweight.
- More than 2 in 3 adults were considered to be overweight or have obesity.
- More than 1 in 3 adults were considered to have obesity.
- About 1 in 13 adults were considered to have extreme obesity.
- About 1 in 6 children and adolescents ages 2 to 19 were considered to have obesity.

You Tube Video: The Obesity Epidemic (https://www.youtube.com/watch?time_continue=1&v=vCORDl4bqDE)

Worldwide Obesity Statistics from the World Health Organization

- Worldwide obesity has nearly tripled since 1975.
- In 2016, more than 1.9 billion adults, 18 years and older, were overweight. Of these over 650 million were obese.
- 39% of adults aged 18 years and over were overweight in 2016, and 13% were obese.
- Most of the world's population live in countries where overweight and obesity kills more people than underweight.
- 41 million children under the age of 5 were overweight or obese in 2016.
- Obesity is preventable.

Causes and Health Consequences of Overweight and Obesity

Factors that may contribute to weight gain among adults and youth include genes, eating habits, physical inactivity, TV, computer, phone, and other screen time, sleep habits, medical conditions or medications, and where and how people live, including their access to healthy foods and safe places to be active.

Overweight and obesity are risk factors for many health problems such as type 2 diabetes, high blood pressure, joint problems, and gallstones, among other conditions.
For more information on the causes and health consequences of overweight and obesity, please visit NIDDK's webpages on Understanding Adult Overweight and Obesity.

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- Video: The Obesity Epidemic. **Authored by**: Centers for Disease Control and Prevention. **Located at**: https://www.youtube.com/watch?v=vCORDl4bqDE. **License**: *Public Domain: No Known Copyright*

- Obesity and Overweight. **Authored by**: World Health Organization. **Provided by**: World Health organization. **Located at: http://www.who.int/mediacentre/factsheets/fs311/en/ License**: *Public Domain: No Known Copyright*

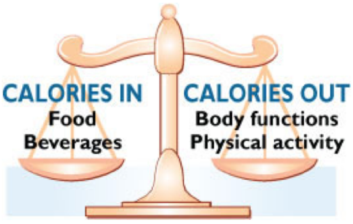
4.2: Balancing Calories

More than one third of U.S. adults are obese. Weight gain occurs when you consume more calories than your body uses. Reaching and maintaining a healthy weight will help you prevent and control many diseases and conditions. The key is "Finding a Balance" in your lifestyle that includes healthy eating and regular physical activity.

The Caloric Balance Equation

When it comes to maintaining a healthy weight for a lifetime, the bottom line is – calories count! Weight management is all about balance—balancing the number of calories you consume with the number of calories your body uses or "burns off."

- A calorie is defined as a unit of energy supplied by food. A calorie is a calorie regardless of its source. Whether you're eating carbohydrates, fats, sugars, or proteins, all of them contain calories.
- Caloric balance is like a scale. To remain in balance and maintain your body weight, the calories consumed (from foods) must be balanced by the calories used (in normal body functions, daily activities, and exercise).



If you are…	Your caloric balance status is…
Maintaining your weight	"in balance." You are eating roughly the same number of calories that your body is using. Your weight will remain stable.
Gaining weight	"in caloric excess." You are eating more calories than your body is using. You will store these extra calories as fat and you'll gain weight.
Losing weight	"in caloric deficit." You are eating fewer calories than you are using. Your body is pulling from its fat storage cells for energy, so your weight is decreasing.

Am I in Caloric Balance?

If you are maintaining your current body weight, you are in caloric balance. If you need to gain weight or to lose weight, you'll need to tip the balance scale in one direction or another to achieve your goal.

If you need to tip the balance scale in the direction of losing weight, keep in mind that it takes approximately 3,500 calories below your calorie needs to lose a pound of body fat. To lose about 1 to 2 pounds per week, you'll need to reduce your caloric intake by 500—1000 calories per day.

To learn how many calories you are currently eating, begin writing down the foods you eat and the beverages you drink each day. By writing down what you eat and drink, you become more aware of everything you are putting in your mouth. Also, begin writing down the physical activity you do each day and the length of time you do it. Here are simple paper and pencil tools to assist you:

- Food Diary[PDF-3KB]
- Physical Activity Diary[PDF-42KB]

Want to try an interactive approach evaluate your food intake and physical activity? Go to the SuperTracker. The site will give you a detailed assessment and analysis of your current eating and physical activity habits.

Physical activities (both daily activities and exercise) help tip the balance scale by increasing the calories you expend each day. For examples, go to How Many Calories Does Physical Activity Burn?

Find out how many calories your body needs to maintain, lose, or gain weight by clicking here.

The bottom line is… each person's body is unique and may have different caloric needs. A healthy lifestyle requires balance, in the foods you eat, in the beverages you consume, in the way you carry out your daily activities, and in the amount of physical activity or exercise you include in your daily routine. While counting calories is not necessary, it may help you in the beginning to gain an awareness of your eating habits as you strive to achieve energy balance. The ultimate test of balance is whether or not you are gaining, maintaining, or losing weight.

Research suggests that safe weight loss involves combining a reduced-calorie diet with physical activity to lose 1/2 to 2 pounds a week (after the first few weeks of weight loss). Make healthy food choices. Eat small portions. Build exercise into your daily life. Combined, these habits may be a healthy way to lose weight and keep it off. These habits may also lower your chances of developing heart disease, high blood pressure, and type 2 diabetes.

To review these key concepts, watch the video below:

YouTube: Finding Balance (https://www.youtube.com/watch?v=1DloJanE-OQ)

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- Finding a Balance. **Authored by**: Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion. **Provided by**: Centers for Disease Control and Prevention. **Located at**: https://www.cdc.gov/healthyweight/calories/. **License**: *Public Domain: No Known Copyright*
- Finding a Balance video. **Authored by**: Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion. **Provided by**: Centers for Disease Control and Prevention. **Located at**: https://www.cdc.gov/cdctv/healthyliving/healthyeating/finding-balance-obesity.html. **License**: *Public Domain: No Known Copyright*

4.3: Measuring Obesity

Body Mass Index (BMI)

What is BMI?

BMI is a person's weight in kilograms divided by the square of height in meters. BMI does not measure body fat directly, but research has shown that BMI is moderately correlated with more direct measures of body fat obtained from skinfold thickness measurements, bioelectrical impedance, densitometry (underwater weighing), dual energy x-ray absorptiometry (DXA) and other methods. Furthermore, BMI appears to be as strongly correlated with various metabolic and disease outcome as are these more direct measures of body fatness. In general, BMI is an inexpensive and easy-to-perform method of screening for weight category, for example underweight, normal or healthy weight, overweight, and obesity.

Adult BMI Calculator

How is BMI used?

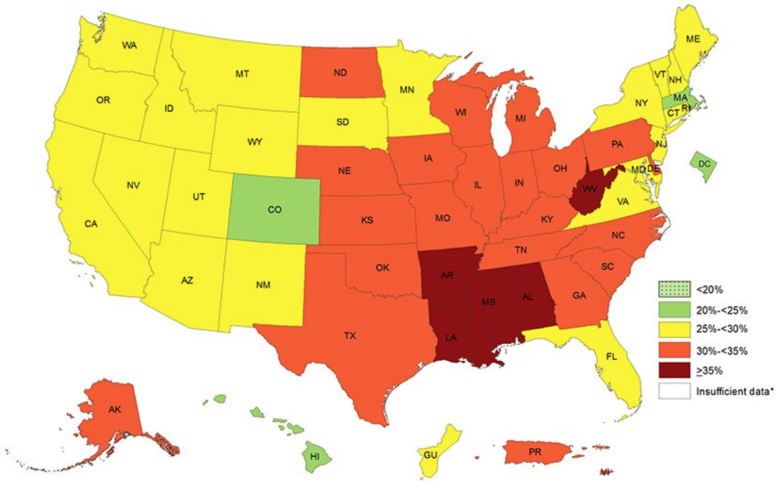
A high BMI can be an indicator of high body fatness. BMI can be used as a screening tool but is not diagnostic of the body fatness or health of an individual.

To determine if a high BMI is a health risk, a healthcare provider would need to perform further assessments. These assessments might include skinfold thickness measurements, evaluations of diet, physical activity, family history, and other appropriate health screenings.

What are the BMI trends for adults in the United States?

The prevalence of adult BMI greater than or equal to 30 kg/m2 (obese status) has greatly increased since the 1970s. Recently, however, this trend has leveled off, except for older women. Obesity has continued to increase in adult women who are age 60 years and older.

Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2016



Why is BMI used to measure overweight and obesity?

BMI can be used for population assessment of overweight and obesity. Because calculation requires only height and weight, it is inexpensive and easy to use for clinicians and for the general public. BMI can be used as a screening tool for body fatness but is not diagnostic.

To see the formula based on either kilograms and meters or pounds and inches, visit How is BMI calculated?

What are some of the other ways to assess excess body fatness besides BMI?

Other methods to measure body fatness include skinfold thickness measurements (with calipers), underwater weighing, bioelectrical impedance, dual-energy x-ray absorptiometry (DXA), and isotope dilution 1,2,3. However, these methods are not always readily available, and they are either expensive or need to be conducted by highly trained personnel.

Furthermore, many of these methods can be difficult to standardize across observers or machines, complicating comparisons across studies and time periods.

How is BMI interpreted for adults?

For adults 20 years old and older, BMI is interpreted using standard weight status categories. These categories are the same for men and women of all body types and ages.

The standard weight status categories associated with BMI ranges for adults are shown in the following table.

BMI	Weight Status
Below 18.5	Underweight
18.5 – 24.9	Normal or Healthy Weight
25.0 – 29.9	Overweight
30.0 and Above	Obese

For example, here are the weight ranges, the corresponding BMI ranges, and the weight status categories for a person who is 5′ 9″.

Height	Weight Range	BMI	Weight Status
5′ 9″	124 lbs or less	Below 18.5	Underweight
	125 lbs to 168 lbs	18.5 to 24.9	Normal or Healthy Weight
	169 lbs to 202 lbs	25.0 to 29.9	Overweight
	203 lbs or more	30 or higher	Obese

For children and teens, the interpretation of BMI depends upon age and sex.

For adults, the interpretation of BMI does not depend on sex or age.

How good is BMI as an indicator of body fatness?

The correlation between the BMI and body fatness is fairly strong, but even if 2 people have the same BMI, their level of body fatness may differ.

In general:

- At the same BMI, women tend to have more body fat than men.
- At the same BMI, Blacks have less body fat than do Whites, and Asians have more body fat than do Whites
- At the same BMI, older people, on average, tend to have more body fat than younger adults.
- At the same BMI, athletes have less body fat than do non-athletes.

The accuracy of BMI as an indicator of body fatness also appears to be higher in persons with higher levels of BMI and body fatness. While, a person with a very high BMI (e.g., 35 kg/m2) is very likely to have high body fat, a relatively high BMI can be the results of either high body fat or high lean body mass (muscle and bone). A trained healthcare provider should perform appropriate health assessments in order to evaluate an individual's health status and risks.

If an athlete or other person with a lot of muscle has a BMI over 25, is that person still considered to be overweight?

According to the BMI weight status categories, anyone with a BMI between 25 and 29.9 would be classified as overweight and anyone with a BMI over 30 would be classified as obese.

However, athletes may have a high BMI because of increased muscularity rather than increased body fatness. In general, a person who has a high BMI is likely to have body fatness and would be considered to be overweight or obese, but this may not apply to athletes. A trained healthcare provider should perform appropriate health assessments in order to evaluate an individual's health status and risks.

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- Body Mass Index. **Authored by**: Centers for Disease Control and Prevention. **Provided by**: U.S. Department of Health and Human Services. **Located at**: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html. **License**: *Public Domain: No Known Copyright*
- *Body Mass Index: Considerations for Practitioners. **Authored by**: Centers for Disease Control and Prevention. **Provided by**: U.S. Department of Health and Human Services. **Located at:** **https://www.cdc.gov/obesity/downloads/bmiforpactitioners.pdf** **License**: Public Domain: No Known Copyright*
- Map: Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory. **Authored by**: Centers for Disease Control and Prevention. **Located at**: https://www.cdc.gov/obesity/data/prevalence-maps.html. **License**: *Public Domain: No Known Copyright*

4.4: Health Effects of Overweight and Obesity

People who are overweight or obese, compared to those with a normal or healthy weight, are at increased risk for many serious diseases and health conditions. The more body fat that you have and the more you weigh, the more likely you are to develop:

- All causes of death (mortality)
- High blood pressure (Hypertension)
- High LDL cholesterol, low HDL cholesterol, or high levels of triglycerides (Dyslipidemia)
- Type 2 diabetes
- Coronary heart disease
- Stroke
- Gallbladder disease
- Osteoarthritis (a breakdown of cartilage and bone within a joint)
- Sleep apnea and breathing problems
- Some cancers (endometrial, breast, colon, kidney, gallbladder, and liver)
- Low quality of life
- Mental illness such as clinical depression, anxiety, and other mental disorders
- Body pain and difficulty with physical functioning

Your weight is the result of many factors. These factors include environment, family history and genetics, metabolism (the way your body changes food and oxygen into energy), behavior or habits, and more.

You can't change some factors, such as family history. However, you can change other factors, such as your lifestyle habits.

For example, follow a healthy eating plan and keep your calorie needs in mind. Be physically active and try to limit the amount of time that you're inactive.

As shown in the video below, it is important to remember that obesity happens one pound at a time, and even relatively small weight gains can negatively affect one's health and well-being.

You Tube: Obesity Happens One Pound at a Time (https://www.youtube.com/watch?v=9Y1MAN23FSQ)

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- The Health Effects of Overweight and Obesity. **Authored by**: Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion. **Provided by**: Centers for Disease Control and Prevention. **Located at**: https://www.cdc.gov/healthyweight/effects/index.html. **License**: *Public Domain: No Known Copyright*
- Obesity happens one pound at a time - Video. **Authored by**: National Heart, Lung, and Blood Institute. **Provided by**: National Institutes of Health. **Located at**: https://www.nhlbi.nih.gov/health/health-topics/topics/obe. **License**: *Public*

CHAPTER OVERVIEW

5: STRESS MANAGEMENT

5.1: Stress Overview

Stress — just the word may be enough to set your nerves on edge. Everyone feels stressed from time to time. Some people may cope with stress more effectively or recover from stressful events quicker than others. It's important to know your limits when it comes to stress to avoid more serious health effects.

What is stress?

Stress can be defined as the brain's response to any demand. Many things can trigger this response, including change. Changes can be positive or negative, as well as real or perceived. They may be recurring, short-term, or long-term and may include things like commuting to and from school or work every day, traveling for a yearly vacation, or moving to another home. Changes can be mild and relatively harmless, such as winning a race, watching a scary movie, or riding a rollercoaster. Some changes are major, such as marriage or divorce, serious illness, or a car accident. Other changes are extreme, such as exposure to violence, and can lead to traumatic stress reactions.

How does stress affect the body?

Not all stress is bad. All humans and animals have a stress response, which can be life-saving in some situations. The nerve chemicals and hormones released during stressful times prepares us to face a threat or flee to safety. When you face a dangerous situation, your pulse quickens, you breathe faster, your muscles tense, your brain uses more oxygen and increases activity—all functions aimed at survival.

However, with chronic stress, those same nerve chemicals that are life-saving in short bursts can suppress functions that aren't needed for immediate survival. Your immunity is lowered and your digestive, excretory, and reproductive systems stop working normally. Once the threat has passed, other body systems act to restore normal functioning. Problems occur if the stress response goes on too long, such as when the source of stress is constant, or if the response continues after the danger has subsided.

How does stress affect your overall health?

There are at least three different types of stress, all of which carry physical and mental health risks:

- Routine stress related to the pressures of work, family and other daily responsibilities.
- Stress brought about by a sudden negative change, such as losing a job, divorce, or illness.
- Traumatic stress, experienced in an event like a major accident, war, assault, or a natural disaster where one may be seriously hurt or in danger of being killed.

The body responds to each type of stress in similar ways. Different people may feel it in different ways. For example, some people experience mainly digestive symptoms, while others may have headaches, sleeplessness, depressed mood, anger and irritability. People under chronic stress are prone to more frequent and severe viral infections, such as the flu or common cold, and vaccines, such as the flu shot, are less effective for them.

Of all the types of stress, changes in health from routine stress may be hardest to notice at first. Because the source of stress tends to be more constant than in cases of acute or traumatic stress, the body gets no clear signal to return to normal functioning. Over time, continued strain on your body from routine stress may lead to serious health problems, such as heart disease, high blood pressure, diabetes, depression, anxiety disorder, and other illnesses.

How can I cope with stress?

The effects of stress tend to build up over time. Taking practical steps to maintain your health and outlook can reduce or prevent these effects. The following are some tips that may help you to cope with stress:

- Seek help from a qualified mental health care provider if you are overwhelmed, feel you cannot cope, have suicidal thoughts, or are using drugs or alcohol to cope.
- Get proper health care for existing or new health problems.
- Stay in touch with people who can provide emotional and other support. Ask for help from friends, family, or community organizations to reduce stress due to work burdens or family issues, such as caring for a loved one.
- Recognize signs of your body's response to stress, such as difficulty sleeping, increased alcohol and other substance use, being easily angered, feeling depressed, and having low energy.
- Set priorities – decide what must get done and what can wait, and learn to say no to new tasks if they are putting you into overload.
- Note what you have accomplished at the end of the day, not what you have been unable to do.
- Avoid dwelling on problems. If you can't do this on your own, seek help from a qualified mental health professional who can guide you.
- Exercise regularly – just 30 minutes per day of walking can help boost mood and reduce stress.
- Schedule regular times for healthy and relaxing activities.
- Explore stress coping programs, which may incorporate meditation, yoga, tai chi, or other related exercises.

If you or someone you know is overwhelmed by stress, ask for help from a health professional. If you or someone close to you is in crisis, call the toll-free, 24-hour National Suicide Prevention Lifeline at 1-800-273-TALK (1-800-273-8255).

Key Takeaway

We all have stress sometimes. For some people, it happens before having to speak in public. For other people, it might be before a first date. What causes stress for you may not be stressful for someone else. Sometimes stress is helpful—it can encourage you to meet a deadline or get things done. But feeling stressed for an extended amount of time can take a toll on your mental and physical health. Even though it may seem hard to find ways to de-stress with all the things you have to do, it's important to find those ways. Your health depends on it.

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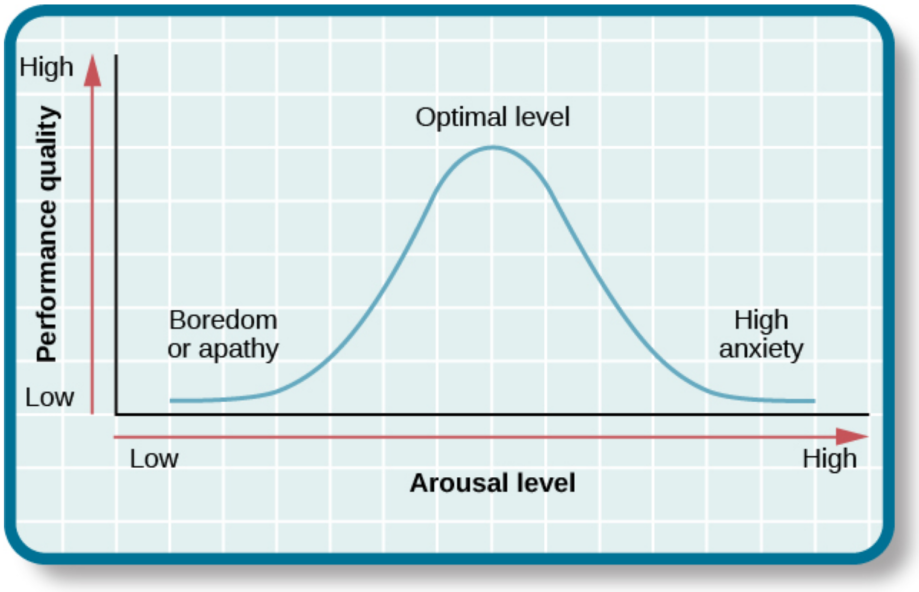
5.2: Yerkes-Dodson Law

Optimal Levels of Arousal (i.e. Stress)

Theories of learning assert that there is an optimal level of arousal (stress) that we all try to maintain. If we are under-aroused, we become bored and will seek out some sort of stimulation. On the other hand, if we are over-aroused, we will engage in behaviors to reduce our arousal/stress. Research shows that moderate arousal is generally best; when arousal (stress) is very high or very low, performance tends to suffer. The Yerkes–Dodson law is an empirical relationship between arousal and performance, originally developed by psychologists Robert M. Yerkes and John Dillingham Dodson in 1908. The law dictates that performance increases with physiological or mental arousal, but only up to a point. When levels of arousal become too high, performance decreases. The process is often illustrated graphically as a bell-shaped curve which increases and then decreases with higher levels of arousal.



Most students have experienced this need to maintain optimal levels of arousal (stress) over the course of their academic career. Think about how much stress students experience toward the end of spring semester—they feel overwhelmed with work and yearn for the rest and relaxation of summer break. Their arousal/stress level may be too high. Once they finish the semester, however, it doesn't take too long before they begin to feel bored; their arousal level is too low and their level of performance or productivity is also typically lower. Generally, by the time fall semester starts, many students are ready to return to school. This is an example of how arousal theory works.

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- Optimal Levels of Arousal. **Authored by**: Boundless. **Located at**: www.boundless.com/psychology...ion-251-12786/. **License**: *CC BY-SA: Attribution-ShareAlike*

5.3: The Stress Response

The **fight-or-flight response** (also called the stress response) is a physiological reaction that occurs in response to a perceived threat or danger. This enables the body to take action quickly, and is intended to keep us out of (physical) harm's way. Unfortunately for our health, this response also occurs when we are not in any immediate physical danger, but are still experiencing stress. For example, this can happen when someone is running late for an appointment or class, and is feeling stressed about trying to get there.

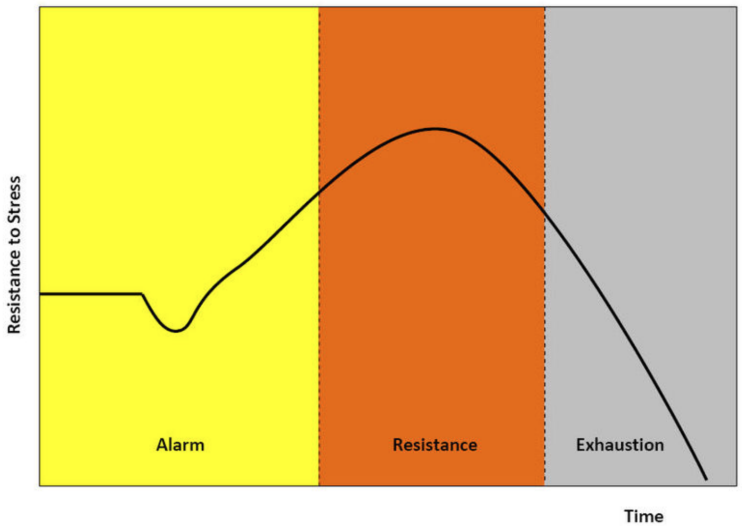
The physical changes that occur during this response can cause wear and tear within the body if the perception of stress persists. Here are a few examples of such bodily changes:

- Heart rate increases
- Blood pressure increases
- Blood sugar (i.e. glucose) levels rise
- Respiration rate increases
- Muscles tense up
- Perspiration increases
- Pupils dilate

For additional information about how these physiological changes occur, click here to read more.

The fight-or-flight response is also recognized as the first stage of the General Adaptation Syndrome.

General Adaptation Syndrome



Homeostasis is a state of physiological calmness or balance, and occurs when our bodily functions are running smoothly in conjunction with low stress levels. When exposed to stressors, this causes an imbalance to occur as the body responds to the perceived threat, and then tries to return to normal functioning.

The **general adaptation syndrome (GAS)**, developed by Hans Selye, describes the pattern of responses that the body goes through after being prompted by a stressor.

There are three stages: alarm, resistance, and exhaustion.

- **Alarm** – This occurs when we first perceive something as stressful, and then the body initiates the fight-or-flight response (as discussed earlier).
- **Resistance** – If the perceived stress continues, the body stays activated at a higher metabolic level in an effort to offset the persistent stress. The body cannot maintain this level indefinitely, and its resources will eventually deplete.
- **Exhaustion** – Prolonged exposure to the stressor will result in the depletion of the body's resources, and the resulting wear and tear will suppress the immune system and cause bodily functions to deteriorate. This can lead to a variety of

health issues and illnesses, including heart disease, digestive problems, depression, and diabetes.

These changes will occur in the body regardless of whether the perceived stressor is considered eustress (positive or pleasant) or distress (negative or unpleasant). Ultimately, this means that we need to take active steps in managing all of our stressors, as it can build up and potentially cause harm to our health otherwise.

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- Diagram of the General Adaptation Syndrome. **Authored by**: David G. Myers - Exploring Psychology 7th ed. (Worth) page 398. **Located at**: https://en.Wikipedia.org/wiki/Stress_(biology)#/media/File:General_Adaptation_Syndrome.jpg. **License**: *CC BY: Attribution*
- The Stress Response. **Authored by**: Boundless. **Located at**: www.boundless.com/physiology...onse-806-5244/. **License**: *CC BY-SA: Attribution-ShareAlike*

5.4: Health Effects of Stress

Stress is a feeling you get when faced with a challenge. In small doses, stress can be good for you because it makes you more alert and gives you a burst of energy. For instance, if you start to cross the street and see a car about to run you over, that jolt you feel helps you to jump out of the way before you get hit. But feeling stressed for a long time can take a toll on your mental and physical health. Even though it may seem hard to find ways to de-stress with all the things you have to do, it's important to find those ways. Your health depends on it.

What are the most common causes of stress?

Stress happens when people feel like they don't have the tools to manage all of the demands in their lives. Stress can be short-term or long-term. Missing the bus or arguing with your spouse or partner can cause short-term stress. Money problems or trouble at work can cause long-term stress. Even happy events, like having a baby or getting married can cause stress. Some of the most common stressful life events include:

- Death of a spouse
- Death of a close family member
- Divorce
- Losing your job
- Major personal illness or injury
- Marital separation
- Marriage
- Pregnancy
- Retirement
- Spending time in jail

What are some common signs of stress?

Everyone responds to stress a little differently. Your symptoms may be different from someone else's. Here are some of the signs to look for:

- Not eating or eating too much
- Feeling like you have no control
- Needing to have too much control
- Forgetfulness
- Headaches
- Lack of energy
- Lack of focus
- Trouble getting things done
- Poor self-esteem
- Short temper
- Trouble sleeping
- Upset stomach
- Back pain
- General aches and pains

These symptoms may also be signs of depression or anxiety, which can be caused by long-term stress.

Can stress affect my health?

The body responds to stress by releasing stress hormones. These hormones make blood pressure, heart rate, and blood sugar levels go up. Long-term stress can help cause a variety of health problems, including:

- Mental health disorders, like depression and anxiety
- Obesity
- Heart disease
- High blood pressure

- Abnormal heart beats
- Menstrual problems
- Acne and other skin problems

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- Stress and Your Health. **Authored by**: womenshealth.gov. **Provided by**: Office on Women's Health, U.S. Department of Health and Human Services. **Located at**: https://www.womenshealth.gov/publications/our-publications/fact-sheet/stress-your-health.html. **License**: *Public Domain: No Known Copyright*

5.5: Managing Stress

How can I help handle my stress?

Everyone has to deal with stress. There are steps you can take to help you handle stress in a positive way and keep it from making you sick. Try these tips to keep stress in check:

Develop a new attitude

- **Become a problem solver.** Make a list of the things that cause you stress. From your list, figure out which problems you can solve now and which are beyond your control for the moment. From your list of problems that you can solve now, start with the little ones. Learn how to calmly look at a problem, think of possible solutions, and take action to solve the problem. Being able to solve small problems will give you confidence to tackle the big ones. And feeling confident that you can solve problems will go a long way to helping you feel less stressed.
- **Be flexible.** Sometimes, it's not worth the stress to argue. Give in once in awhile or meet people halfway.
- **Get organized.** Think ahead about how you're going to spend your time. Write a to-do list. Figure out what's most important to do and do those things first.
- **Set limits.** When it comes to things like work and family, figure out what you can really do. There are only so many hours in the day. Set limits for yourself and others. Don't be afraid to say NO to requests for your time and energy.

Relax

- **Take deep breaths.** If you're feeling stressed, taking a few deep breaths makes you breathe slower and helps your muscles relax.
- **Stretch**. Stretching can also help relax your muscles and make you feel less tense.
- **Massage tense muscles**. Having someone massage the muscles in the back of your neck and upper back can help you feel less tense.
- **Take time to do something you want to do.** We all have lots of things that we have to do. But often we don't take the time to do the things that we really want to do. It could be listening to music, reading a good book, or going to a movie. Think of this as an order from your doctor, so you won't feel guilty!

Take care of your body

- **Get enough sleep.** Getting enough sleep helps you recover from the stresses of the day. Also, being well-rested helps you think better so that you are prepared to handle problems as they come up. Most adults need 7 to 9 hours of sleep a night to feel rested.
- **Eat right.** Try to fuel up with fruits, vegetables, beans, and whole grains. Don't be fooled by the jolt you get from caffeine or high-sugar snack foods. Your energy will wear off, and you could wind up feeling more tired than you did before.
- **Get moving.** Getting physical activity can not only help relax your tense muscles but improve your mood. Research shows that physical activity can help relieve symptoms of depression and anxiety.
- **Don't deal with stress in unhealthy ways.** This includes drinking too much alcohol, using drugs, smoking, or overeating.

Connect with others

- **Share your stress.** Talking about your problems with friends or family members can sometimes help you feel better. They might also help you see your problems in a new way and suggest solutions that you hadn't thought of.
- **Get help from a professional if you need it.** If you feel that you can no longer cope, talk to your doctor. She or he may suggest counseling to help you learn better ways to deal with stress. Your doctor may also prescribe medicines, such as antidepressants or sleep aids.
- **Help others.** Volunteering in your community can help you make new friends and feel better about yourself.

What Are Relaxation Techniques?

Relaxation techniques include a number of practices such as progressive relaxation, guided imagery, biofeedback, self-hypnosis, and deep breathing exercises. The goal is similar in all: to produce the body's natural relaxation response, characterized by slower breathing, lower blood pressure, and a feeling of increased well-being.

Meditation and practices that include meditation with movement, such as yoga and tai chi, can also promote relaxation. You can find additional information about these practices on the NCCIH web site.

What Is Meditation?

Meditation is a mind and body practice that has a long history of use for increasing calmness and physical relaxation, improving psychological balance, coping with illness, and enhancing overall health and well-being. Mind and body practices focus on the interactions among the brain, mind, body, and behavior.

There are many types of meditation, but most have four elements in common: a quiet location with as few distractions as possible; a specific, comfortable posture (sitting, lying down, walking, or in other positions); a focus of attention (a specially chosen word or set of words, an object, or the sensations of the breath); and an open attitude (letting distractions come and go naturally without judging them).

What the Science Says About the Effectiveness of Meditation

Many studies have investigated meditation for different conditions, and there's evidence that it may reduce blood pressure as well as symptoms of irritable bowel syndrome and flare-ups in people who have had ulcerative colitis. It may ease symptoms of anxiety and depression, and may help people with insomnia.

Note

No matter which techniques or strategies you select to help cope with stress more effectively, keep in mind that it takes time and effort to reap the benefits from them.

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CHAPTER OVERVIEW

6: EMOTIONAL AND MENTAL HEALTH

6.1: Mental Health Overview

What Is Mental Health?

Mental health includes our emotional, psychological, and social well-being. It affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make choices. Mental health is important at every stage of life, from childhood and adolescence through adulthood.

Over the course of your life, if you experience mental health problems, your thinking, mood, and behavior could be affected. Many factors contribute to mental health problems, including:

- Biological factors, such as genes or brain chemistry
- Life experiences, such as trauma or abuse
- Family history of mental health problems

Mental health problems are common but help is available. People with mental health problems can get better and many recover completely.

Early Warning Signs

Not sure if you or someone you know is living with mental health problems? Experiencing one or more of the following feelings or behaviors can be an early warning sign of a problem:

- Eating or sleeping too much or too little
- Pulling away from people and usual activities
- Having low or no energy
- Feeling numb or like nothing matters
- Having unexplained aches and pains
- Feeling helpless or hopeless
- Smoking, drinking, or using drugs more than usual
- Feeling unusually confused, forgetful, on edge, angry, upset, worried, or scared
- Yelling or fighting with family and friends
- Experiencing severe mood swings that cause problems in relationships
- Having persistent thoughts and memories you can’t get out of your head
- Hearing voices or believing things that are not true
- Thinking of harming yourself or others
- Inability to perform daily tasks like taking care of your kids or getting to work or school

Learn more about specific mental health problems and where to find help.

Mental Health and Wellness

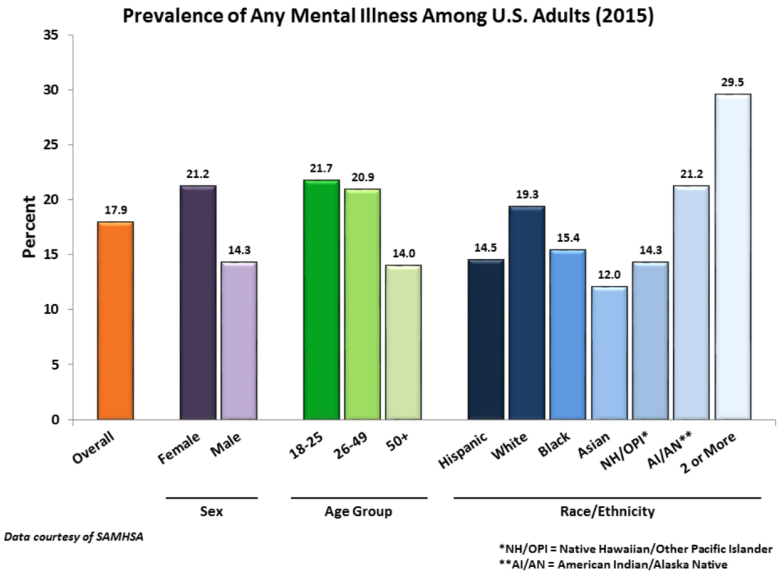
Positive mental health allows people to:

- Realize their full potential
- Cope with the stresses of life
- Work productively
- Make meaningful contributions to their communities

Ways to maintain positive mental health include:

- Getting professional help if you need it
- Connecting with others
- Staying positive
- Getting physically active
- Helping others
- Getting enough sleep
- Developing coping skills

Mental illnesses are common in the United States. In 2015, there were an estimated 43.4 million adults aged 18 or older in the United States with any mental illness (AMI) within the past year. This number represented 17.9% of all U.S. adults.



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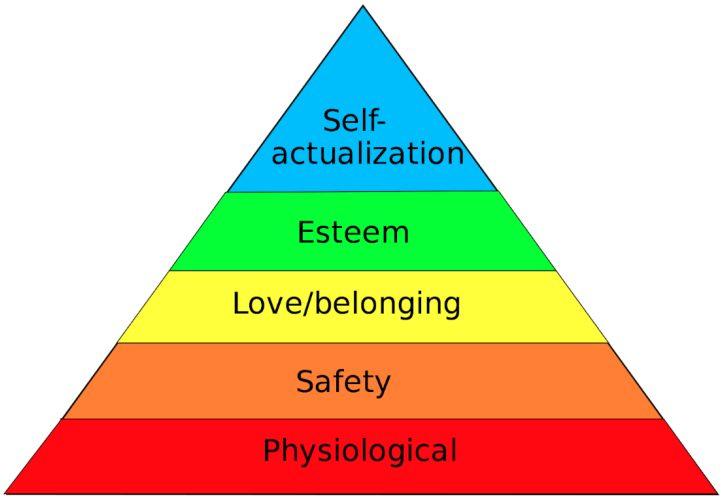
6.2: Psychological Constructs

Maslow's Hierarchy of Needs

- Maslow's hierarchy of needs is often portrayed in the shape of a pyramid, with the greatest and most fundamental levels of needs at the bottom, and the need for self-actualization at the top.
- The order of needs as categorized by Maslow are physiological; safety; love and belonging; esteem; and self-actualization.
- Maslow acknowledged that many different levels of motivation are likely to be present in a human all at once. His focus in discussing the hierarchy was to identify the basic types of motivation and the order that they generally progress as lower needs are reasonably well met.



Physiological Needs

Physiological needs are generally obvious because they are required for survival. If requirements are not met, the body cannot continue to function. Air, water, food, clothing, and shelter are the basic physiological needs.

Safety Needs

Once physical needs are satisfied, individual safety takes precedence. Safety and Security needs include:

- Personal and family safety
- Financial security
- Health and well-being

Love/belonging Needs

After physiological and safety needs are fulfilled, the third layer of human needs are interpersonal. This involves feelings of belongingness. Deficiencies in interpersonal needs, due to neglect, shunning, ostracism, etc., can impact an individual's ability to form and maintain emotionally significant relationships in general, such as:

- Friendship
- Intimacy
- Family

Humans need to feel a sense of belonging and acceptance, whether it comes from larger community affiliations or simply a few close friends. Without these connections, many people become susceptible to loneliness, social anxiety, and clinical depression. This need for belonging can sometimes overcome physiological and security needs. For example, an anorexic may ignore the need to eat and the security of health for a feeling of control and belonging.

Esteem

Esteem represents the normal human desire to be accepted and valued by others. People need to engage themselves to gain recognition and have an activity or activities that give the person a sense of contribution, to feel self-valued, be it in a profession or hobby. Imbalances at this level can result in low self-esteem or an inferiority complex. Many people with low self-esteem will not be able to improve their view of themselves simply by receiving fame, respect, and glory externally, but must first accept themselves internally. Psychological imbalances, such as depression, can prevent one from obtaining self-esteem on both levels.

Self-actualization

This level of need refers to what a person's full potential is and the realization of that potential. Maslow describes this level as the desire to accomplish everything that one can, to become the most that one can be. Individuals may perceive or focus on this need very specifically. For example, one individual may have the strong desire to become an ideal parent. In another, the desire may be expressed athletically. For others, it may be expressed in paintings, pictures, or inventions. Maslow believed that to acquire this level of need, the person must adequately achieve the previous needs.

Freud's Defense Mechanisms

Defense mechanisms are psychological mechanisms aimed at reducing anxiety. They were first discussed by Sigmund Freud as part of his psychoanalytic theory and further developed by his daughter, Anna Freud. Often unconscious, defense mechanisms are used to protect an individual from psychological pain or anxiety.

While such mechanisms may seem to be helpful in the short term, they can easily become a substitute for addressing the underlying cause and lead to additional problems. The solution, therefore, is to address the underlying causes of the pain these mechanisms are used to alleviate.

Here are a few examples:

Defense Mechanism	Description	Example
Repression	Unknowingly placing an unpleasant memory or thought in the conscious	Not remembering a traumatic event such as being sexually abused as a child.
Regression	Reverting back to an immature behavior from an earlier stage of development	Throwing temper tantrums as an adult when you don't get your way
Displacement	Redirecting feelings or actions from the intended source to a safer, substitute target	Taking your anger towards your boss out on family members by yelling at them in place of your boss.
Sublimation	Replacing socially unacceptable impulses with socially acceptable behavior	Channeling aggressiveness into playing football
Reaction formation	Overacting in the opposite way to one's true feelings.	Being overly protective of an unwanted child.
Projection	Attributing one's own unacceptable feelings and thoughts to others and not yourself	Accusing your boy/girlfriend of cheating on you because you have thoughts about cheating on him/her
Rationalization	Justifying actions, thoughts, or unwanted outcomes with excuses or faulty logic	Blaming the teaching style of a professor for why you failed an exam.

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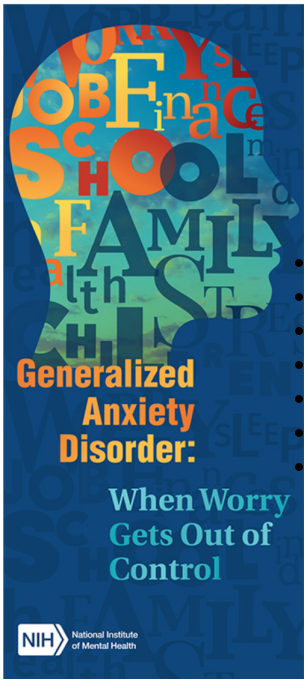
6.3: Anxiety Disorders

Occasional anxiety is a normal part of life. You might feel anxious when faced with a problem at work, before taking a test, or making an important decision. But anxiety disorders involve more than temporary worry or fear. For a person with an anxiety disorder, the anxiety does not go away and can get worse over time. The feelings can interfere with daily activities such as job performance, school work, and relationships. There are several different types of anxiety disorders. Examples include generalized anxiety disorder, panic disorder, and social anxiety disorder.

Signs and Symptoms



Generalized Anxiety Disorder

People with generalized anxiety disorder (GAD) display excessive anxiety or worry about everyday problems that lingers for months—even when there is little or no reason to worry about them. People with GAD find it difficult to control their anxiety and stay focused on daily tasks.

Generalized anxiety disorder symptoms include:

- Restlessness or feeling wound-up or on edge
- Being easily fatigued
- Difficulty concentrating or having their minds go blank
- Irritability
- Muscle tension
- Difficulty controlling the worry
- Sleep problems (difficulty falling or staying asleep or restless, unsatisfying sleep)

Excessive worry or anxiety about everyday issues that lasts for 6 months or more may indicate generalized anxiety disorder.

Panic Disorder

People with panic disorder have recurrent unexpected panic attacks, which are sudden periods of intense fear that may include palpitations, pounding heart, or accelerated heart rate; sweating; trembling or shaking; sensations of shortness of breath, smothering, or choking; and feeling of impending doom.

Panic disorder symptoms include:

- Sudden and repeated attacks of intense fear
- Feelings of being out of control during a panic attack
- Intense worries about when the next attack will happen
- Fear or avoidance of places where panic attacks have occurred in the past

Social Anxiety Disorder

People with social anxiety disorder (sometimes called “social phobia”) have a marked fear of social or performance situations in which they expect to feel embarrassed, judged, rejected, or fearful of offending others.

Social anxiety disorder symptoms include:

- Feeling highly anxious about being with other people and having a hard time talking to them
- Feeling very self-conscious in front of other people and worried about feeling humiliated, embarrassed, or rejected, or fearful of offending others
- Being very afraid that other people will judge them
- Worrying for days or weeks before an event where other people will be
- Staying away from places where there are other people
- Having a hard time making friends and keeping friends
- Blushing, sweating, or trembling around other people
- Feeling nauseous or sick to your stomach when other people are around

Evaluation for an anxiety disorder often begins with a visit to a primary care provider. Some physical health conditions, such as an overactive thyroid or low blood sugar, as well as taking certain medications, can imitate or worsen an anxiety disorder. A thorough mental health evaluation is also helpful, because anxiety disorders often co-exist with other related conditions, such as depression or obsessive-compulsive disorder.

Risk Factors

Researchers are finding that genetic and environmental factors, frequently in interaction with one another, are risk factors for anxiety disorders. Specific factors include:

- Shyness, or behavioral inhibition, in childhood
- Being female
- Having few economic resources
- Being divorced or widowed
- Exposure to stressful life events in childhood and adulthood
- Anxiety disorders in close biological relatives
- Parental history of mental disorders
- Elevated afternoon cortisol levels in the saliva (specifically for social anxiety disorder)

Treatments and Therapies

Anxiety disorders are generally treated with psychotherapy, medication, or both.

Psychotherapy

Psychotherapy or “talk therapy” can help people with anxiety disorders. To be effective, psychotherapy must be directed at the person’s specific anxieties and tailored to his or her needs. A typical “side effect” of psychotherapy is temporary discomfort involved with thinking about confronting feared situations.

Cognitive Behavioral Therapy (CBT)

CBT is a type of psychotherapy that can help people with anxiety disorders. It teaches a person different ways of thinking, behaving, and reacting to anxiety-producing and fearful situations. CBT can also help people learn and practice social skills, which is vital for treating social anxiety disorder.

Two specific stand-alone components of CBT used to treat social anxiety disorder are cognitive therapy and exposure therapy. Cognitive therapy focuses on identifying, challenging, and then neutralizing unhelpful thoughts underlying anxiety disorders.

Exposure therapy focuses on confronting the fears underlying an anxiety disorder in order to help people engage in activities they have been avoiding. Exposure therapy is used along with relaxation exercises and/or imagery. One study, called a meta-analysis because it pulls together all of the previous studies and calculates the statistical magnitude of the combined effects, found that cognitive therapy was superior to exposure therapy for treating social anxiety disorder.

CBT may be conducted individually or with a group of people who have similar problems. Group therapy is particularly effective for social anxiety disorder. Often “homework” is assigned for participants to complete between sessions.

Stress-Management Techniques

Stress management techniques and meditation can help people with anxiety disorders calm themselves and may enhance the effects of therapy. While there is evidence that aerobic exercise has a calming effect, the quality of the studies is not strong enough to support its use as treatment. Since caffeine, certain illicit drugs, and even some over-the-counter cold medications can aggravate the symptoms of anxiety disorders, avoiding them should be considered. Check with your physician or pharmacist before taking any additional medications.

The family can be important in the recovery of a person with an anxiety disorder. Ideally, the family should be supportive but not help perpetuate their loved one’s symptoms. Talking with a trusted friend or member of the clergy can also provide support, but it is not necessarily a sufficient alternative to care from an expert clinician.

Medication

Medication does not cure anxiety disorders but often relieves symptoms. Medication can only be prescribed by a medical doctor (such as a psychiatrist or a primary care provider), but a few states allow psychologists to prescribe psychiatric medications.

Medications are sometimes used as the initial treatment of an anxiety disorder, or are used only if there is insufficient response to a course of psychotherapy. In research studies, it is common for patients treated with a combination of psychotherapy and medication to have better outcomes than those treated with only one or the other.

The most common classes of medications used to combat anxiety disorders are antidepressants, anti-anxiety drugs, and beta-blockers (visit Mental Health Medications). Be aware that some medications are effective only if they are taken regularly and that symptoms may recur if the medication is stopped.

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6.4: Depression

Depression (major depressive disorder or clinical depression) is a common but serious mood disorder. It causes severe symptoms that affect how you feel, think, and handle daily activities, such as sleeping, eating, or working. To be diagnosed with depression, the symptoms must be present for at least two weeks. Some forms of depression are slightly different, or they may develop under unique circumstances, such as:

- **Persistent depressive disorder** (also called dysthymia) is a depressed mood that lasts for at least two years. A person diagnosed with persistent depressive disorder may have episodes of major depression along with periods of less severe symptoms, but symptoms must last for two years to be considered persistent depressive disorder.
- **Perinatal depression** is much more serious than the "baby blues" (relatively mild depressive and anxiety symptoms that typically clear within two weeks after delivery) that many women experience after giving birth. Women with perinatal depression experience full-blown major depression during pregnancy or after delivery (postpartum depression). The feelings of extreme sadness, anxiety, and exhaustion that accompany perinatal depression may make it difficult for these new mothers to complete daily care activities for themselves and/or for their babies. Perinatal depression can also include intense irritability and anger as well as thoughts of harming yourself or the baby (Mayo Clinic).
- **Psychotic depression** occurs when a person has severe depression plus some form of psychosis, such as having disturbing false fixed beliefs (delusions) or hearing or seeing upsetting things that others cannot hear or see (hallucinations). The psychotic symptoms typically have a depressive "theme," such as delusions of guilt, poverty, or illness.
- **Seasonal affective disorder** is characterized by the onset of depression during the winter months, when there is less natural sunlight. This depression generally lifts during spring and summer. Winter depression, typically accompanied by social withdrawal, increased sleep, and weight gain, predictably returns every year in seasonal affective disorder.
- **Bipolar disorder** is different from depression, but it is included in this list is because someone with bipolar disorder experiences episodes of extremely low moods that meet the criteria for major depression (called "bipolar depression"). But a person with bipolar disorder also experiences extreme high – euphoric or irritable – moods called "mania" or a less severe form called "hypomania."

Signs and Symptoms

If you have been experiencing some of the following signs and symptoms most of the day, nearly every day, for at least two weeks, you may be suffering from depression:

- Persistent sad, anxious, or "empty" mood
- Feelings of hopelessness, or pessimism
- Irritability
- Feelings of guilt, worthlessness, or helplessness
- Loss of interest or pleasure in hobbies and activities
- Decreased energy or fatigue
- Moving or talking more slowly
- Feeling restless or having trouble sitting still
- Difficulty concentrating, remembering, or making decisions
- Difficulty sleeping, early-morning awakening, or oversleeping
- Appetite and/or weight changes
- Thoughts of death or suicide, or suicide attempts
- Aches or pains, headaches, cramps, or digestive problems without a clear physical cause and/or that do not ease even with treatment

Not everyone who is depressed experiences every symptom. Some people experience only a few symptoms while others may experience many. Several persistent symptoms in addition to low mood are required for a diagnosis of major depression, but people with only a few – but distressing – symptoms may benefit from treatment of their "subsyndromal" depression. The severity and frequency of symptoms and how long they last will vary depending on the individual and his or her particular illness. Symptoms may also vary depending on the stage of the illness.

Risk Factors

Depression is one of the most common mental disorders in the U.S. Current research suggests that depression is caused by a combination of genetic, biological, environmental, and psychological factors.

Depression can happen at any age, but often begins in adulthood. Depression is now recognized as occurring in children and adolescents, although it sometimes presents with more prominent irritability than low mood. Many chronic mood and anxiety disorders in adults begin as high levels of anxiety in children.

Depression, especially in midlife or older adults, can co-occur with other serious medical illnesses, such as diabetes, cancer, heart disease, and Parkinson's disease. These conditions are often worse when depression is present. Sometimes medications taken for these physical illnesses may cause side effects that contribute to depression. A doctor experienced in treating these complicated illnesses can help work out the best treatment strategy.

Risk factors include:

- Personal or family history of depression
- Major life changes, trauma, or stress
- Certain physical illnesses and medications

Treatment and Therapies

Depression, even the most severe cases, can be treated. The earlier that treatment can begin, the more effective it is. Depression is usually treated with medications, psychotherapy, or a combination of the two. If these treatments do not reduce symptoms, electroconvulsive therapy (ECT) and other brain stimulation therapies may be options to explore.

Quick Tip: No two people are affected the same way by depression and there is no "one-size-fits-all" for treatment. It may take some trial and error to find the treatment that works best for you.

Please Note: In some cases, children, teenagers, and young adults under 25 may experience an increase in suicidal thoughts or behavior when taking antidepressants, especially in the first few weeks after starting or when the dose is changed. This warning (referred to as a Black Box warning) from the U.S. Food and Drug Administration (FDA) also says that patients of all ages taking antidepressants should be watched closely, especially during the first few weeks of treatment.

Beyond Treatment: Things You Can Do

Here are other tips that may help you or a loved one during treatment for depression:

- Try to be active and exercise.
- Set realistic goals for yourself.
- Try to spend time with other people and confide in a trusted friend or relative.
- Try not to isolate yourself, and let others help you.
- Expect your mood to improve gradually, not immediately.
- Postpone important decisions, such as getting married or divorced, or changing jobs until you feel better. Discuss decisions with others who know you well and have a more objective view of your situation.
- Continue to educate yourself about depression.

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6.5: Suicide Prevention

If You Know Someone in Crisis

Call the toll-free National Suicide Prevention Lifeline at 1-800-273-TALK (8255), 24 hours a day, 7 days a week. The service is available to everyone. The deaf and hard of hearing can contact the Lifeline via TTY at 1-800-799-4889. All calls are confidential.

Introduction

Suicide is a major public health concern. Over 40,000 people die by suicide each year in the United States. Suicide is complicated and tragic but it is often preventable. Knowing the warning signs for suicide and how to get help can help save lives.

Signs and Symptoms

The behaviors listed below may be signs that someone is thinking about suicide:

- Talking about wanting to die or wanting to kill themselves
- Talking about feeling empty, hopeless, or having no reason to live
- Making a plan or looking for a way to kill themselves, such as searching online, stockpiling pills, or buying a gun
- Talking about great guilt or shame
- Talking about feeling trapped or feeling that there are no solutions
- Feeling unbearable pain (emotional pain or physical pain)
- Talking about being a burden to others
- Using alcohol or drugs more often
- Acting anxious or agitated
- Withdrawing from family and friends
- Changing eating and/or sleeping habits
- Showing rage or talking about seeking revenge
- Taking great risks that could lead to death, such as driving extremely fast
- Talking or thinking about death often
- Displaying extreme mood swings, suddenly changing from very sad to very calm or happy
- Giving away important possessions
- Saying goodbye to friends and family
- Putting affairs in order, making a will

Risk Factors

Suicide does not discriminate. People of all genders, ages, and ethnicities can be at risk. Suicidal behavior is complex and there is no single cause. In fact, many different factors contribute to someone making a suicide attempt. But people most at risk tend to share certain characteristics. The main risk factors for suicide are:

- Depression, other mental disorders, or substance abuse disorder
- Certain medical conditions
- Chronic pain
- A prior suicide attempt
- Family history of a mental disorder or substance abuse
- Family history of suicide
- Family violence, including physical or sexual abuse
- Having guns or other firearms in the home

- Having recently been released from prison or jail
- Being exposed to others' suicidal behavior, such as that of family members, peers, or celebrities

Many people have some of these risk factors but do not attempt suicide. It is important to note that suicide is not a normal response to stress. Suicidal thoughts or actions are a sign of extreme distress, not a harmless bid for attention, and should not be ignored.

Do gender and age affect suicide risk?

Men are more likely to die by suicide than women, but women are more likely to attempt suicide. Men are more likely to use deadlier methods, such as firearms or suffocation. Women are more likely than men to attempt suicide by poisoning. The most recent figures released by the CDC show that the highest rate of suicide deaths among women is found between ages 45 and 64, while the highest rate for men occurs at ages 75+. Children and young adults also are at risk for suicide. Suicide is the second leading cause of death for young people ages 15 to 34.

What about different racial/ethnic groups?

The CDC reports that among racial and ethnic groups, American Indians and Alaska Natives tend to have the highest rate of suicides, followed by non-Hispanic Whites. African Americans tend to have the lowest suicide rate, while Hispanics tend to have the second lowest rate.

5 Action Steps for Helping Someone in Emotional Pain

1. Ask: "Are you thinking about killing yourself?" It's not an easy question but studies show that asking at-risk individuals if they are suicidal does not increase suicides or suicidal thoughts.
2. Keep them safe: Reducing a suicidal person's access to highly lethal items or places is an important part of suicide prevention. While this is not always easy, asking if the at-risk person has a plan and removing or disabling the lethal means can make a difference.
3. Be there: Listen carefully and learn what the individual is thinking and feeling. Findings suggest acknowledging and talking about suicide may in fact reduce rather than increase suicidal thoughts.
4. Help them connect: Save the National Suicide Prevention Lifeline's number in your phone so it's there when you need it: 1-800-8255 (TALK). You can also help make a connection with a trusted individual like a family member, friend, spiritual advisor, or mental health professional.
5. Stay Connected: Staying in touch after a crisis or after being discharged from care can make a difference. Studies have shown the number of suicide deaths goes down when someone follows up with the at-risk person.

Treatments and Therapies

Research has shown that there are multiple risk factors for suicide and that these factors may vary with age, gender, physical and mental well-being, and with individual experiences. Treatments and therapies for people with suicidal thoughts or actions will vary as well. NIMH has focused research on strategies that have worked well for mental health conditions related to suicide such as depression and anxiety.

Psychotherapies

Multiple types of psychosocial interventions have been found to be beneficial for individuals who have attempted suicide. These types of interventions may prevent someone from making another attempt. Psychotherapy, or "talk therapy," is one type of psychosocial intervention and can effectively reduce suicide risk.

One type of psychotherapy is called cognitive behavioral therapy (CBT). CBT can help people learn new ways of dealing with stressful experiences through training. CBT helps individuals recognize their own thought patterns and consider alternative actions when thoughts of suicide arise.

Another type of psychotherapy, called dialectical behavior therapy (DBT), has been shown to reduce the rate of suicide among people with borderline personality disorder, a serious mental illness characterized by unstable moods, relationships, self-image, and behavior. A therapist trained in DBT helps a person recognize when his or her feelings or actions are disruptive or unhealthy, and teaches the skills needed to deal better with upsetting situations.

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6.6: Eating Disorders

What are eating disorders?

The eating disorders anorexia nervosa, bulimia nervosa, and binge-eating disorder, and their variants, all feature serious disturbances in eating behavior and weight regulation. They are associated with a wide range of adverse psychological, physical, and social consequences. A person with an eating disorder may start out just eating smaller or larger amounts of food, but at some point, their urge to eat less or more spirals out of control. Severe distress or concern about body weight or shape, or extreme efforts to manage weight or food intake, also may characterize an eating disorder.

Eating disorders are real, treatable medical illnesses. They frequently coexist with other illnesses such as depression, substance abuse, or anxiety disorders. Other symptoms can become life-threatening if a person does not receive treatment, which is reflected by anorexia being associated with the highest mortality rate of any psychiatric disorder.

Eating disorders affect both genders, although rates among women and girls are 2½ times greater than among men and boys. Eating disorders frequently appear during the teen years or young adulthood but also may develop during childhood or later in life.

What are the different types of eating disorders?

Anorexia nervosa

Many people with anorexia nervosa see themselves as overweight, even when they are clearly underweight. Eating, food, and weight control become obsessions. People with anorexia nervosa typically weigh themselves repeatedly, portion food carefully, and eat very small quantities of only certain foods. Some people with anorexia nervosa also may engage in binge eating followed by extreme dieting, excessive exercise, self-induced vomiting, or misuse of laxatives, diuretics, or enemas.

Symptoms of anorexia nervosa

- Extremely low body weight
- Severe food restriction
- Relentless pursuit of thinness and unwillingness to maintain a normal or healthy weight
- Intense fear of gaining weight
- Distorted body image and self-esteem that is heavily influenced by perceptions of body weight and shape, or a denial of the seriousness of low body weight
- Lack of menstruation among girls and women.

Some who have anorexia nervosa recover with treatment after only one episode. Others get well but have relapses. Still others have a more chronic, or long-lasting, form of anorexia nervosa, in which their health declines as they battle the illness.

Other symptoms and medical complications may develop over time, including:

- Thinning of the bones (osteopenia or osteoporosis)
- Brittle hair and nails
- Dry and yellowish skin
- Growth of fine hair all over the body (lanugo)
- Mild anemia, muscle wasting, and weakness
- Severe constipation
- Low blood pressure, or slowed breathing and pulse
- Damage to the structure and function of the heart
- Brain damage
- Multi-organ failure
- Drop in internal body temperature, causing a person to feel cold all the time
- Lethargy, sluggishness, or feeling tired all the time
- Infertility.

Bulimia nervosa

People with bulimia nervosa have recurrent and frequent episodes of eating unusually large amounts of food and feel a lack of control over these episodes. This binge eating is followed by behavior that compensates for the overeating such as forced vomiting, excessive use of laxatives or diuretics, fasting, excessive exercise, or a combination of these behaviors.

Unlike anorexia nervosa, people with bulimia nervosa usually maintain what is considered a healthy or normal weight, while some are slightly overweight. But like people with anorexia nervosa, they often fear gaining weight, want desperately to lose weight, and are intensely unhappy with their body size and shape. Usually, bulimic behavior is done secretly because it is often accompanied by feelings of disgust or shame. The binge eating and purging cycle can happen anywhere from several times a week to many times a day.

Other symptoms include:

- Chronically inflamed and sore throat
- Swollen salivary glands in the neck and jaw area
- Worn tooth enamel, and increasingly sensitive and decaying teeth as a result of exposure to stomach acid
- Acid reflux disorder and other gastrointestinal problems
- Intestinal distress and irritation from laxative abuse
- Severe dehydration from purging of fluids
- Electrolyte imbalance—too low or too high levels of sodium, calcium, potassium, and other minerals that can lead to a heart attack or stroke.

Binge-eating disorder

People with binge-eating disorder lose control over their eating. Unlike bulimia nervosa, periods of binge eating are not followed by compensatory behaviors like purging, excessive exercise, or fasting. As a result, people with binge-eating disorder often are overweight or obese. People with binge-eating disorder who are obese are at higher risk for developing cardiovascular disease and high blood pressure. They also experience guilt, shame, and distress about their binge eating, which can lead to more binge eating.

How are eating disorders treated?

Typical treatment goals include restoring adequate nutrition, bringing weight to a healthy level, reducing excessive exercise, and stopping binging and purging behaviors. Specific forms of psychotherapy, or talk therapy—including a family-based therapy called the Maudsley approach and cognitive behavioral approaches—have been shown to be useful for treating specific eating disorders. Evidence also suggests that antidepressant medications approved by the U.S. Food and Drug Administration may help for bulimia nervosa and also may be effective for treating co-occurring anxiety or depression for other eating disorders.

Treatment plans often are tailored to individual needs and may include one or more of the following:

- Individual, group, or family psychotherapy
- Medical care and monitoring
- Nutritional counseling
- Medications (for example, antidepressants).

Some patients also may need to be hospitalized to treat problems caused by malnutrition or to ensure they eat enough if they are very underweight. Complete recovery is possible.

For information about additional mental health topics, go to the National Institute of Mental Health

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CHAPTER OVERVIEW

7: ALCOHOL AND TOBACCO

7.1: Alcohol Facts

What is a “drink”?

In the United States, a standard drink contains 0.6 ounces (14.0 grams or 1.2 tablespoons) of pure alcohol. Generally, this amount of pure alcohol is found in:

- 12-ounces of beer (5% alcohol content).
- 8-ounces of malt liquor (7% alcohol content).
- 5-ounces of wine (12% alcohol content).
- 1.5-ounces of 80-proof (40% alcohol content) distilled spirits or liquor (e.g., gin, rum, vodka, whiskey).

What is excessive drinking?

Excessive drinking includes binge drinking, heavy drinking, and any drinking by pregnant women or people younger than age 21.

- Binge drinking, the most common form of excessive drinking, is defined as consuming:
  - For women, 4 or more drinks during a single occasion.
  - For men, 5 or more drinks during a single occasion.
- Heavy drinking is defined as consuming:
  - For women, 8 or more drinks per week.
  - For men, 15 or more drinks per week.

Most people who drink excessively are not alcoholics or alcohol dependent.

Blood Alcohol Concentration (BAC) – Differences Between Women and Men

- Women have less of a particular enzyme (gastric alcohol dehydrogenase) than men do that breaks down alcohol in the stomach. As a result, more alcohol is absorbed within a woman’s body and leads to a higher BAC than in men.
- In general, women have less body water than men resulting in a higher BAC for women.
- In general, men have a greater ratio of muscle to fat than do women. Muscle has a large amount of blood that flows through the muscle tissue. Fat has a much smaller amount of blood. The functional difference this makes is that alcohol is more diluted in a man’s body due to this larger volume of blood. Since women tend to have a higher percentage of body fat than men, this results in a higher BAC level for women compared to men.

What is moderate drinking?

The Dietary Guidelines for Americans defines moderate drinking as up to 1 drink per day for women and up to 2 drinks per day for men. In addition, the Dietary Guidelines do not recommend that individuals who do not drink alcohol start drinking for any reason.

However, there are some people who should not drink any alcohol, including those who are:

- Younger than age 21.
- Pregnant or may be pregnant.
- Driving, planning to drive, or participating in other activities requiring skill, coordination, and alertness.
- Taking certain prescription or over-the-counter medications that can interact with alcohol.
- Suffering from certain medical conditions.
- Recovering from alcoholism or are unable to control the amount they drink.

By adhering to the Dietary Guidelines, you can reduce the risk of harm to yourself or others.

Short-Term Health Risks

Excessive alcohol use has immediate effects that increase the risk of many harmful health conditions. These are most often the result of binge drinking and include the following:

- Injuries, such as motor vehicle crashes, falls, drownings, and burns.

- Violence, including homicide, suicide, sexual assault, and intimate partner violence.
- Alcohol poisoning, a medical emergency that results from high blood alcohol levels.
- Risky sexual behaviors, including unprotected sex or sex with multiple partners. These behaviors can result in unintended pregnancy or sexually transmitted diseases, including HIV.
- Miscarriage and stillbirth or fetal alcohol spectrum disorders (FASDs) among pregnant women.

Long-Term Health Risks

Over time, excessive alcohol use can lead to the development of chronic diseases and other serious problems including:

- High blood pressure, heart disease, stroke, liver disease, and digestive problems.
- Cancer of the breast, mouth, throat, esophagus, liver, and colon.
- Learning and memory problems, including dementia and poor school performance.
- Mental health problems, including depression and anxiety.
- Social problems, including lost productivity, family problems, and unemployment.
- Alcohol dependence, or alcoholism.

By not drinking too much, you can reduce the risk of these short- and long-term health risks.

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7.2: Health Effects of Alcohol Abuse

Drinking too much – on a single occasion or over time – can take a serious toll on your health. Here's how alcohol can affect your body:

Brain:

Alcohol interferes with the brain's communication pathways, and can affect the way the brain looks and works. These disruptions can change mood and behavior, and make it harder to think clearly and move with coordination.

Heart:

Drinking a lot over a long time or too much on a single occasion can damage the heart, causing problems including:

- Cardiomyopathy – Impaired ability of the heart to deliver blood to the body, can lead to heart failure
- Arrhythmias – Irregular heart beat
- Stroke
- High blood pressure

Liver:

Heavy drinking takes a toll on the liver, and can lead to a variety of problems and liver inflammations including:

- Steatosis, or fatty liver
- Alcoholic hepatitis
- Fibrosis
- Cirrhosis

Pancreas:

Alcohol causes the pancreas to produce toxic substances that can eventually lead to pancreatitis, a dangerous inflammation and swelling of the blood vessels in the pancreas that prevents proper digestion.

Cancer:

Drinking too much alcohol can increase your risk of developing certain cancers, including cancers of the:

- Mouth
- Esophagus
- Throat
- Liver
- Breast

Immune System:

Drinking too much can weaken your immune system, making your body a much easier target for disease. Chronic drinkers are more liable to contract diseases like pneumonia and tuberculosis than people who do not drink too much. Drinking a lot on a single occasion slows your body's ability to ward off infections – even up to 24 hours after getting drunk.

Learn more about alcohol's effects on the body.

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7.3: Rethinking Drinking

Why is being able to “hold your liquor” a concern?

For some people, it takes quite a few drinks to get a buzz or feel relaxed. Often they are unaware that being able to “hold your liquor” isn’t protection from alcohol problems, but instead a reason for caution. They tend to drink more, socialize with people who drink a lot, and develop a tolerance to alcohol. As a result, they have an increased risk for developing alcohol use disorder. The higher alcohol levels can also harm the liver, heart, and brain without the person drinking noticing until it’s too late. And all people who drink need to be aware that even moderate amounts of alcohol can significantly impair driving performance, even when they don’t feel a buzz from drinking.

Why are women’s low-risk limits different from men’s?

Research shows that women start to have alcohol-related problems at lower drinking levels than men do. One reason is that, on average, women weigh less than men. In addition, alcohol disperses in body water, and pound for pound, women have less water in their bodies than men do. So after a man and woman of the same weight drink the same amount of alcohol, the woman’s blood alcohol concentration will tend to be higher, putting her at greater risk for harm. For more information, see Alcohol: A Women’s Health Issue.

Isn’t drinking good for the heart?

For some people, the answer can be “yes,” depending on the amount. Regular light to moderate drinking can lower the risk for coronary heart disease, mainly among middle-aged and older adults (other factors also cut the risk, including a healthy diet and weight, exercise, and not smoking). Heavy drinking can actually increase blood pressure and damage the heart.

Is “low-risk” drinking just another term for “moderate” drinking?

Not exactly—the weekly amounts may be the same, but the daily ones are different, and the recommendations serve different purposes for people with different drinking patterns.

- Low-risk drinking, for healthy men under age 65 is no more than 4 drinks on any day and 14 per week, and for healthy women (and men over 65) is no more than 3 drinks on any day and 7 per week.
- Moderate drinking, according to the U.S. dietary guidelines, is up to 2 drinks per day for men and up to 1 drink per day for women. (Per week, this corresponds to an upper limit of 14 drinks for men and 7 for women.)

In the United States, most people who drink don’t have a daily, low-level pattern of 1 or 2 drinks per day. Instead, they tend to have less on weekdays and more on weekends and holidays. Some people may look at the weekly limits of 14 or 7 drinks and wonder if they can have them all on one or two weekend days. As shown by the daily low-risk drinking levels, however, from a health standpoint, it’s risky to have more than 4 drinks on any day for men or 3 for women.

It’s important to note that the low-risk drinking levels are not risk free. People who drink lightly to moderately should not increase their intake beyond the moderate drinking guidelines, as this would increase their chances for alcohol-related problems.

Can I do anything to protect my liver from the effects of too much alcohol?

There are no guarantees that anything will protect the liver from too much alcohol. Liver damage from heavy drinking happens in stages. Some relatively mild damage may happen after a single binge drinking episode, but this reverses itself if the heavy drinking stops. If heavy drinking continues, however, liver damage can progress through several more advanced stages, and repair becomes much more difficult, if not impossible. When the damage goes as far as cirrhosis, the only treatment is liver transplant. The best way to protect your liver’s health is by staying within the low-risk drinking limits or — if you already have liver damage or any signsof an alcohol problem — by quitting. Also, it’s best if people who drink avoid acetaminophen (found in Tylenol® and other medications). Even the standard recommended dose of acetaminophen can increase the risk of liver damage, particularly among people who drink heavily.

I am considering cutting down or quitting drinking. How do I begin?

The first step, of course, is to decide whether cutting down or quitting is best for you. See these considerations and discuss different options with a doctor, a friend, or someone else you trust.

Thinking about cutting back? Here are some tips to try, small changes that can make a big difference. Choose two or three to try in the next week or two. It may help to have reminders to reinforce your decision to make a change, such as automated smartphone alerts that you send yourself.

Thinking about quitting? One size doesn't fit all, and it's important to find options that appeal to you. Start by visiting the choose your approach page. Here you'll find links to self-help strategies, a helpful publication about treatment options, and information about professional help and social support.

Changing habits such as smoking, overeating, or drinking too much can take a lot of effort, and you may not succeed with the first try. Setbacks are common, but you learn more each time. Each try brings you closer to your goal. Whatever course you choose, give it a fair trial.

What treatments are available for someone with an alcohol problem?

People commonly think of 12-step programs or 28-day inpatient rehabilitation as the only options for treating alcohol problems. Other choices are available, however. It's a good idea to start by talking with a primary care doctor to put together an individualized treatment plan. A treatment plan can include:

- Behavioral treatments. Counseling led by a health professional aims to change drinking behavior. Types of counseling include cognitive-behavioral therapy, motivational enhancement therapy, and marital and family counseling. It's important to choose an approach that avoids heavy-handed confrontation, incorporates empathy, and increases motivation while focusing on changing drinking behavior.
- Medications. Three medications are currently approved by the Food and Drug Administration to treat alcohol dependence. These medications help people stop or reduce their drinking and prevent relapse. All approved medications are non-addictive, and can be used alone or in combination with other forms of treatment.
- Mutual-support groups. People who are quitting or cutting back on their drinking may also find peer support through organizations such as Alcoholics Anonymous and other mutual support groups.

Find a summary of treatment options in the NIAAA publication Treatment for Alcohol Problems: Finding and Getting Help. The good news is that no matter how severe the problem may seem, most people with an alcohol problem can benefit from some form of treatment.

Thinking about a change? Click here for an interactive approach to weighing the pros and cons…

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7.4: Tobacco Use

Tobacco use is the leading preventable cause of disease, disability, and death in the United States. According to the Centers for Disease Control and Prevention (CDC), cigarette smoking results in more than 480,000 premature deaths in the United States each year—about 1 in every 5 U.S. deaths—and an additional 16 million people suffer with a serious illness caused by smoking. In fact, for every one person who dies from smoking, about 30 more suffer from at least one serious tobacco-related illness.

The harmful effects of smoking extend far beyond the smoker. Exposure to secondhand smoke can cause serious diseases and death. Each year, an estimated 88 million nonsmoking Americans are regularly exposed to secondhand smoke and almost 41,000 nonsmokers die from diseases caused by secondhand smoke exposure.

How Does Tobacco Affect the Brain?

Cigarettes and other forms of tobacco—including cigars, pipe tobacco, snuff, and chewing tobacco—contain the addictive drug nicotine. Nicotine is readily absorbed into the bloodstream when a tobacco product is chewed, inhaled, or smoked. A typical smoker will take 10 puffs on a cigarette over the period of about 5 minutes that the cigarette is lit. Thus, a person who smokes about 1 pack (25 cigarettes) daily gets 250 “hits” of nicotine each day.

Upon entering the bloodstream, nicotine immediately stimulates the adrenal glands to release the hormone epinephrine (adrenaline). Epinephrine stimulates the central nervous system and increases blood pressure, respiration, and heart rate.

Similar to other addictive drugs like cocaine and heroin, nicotine increases levels of the neurotransmitter dopamine, which affects the brain pathways that control reward and pleasure. For many tobacco users, long-term brain changes induced by continued nicotine exposure result in addiction—a condition of compulsive drug seeking and use, even in the face of negative consequences. Studies suggest that additional compounds in tobacco smoke, such as acetaldehyde, may enhance nicotine’s effects on the brain.

When an addicted user tries to quit, he or she experiences withdrawal symptoms including irritability, attention difficulties, sleep disturbances, increased appetite, and powerful cravings for tobacco. Treatments can help smokers manage these symptoms and improve the likelihood of successfully quitting.

Electronic Cigarettes

What are they?

E-cigarettes are battery-operated devices that typically produce a flavored nicotine vapor that looks like tobacco smoke.

Are they safe?

Although e-cigarette vapor does not contain the tar currently responsible for most lung cancer and other lung diseases, it has been shown to contain known carcinogens and toxic chemicals (such as formaldehyde and acetaldehyde), as well as potentially toxic metal nanoparticles from the vaporizing mechanism. There are currently no accepted measures to confirm their purity or safety, and the long-term health consequence of e-cigarette use remain unknown. NIDA is developing research programs to help answer these questions.

In addition, the U.S. Food and Drug Administration (FDA) has established a new rule for e-cigarettes and their liquid solutions in an effort to help protect the public from the dangers of tobacco use. Because e-cigarettes contain nicotine derived from tobacco, they are now subject to government regulation as tobacco products, including the requirement that both in-store and online purchasers be at least 18 years of age (see “Government Regulation of Tobacco Extended to All Tobacco Products“).

Can they help people quit smoking traditional cigarettes?

Because they deliver nicotine without burning tobacco, e-cigarettes are thought by many to be a safer alternative to conventional cigarettes, and some people even think they may help smokers lower nicotine cravings while they are trying to quit smoking. However, studies of the effectiveness of e-cigarettes have not shown they help with smoking cessation. It has also been suggested that they could perpetuate the nicotine addiction and actually interfere with quitting.

In fact, early evidence suggests that e-cigarette use may not only put users at risk for nicotine addiction but also serve as an introduction to nicotine that could lead to use of regular cigarettes and other tobacco products. A recent study showed that students who have used e-cigarettes by the time they start 9th grade are more likely than others to start smoking traditional cigarettes and other smokable tobacco products within the next year.

What Other Adverse Effects Does Tobacco Have on Health?

Cigarette smoking accounts for about one-third of all cancers, including 85-90 percent of lung cancer cases. More people in the United States, both men and women, die from lung cancer than any other type of cancer. Smokeless tobacco (such as chewing tobacco and snuff) also increases the risk of cancer, especially oral cancers. In addition to cancer, smoking causes lung diseases such as chronic bronchitis and emphysema, and increases the risk of heart disease, including stroke, heart attack, vascular disease, and aneurysm. Smoking has also been linked to leukemia, cataracts, and pneumonia. On average, adults who smoke die 10 years earlier than nonsmokers.

Although nicotine is addictive and can be toxic if ingested in high doses, it does not cause cancer—other chemicals are responsible for most of the severe health consequences of tobacco use. Tobacco smoke is a complex mixture of chemicals such as carbon monoxide, tar, formaldehyde, cyanide, and ammonia—many of which are known carcinogens. Carbon monoxide increases the chance of cardiovascular diseases. Tar exposes the user to an increased risk of lung cancer, emphysema, and bronchial disorders.

Pregnant women who smoke cigarettes run an increased risk of miscarriage, stillborn or premature infants, or infants with low birthweight. Maternal smoking may also be associated with learning and behavioral problems in children. Smoking more than one pack of cigarettes per day during pregnancy nearly doubles the risk that the affected child will become addicted to tobacco if that child starts smoking.

While we often think of medical consequences that result from direct use of tobacco products, passive or secondary smoke also increases the risk for many diseases. Secondhand smoke, also known as environmental tobacco smoke, consists of exhaled smoke and smoke given off by the burning end of tobacco products.

Note

Nonsmokers exposed to secondhand smoke at home or work increase their risk of developing heart disease by 25–30 percent and lung cancer by 20–30 percent.

In addition; secondhand smoke causes health problems in both adults and children, such as coughing, overproduction of phlegm, reduced lung function and respiratory infections, including pneumonia and bronchitis. Each year about 150,000 – 300,000 children younger than 18 months old experience respiratory tract infections caused by secondhand smoke. Children exposed to secondhand smoke are at an increased risk of ear infections, severe asthma, respiratory infections and death. In fact, more than 100,000 babies have died in the past 50 years from sudden infant death syndrome (SIDS), and other health complications as a result of parental smoking. Children who grow up with parents who smoke are more likely to become smokers, thus placing themselves (and their future families) at risk for the same health problems as their parents when they become adults.

Note

There is no safe level of exposure to tobacco smoke.

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7.5: Quitting Smoking

Although quitting can be difficult, the health benefits of smoking cessation are immediate and substantial—including reduced risk for cancers, heart disease, and stroke.

What are the immediate benefits of quitting smoking?

The immediate health benefits of quitting smoking are substantial:

- Heart rate and blood pressure, which are abnormally high while smoking, begin to return to normal.
- Within a few hours, the level of carbon monoxide in the blood begins to decline. (Carbon monoxide reduces the blood's ability to carry oxygen.)
- Within a few weeks, people who quit smoking have improved circulation, produce less phlegm, and don't cough or wheeze as often.
- Within several months of quitting, people can expect substantial improvements in lung function.
- Within a few years of quitting, people will have lower risks of cancer, heart disease, and other chronic diseases than if they had continued to smoke.
- In addition, people who quit smoking will have an improved sense of smell, and food will taste better.

What are the long-term benefits of quitting smoking?

Quitting smoking reduces the risk of cancer and many other diseases, such as heart disease and COPD, caused by smoking.

Data from the U.S. National Health Interview Survey show that people who quit smoking, regardless of their age, are less likely to die from smoking-related illness than those who continue to smoke. Smokers who quit before age 40 reduced their chance of dying prematurely from smoking-related diseases by about 90 percent, and those who quit by age 45-54 reduced their chance of dying prematurely by about two-thirds.

People who quit smoking, regardless of their age, have substantial gains in life expectancy compared with those who continue to smoke. Those who quit between the ages of 25 and 34 years lived about 10 years longer; those who quit between ages 35 and 44 lived about 9 years longer; those who quit between ages 45 and 54 lived about 6 years longer; and those who quit between ages 55 and 64 lived about 4 years longer.

Does quitting smoking lower the risk of cancer?

Yes. Quitting smoking reduces the risk of developing and dying from cancer. Although it is never too late to get a benefit from quitting, the benefit is strongest among those who quit at a younger age.

The risk of premature death and the chance of developing cancer from smoking depend on many factors, including the number of years a person smokes, the number of cigarettes he or she smokes per day, the age at which he or she began smoking, and whether or not he or she was already ill at the time of quitting. For people who have already developed cancer, quitting smoking reduces the risk of developing a second cancer.

Should someone already diagnosed with cancer bother to quit smoking?

Yes. Cigarette smoking has a profound adverse impact on health outcomes in cancer patients. For patients with some cancers, quitting smoking at the time of diagnosis may reduce the risk of dying by 30 percent to 40 percent. For those having surgery, chemotherapy, or other treatments, quitting smoking helps improve the body's ability to heal and respond to therapy. It also lowers the risk of pneumonia and respiratory failure. Moreover, quitting smoking may lower the risk of the cancer returning, of dying from the cancer, of a second cancer developing, and of dying from other causes.

Are There Effective Treatments for Tobacco Addiction?

Tobacco addiction is a chronic disease that often requires multiple attempts to quit. Although some smokers are able to quit without help, many others need assistance. Both behavioral interventions (counseling) and medication can help smokers quit; but the combination of medication with counseling is more effective than either alone.

The U.S. Department of Health and Human Services' (HHS) has established a national toll-free quitline, 800-QUIT-NOW, to serve as an access point for any smoker seeking information and assistance in quitting. NIDA's scientists are looking at

ways to make smoking cessation easier by developing tools to make behavioral support available over the internet or through text-based messaging. In addition, NIDA is developing strategies designed to help vulnerable or hard-to-reach populations quit smoking.

Behavioral Treatments

Behavioral treatments employ a variety of methods to help smokers quit, ranging from self-help materials to counseling. These interventions teach people to recognize high-risk situations and develop coping strategies to deal with them.

Nicotine Replacement Treatments

Nicotine replacement therapies (NRTs) were the first pharmacological treatments approved by the Food and Drug Administration (FDA) for use in smoking cessation therapy. Current FDA-approved NRT products include nicotine chewing gum, the nicotine transdermal patch, nasal sprays, inhalers, and lozenges. NRTs deliver a controlled dose of nicotine to a smoker in order to relieve withdrawal symptoms during the smoking cessation process. They are most successful when used in combination with behavioral treatments.

Other Medications

Bupropion and varenicline are two FDA-approved non-nicotine medications that have helped people quit smoking. Bupropion, a medication that goes by the trade name Zyban, was approved by the FDA in 1997, and Varenicline tartrate (trade name: Chantix) was approved in 2006. It targets nicotine receptors in the brain, easing withdrawal symptoms and blocking the effects of nicotine if people resume smoking.

Current Treatment Research

Scientists are currently developing new smoking cessation therapies. For example, they are working on a nicotine vaccine, which would block nicotine's reinforcing effects by causing the immune system to bind to nicotine in the bloodstream preventing it from reaching the brain. In addition, some medications already in use might work better if they are used together. Scientists are looking for ways to target several relapse symptoms at the same time—like withdrawal, craving and depression.

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CHAPTER OVERVIEW

8: DRUGS AND ADDICTION

8.1: Understanding Drug Use and Addiction

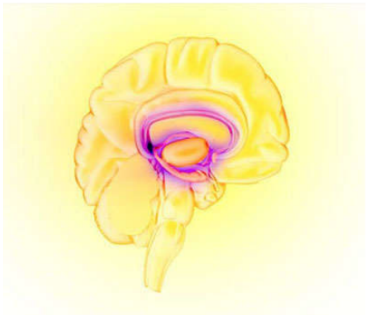
Many people don't understand why or how other people become addicted to drugs. They may mistakenly think that those who use drugs lack moral principles or willpower and that they could stop their drug use simply by choosing to. In reality, drug addiction is a complex disease, and quitting usually takes more than good intentions or a strong will. Drugs change the brain in ways that make quitting hard, even for those who want to. Fortunately, researchers know more than ever about how drugs affect the brain and have found treatments that can help people recover from drug addiction and lead productive lives.

What Is drug addiction?

Addiction is a chronic disease characterized by drug seeking and use that is compulsive, or difficult to control, despite harmful consequences. The initial decision to take drugs is voluntary for most people, but repeated drug use can lead to brain changes that challenge an addicted person's self-control and interfere with their ability to resist intense urges to take drugs. These brain changes can be persistent, which is why drug addiction is considered a "relapsing" disease—people in recovery from drug use disorders are at increased risk for returning to drug use even after years of not taking the drug.

It's common for a person to relapse, but relapse doesn't mean that treatment doesn't work. As with other chronic health conditions, treatment should be ongoing and should be adjusted based on how the patient responds. Treatment plans need to be reviewed often and modified to fit the patient's changing needs.

What happens to the brain when a person takes drugs?



Most drugs affect the brain's "reward circuit" by flooding it with the chemical messenger dopamine. This reward system controls the body's ability to feel pleasure and motivates a person to repeat behaviors needed to thrive, such as eating and spending time with loved ones. This overstimulation of the reward circuit causes the intensely pleasurable "high" that can lead people to take a drug again and again.

As a person continues to use drugs, the brain adjusts to the excess dopamine by making less of it and/or reducing the ability of cells in the reward circuit to respond to it. This reduces the high that the person feels compared to the high they felt when first taking the drug—an effect known as tolerance. They might take more of the drug, trying to achieve the same dopamine high. It can also cause them to get less pleasure from other things they once enjoyed, like food or social activities.

Long-term use also causes changes in other brain chemical systems and circuits as well, affecting functions that include:

- learning
- judgment
- decision-making
- stress
- memory
- behavior

Despite being aware of these harmful outcomes, many people who use drugs continue to take them, which is the nature of addiction.

Why do some people become addicted to drugs while others don't?

No one factor can predict if a person will become addicted to drugs. A combination of factors influences risk for addiction. The more risk factors a person has, the greater the chance that taking drugs can lead to addiction. For example:

- **Biology.** The genes that people are born with account for about half of a person's risk for addiction. Gender, ethnicity, and the presence of other mental disorders may also influence risk for drug use and addiction.
- **Environment.** A person's environment includes many different influences, from family and friends to economic status and general quality of life. Factors such as peer pressure, physical and sexual abuse, early exposure to drugs, stress, and parental guidance can greatly affect a person's likelihood of drug use and addiction.
- **Development.** Genetic and environmental factors interact with critical developmental stages in a person's life to affect addiction risk. Although taking drugs at any age can lead to addiction, the earlier that drug use begins, the more likely it will progress to addiction. This is particularly problematic for teens. Because areas in their brains that control decision-making, judgment, and self-control are still developing, teens may be especially prone to risky behaviors, including trying drugs.

Can drug addiction be cured or prevented?

As with most other chronic diseases, such as diabetes, asthma, or heart disease, treatment for drug addiction generally isn't a cure. However, addiction is treatable and can be successfully managed. People who are recovering from an addiction will be at risk for relapse for years and possibly for their whole lives. Research shows that combining addiction treatment medicines with behavioral therapy ensures the best chance of success for most patients. Treatment approaches tailored to each patient's drug use patterns and any co-occurring medical, mental, and social problems can lead to continued recovery.

More good news is that drug use and addiction are preventable. Results from NIDA-funded research have shown that prevention programs involving families, schools, communities, and the media are effective for preventing or reducing drug use and addiction. Although personal events and cultural factors affect drug use trends, when young people view drug use as harmful, they tend to decrease their drug taking. Therefore, education and outreach are key in helping people understand the possible risks of drug use. Teachers, parents, and health care providers have crucial roles in educating young people and preventing drug use and addiction.

Points to Remember

- Drug addiction is a chronic disease characterized by drug seeking and use that is compulsive, or difficult to control, despite harmful consequences.
- Brain changes that occur over time with drug use challenge an addicted person's self-control and interfere with their ability to resist intense urges to take drugs. This is why drug addiction is also a relapsing disease.
- Relapse is the return to drug use after an attempt to stop. Relapse indicates the need for more or different treatment.
- Most drugs affect the brain's reward circuit by flooding it with the chemical messenger dopamine. This overstimulation of the reward circuit causes the intensely pleasurable "high" that leads people to take a drug again and again.
- Over time, the brain adjusts to the excess dopamine, which reduces the high that the person feels compared to the high they felt when first taking the drug—an effect known as tolerance. They might take more of the drug, trying to achieve the same dopamine high.
- No single factor can predict whether a person will become addicted to drugs. A combination of genetic, environmental, and developmental factors influences risk for addiction. The more risk factors a person has, the greater the chance that taking drugs can lead to addiction.
- Drug addiction is treatable and can be successfully managed.
- More good news is that drug use and addiction are preventable. Teachers, parents, and health care providers have crucial roles in educating young people and preventing drug use and addiction.

Watch these videos to reinforce the previously discussed key points:

YouTube Video: Anyone can become addicted to Drugs (https://youtu.be/wCMkW2ji2OE)

YouTube video:Why are drugs to hard to quit (https://www.youtube.com/watch?v=zV6zKmt7S5E)

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8.2: Health Effects of Drug Abuse

In addition to the effects various drugs of abuse may have on specific organs of the body, many drugs produce global body changes such as dramatic changes in appetite and increases in body temperature, which may impact a variety of health conditions. Withdrawal from drug use also may lead to numerous adverse health effects, including restlessness, mood swings, fatigue, changes in appetite, muscle and bone pain, insomnia, cold flashes, diarrhea, and vomiting.

Marijuana

Marijuana is made from the hemp plant, Cannabis sativa. The main psychoactive (mind-altering) chemical in marijuana is delta-9-tetrahydrocannabinol, or THC.

Possible Health Effects	
Short-term	Enhanced sensory perception and euphoria followed by drowsiness/relaxation; slowed reaction time; problems with balance and coordination; increased heart rate and appetite; problems with learning and memory; hallucinations; anxiety; panic attacks; psychosis.
Long-term	Mental health problems, chronic cough, frequent respiratory infections.
Other Health-related Issues	Youth: possible loss of IQ points when repeated use begins in adolescence. Pregnancy: babies born with problems involving attention, memory, and problem solving.

Click here for additional details regarding marijuana use.

Cocaine

A powerfully addictive stimulant drug made from the leaves of the coca plant native to South America.

Possible Health Effects	
Short-term	Narrowed blood vessels; enlarged pupils; increased body temperature, heart rate, and blood pressure; headache; abdominal pain and nausea; euphoria; increased energy, alertness; insomnia, restlessness; anxiety; erratic and violent behavior, panic attacks, paranoia, psychosis; heart rhythm problems, heart attack; stroke, seizure, coma.
Long-term	Loss of sense of smell, nosebleeds, nasal damage and trouble swallowing from snorting; infection and death of bowel tissue from decreased blood flow; poor nutrition and weight loss from decreased appetite.
Other Health-related Issues	Pregnancy: premature delivery, low birth weight, smaller head circumference. Risk of HIV, hepatitis, and other infectious diseases from shared needles.

Click here to learn more about cocaine.

Methamphetamine

An extremely addictive stimulant amphetamine drug.

Possible Health Effects	
Short-term	Increased wakefulness and physical activity; decreased appetite; increased breathing, heart rate, blood pressure, temperature; irregular heartbeat.

Long-term	Anxiety, confusion, insomnia, mood problems, violent behavior, paranoia, hallucinations, delusions, weight loss, severe dental problems (“meth mouth”), intense itching leading to skin sores from scratching.
Other Health-related Issues	Pregnancy: premature delivery; separation of the placenta from the uterus; low birth weight; lethargy; heart and brain problems. Risk of HIV, hepatitis, and other infectious diseases from shared needles.

To learn more about methamphetamine, click here.

CNS Depressants

CNS depressants slow down brain activity and can cause sleepiness and loss of coordination. Continued use can lead to physical dependence and withdrawal symptoms if use is stopped.

Possible Health Effects	
Short-term	Drowsiness, slurred speech, poor concentration, confusion, dizziness, problems with movement and memory, lowered blood pressure, slowed breathing.
Long-term	Physical dependence, withdrawal, possibility of seizures from rebound effect.
Other Health-related Issues	Sleep medications are sometimes used as date rape drugs (e.g. Rohypnol). Risk of HIV, hepatitis, and
In Combination with Alcohol	Further slows heart rate and breathing, which can lead to death.

Click here to find out more about the misuse of prescription drugs.

Prescription Opioids

Pain relievers with an origin similar to that of heroin. Opioids can cause euphoria and are often used non-medically, leading to overdose deaths.

Possible Health Effects	
Short-term	Pain relief, drowsiness, nausea, constipation, euphoria, confusion, slowed breathing, death.
Long-term	Physical dependence, possible brain damage.
Other Health-related Issues	Pregnancy: Miscarriage, low birth weight, neonatal abstinence syndrome. Older adults: higher risk of accidental misuse or abuse because many older adults have multiple prescriptions, increasing the risk of drug-drug interactions, and breakdown of drugs slows with age; also, many older adults are treated with prescription medications for pain. Risk of HIV, hepatitis, and other infectious diseases from shared needles.
In Combination with Alcohol	Dangerous slowing of heart rate and breathing leading to coma or death.

Heroin

Possible Health Effects	
Short-term	Euphoria; warm flushing of skin; dry mouth; heavy feeling in the hands and feet; clouded thinking; alternate wakeful and drowsy states; itching; nausea; vomiting; slowed breathing and heart rate.

Long-term	Collapsed veins; abscesses (swollen tissue with pus); infection of the lining and valves in the heart; constipation and stomach cramps; liver or kidney disease; pneumonia.
Other Health-related Issues	Pregnancy: miscarriage, low birth weight, neonatal abstinence syndrome. Risk of HIV, hepatitis, and other infectious diseases from shared needles.
In Combination with Alcohol	Dangerous slowdown of heart rate and breathing, coma, death.

Click here to learn more about heroin and opioid abuse.

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8.3: Consequences of Drug Abuse

Drug abuse is a serious public health problem that affects many communities and families in some way. Each year drug abuse causes millions of serious illnesses or injuries among Americans. Examples of abused drugs include:

- Methamphetamine
- Anabolic steroids
- Club drugs
- Cocaine
- Heroin
- Inhalants
- Marijuana
- Prescription drugs

Drug abuse also plays a role in many major social problems, such as drugged driving, violence, stress, and child abuse. Drug abuse can lead to homelessness, crime, and missed work or problems with keeping a job. It harms unborn babies and destroys families. There are different types of treatment for drug abuse. But the best is to prevent drug abuse in the first place.

How it affects the family

When a person has a drug problem, they have a disease that can hurt the family.

Drug abuse puts a lot of stress on parents, brothers and sisters, children, grandparents—anyone who is part of the home.

When family members take drugs:

- You generally can't count on them to do what they say they will do.
- They may forget or get distracted because their focus is on getting and taking drugs.
- They might lie or steal money to buy drugs.
- They might get fired from their jobs.
- They might not come home at night.
- They may do bad things they would never do if they weren't abusing drugs.

Family members might fight a lot because of the problems the drug abuse is causing. The drug user might do and say things that upset neighbors and friends, and make the family ashamed.

Some people who are addicted don't believe that they are sick and out of control, so they don't look for treatment. They don't see the problems they are causing themselves and those around them. Other people who are addicted are aware of the problem, but may be so upset and confused that they do not know how to ask for or get help.

Drugs don't just hurt the person taking them. Everyone connected to the person can get hurt.

Drug abuse can cause many problems:

- Fighting and violence in and outside the home
- Money problems
- Trouble at school
- Trouble at work, losing a job
- Trouble in relationships
- Child abuse, neglect
- Driving accidents
- Arrests and jail

When you or a loved one abuse drugs, everyday life can feel out of control.

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8.4: Treatment Approaches for Drug Addiction

Can drug addiction be treated?

Yes, but it's not simple. Because addiction is a chronic disease, people can't simply stop using drugs for a few days and be cured. Most patients need long-term or repeated care to stop using completely and recover their lives.

Addiction treatment must help the person do the following:

- stop using drugs
- stay drug-free
- be productive in the family, at work, and in society

Principles of Effective Treatment

Based on scientific research since the mid-1970s, the following key principles should form the basis of any effective treatment program:

- Addiction is a complex but treatable disease that affects brain function and behavior.
- No single treatment is right for everyone.
- People need to have quick access to treatment.
- Effective treatment addresses all of the patient's needs, not just his or her drug use.
- Staying in treatment long enough is critical.
- Counseling and other behavioral therapies are the most commonly used forms of treatment.
- Medications are often an important part of treatment, especially when combined with behavioral therapies.
- Treatment plans must be reviewed often and modified to fit the patient's changing needs.
- Treatment should address other possible mental disorders.
- Medically assisted detoxification is only the first stage of treatment.
- Treatment doesn't need to be voluntary to be effective.
- Drug use during treatment must be monitored continuously.
- Treatment programs should test patients for HIV/AIDS, hepatitis B and C, tuberculosis, and other infectious diseases as well as teach them about steps they can take to reduce their risk of these illnesses.

How is drug addiction treated?

Successful treatment has several steps:

- detoxification (the process by which the body rids itself of a drug)
- behavioral counseling
- medication (for opioid, tobacco, or alcohol addiction)
- evaluation and treatment for co-occurring mental health issues such as depression and anxiety
- long-term follow-up to prevent relapse

A range of care with a tailored treatment program and follow-up options can be crucial to success. Treatment should include both medical and mental health services as needed. Follow-up care may include community- or family-based recovery support systems.

How are medications used in drug addiction treatment?

Medications can be used to manage withdrawal symptoms, prevent relapse, and treat co-occurring conditions.

Withdrawal. Medications help suppress withdrawal symptoms during detoxification. Detoxification is not in itself "treatment," but only the first step in the process. Patients who do not receive any further treatment after detoxification usually resume their drug use. One study of treatment facilities found that medications were used in almost 80 percent of detoxifications (SAMHSA, 2014).

Relapse prevention. Patients can use medications to help re-establish normal brain function and decrease cravings. Medications are available for treatment of opioid (heroin, prescription pain relievers), tobacco (nicotine), and alcohol addiction. Scientists are developing other medications to treat stimulant (cocaine, methamphetamine) and cannabis

(marijuana) addiction. People who use more than one drug, which is very common, need treatment for all of the substances they use.

- **Opioids:** Methadone (Dolophine®, Methadose®), buprenorphine (Suboxone®, Subutex®, Probuphine®), and naltrexone (Vivitrol®) are used to treat opioid addiction. Acting on the same targets in the brain as heroin and morphine, methadone and buprenorphine suppress withdrawal symptoms and relieve cravings. Naltrexone blocks the effects of opioids at their receptor sites in the brain and should be used only in patients who have already been detoxified. All medications help patients reduce drug seeking and related criminal behavior and help them become more open to behavioral treatments.
- **Tobacco:** Nicotine replacement therapies have several forms, including the patch, spray, gum, and lozenges. These products are available over the counter. The U.S. Food and Drug Administration (FDA) has approved two prescription medications for nicotine addiction: bupropion (Zyban®) and varenicline (Chantix®). They work differently in the brain, but both help prevent relapse in people trying to quit. The medications are more effective when combined with behavioral treatments, such as group and individual therapy as well as telephone quitlines.
- **Alcohol:** Three medications have been FDA-approved for treating alcohol addiction and a fourth, topiramate, has shown promise in clinical trials (large-scale studies with people). The three approved medications are as follows:
  - **Naltrexone** blocks opioid receptors that are involved in the rewarding effects of drinking and in the craving for alcohol. It reduces relapse to heavy drinking and is highly effective in some patients. Genetic differences may affect how well the drug works in certain patients.
  - **Acamprosate (Campral®)** may reduce symptoms of long-lasting withdrawal, such as insomnia, anxiety, restlessness, and dysphoria (generally feeling unwell or unhappy). It may be more effective in patients with severe addiction.
  - **Disulfiram (Antabuse®)** interferes with the breakdown of alcohol. Acetaldehyde builds up in the body, leading to unpleasant reactions that include flushing (warmth and redness in the face), nausea, and irregular heartbeat if the patient drinks alcohol. Compliance (taking the drug as prescribed) can be a problem, but it may help patients who are highly motivated to quit drinking.
- **Co-occuring conditions:** Other medications are available to treat possible mental health conditions, such as depression or anxiety, that may be contributing to the person's addiction.

How are behavioral therapies used to treat drug addiction?

The best treatment programs provide a combination of therapies and other services to meet the needs of the individual patient.

Behavioral therapies help patients:

- modify their attitudes and behaviors related to drug use
- increase healthy life skills
- persist with other forms of treatment, such as medication

Patients can receive treatment in many different settings with various approaches.

Outpatient behavioral treatment includes a wide variety of programs for patients who visit a behavioral health counselor on a regular schedule. Most of the programs involve individual or group drug counseling, or both. These programs typically offer forms of behavioral therapy such as:

- cognitive-behavioral therapy, which helps patients recognize, avoid, and cope with the situations in which they are most likely to use drugs
- multidimensional family therapy—developed for adolescents with drug abuse problems as well as their families—which addresses a range of influences on their drug abuse patterns and is designed to improve overall family functioning
- motivational interviewing, which makes the most of people's readiness to change their behavior and enter treatment
- motivational incentives (contingency management), which uses positive reinforcement to encourage abstinence from drugs

Treatment is sometimes intensive at first, where patients attend multiple outpatient sessions each week. After completing intensive treatment, patients transition to regular outpatient treatment, which meets less often and for fewer hours per week to help sustain their recovery.

Inpatient or residential treatment can also be very effective, especially for those with more severe problems (including co-occurring disorders). Licensed residential treatment facilities offer 24-hour structured and intensive care, including safe housing and medical attention. Residential treatment facilities may use a variety of therapeutic approaches, and they are generally aimed at helping the patient live a drug-free, crime-free lifestyle after treatment.

Points to Remember

- Drug addiction can be treated, but it's not simple. Addiction treatment must help the person do the following:
  - stop using drugs
  - stay drug-free
  - be productive in the family, at work, and in society
- Successful treatment has several steps:
  - detoxification
  - behavioral counseling
  - medication (for opioid, tobacco, or alcohol addiction)
  - evaluation and treatment for co-occurring mental health issues such as depression and anxiety
  - long-term follow-up to prevent relapse
- Medications can be used to manage withdrawal symptoms, prevent relapse, and treat co-occurring conditions.
- Behavioral therapies help patients:
  - modify their attitudes and behaviors related to drug use
  - increase healthy life skills
  - persist with other forms of treatment, such as medication
- People within the criminal justice system may need additional treatment services to treat drug use disorders effectively. However, many offenders don't have access to the types of services they need

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8.5: Synthetic Drugs

Synthetic Drugs (a.k.a. K2, Spice, Bath Salts, etc.)

Overview and History

- Synthetic cannabinoids, commonly known as “synthetic marijuana,” “K2,” or “Spice”, are often sold in legal retail outlets as “herbal incense” or “potpourri”, and synthetic cathinones are often sold as “bath salts” or “jewelry cleaner”. They are labeled “not for human consumption” to mask their intended purpose and avoid Food and Drug Administration (FDA) regulatory oversight of the manufacturing process.
- Synthetic cannabinoids are man-made chemicals that are applied (often sprayed) onto plant material and marketed as a “legal” high. Users claim that synthetic cannabinoids mimic Δ9-tetrahydrocannabinol (THC), the primary psychoactive active ingredient in marijuana.
- Use of synthetic cannabinoids is alarmingly high, especially among young people. According to the 2012 Monitoring the Future survey of youth drug-use trends, one in nine 12th graders in America reported using synthetic cannabinoids in the past year. This rate, unchanged from 2011, puts synthetic cannabinoids as the second most frequently used illegal drug among high school seniors after marijuana (see chart).
- Synthetic cathinones are man-made chemicals related to amphetamines. Synthetic cathinone products often consist of methylenedioxypyrovalerone (MDPV), mephedrone, and methylone.
- The Administration has been working with Federal, Congressional, state, local, and non-governmental partners to put policies and legislation in place to combat this threat, and to educate people about the tremendous health risk posed by these substances.

A Rapidly Emerging Threat

- Synthetic cannabinoids laced on plant material were first reported in the U.S. in December 2008, when a shipment of “Spice” was seized and analyzed by U.S. Customs and Border Protection (CBP) in Dayton, Ohio.
- There is an increasingly expanding array of synthetic drugs available. 51 new synthetic cannabinoids were identified in 2012, compared to just two in 2009. Furthermore, 31 new synthetic cathinones were identified in 2012, compared to only four in 2009. In addition, 76 other synthetic compounds were identified in 2012, bringing the total number of new synthetic substances identified in 2012 to 158.

Risk to the Public Health

- The contents and effects of synthetic cannabinoids and cathinones are unpredictable due to a constantly changing variety of chemicals used in manufacturing processes devoid of quality controls and government regulatory oversight.
- Health warnings have been issued by numerous public health authorities and poison control centers describing the adverse health effects associated with the use of synthetic drugs.
- The effects of synthetic cannabinoids include severe agitation and anxiety, nausea, vomiting, tachycardia (fast, racing heartbeat), elevated blood pressure, tremors and seizures, hallucinations, dilated pupils, and suicidal and other harmful thoughts and/or actions.
- Similar to the adverse effects of cocaine, LSD, and methamphetamine, synthetic cathinone use is associated with increased heart rate and blood pressure, chest pain, extreme paranoia, hallucinations, delusions, and violent behavior, which causes users to harm themselves or others.

Sources and Continuing Availability

- According to CBP, many synthetic cannabinoid and cathinone products originate overseas. Law enforcement personnel have also encountered the manufacture of synthetic drugs in the U.S., including in residential neighborhoods.
- Synthetic drugs are often sold at small retail outlets and are readily available via the Internet. The chemical compositions of synthetic drugs are frequently altered in an attempt to avoid government bans.

Government Efforts to Ban Synthetic Drug Products

- Congress has taken steps to ban many of these substances at the Federal level, and the Administration has supported such efforts.

- The Synthetic Drug Abuse Prevention Act is part of the FDA Safety and Innovation Act of 2012, signed into law by President Obama. The law permanently places 26 types of synthetic cannabinoids and cathinones into Schedule I of the Controlled Substances Act (CSA). It also doubled the maximum period of time that the Drug Enforcement Administration (DEA) can administratively schedule substances under its emergency scheduling authority, from 18 to 36 months.
- The Controlled Substance Analogue Enforcement Act of 1986 allows many synthetic drugs to be treated as controlled substances if they are proven to be chemically and/or pharmacologically similar to a Schedule I or Schedule II controlled substance.
- In 2011, DEA exercised its emergency scheduling authority to control five types of synthetic cannabinoids, and three of the synthetic substances used to manufacture synthetic cathinones. In 2012, all but one of these substances were permanently designated as Schedule I substances under the Synthetic Drug Abuse Prevention Act, and the remaining substance was permanently placed into Schedule I by DEA regulation.
- On April 12, 2013, DEA used its emergency scheduling authority to schedule three more types of synthetic cannabinoids, temporarily designating them as Schedule I substances.
- At least 43 states have taken action to control one or more synthetic cannabinoids. Prior to 2010, synthetic cannabinoids were not controlled by any State or at the Federal level. In addition, at least 44 states have taken action to control one or more synthetic cathinones.

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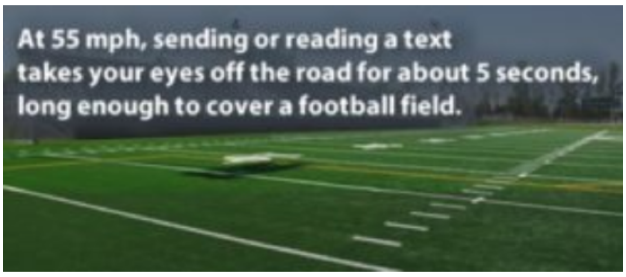
CHAPTER OVERVIEW

9: UNINTENTIONAL INJURIES AND VIOLENCE

9.1: Unintentional Injuries

Motor Vehicle Safety: Distracted Driving



Each day in the United States, over 8 people are killed and 1,161 injured in crashes that are reported to involve a distracted driver. Distracted driving is driving while doing another activity that takes your attention away from driving. Distracted driving can increase the chance of a motor vehicle crash.

What are the types of distraction?

There are three main types of distraction:

- Visual: taking your eyes off the road;
- Manual: taking your hands off the wheel; and
- Cognitive: taking your mind off of driving.

Distracted driving activities

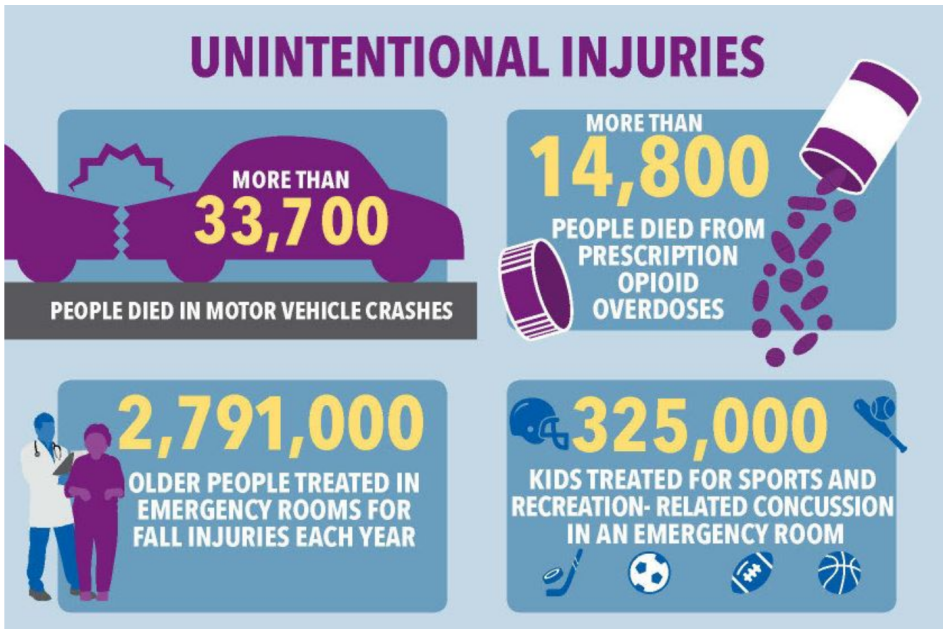
Distracted driving activities include things like using a cell phone, texting, applying makeup, and eating. Using in-vehicle technologies (such as navigation systems) can also be sources of distraction. While any of these distractions can endanger the driver and others, texting while driving is especially dangerous because it combines all three types of distraction.

Young adult and teen drivers

- Drivers under the age of 20 have the highest proportion of distraction-related fatal crashes.
- The national The Youth Risk Behavior Surveillance System (YRBSS) monitors health-risk behaviors among high school students, including sending texts while driving.
  - In 2013, more than two out of five students who drove in the past 30 days sent a text or email while driving.
  - Those who text while driving are nearly twice as likely to ride with a driver who has been drinking.
  - Students who frequently text while driving are more likely to ride with a drinking driver or drink and drive than students who text while driving less frequently.

What is being done?

- Many states are enacting laws—such as banning texting while driving, or using graduated driver licensing systems for teen drivers—to help raise awareness about the dangers of distracted driving and to keep it from occurring. However, the effectiveness of cell phone and texting laws on decreasing distracted driving-related crashes requires further study. The Insurance Institute for Highway Safety keeps track of such laws.



Home and Recreational Safety

Falls

Although falls can hurt a person at any age, older adults are highly affected by falls. The CDC believes more than one out of four older people falls each year equating to millions of falls for persons over the age of 65. Hip fractures and traumatic brain injuries (TBI's) in older adults and are caused primarily by falls. Falls may be attributed to poor balance, weak muscles and bones, vitamin deficiencies, and visual impairment. To reduce the chances of falls, older adults should talk with their doctors and have their balance and strength tested. To reduce the chances of anyone falling in a home the home should be clutter free, have side rails installed, and have proper lighting.

Water-Related Injuries

Each day about 10 people in the U.S. from unintentional (accidental) drowning. Drowning is the fifth leading cause of unintentional injury death for people of all ages, and the second leading cause of injury death for children ages 1 to 14 years.

Drowning is a problem worldwide. The World Health Organization (WHO) estimates that every hour of everyday 40 people die from unintentional drownings. The WHO identifies drowning as a server public health concern especially for low- and middle-income countries. Based on research and evidence, the WHO describes the following 10 actions that can help prevent drowning:

COMMUNITY-BASED ACTION:

1. Install barriers controlling access to water.
2. Provide safe places away from water for pre-school children, with capable child care.
3. Teach school-age children basic swimming, water safety and safe rescue skills.
4. Train bystanders in safe rescue and resuscitation.
5. Strengthen public awareness of drowning and highlight the vulnerability of children.

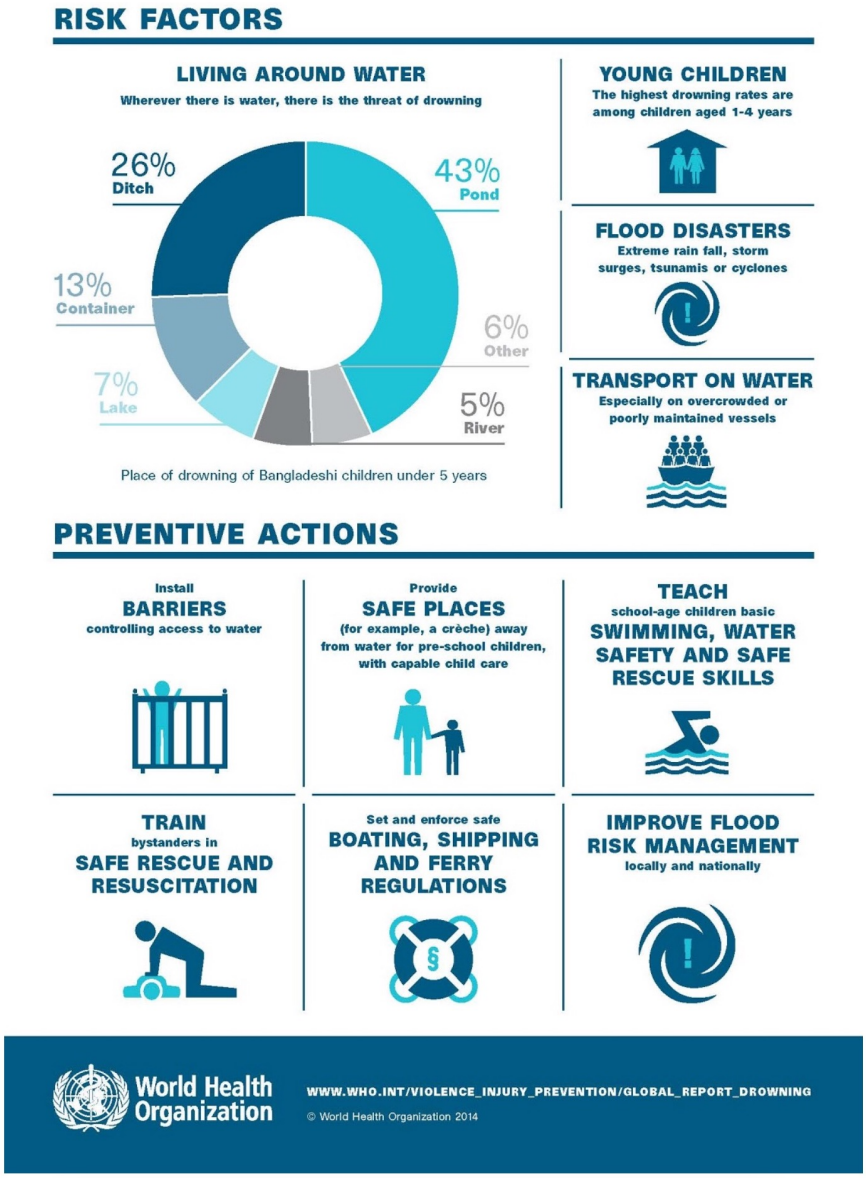
EFFECTIVE POLICIES AND LEGISLATION:

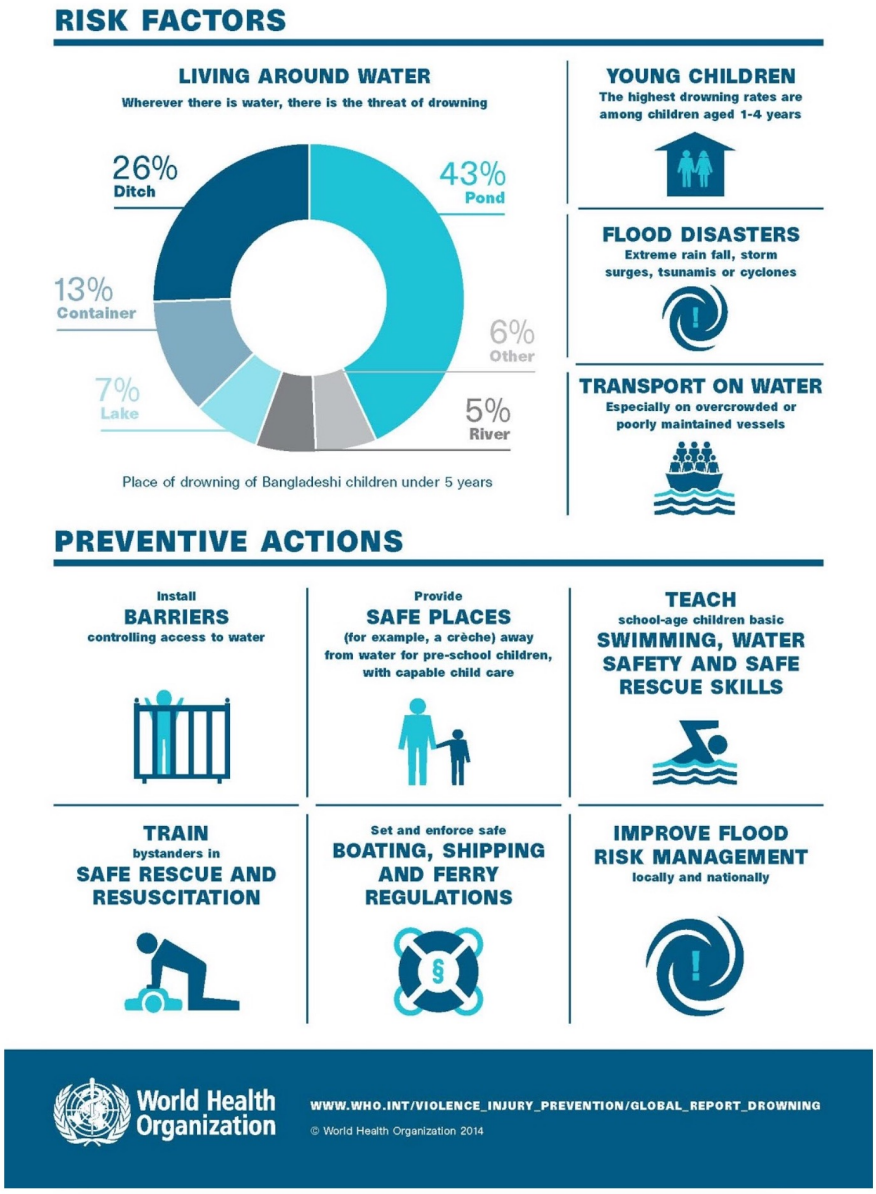
6. Set and enforce safe boating, shipping and ferry regulations.
7. Build resilience and manage flood risks and other hazards locally and nationally.
8. Coordinate drowning prevention efforts with those of other sectors and agendas.

9. Develop a national water safety plan.

FURTHER RESEARCH:

10. Address priority research questions with well-designed studies.





Poisoning

A poison is any substance, including medications, that is harmful to your body if too much is eaten, inhaled, injected, or absorbed through the skin. In the home, poisonings are commonly caused by the misuse of medications or breathing in Carbon Monoxide (CO). It is very important to use medication as prescribed and store them in a very safe place away from children. Because Carbon monoxide is an odorless and tasteless gas, it is very important that all buildings be equipped with Carbon Monoxide detectors. Humans and animals may not be aware that they are inhaling Carbon Monoxide until it is too late. CO poisoning typically presents with flu-like symptoms that can quickly make you pass out.

Fires

Deaths due to fires has declined over the past few years likely due to the use of smoke alarms and education programs on what to do if you are in a fire. The CDC provides the following steps to prevent burns from fires and scalding:

- Be "alarmed".
  - Install and maintain smoke alarms in your home—on every floor and near all rooms family members sleep in. Test your smoke alarms once a month to make sure they are working properly. Use long life batteries when possible.
- Have an escape plan.
  - Create and practice a family fire escape plan, and involve kids in the planning. Make sure everyone knows at least two ways out of every room and identify a central meeting place outside.
- Cook with care.
  - Use safe cooking practices, such as never leaving food unattended on the stove. Also, supervise or restrict children's use of stoves, ovens, and especially microwaves.
- Check water heater temperature.
  - Set your water heater's thermostat to 120 degrees Fahrenheit or lower. Infants and small children may not be able to get away from water that may be too hot, and maintaining a constant thermostat setting can help control the water temperature throughout your home—preventing it from getting too high. Test the water at the tap if possible.

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9.2: Intentional Injuries- Violence

The Social-Ecological Model: A Framework for Prevention

The ultimate goal is to stop violence before it begins. Prevention requires understanding the factors that influence violence. CDC uses a four-level social-ecological model to better understand violence and the effect of potential prevention strategies. This model considers the complex interplay between individual, relationship, community, and societal factors. It allows us to understand the range of factors that put people at risk for violence or protect them from experiencing or perpetrating violence. The overlapping rings in the model illustrate how factors at one level influence factors at another level.

Besides helping to clarify these factors, the model also suggests that in order to prevent violence, it is necessary to act across multiple levels of the model at the same time. This approach is more likely to sustain prevention efforts over time than any single intervention.

Individual

The first level identifies biological and personal history factors that increase the likelihood of becoming a victim or perpetrator of violence. Some of these factors are age, education, income, substance use, or history of abuse. Prevention strategies at this level are often designed to promote attitudes, beliefs, and behaviors that ultimately prevent violence. Specific approaches may include education and life skills training.

Relationship

The second level examines close relationships that may increase the risk of experiencing violence as a victim or perpetrator. A person's closest social circle-peers, partners and family members-influences their behavior and contributes to their range of experience. Prevention strategies at this level may include parenting or family-focused prevention programs, and mentoring and peer programs designed to reduce conflict, foster problem solving skills, and promote healthy relationships.

Community

The third level explores the settings, such as schools, workplaces, and neighborhoods, in which social relationships occur and seeks to identify the characteristics of these settings that are associated with becoming victims or perpetrators of violence. Prevention strategies at this level are typically designed to impact the social and physical environment – for example, by reducing social isolation, improving economic and housing opportunities in neighborhoods, as well as the climate, processes, and policies within school and workplace settings.

Societal

The fourth level looks at the broad societal factors that help create a climate in which violence is encouraged or inhibited. These factors include social and cultural norms that support violence as an acceptable way to resolve conflicts. Other large societal factors include the health, economic, educational and social policies that help to maintain economic or social inequalities between groups in society.

What are Social Norms?

Social norms refer to values, beliefs, attitudes, and/or behaviors shared by a group of people. They are often based on what people believe to be normal, typical, or appropriate. Social norms can function as unspoken rules or guidelines for how people behave, and for how people are expected to behave. People generally follow social norms because they want to fit in with the people around them.

Social norms can result in positive or negative outcomes. Sometimes social norms help people behave in ways that keep themselves – and others – safe and healthy.

Other times, social norms can have the opposite effect, and can lead people to behave in harmful ways.

Social Norms and Violence

Social norms can affect nearly any aspect of our lives. They contribute to our clothing choices, how we speak, our music preferences, and our beliefs about certain social issues. They can also affect our attitudes, beliefs, and behaviors related to violence.

The way we react to violence may be based on what we see other people do, or how we think other people would act. In other words, our reactions are based on what we believe is normal or appropriate.

Misperceptions

People often misperceive (or misunderstand) social norms and overestimate the number of people who behave in unhealthy ways or who accept unhealthy behavior. Researchers have studied college students' misperceptions of social norms related to alcohol use. They've found that most college students do not enjoy heavy drinking. However, they tend to think that heavy drinking is the norm among their peers and overdrink to fit in.

Misperceptions can be harmful when a person alters their own beliefs and behaviors based on a false assumption about other people's beliefs and behaviors.

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9.3: Intimate Partner Violence

Intimate partner violence (IPV) is a serious, preventable public health problem that affects millions of Americans. The term “intimate partner violence” describes physical, sexual, or psychological harm by a current or former partner or spouse. This type of violence can occur among heterosexual or same-sex couples and does not require sexual intimacy.

The goal is to stop IPV before it begins. There is a lot to learn about how to prevent IPV. We do know that strategies that promote healthy behaviors in relationships are important. Programs that teach young people skills for dating can prevent violence. These programs can stop violence in dating relationships before it occurs.IPV can vary in frequency and severity. It occurs on a continuum, ranging from one episode that might or might not have lasting impact to chronic and severe episodes over a period of years.

The Four Main Types of Intimate Partner Violence

- **Physical violence** is the intentional use of physical force with the potential for causing death, disability, injury, or harm. Physical violence includes, but is not limited to, scratching; pushing; shoving; throwing; grabbing; biting; choking; shaking; aggressive hair pulling; slapping; punching; hitting; burning; use of a weapon; and use of restraints or one’s body, size, or strength against another person. Physical violence also includes coercing other people to commit any of the above acts.
- **Sexual violence** is divided into five categories. Any of these acts constitute sexual violence, whether attempted or completed. Additionally all of these acts occur without the victim’s freely given consent, including cases in which the victim is unable to consent due to being too intoxicated (e.g., incapacitation, lack of consciousness, or lack of awareness) through their voluntary or involuntary use of alcohol or drugs.
  - **Rape or penetration of victim** – This includes completed or attempted, forced or alcohol/drug-facilitated unwanted vaginal, oral, or anal insertion. Forced penetration occurs through the perpetrator’s use of physical force against the victim or threats to physically harm the victim.
  - **Victim was made to penetrate someone else** – This includes completed or attempted, forced or alcohol/drug-facilitated incidents when the victim was made to sexually penetrate a perpetrator or someone else without the victim’s consent.
  - **Non-physically pressured unwanted penetration** – This includes incidents in which the victim was pressured verbally or through intimidation or misuse of authority to consent or acquiesce to being penetrated.
  - **Unwanted sexual contact** – This includes intentional touching of the victim or making the victim touch the perpetrator, either directly or through the clothing, on the genitalia, anus, groin, breast, inner thigh, or buttocks without the victim’s consent
  - **Non-contact unwanted sexual experiences** – This includes unwanted sexual events that are not of a physical nature that occur without the victim’s consent. Examples include unwanted exposure to sexual situations (e.g., pornography); verbal or behavioral sexual harassment; threats of sexual violence to accomplish some other end; and /or unwanted filming, taking or disseminating photographs of a sexual nature of another person.
- **Stalking** is a pattern of repeated, unwanted, attention and contact that causes fear or concern for one’s own safety or the safety of someone else (e.g., family member or friend). Some examples include repeated, unwanted phone calls, emails, or texts; leaving cards, letters, flowers, or other items when the victim does not want them; watching or following from a distance; spying; approaching or showing up in places when the victim does not want to see them; sneaking into the victim’s home or car; damaging the victim’s personal property; harming or threatening the victim’s pet; and making threats to physically harm the victim.
- **Psychological Aggression i**s the use of verbal and non-verbal communication with the intent to harm another person mentally or emotionally, and/or to exert control over another person. Psychological aggression can include expressive aggression (e.g., name-calling, humiliating); coercive control (e.g., limiting access to transportation, money, friends, and family; excessive monitoring of whereabouts); threats of physical or sexual violence; control of reproductive or sexual health (e.g., refusal to use birth control; coerced pregnancy termination); exploitation of victim’s vulnerability (e.g., immigration status, disability); exploitation of perpetrator’s vulnerability; and presenting false information to the victim with the intent of making them doubt their own memory or perception (e.g., mind games).

Risk Factors for Intimate Partner Violence

Persons with certain risk factors are more likely to become perpetrators or victims of intimate partner violence (IPV). Those risk factors contribute to IPV but might not be direct causes. Not everyone who is identified as “at risk” becomes involved in violence.

A combination of individual, relational, community, and societal factors contribute to the risk of becoming an IPV perpetrator or victim. Understanding these multilevel factors can help identify various opportunities for prevention.

Individual Risk Factors

- Low self-esteem
- Low income
- Low academic achievement
- Young age
- Aggressive or delinquent behavior as a youth
- Heavy alcohol and drug use
- Depression
- Anger and hostility
- Antisocial personality traits
- Borderline personality traits
- Prior history of being physically abusive
- Having few friends and being isolated from other people
- Unemployment
- Emotional dependence and insecurity
- Belief in strict gender roles (e.g., male dominance and aggression in relationships)
- Desire for power and control in relationships
- Perpetrating psychological aggression
- Seeing or being a victim of physical or psychological abuse (consistently one of the strongest predictors of perpetration)
- History of experiencing poor parenting as a child
- History of experiencing physical discipline as a child

Relationship Factors

- Marital conflict-fights, tension, and other struggles
- Marital instability-divorces or separations
- Dominance and control of the relationship by one partner over the other
- Economic stress
- Unhealthy family relationships and interactions

Community Factors

- Poverty and associated factors (e.g., overcrowding)
- Low social capital-lack of institutions, relationships, and norms that shape a community’s social interactions
- Weak community sanctions against IPV (e.g., unwillingness of neighbors to intervene in situations where they witness violence)

Societal Factors

- Traditional gender norms (e.g., women should stay at home, not enter workforce, and be submissive; men support the family and make the decisions)

Protecting Yourself from Relationship Violence

It can be hard to know if your relationship is headed down the wrong path. While it’s not always possible to prevent relationship violence, there are steps you can take to protect yourself.

If you think your partner might be controlling or abusive, it’s important to:

- Trust your feelings. If something doesn't seem right, take it seriously.
- Learn the warning signs of someone who might become controlling or violent.
- Get help. Talk to experts in relationship violence.

If your partner is controlling or abusive, it's better to get help now than to wait. Controlling or violent relationships usually get worse over time.

Remember: if your partner hurts you, it's not your fault.

What is relationship violence?

Relationship violence is when one person in a relationship is abusive or controlling toward the other person – especially when they disagree about something.

Relationship violence is sometimes called dating violence, domestic violence, or intimate partner violence. In some relationships, both partners act in abusive or controlling ways.

When many people think about relationship violence, they think about physical violence, like hitting or pushing. But people can also use other methods, like threats or insults, to control their partners.

Relationship violence can include:

- Physical violence, like pushing, hitting, or throwing things
- Sexual violence, like forcing or trying to force someone to do something sexual
- Threats of physical or sexual violence, which may include threatening to hurt another person or a pet
- Emotional abuse, like embarrassing a partner or keeping that person away from family and friends

If you feel controlled by or afraid of your partner – even if you haven't been hurt physically – trust yourself. There are people who can help you figure out what to do next.

How do I know if my relationship might become violent?

Relationship violence can start slowly and be hard to recognize at first. For example, when people first start dating, it's common to want to spend a lot of time together. But spending less time with other people can also be a sign that your partner is trying to control your time.

Try asking yourself these questions:

- Does my partner respect me?
- Does my partner blame me for everything that goes wrong?
- Does my partner make most of the decisions in our relationship?
- Am I ever afraid to tell my partner something?
- Do I ever feel forced to do things that I don't want to do?
- Have I ever done anything sexual with my partner when I didn't want to?
- Does my partner promise to change and then keep doing the same things?

Get more information about the signs of abusive relationships.

What if I'm not sure if my relationship is violent?

It's okay if you aren't sure – you can still get help. Domestic violence agencies have counselors who are experts at helping people with questions about their relationships. You don't even have to give your name.

If you have questions about your relationship, call the National Domestic Violence Hotline at 1-800-799-SAFE (1-800-799-7233) or chat online with a trained advocate.

If you are in danger right now, call 911.

Take Action!

If you think your partner is controlling or abusive, take steps to protect yourself.

Trust your instincts.

- You are the expert on your life and relationships. If you think your relationship is unhealthy or you are worried about your safety, trust your gut.

Plan for your safety.

- If you are in a relationship with someone who is violent or might become violent, make a plan to keep yourself safe. This is important whether you are planning to leave your partner or not.

Start with a phone call.

- If you need help or have questions about your relationship, call the National Domestic Violence Hotline at 1-800-799-SAFE (1-800-799-7233). You'll be able to find a domestic violence agency near you or talk to a counselor over the phone. If you are in danger right now, call 911.

What kind of help can I get?

Domestic violence agencies provide:

- Emotional support
- Safety planning
- A safe place to stay in an emergency
- Legal help
- Help with housing

What about cost?

Domestic violence agencies offer free services, like hotlines, counseling, and help finding resources such as housing or lawyers.

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CHAPTER OVERVIEW

10: RELATIONSHIPS, SEXUALITY, AND CONTRACEPTION

10.1: Healthy Relationships

Healthy vs. Unhealthy Relationships

Sometimes a relationship might not be abusive, but it might have some serious problems that make it unhealthy. If you think you might be in an unhealthy relationship, you should be able to talk to your partner about your concerns. If you feel like you can't talk to your partner, try talking to a trusted friend, family member, or counselor. Consider calling a confidential hotline to get the support you need and to explore next steps. If you're afraid to end the relationship, call a hotline for help.

Signs of an unhealthy relationship include:

- Focusing all your energy on your partner
- Dropping friends and family or activities you enjoy
- Feeling pressured or controlled a lot
- Having more bad times in the relationship than good
- Feeling sad or scared when with your partner

Signs of a healthy relationship include:

- Having more good times in the relationship than bad
- Having a life outside the relationship, with your own friends and activities
- Making decisions together, with each partner compromising at times
- Dealing with conflicts by talking honestly
- Feeling comfortable and able to be yourself
- Feeling able to take care of yourself
- Feeling like your partner supports you

Click here to further explore what Healthy Relationships are all about.

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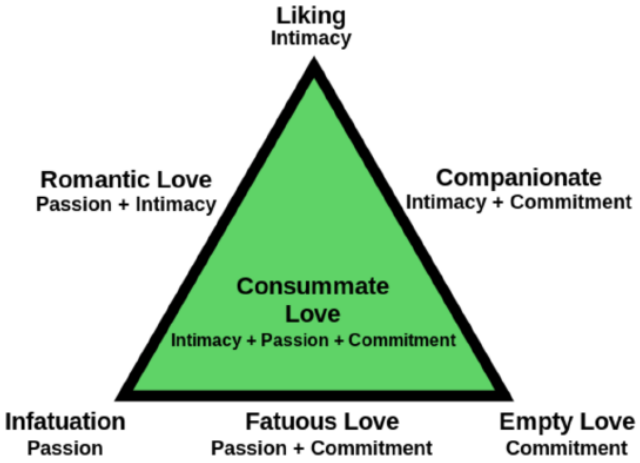
10.2: Love and Attraction Theory

One of the most important factors in interpersonal attraction is similarity: the more similar two people are in attitudes, background, and other traits, the more probable it is that they will like each other. Contrary to popular belief, opposites do not usually attract. Although physical attraction may take precedence in the early stages of a romantic relationship, similarity and other compatibility factors become more important later on.

Sternberg's Triangular Theory of Love

Psychologist Robert Sternberg describes love based on combinations of three components: passion, intimacy, and commitment. When two people share all three, they are said to be in a state of consummate love. This combination is considered to be an ideal type of love, but is also relatively difficult to maintain for a long period of time.



Note

A relationship based on a single component is less likely to survive than one based on two or three components.

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10.3: Effective Communication

Developing Effective Communication Skills

Three skills to Effective Communication

1. Be an active listener

Actively listening means listening without judging and with an openness to want to understand what you are hearing.

2. Communicate clearly

When developing either written or verbal communication it is important to take into consideration your audience, their cultures, and their experiences. Communication takes many skills, it is not just about listening and speaking, but also takes into consideration your thoughts and feelings throughout the exchange and how the setting or type of communication impacts the message. When communicating verbally or through written text it is important to ensure your communication is clear and not too complex or lengthy.

3. Understand body language

Non-verbal clues play a large role in the communication process. Non-verbal feedback may be positive such as nodding the head, maintaining eye contact, and leaning in. Non-verbal feedback can also seem to show uninterest such as looking away, turning the body away, or rolling eyes.

Assertiveness

Assertiveness is an honest and appropriate expression of your feelings, thoughts, wants and needs. Acting in an assertive way helps you to stand up for your rights in a respectful manner. It is a way to communicate what you believe, what you want and need, and what is important to you.

Learning to Be More Assertive

People often associate the concept of assertiveness with standing up for your rights when you feel that someone has taken advantage of you in a negative way. However, it is also important to recognize that being more assertive can help you to communicate in a positive way in your relationships, which helps to promote mutual respect.

Assertiveness can help you:

- speak up when you have a question or concern,
- say “no” when you don’t want to do something, and
- express thoughts or feelings

Communicating assertively does not guarantee that you will get what you want or need. However, you will have the satisfaction of expressing yourself in a positive, self-advocating way. You will probably feel better about yourself and your communication with others. And, you will increase the probability of getting what you need or want, while also respecting the wants or needs of others.

Aggressive, Assertive, and Non-Assertive Behavior

Aggressive behavior often means standing up for yourself in ways that violate the rights of others. Aggressive behavior can be demanding, hostile, and blaming.

Non-Assertive behavior is often submissive, inhibited, passive, and self-denying.

Assertive behavior involves expressing your wants, needs, thoughts and/or feelings while respecting the rights of others.

What keeps people from speaking up in an assertive way?

- Not being clear about what they want and need
- Fear of displeasing others and of not being liked
- Not believing they have the right to be assertive
- Lacking the skills to effectively express themselves

“I” Statements vs. “You” Statements

“I” statements can help you focus on and be clear about your own thoughts and feelings, and what it is that you want or need. They may also involve an acknowledgement of the thoughts/feelings/goals of the other person.

The real focus in “I” statements is on the “I feel,” “I want,” or “I think” part of the statement. Identifying your thoughts, feelings, needs, and wants related to a situation will help you to avoid blaming someone else or getting caught up in the emotion of the moment.

“You” statements, on the other hand, tend to place blame or criticize the other person. This typically puts the other person on the defensive, and does not encourage open communication.

For example, saying “I feel worried when you are running late to meet me for dinner and don’t call to let me know” (I statement) vs. “You are always running late, and never bother to let me know” (You statement) will likely result in two very different reactions and conversations! The first statement simply expresses how the person is feeling, whereas the second statement sets a critical and accusatory tone.

Practice

To become more skilled in communicating assertively it is important to practice. You won’t learn how to become a more assertive person just by reading one book or attending one workshop. You can practice with your friends and family. Let them know what you are doing first! Ask for help/feedback on how you’re doing.

Start Gradually

In the beginning, don’t try changing your behavior in the most complex or difficult situations. Practice first in the least risky ones.

Some examples:

- Returning a purchased item (that you are not satisfied with) to a store for a refund
- Asking your partner/roommate/kids to help empty the dishwasher or take out the garbage
- Suggesting a movie that you would like to watch for an upcoming movie night

If you start small to enhance your chances of success, you will experience how it feels to express yourself assertively and it will be easier to move onto more challenging situations.

Keep in mind:

- No one can read your mind– focus on expressing and communicating what is important to you.

Note

10.4: Sex, Gender, and Sexuality

When filling out official documents, you are often asked to provide your name, birthdate, and sex or gender. But have you ever been asked to provide your sex and your gender? It may not have occurred to you that sex and gender are not the same. However, sociologists and most other social scientists view sex and gender as conceptually distinct. Sex denotes biological characteristics and exists along a spectrum from male to female. Gender, on the other hand, denotes social and cultural characteristics that are assigned to different sexes. Sex and gender are not always synchronous, meaning they do not always line up in an easy-to-categorize way.

Sex

"Sex" refers to physiological differences found among male, female, and various intersex bodies. Sex includes both primary sex characteristics (those related to the reproductive system) and secondary sex characteristics (those that are not directly related to the reproductive system, such as breasts and facial hair). In humans, the biological sex of a child is determined at birth based on several factors, including chromosomes, gonads, hormones, internal reproductive anatomy, and genitalia. Biological sex has traditionally been conceptualized as a binary in Western medicine, typically divided into male and female. However, anywhere from 1.0 to 1.7% of children are born intersex, having a variation in sex characteristics (including chromosomes, gonads, or genitals) that do not allow them to be distinctly identified as male or female. Due to the existence of multiple forms of intersex conditions (which are more prevalent than researchers once thought), many view sex as existing along a spectrum, rather than simply two mutually exclusive categories.

Male, female, and the spectrum of sex

In humans, sex is typically divided into male, female, or intersex (i.e., having some combination of male and female sex characteristics). The symbols (to the left) represent female on the left and male on the right.

Gender

A person's sex, as determined by his or her biology, does not always correspond with their gender; therefore, the terms "sex" and "gender" are not interchangeable. "Gender" is a term that refers to social or cultural distinctions associated with being male, female, or intersex. Typically, babies born with male sex characteristics (sex) are assigned as boys (gender); babies born with female sex characteristics (sex) are assigned as girls (gender). Because our society operates in a binary system when it comes to gender (in other words, seeing gender as only having two options), many children who are born intersex are forcibly assigned as either a boy or a girl and even surgically "corrected" to fit a particular gender. Scholars generally regard gender as a social construct—meaning that it does not exist naturally, but is instead a concept that is created by cultural and societal norms.

Gender identity is a person's sense of self as a member of a particular gender. Individuals who identify with a role that corresponds to the sex assigned to them at birth (for example, they were born with male sex characteristics, were assigned as a boy, and identify today as a boy or man) are cisgender. Those who identify with a role that is different from their biological sex (for example, they were born with male sex characteristics, were assigned as a boy, but identify today as a girl, woman, or some other gender altogether) are often referred to as transgender. The term "transgender" encompasses a wide range of possible identities, including agender, genderfluid, genderqueer, two-spirit (for many indigenous people), androgynous, and many others.

The continuum of sex and gender

Those who identify with a gender that is different from their biological sex are referred to as transgender.

Modern scholars such as Anne Fausto-Sterling and Bonnie Spanier criticize the standard binaries of sex and gender, arguing that sex and gender are both fluid concepts that exist along a spectrum, rather than as binaries.

Cultural Variations of Gender

Since the term “sex” refers to biological or physical distinctions, characteristics of sex will not vary significantly between different human societies. For example, persons of the female sex, in general, regardless of culture, will eventually menstruate and develop breasts that can lactate. Characteristics of gender, on the other hand, may vary greatly between different societies. For example, in American culture, it is considered feminine (or a trait of the female gender) to wear a dress or skirt. However, in many Middle Eastern, Asian, and African cultures, dresses or skirts (often referred to as sarongs, robes, or gowns) can be considered masculine. Similarly, the kilt worn by a Scottish male does not make him appear feminine in his culture.

Sexuality

Human sexuality refers to a person’s sexual interest in and attraction to others, as well as their capacity to have erotic experiences and responses. A person’s sexual orientation is their emotional and sexual attraction to particular sexes or genders, which often shapes their sexuality. Sexuality may be experienced and expressed in a variety of ways, including thoughts, fantasies, desires, beliefs, attitudes, values, behaviors, practices, roles, and relationships. These may manifest themselves in biological, physical, emotional, social, or spiritual aspects. The biological and physical aspects of sexuality largely concern the human reproductive functions, including the human sexual-response cycle and the basic biological drive that exists in all species. Emotional aspects of sexuality include bonds between individuals that are expressed through profound feelings or physical manifestations of love, trust, and care. Social aspects deal with the effects of human society on one’s sexuality, while spirituality concerns an individual’s spiritual connection with others through sexuality.

Note

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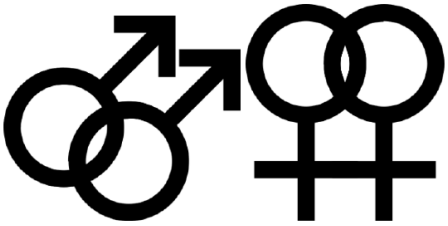
10.5: LGBT Health



Lesbian, Gay, Bisexual, and Transgender Health

People who are lesbian, gay, bisexual, or transgender (LGBT) are members of every community. They are diverse, come from all walks of life, and include people of all races and ethnicities, all ages, all socioeconomic statuses, and from all parts of the United States and world. The perspectives and needs of LGBT people should be routinely considered in public health efforts to improve the overall health of every person and eliminate health disparities.

In addition to considering the needs of LGBT people in programs designed to improve the health of entire communities, there is also a need for culturally competent medical care and prevention services that are specific to this population. Social inequality is often associated with poorer health status, and sexual orientation has been associated with multiple health threats. Members of the LGBT community are at increased risk for a number of health threats when compared to their heterosexual peers. Differences in sexual behavior account for some of these disparities, but others are associated with social and structural inequities, such as the stigma and discrimination that LGBT populations still experience.

The Effects of Negative Attitudes and Discrimination

Lesbian, Gay, Bisexual, and Transgender (LGBT) sexual health and well-being is affected by numerous social and cultural challenges across the life course, contributing to negative health outcomes and posing barriers to attain such protective health indicators as marriage and family formation, community support, and inclusion in faith communities.

The incidence of hate crimes and discrimination promulgated through the denial of equal rights contribute to the perpetuation of homophobia as a structural norm. As a result of cultural and societal discrimination, many LGBT people suffer an added burden of stress and experience health disparities, such as:

- Potential difficulties in getting or keeping health insurance, and possible employment instability.
- Limited access to high quality health care that is responsive to LGBT health issues.
- Mental health problems and unhealthy coping skills, such as substance abuse, risky sexual behaviors, and suicide attempts.
- Challenges or difficulties with being open about one’s sexual orientation, which can increase stress, limit social support, and negatively affect overall health.

The effects of homophobia, stigma and discrimination can be especially hard on adolescents and young adults. In addition to an increased risk of being bullied at school, they are also at risk of being rejected by their families and, as a result, are at increased risk of homelessness. A study published in 2009 compared gay, lesbian, and bisexual young adults who experienced strong rejection from their families with their peers who had more supportive families. The researchers found that those who experienced stronger rejection were about:

- 8 times more likely to have tried to commit suicide
- 6 times more likely to report high levels of depression
- 3 times more likely to use illegal drugs
- 3 times more likely to have risky sex

Increasing Positive Perceptions and Acceptance

Whether you are gay or straight, you can help reduce homophobia, stigma, and discrimination in your community and decrease the associated negative health effects. Even small things can make a difference, such as accepting and supporting a family member, friend, or co-worker.

For additional information about Sexual Orientation, click here.

Note

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10.6: Contraception

Purpose and Effectiveness of Contraceptives

Using Contraceptives has two main purposes:

1. Reduce the chance of unwanted pregnancies
2. Reduce the transmission of Sexually Transmitted Diseases

Some birth control methods may be more effective for reducing unwanted pregnancies, whereas other methods may be more effective for reducing the transmission of STD's. There are many different types of contraceptives, it is important to know and understand the effectiveness from both perspectives in order to make the best decision.

In terms of reducing unwanted pregnancies, the effectiveness is also impacted by the way in which the contraceptive method is used. If a person uses the method perfectly, **Perfect Use Effectiveness**, it will have a higher effectiveness than those who are considered typical users, **Typical Use Effectiveness**.

The **contraceptive effectiveness rate, or failure rate,** is calculated based on typical use as the percentage of typical couples who use the method for one full year and experience an unintended pregnancy.

There are two main categories for birth control methods, **reversible methods** and **permanent methods**. Reversible methods may use hormones, a barrier, or fertility awareness to reduce the chance of pregnancy.

Reversible Methods for Birth Control

Reversible methods for birth control refer to birth control methods where users can stop using the method and become pregnant. There are three main types of reversible contraceptives, hormonal methods, barrier methods, and Fertility-Awareness Methods.

Hormonal Methods

When a woman is pregnant they no longer release an egg each month and if there is no egg released, they cannot become pregnant. Hormonal methods reduce the chance of pregnancy by providing hormones to the woman that tricks the woman's body into thinking they are pregnant, thus the egg is not released each month. There are several different hormonal methods that each provide the hormones to the woman in a different way.

Note

HORMONAL METHODS DO NOT PROTECT AGAINST SEXUALLY TRANSMITTED DISEASES BUT ARE EFFECTIVE FOR BIRTH CONTROL.

Barrier Methods

In order for pregnancy to occur the egg from a woman and the sperm from a man must meet. If the sperm fertilizes the egg then conception, or pregnancy, occurs. Barrier methods of birth control work by creating a barrier in which the egg and sperm cannot meet.

Permanent Methods of Birth Control

Permanent methods of birth control are also referred to as sterilization. These methods are for those who are sure that they do not want to conceive a child. Women choosing a permanent method can have their fallopian tubes tied or closed off, called a tubal ligation, or they can choose to have a small tube inserted into the fallopian tubes, called transcervical sterilization, which irritates the fallopian tubes causing scar tissue to form and close off the tubes. Men commonly get a vasectomy which is an outpatient procedure in which the tube that carries sperm it cut.

Highly Effective Reversible Birth Control Methods

-

Abstinence

- Description: The only 100% effective means of unintended pregnancy and STD transmission is abstinence from oral, anal, or vaginal intercourse
- Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 0%

- IntraUterine Device (IUD), Copper IUD (ParaGard), Levonorgestrel-Releasing IUD (Mirena)
  - Description: As the name suggests, this is a device that goes inside (intra) the woman's uterus. There are two types of IUD's, one contains hormones and the other does not. The IUD is a T-shaped device that is inserted into the uterus. The Copper IUD can stay in the uterus up to 10 years and the hormonal IUD, the levonorgetrel-releasing IUD, can remain in the uterus for 5 years.
  - Type: Reversible, some are hormonal methods
  - Use: The IUD is inserted into the Uterus by a physician during a routine office visit through a non-surgical procedure.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: less than 1%

- The Implant, Implanon
  - Description: The hormonal implant is a small match sized stick that is inserted into the woman's upper arm and releases hormones (progestin only) for 3 years.
  - Type: Reversible, hormonal method
  - Use: The implant is a minor surgical procedure. Woman choosing the implant must make an appointment with their doctor for the procedure. The stick is inserted into the inside upper arm just under the skin.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 0.05%

Moderately Effective Reversible Birth Control Methods

- The Pill, combination pill, mini-pill
  - Description: The pill is an oral contraceptive. The combination pill includes both estrogen and progestin, however the mini-pill contains only progestin. The Progestin only mini-pill may be a good option for woman who cannot take estrogen. Pill packs contain 28 pills. For three weeks, 21 days, the pills contain hormones and the fourth week the pills are placebo pills without hormones. The week with no hormones is when the menstrual cycle occurs.
  - Type: Reversible, hormonal method
  - Use: Women who choose to use the pill swallow a single pill every day. It is very important that the pill is taken at the same time each day. The effectiveness of the pill is lowered if it is not used correctly. If the pill is ingested at different times each day or if the woman forgets to take a pill and takes two the next day it will not be as effective at reducing the chance for pregnancy.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 9%

- The Shot, Injectable contraceptives, Depo-Provera
  - Description: The shot is an injectable contraceptive which means the woman has to go to the doctor to receive an injection of hormones.
  - Type: Reversible, hormonal method
  - Use: Woman who choose an injectable contraceptive get a shot either once every three months.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 6%

- The Patch, dermal (placed on the skin for absorption), Ortho Evra
  - Description: The skin patch provides hormones to women by means of absorption through the skin.
  - Type: Reversible, hormonal method
  - Use: Woman using the patch place it on their body typically on the buttocks, stomach, or upper body. The patch is replaced every week for three weeks and the fourth week no patch is used.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 9%

- The Ring, Hormonal Vaginal Contraceptive Ring, NuvaRing
  - Description: The vaginal ring is a soft silicon ring closely resembling a bracelet in size. The Ring contains hormones that are absorbed into the woman's body for 3 weeks.

- Type: Reversible, hormonal method
- Use: The ring is inserted into the vagina, similarly to the way a tampon is inserted, and stays in place for 3 weeks while slowly releasing hormones. The ring is removed for the fourth week and menstrual flow begins.
- Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 9%

- Diaphragm or cervical cap
  - Description: The diaphragm and Cervical Cap both have the same purpose, to cover the entrance to the uterus by providing a barrier to prevent sperm from entering the woman's body. Both are shaped like a small cup and used along with spermicide. A consultation with a doctor is important to ensure the proper size is used. If a woman gains or loses significant weight or gives birth the woman will need to see a doctor again to ensure the correct size is used.
  - Type: Reversible, barrier method
  - Use: The woman inserts the diaphragm or cervical cap along with spermicide.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 12%

Least Effective Reversible Birth Control Methods

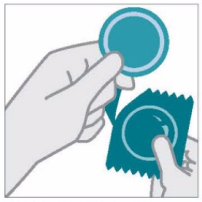
- Male Condom
  - Description: The male condom is a thin sheath that covers the penis, thus creating a barrier that should not allow the sperm to enter the woman's body. Male condoms are usually made from latex, however there alternative materials such as "natural" or "lambskin". Research shows latex are more effective for reducing STD's and pregnancies.
  - Type: Reversible, barrier method
  - Use: It is very important to use male condoms correctly! Correct use means purchasing the appropriate size, checking to make sure they are stored correctly and used before the expiration date, putting the condom on before any penetration, opening the condom carefully and ensuring to pinch the tip of the condom prior to carefully rolling the condom onto the erect penis, not using oil based lubricants, not reusing a condom, and not using more than one condom at a time.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 18%
  - STD Protection: When used correctly, the male condom can be an effective method to reduce the transmission of STD's. Studies have been conducted comparing HIV infection rates between condom users and non-condom user and have shown high effectiveness in reducing the transmission of HIV.

The Right Way To Use A Male Condom

Condom Dos and Don'ts

- **DO** use a condom every time you have sex.
- **DO** put on a condom before having sex.
- **DO** read the package and check the expiration date.
- **DO** make sure there are no tears or defects.
- **DO** store condoms in a cool, dry place.
- **DO** use latex or polyurethane condoms.
- **DO** use water-based or silicone-based lubricant to prevent breakage.
- **DON'T** store condoms in your wallet as heat and friction can damage them.
- **DON'T** use nonoxynol-9 (a spermicide), as this can cause irritation.
- **DON'T** use oil-based products like baby oil, lotion, petroleum jelly, or cooking oil because they will cause the condom to break.
- **DON'T** use more than one condom at a time.
- **DON'T** reuse a condom.

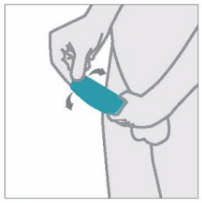
How To Put On and Take Off a Male Condom



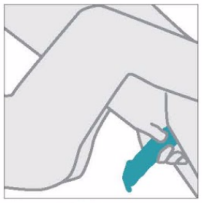
Carefully open and remove condom from wrapper.

Place condom on the head of the erect, hard penis. If uncircumcised, pull back the foreskin first.

Pinch air out of the tip of the condom.



Unroll condom all the way down the penis.



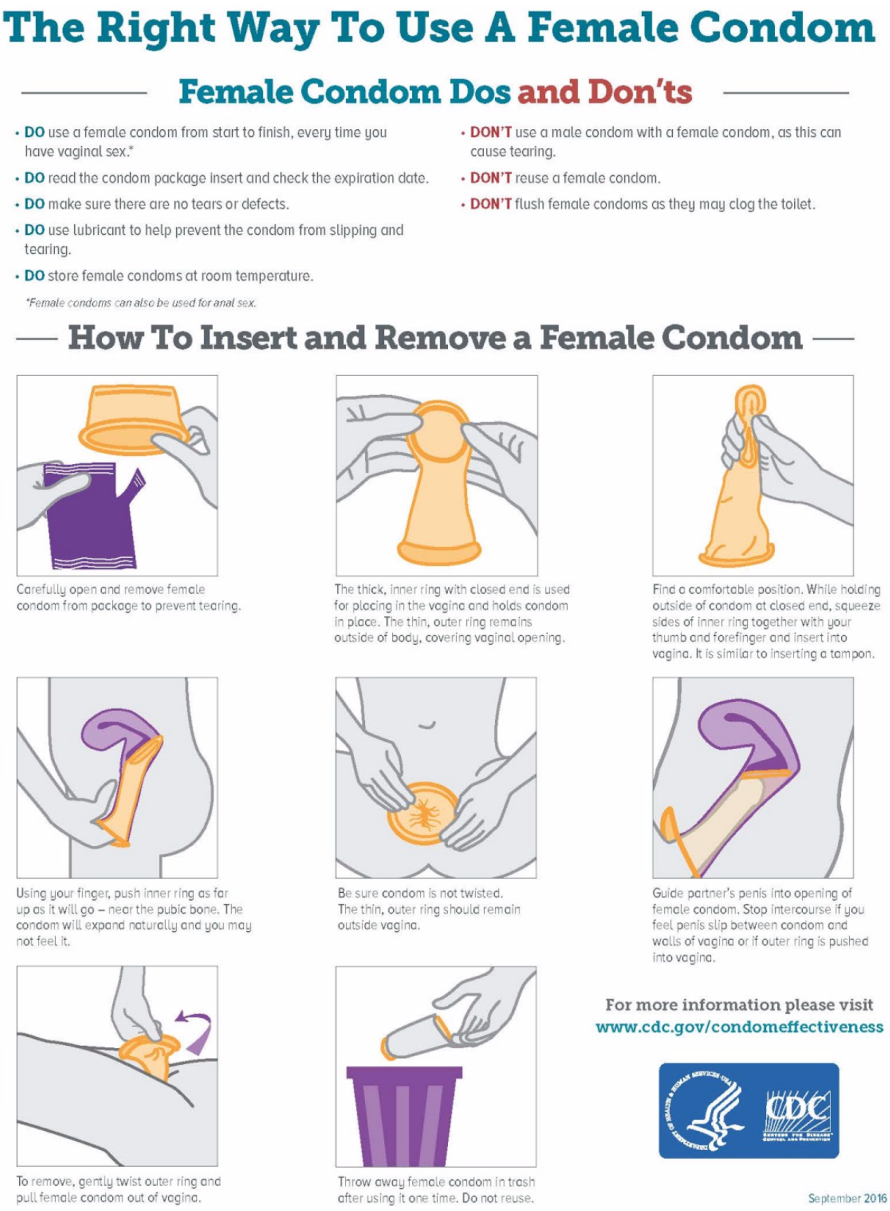
After sex but before pulling out, hold the condom at the base. Then pull out, while holding the condom in place.

Carefully remove the condom and throw it in the trash.

For more information please visit
www.cdc.gov/condomeffectiveness

September 2016

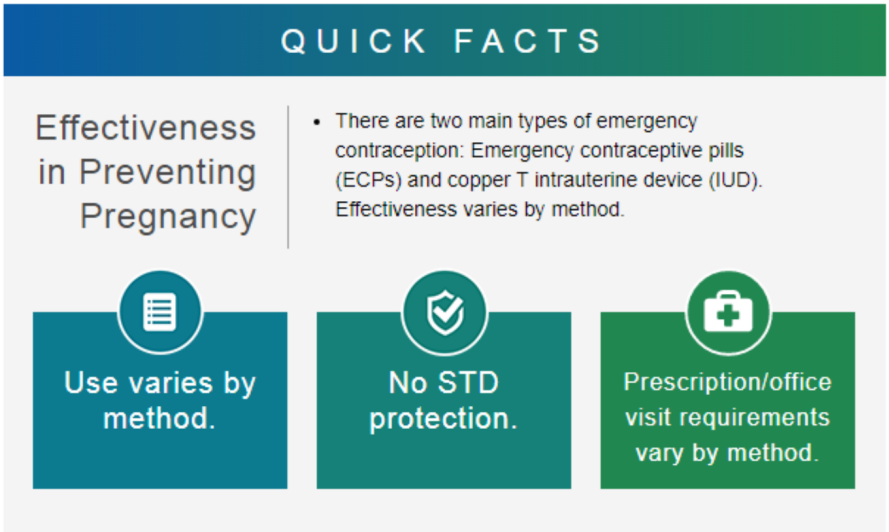
- Female Condom
  - Description: The female condom is a thin pouch that is inserted into the vagina in order to create a barrier to stop the sperm from entering the woman's body.
  - Type: Reversible, barrier method
  - Use: The female condom is used with a lubricant and can be inserted into the vagina up to 8 hours before intercourse.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 21%
  - STD Protection: In terms of HIV transmission, when used correctly, the female condom can be as effective as the male condom to reduce the transmission of STD's.



- Fertility Awareness Method (FAM)
  - Description: Fertility Awareness is a natural method of birth control that is based on understanding a woman's reproductive cycle. Beginning in puberty and until menopause, women typically release one egg each month from their ovaries. The time around when the egg is released is considered the fertile time of the month. Couples who use the Fertility Awareness Method, and do not want to conceive a child, abstain from intercourse during the fertile days. Many couples use the Fertility Awareness Method when they are trying to conceive as well.
  - Type: Reversible, Natural
  - Use: Women who choose to use FAM must spend several months, or up to a year, tracking their menstrual cycle. Two common ways to track fertility are the Calendar Method and Basal Body Temperature Method.
    - The Calendar Method:
      - Woman choosing the calendar method must track their menstrual cycle using a calendar to identify the length of their cycle. Women typically track their cycle for 8-12 months. The average length of the menstrual cycle is 28 days, but normal cycles vary between 21 to 35 days. Day 1 of the menstrual cycle is the first day of menstruation (bleeding). To calculate the day the egg is released take your total cycle length and subtract 14. For example, if the total cycle length is 28 days, then the date of ovulation (egg released) is on day 14. If the

total cycle length is 31 days, ovulation occurs around day 17. Abstaining from intercourse on day of ovulation is not enough, you must take into account days preceding ovulation and the days after ovulation. After the egg is released (ovulation) it has two days to become fertilized by a sperm. If the egg does not get fertilized by a sperm then it dies and is shed during menstrual flow. Sperm can live inside a woman's body about 4 days, so you must account for these possible fertile days prior to ovulation.
        - Because most women have varying cycle lengths, to calculate the fertile days, subtract 18 from your shortest cycle and subtract 11 from your longest cycle.
    - Basal Body Temperature Method:
        - Basal Body Temperature is your body temperature when you wake up in the morning. During ovulation a woman's body temperature rises slightly. Women who use this method record their basal body temperature every morning and note then there is a slight increase. The slight increase indicates ovulation, the release of the egg. Women using this method abstain from intercourse 2-3 days prior to ovulation and 12-24 hours after ovulation.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: 24%
  - STD Protection: There is no protection against STD's.

- Emergency Birth Control
- The Morning After Pill, Emergency Contraception, Plan B
  - Description: As the name suggests, Emergency Contraceptives are for emergencies and are not a regular method of birth control. If a woman has unprotected sex or if the birth control method used failed, emergency contraceptives may be a good option for reducing the chances of an unintended pregnancy. Emergency Contraception may include taking a pill or choosing to insert an IntraUterine Device, also called an IUD.
  - Use: Emergency Contraceptives can be obtained from a pharmacy. Some emergency contraceptives can be taken up to 5 days after intercourse, but the sooner they are taken the more effective it will be. Plan B, a common Emergency Contraceptive, should be taken within 3 days, or 72 hours.
  - Contraceptive Effectiveness Rate, or Typical Use Failure Rate: varying
    - The effectiveness is impacted by the type of Emergency Contraceptive used and the time between taking the contraceptive and intercourse.



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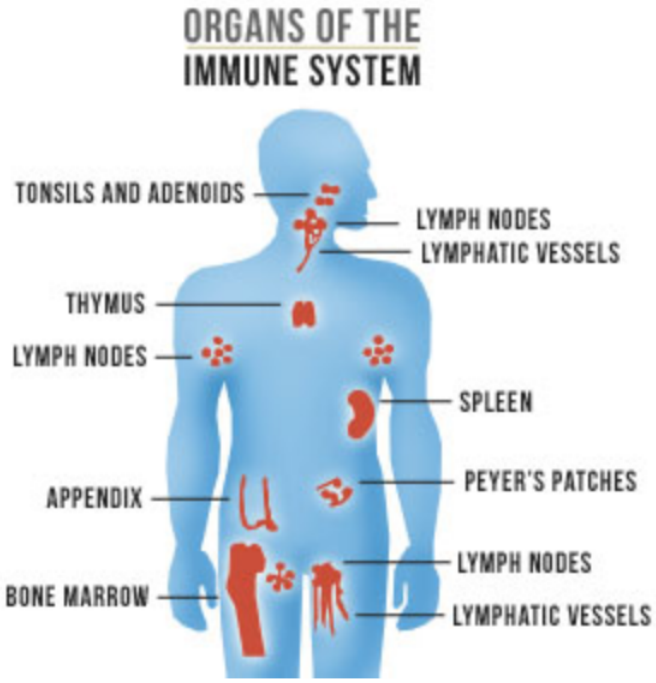
CHAPTER OVERVIEW

11: IMMUNE SYSTEM, INFECTIOUS DISEASES, AND STD'S/STI'S

11.1: The Immune System

Our immune system works all day every day to fight off infections and diseases. The immune system consists of bone marrow, spleen, tonsils, thymus, lymph nodes, and lymphatic vessels. Because the lymph node and lymphatic vessels are part of the immune system, the immune system is sometimes referred to as the lymphatic system.

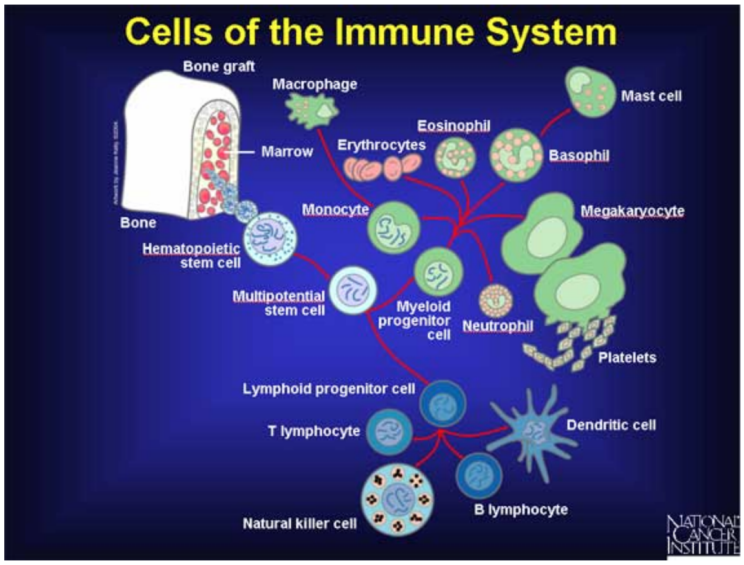
The immune system produces, stores, and carries white blood cells around the body. The job of white blood cells is to fight off infection. The enemies the white blood cells are fighting are called antigens. Antigens are the markers on foreign substances that cause an immune response. Every **pathogen**, or disease causing agent, that enters the body has a different antigen. Common pathogens include bacteria, virus', parasitic worms, fungi, and prions.



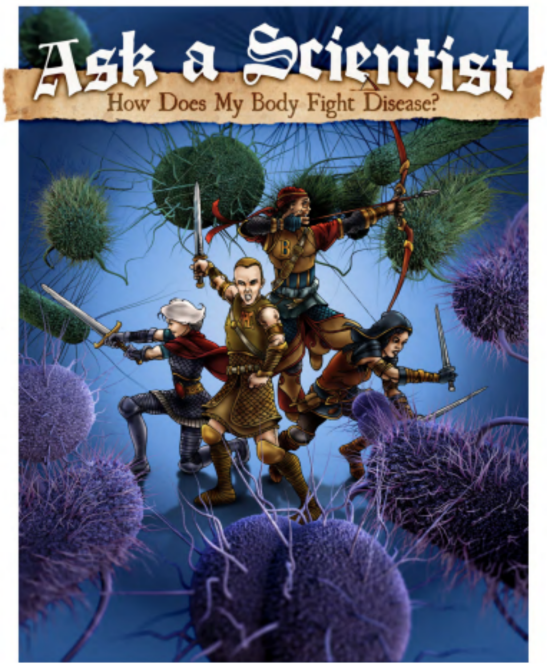
- **Lymph:** a clear fluid that travels through the lymphatic system and carries cells that help fight infections and other diseases.
- **Lymph nodes:** rounded masses of lymphatic tissue that is surrounded by a capsule of connective tissue. Lymph nodes filter lymph, and they store white blood cells. They are located along lymphatic vessels.
- **Lymph vessels:** thin tubes that carry lymph and white blood cells through the lymphatic system. They branch, like blood vessels, into all the tissues of the body.
- **The thymus:** an organ in the chest behind the breastbone. T lymphocytes grow and multiply in the thymus.
- **The spleen:** an organ on the left side of the abdomen, near the stomach. It produces some white blood cells, filters the blood, stores blood cells, and destroys old blood cells.
- **White blood cells:** cells are made by bone marrow and help the body fight infection and other diseases. There are lots of types of white blood cells.

Because we have many different key players in our immune system and each has a specialized role, it can be helpful to learn about the immune system through a visualization. Imagine that our white blood cells are warriors fighting a battle or are superheroes saving our body. The CDC developed a program for 9-12 year olds called *BAM!* that describes the immune system as the Immune Platoon, a team of super-powered white blood cells that protect our bodies. Each member of the immune platoon has a different super power, much like each type of white blood cells. When a pathogen enters the body, the antigen is read by the cells. Some white blood cells absorb the pathogen, others release antibodies that knock out the antigen, and others destroy the damaged cells.

Types of white blood cells include: Macrophages, eosinophils, basophils, mast cells, natural killer cells, dendritic cells, t-cells, and b-cells. For information on the role ach type of cell plays in the immune response please click here.



The CDC has also published the “Ask a Scientist” series, which provides two graphic comic strips to help explain how the body fights off disease and how it can become infected with germs.



Common Pathogen: Influenza

What is Influenza (also called Flu)?

The flu is a contagious respiratory illness caused by influenza viruses that infect the nose, throat, and lungs. It can cause mild to severe illness, and at times can lead to death. The best way to prevent the flu is by getting a flu vaccine each year.

Signs and Symptoms of Flu

People who have the flu often feel some or all of these signs and symptoms:

- Fever* or feeling feverish/chills
- Cough
- Sore throat

- Runny or stuffy nose
- Muscle or body aches
- Headaches
- Fatigue (very tired)
- Some people may have vomiting and diarrhea, though this is more common in children than adults.

*It's important to note that not everyone with flu will have a fever.

How Flu Spreads

Most experts believe that flu viruses spread mainly by droplets made when people with flu cough, sneeze or talk. These droplets can land in the mouths or noses of people who are nearby. Less often, a person might also get flu by touching a surface or object that has flu virus on it and then touching their own mouth, eyes or possibly their nose.

Period of Contagiousness

You may be able to pass on the flu to someone else before you know you are sick, as well as while you are sick. Most healthy adults may be able to infect others beginning 1 day before symptoms develop and up to 5 to 7 days after becoming sick. Some people, especially young children and people with weakened immune systems, might be able to infect others for an even longer time.

Onset of Symptoms

The time from when a person is exposed to flu virus to when symptoms begin is about 1 to 4 days, with an average of about 2 days.

Complications of Flu

Complications of flu can include bacterial pneumonia, ear infections, sinus infections, dehydration, and worsening of chronic medical conditions, such as congestive heart failure, asthma, or diabetes.

People at High Risk from Flu

Anyone can get the flu (even healthy people), and serious problems related to the flu can happen at any age, but some people are at high risk of developing serious flu-related complications if they get sick. This includes people 65 years and older, people of any age with certain chronic medical conditions (such as asthma, diabetes, or heart disease), pregnant women, and young children.

Preventing Flu

The first and most important step in preventing flu is to get a flu vaccination each year. CDC also recommends everyday preventive actions (like staying away from people who are sick, covering coughs and sneezes and frequent handwashing) to help slow the spread of germs that cause respiratory (nose, throat, and lungs) illnesses, like flu.

Diagnosing Flu

It is very difficult to distinguish the flu from other viral or bacterial causes of respiratory illnesses on the basis of symptoms alone. There are tests available to diagnose flu. For more information, see Diagnosing Flu.

Treating

There are influenza antiviral drugs that can be used to treat flu illness.

For more information, see "Seasonal Influenza, More Information."

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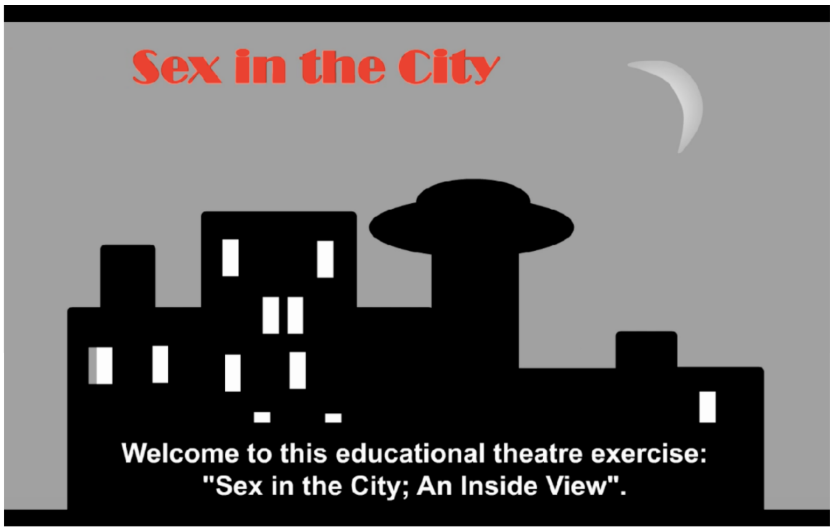
11.2: STD's/STI's

The Relationship of STD's and HIV

Now that you have learned about the immune system and how the immune cells work to fight off infection is it now important to understand the relationship of STD's and HIV. What is the relationship of STD's to HIV? Take a few minutes to watch the CDC video Sex in the City. Click here to go the website where you can watch the full video.



STD Data

> CDC Fact Sheet: Reported STDs in the United States 2016: High Burden of STD's Threaten Millions of Americans

Many cases of chlamydia, gonorrhea, and syphilis continue to go undiagnosed and unreported, and data on several additional STDs — such as human papillomavirus, herpes simplex virus, and trichomoniasis — are not routinely reported to CDC. As a result, the annual surveillance report captures only a fraction of the true burden of STDs in America. However, it provides important insights into the scope, distribution, and trends in STD diagnoses in the country.

More than 2 million cases of the three nationally reported STDs – chlamydia, gonorrhea, and syphilis – were reported in the United States in 2016, the highest number ever.

Cases Reported in 2016

Chlamydia	Gonorrhea	Primary & Secondary Syphilis
1,598,354 Rate per 100,000 people: 497	468,514 Rate per 100,000 people: 146	27,814 Rate per 100,000 people: 9

STDs are a substantial health challenge facing the United States. CDC estimates that nearly 20 million new sexually transmitted infections occur every year in this country, half among young people aged 15–24, and account for almost $16 billion in health care costs. Each of these infections is a potential threat to an individual's immediate and long-term health and well-being. In addition to increasing a person's risk for acquiring and transmitting HIV infection, STDs can lead to chronic pain and severe reproductive health complications, such as infertility and ectopic pregnancy.

Types of STDs/STIs

What are some types of sexually transmitted diseases or sexually transmitted infections (STDs/STIs)?

Approximately 20 different infections are known to be transmitted through sexual contact. Here are descriptions of some of the most common and well known:

- Chlamydia

- Gonorrhea
- Genital Herpes
- HIV/AIDS
- Human Papillomavirus (HPV)
- Syphilis
- Bacterial Vaginosis
- Trichomoniasis
- Viral Hepatitis

Chlamydia

Chlamydia is a common STD/STI caused by the bacterium Chlamydia trachomatis. Chlamydia can be transmitted during vaginal, oral, or anal sexual contact with an infected partner. While many individuals will not experience symptoms, chlamydia can cause fever, abdominal pain, and unusual discharge of the penis or vagina.

In women, whether or not they are having symptoms and know about their infection, chlamydia can cause pelvic inflammatory disease (PID). In PID, the untreated STD/STI progresses and involves other parts of the woman's reproductive system, including the uterus and fallopian tubes. This progression can lead to permanent damage to the woman's reproductive organs. This damage may lead to ectopic pregnancy (in which the fetus develops in abnormal places outside of the womb, a condition that can be life-threatening) and infertility.

Additionally, if the woman is pregnant, her developing fetus is at risk, because chlamydia can be passed on during her pregnancy or delivery and could lead to eye infections or pneumonia in the infant. If chlamydia is detected early, it can be treated easily with an antibiotic taken by mouth.

Chlamydia Treatment

Gonorrhea and chlamydia are bacterial STDs/STIs that can be treated with antibiotics given either orally or by injection. Because the infections often occur together, people who have one infection are typically treated for both by their health care provider. Recent sexual partners should be treated at the same time.

Gonorrhea

Gonorrhea is caused by the bacterium Neisseria gonorrhoeae, which can grow rapidly and multiply easily in the warm, moist areas of the reproductive tract. The most common symptoms of gonorrheal infection are a discharge from the vagina or penis and painful or difficult urination.

As with chlamydial infection, the most common and serious complications of gonorrhea occur in women and include pelvic inflammatory disease (PID), ectopic pregnancy, infertility, and the potential spread to the developing fetus if acquired during pregnancy. Gonorrhea also can infect the mouth, throat, eyes, and rectum and can spread to the blood and joints, where it can become a life-threatening illness.

In addition, people with gonorrhea can more easily contract HIV, the virus that causes AIDS. HIV-infected people with gonorrhea are also more likely to transmit the virus to someone else.

Gonorrhea Treatment

Gonorrhea and chlamydia are bacterial STDs/STIs that can be treated with antibiotics given either orally or by injection. Because the infections often occur together, people who have one infection are typically treated for both by their health care provider. Recent sexual partners should be treated at the same time.

Genital Herpes

Genital herpes is a contagious infection caused by the herpes simplex virus (HSV). There are two different strains, or types, of HSV: herpes simplex virus type 1 (HSV-1) and type 2 (HSV-2). Both can cause genital herpes, although most cases of genital herpes are caused by HSV-2. When symptomatic, HSV-1 usually appears as fever blisters or cold sores on the lips, but it can also infect the genital region through oral-genital or genital-genital contact. Symptomatic HSV-2 typically causes painful, watery skin blisters on or around the genitals or anus. However, substantial numbers of people who carry these viruses have no or only minimal signs or symptoms.

Neither HSV-1 nor HSV-2 can be cured, and even during times when an infected person has no symptoms, the virus can be found in the body's nerve cells. Periodically, some people will experience outbreaks in which new blisters form on the skin in the genital area; at those times, the virus is more likely to be passed on to other people.

Pregnant women, especially those who acquire genital herpes for the first time during pregnancy, may pass the infection to their newborns, causing life-threatening neonatal HSV, an infection affecting the infant's skin, brain, and other organs.

Genital Herpes Treatment

Genital herpes outbreaks can be treated with antiviral drugs. Although this medication can limit the length and severity of outbreaks, it does not cure the infection. In addition, daily suppressive therapy (daily use of antiviral medication) for herpes can reduce the likelihood of transmission to partners. A pregnant woman known to have the infection must take additional care because she can pass the infection to her infant during delivery. Women who first acquire genital HSV during pregnancy are at highest risk of transmission to their infants. If a pregnant woman has an outbreak when she goes into labor, she may need to have a cesarean section (C-section) to prevent the infant from getting the virus during birth.

HIV/AIDS

HIV, or the human immunodeficiency virus, is the virus that causes AIDS (acquired immunodeficiency syndrome). HIV destroys the body's immune system by killing the blood cells that fight infection. Once HIV destroys a substantial proportion of these cells (CD4 cells), the body's ability to fight off and recover from infections is compromised. This advanced stage of HIV infection is known as AIDS.

The CD4 count is like a snapshot of how well your immune system is functioning. CD4 cells (also known as CD4+ T cells) are white blood cells that fight infection. The more you have, the better. These are the cells that the HIV virus kills. As HIV infection progresses, the number of these cells declines. When the CD4 count drops below 200 due to advanced HIV disease, a person is diagnosed with AIDS. A normal range for CD4 cells is about 500-1,500. Usually, when a person with low CD4 cells starts HIV medicines, the CD4 cell count increases as the HIV virus is controlled. Most, but not all, people will experience an increase in CD4 cells with effective HIV treatment.

People whose HIV has progressed to AIDS are very susceptible to opportunistic infections that do not normally make people sick and to certain forms of cancer.

AIDS can be prevented by early initiation of antiretroviral therapy in those with HIV infection. Transmission of the virus primarily occurs during unprotected sexual activity and by sharing needles used to inject intravenous drugs, although the virus also can spread from mother to infant during pregnancy, delivery, and breastfeeding.

In 2013, NIH-supported researchers reported that a 2-year-old child who was born with HIV and was treated starting in the first few days of life has had her HIV infection go into remission. This appears to be the first case of functional cure of HIV.

HIV/AIDS Treatment

There is no cure for HIV/AIDS. However, research into new treatments has improved outcomes for people living with the disease. A combination of antiretroviral drugs can be given in highly active antiretroviral therapy to control the virus, promote a healthy immune system, help people with the virus live longer lives, and reduce the risk of transmission.

Human Papillomavirus (HPV)

HPV is the most common STD/STI. More than 40 HPV types exist, and all of them can infect both men and women. The types of HPVs vary in their ability to cause genital warts; infect other regions of the body, including the mouth and throat; and cause cancers of the cervix, vulva, penis, and mouth.

Although no cure exists for HPV infection once it occurs, regular screening with a Pap smear test can prevent or detect at an early stage most cases of HPV-caused cervical cancer. (A Pap smear test involves a health care provider taking samples of cells from the cervix during a standard gynecologic exam; these cells are examined under a microscope for signs of developing cancer).

Newly available vaccines protect against most (but not all) HPV types that cause cervical cancer. The three vaccines that are approved are Gardasil, Gardasil 9, and Ceravix. These vaccines prevent infection of HPV types 16 and 18, which cause 70% of infections. The American Academy of Pediatrics recommends this vaccine for school-aged boys and girls.

Human Papillomavirus Treatment

A person who has an HPV infection cannot be cured. However, many HPV infections can be prevented with vaccination. Furthermore, a healthcare provider can treat genital warts caused by the virus as well as monitor and control a woman's risk of cervical cancer through frequent screening with Pap smear tests.

Syphilis

Syphilis infections, caused by the bacterium Treponema pallidum, are passed from person to person during vaginal, anal, or oral sex through direct contact with sores, called chancres. Between 2001 and 2009, the Centers for Disease Control and Prevention (CDC) data show that the syphilis rate increased each year. Those people at highest risk for syphilis include men having sex with both men and women and people residing in the south. The first sign of syphilis is a chancre, a painless genital sore that most often appears on the penis or in and around the vagina. Beyond being the first sign of a syphilis infection, chancres make a person two to five times more likely to contract an HIV infection. If the person is already infected with HIV, chancres also increase the likelihood that the virus will be passed on to a sexual partner. These sores typically resolve on their own, even without treatment. However, the body does not clear the infection on its own, and, over time, syphilis may involve other organs, including the skin, heart, blood vessels, liver, bones, and joints in secondary syphilis. If the illness is still not treated, tertiary syphilis can develop over a period of years and involve the nerves, eyes, and brain and can potentially cause death.

Expectant mothers harboring the bacterium are at an increased risk of miscarriage and stillbirth, and they can pass the infection on to their fetuses during pregnancy and delivery. Infants that acquire congenital syphilis during pregnancy may suffer from skeletal deformity, difficulty with speech and motor development, seizure, anemia, liver disease, and neurological problems.

Syphilis Treatment

If recognized during the early stages, usually within the first year of infection, syphilis can be treated with a singular intramuscular injection of antibiotic. A person being treated for syphilis must avoid sexual contact until the chancre sores caused by the bacteria are completely healed to avoid infecting other people. If a person does not recognize the infection early, or does not seek treatment immediately, longer treatment with antibiotics may be required. If left untreated, the infection can progress even further and potentially cause death. Although antibiotics can prevent the infection from getting worse, they cannot reverse damage that has already occurred.

Bacterial Vaginosis

Bacterial vaginosis is a common, possibly sexually transmitted, vaginal infection in women of reproductive age. While it is healthy and normal for a vagina to have bacteria, just like the skin, mouth, or gastrointestinal (GI) tract, sometimes changes in the balance of different types of bacteria can cause problems.

Bacterial vaginosis occurs when problematic bacteria that are normally present only in small amounts increase in number, replace normal vaginal lactobacilli bacteria, and upset the usual balance. This situation becomes more likely if a woman douches frequently or has new or multiple sexual partners. The most common sign of a bacterial vaginosis infection is a thin, milky discharge that is often described as having a "fishy" odor. However, some women will have no symptoms at all.

Regardless of symptoms, having bacterial vaginosis increases the risk of getting other STDs/STIs and is also associated with pelvic inflammatory disease (PID), an infection of the female reproductive organs, including the uterus and the fallopian tubes (which carry eggs to the uterus), and postoperative infections. Preterm labor and birth are also possibly more common in women with bacterial vaginosis.

Bacterial vaginosis Treatment

Bacterial vaginosis can be treated with antibiotics, typically metronidazole or clindamycin. Generally, male sexual partners of women with bacterial vaginosis do not need to be treated because treatment of partners has not been shown to reduce the risk of recurrence. Treatment during pregnancy is recommended primarily for women at risk for preterm labor or having a low birthweight infant.

Trichomoniasis

Trichomoniasis infection is caused by the single-celled protozoan parasite Trichomonas vaginalis and is common in young, sexually active women. The parasite also infects men, though less frequently. The parasite can be transmitted between men and women as well as between women whenever physical contact occurs between the genital areas. Although Trichomoniasis infections do not always cause symptoms, they can cause frequent, painful, or burning urination in men and women as well as vaginal discharge, genital soreness, redness, or itching in women. Because the infection can occur without symptoms, a person may be unaware that he or she is infected and continue to re-infect a sexual partner who is having recurrent signs of infection. As with bacterial STDs/STIs, all sexual partners should be treated at the same time to avoid reinfection.

NICHD-sponsored research has shown that during pregnancy, women with Trichomoniasis infection are associated with an increased risk of premature birth and infants with low birth weight. Moreover, infants born to mothers with Trichomoniasis infection are more than twice as likely as infants born to uninfected women to be stillborn or to die as newborns.

Trichomoniasis Treatment

Trichomoniasis can be treated with a single dose of an antibiotic, usually either metronidazole or tinidazole, taken by mouth. Often, Trichomonas infection recurs, so it is important to make sure that both you and your sexual partners are treated if you are diagnosed with this infection.

Viral Hepatitis

Viral hepatitis is a serious liver disease that can be caused by several different viruses, which can be transmitted through sexual contact.

- Hepatitis A virus (HAV) causes a short-term or self-limited liver infection that can be quite serious, although it does not result in chronic infection. While there are other ways the virus can be transmitted, HAV can be spread from person to person during sexual activity through oral-rectal contact. Vaccination can prevent HAV infection.
- Hepatitis B virus (HBV) causes a serious liver disease that can result in both immediate illness and lifelong infection leading to permanent liver scarring (cirrhosis), cancer, liver failure, and death. HBV spreads through both heterosexual and homosexual contact as well as through contact with other bodily fluids, such as blood, through shared contaminated needles used for injecting intravenous (IV) drugs, tattooing, and piercing. Pregnant women with HBV can transmit the virus to their infants during delivery. HBV infection is preventable through vaccination.
- Hepatitis C virus (HCV) can cause an immediate illness affecting the liver, but it more commonly becomes a silent, chronic infection that leads to liver scarring (cirrhosis), cancer, liver failure, and death. HCV is most commonly transmitted through sharing needles or exposure to infected blood. However, it can spread through sexual contact or from mother to fetus during pregnancy and delivery. There is no vaccine for HCV, and treatments are not always effective.

Viral Hepatitis Treatment

- Hepatitis A virus (HAV) infects the liver and may cause abdominal pain, nausea, and vomiting. Usually the infection gets better on its own without requiring treatment. In some cases, however, individuals may have lasting damage to their livers or may have such severe nausea and vomiting that they must be admitted to the hospital.
- Hepatitis B virus (HBV) can cause a lifelong infection but can be treated with antiviral medications. People with HBV infection will need to see a liver specialist with experience treating individuals with chronic liver disease. These individuals need to take special care not to pass on the virus to their sexual partners, and sexual partners should receive hepatitis B vaccine if not already immune.
- Hepatitis C virus can cause immediate illness affecting the liver or, more commonly, it can be a silent, chronic infection. As with hepatitis B, individuals with HCV may have a lifelong infection and will always be at risk of passing the virus onto their sexual partners. New treatments are available that can clear the infection in some individuals.

STD/STI Prevention

Every year, there are an estimated 20 million new STD infections in the United States.

Anyone who is sexually active can get an STD. Some groups are disproportionately affected by STDs:

- Adolescents and Young Adults

- Gay, Bisexual, & other Men who have Sex with Men
- Some Racial and Ethnic Minorities

The Good News: STDs ARE preventable. There are steps you can take to keep yourself and your partner(s) healthy.

Practice Abstinence

The surest way to avoid STDs is to not have sex. This means not having vaginal, oral, or anal sex.

Use Condoms

Using a condom correctly every time you have sex can help you avoid STDs. Condoms lessen the risk of infection for all STDs. You still can get certain STDs, like herpes or HPV, from contact with your partner's skin even when using a condom.

Most people say they used a condom the first time they ever had sex, but when asked about the last 4 weeks, less than a quarter said they used a condom every time.

Step by step male condom instructions

Have Fewer Partners

Agree to only have sex with one person who agrees to only have sex with you. Make sure you both get tested to know for sure that neither of you has an STD. This is one of the most reliable ways to avoid STDs.

Talk With Your Partner

Talk with your sex partner(s) about STDs and staying safe before having sex. It might be uncomfortable to start the conversation, but protecting your health is your responsibility.

Get Tested

Many STDs don't have symptoms, but they can still cause health problems.

- Talk with your health care provider
- Search for CDC recommended tests
- Find a location to get tested for STDs

The only way to know for sure if you have an STD is to get tested.

If You Test Positive…

Getting an STD is not the end! Many STDs are curable and all are treatable. If either you or your partner is infected with an STD that can be cured, both of you need to start treatment immediately to avoid getting re-infected.

Get Vaccinated

The most common STD can be prevented by a vaccine. The HPV vaccine is safe, effective, and can help you avoid HPV-related health problems like genital warts and some cancers.

Who should get the HPV vaccine?

- Routine vaccination for boys & girls ages 11 to 12

Catch-up vaccination for:

- Young women ages 13 to 26 and young men ages 13 to 21
- Gay, Bisexual, & other Men who have sex with Men up to age 26
- Men with compromised immune systems up to age 26

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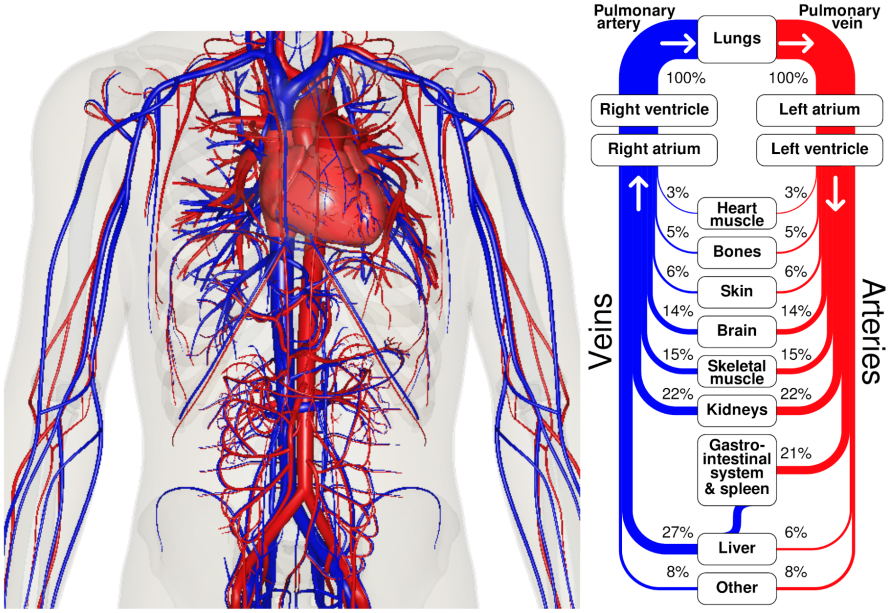
CHAPTER OVERVIEW

12: CARDIOVASCULAR DISEASE

12.1: The Cardiovascular System

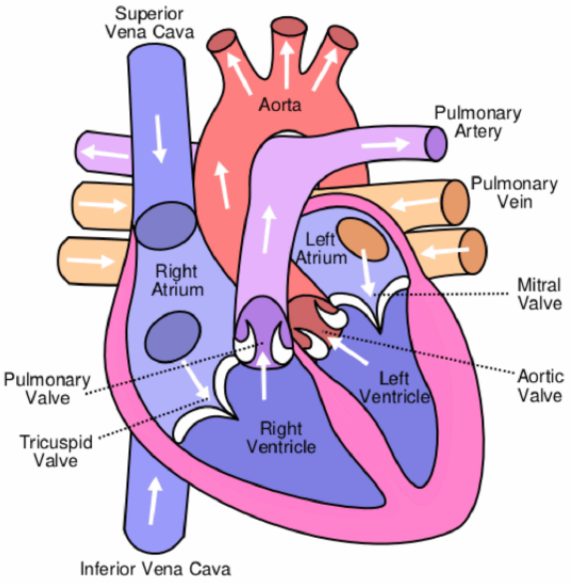
The cardiovascular system includes the heart and blood vessels. The blood vessels include arteries, veins, and capillaries. In pictures of the circulatory system, arteries are typically represented by red blood vessels and veins are typically represented as blue blood vessels. Red is used for arteries because most arteries carry oxygenated blood or red blood. Veins typically carry deoxygenated blood, or blue blood.

Arteries take oxygenated blood to the organs and tissues. Our organs and tissues use the oxygen and then the deoxygenated blood is returned to the heart through our veins. Most of the oxygenated blood is used by our kidneys, gastrointestinal system, and skeletal muscle.



The heart is the power, the pumping force, behind the circulation of blood through the arteries and veins. The faster the heart beats the more oxygen is transported throughout the body. The heart has four chambers: the right atrium, right ventricle, left atrium, and left ventricle. The heart is divided into two halves, each half has a very important function.

Deoxygenated blood enters the heart on the right side through the right atrium. The blood moves from the right atrium to the right ventricle and then leaves the heart through the pulmonary artery to go to the lungs. The lungs re-oxygenate the blood. The oxygenated blood then goes back to the heart through the pulmonary vein. The blood enters the left atrium, travels down to the left ventricle, and then leaves the heart through the aorta.



Heart Disease and Stroke Facts

Heart Disease Facts

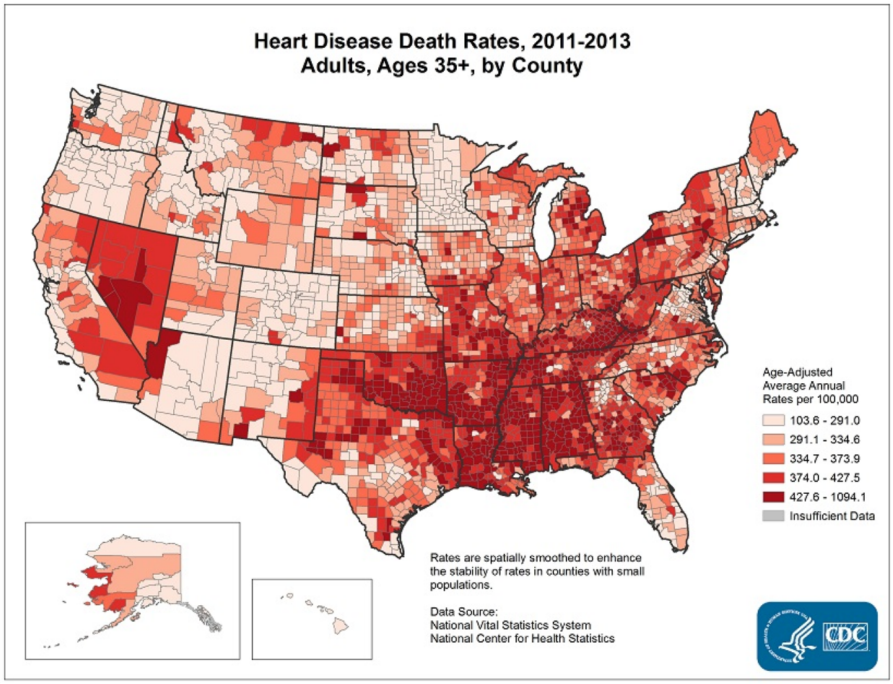
- Heart disease is the leading cause of death for both men and women.
- About 610,000 Americans die from heart disease each year—that's 1 in every 4 deaths.
- Coronary heart disease is the most common type of heart disease, killing about 365,000 people in 2014.
- In the United States, someone has a heart attack every 42 seconds. Each minute, someone in the United States dies from a heart disease-related event.
- Heart disease is the leading cause of death for people of most racial/ethnic groups in the United States, including African Americans, Hispanics, and whites. For Asian Americans or Pacific Islanders and American Indians or Alaska Natives, heart disease is second only to cancer.
- Heart disease costs the United States about $207 billion each year. This total includes the cost of health care services, medications, and lost productivity.

Risk Factors

High blood pressure, high LDL cholesterol, and smoking are key risk factors for heart disease. About half of Americans (49%) have at least one of these three risk factors.

Several other medical conditions and lifestyle choices can also put people at a higher risk for heart disease, including:

- Diabetes
- Overweight and obesity
- Poor diet
- Physical inactivity
- Excessive alcohol use

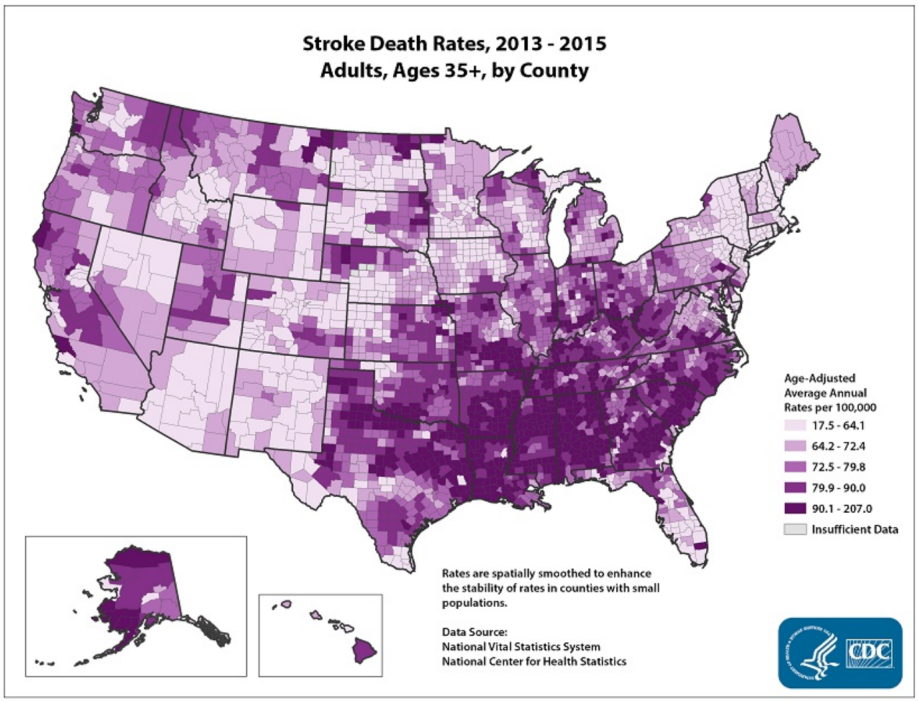


Stroke Facts

- Stroke is the fifth leading cause of death in the United States, killing more than 130,000 Americans each year—that's 1 of every 20 deaths.
- A stroke, sometimes called a brain attack, occurs when a clot blocks the blood supply to the brain or when a blood vessel in the brain bursts.
- Someone in the United States has a stroke every 40 seconds. Every four minutes, someone dies of stroke.
- Every year, about 795,000 people in the United States have a stroke. About 610,000 of these are first or new strokes; 185,000 are recurrent strokes.
- Stroke is an important cause of disability. Stroke reduces mobility in more than half of stroke survivors age 65 and over.
- Stroke costs the nation $33 billion annually, including the cost of health care services, medications, and lost productivity.
- You can't control some stroke risk factors, like heredity, age, gender, and ethnicity. Some medical conditions—including high blood pressure, high cholesterol, heart disease, diabetes, overweight or obesity, and previous stroke or transient ischemic attack (TIA)—can also raise your stroke risk. Avoiding smoking and drinking too much alcohol, eating a balanced diet, and getting exercise are all choices you can make to reduce your risk.

Common Stroke Warning Signs and Symptoms

- Sudden numbness or weakness of the face, arm, or leg—especially on one side of the body.
- Sudden confusion, trouble speaking or understanding.
- Sudden trouble seeing in one or both eyes.
- Sudden trouble walking, dizziness, loss of balance or coordination.
- Sudden severe headache with no known cause.



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12.2: Cardiovascular Diseases

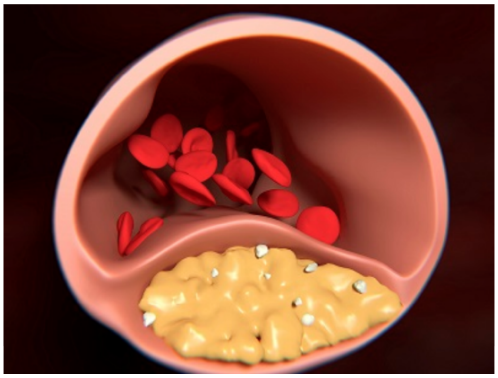
Coronary artery disease (CAD)

Coronary artery disease (CAD) is the most common type of heart disease in the United States. For some people, the first sign of CAD is a heart attack. Therefore, taking steps to reduce your risk for CAD is essential.

Research suggests that CAD (also referred to as coronary heart disease, abbreviated CHD) starts when certain factors damage the inner layers of the coronary arteries. These factors include:

- Smoking
- High levels of certain fats and cholesterol in the blood
- High blood pressure
- High levels of sugar in the blood due to insulin resistance or diabetes

Causes of CAD



When damage occurs, your body starts a healing process. The healing may cause plaque to build up where the arteries are damaged. Plaque is made up of deposits of cholesterol and other substances in the artery. This progression of plaque build up is called atherosclerosis.

The buildup of plaque in the coronary arteries may start in childhood. Over time, plaque can narrow or block some of your coronary arteries. This reduces the flow of oxygen-rich blood to your heart muscle.

Eventually, an area of plaque can rupture (break open). If this happens, blood cell fragments called platelets will stick to the site of the injury and may clump together to form blood clots. Blood clots narrow the coronary arteries even more and worsen angina (chest discomfort or pain) or cause a heart attack.

Over time, CAD can weaken the heart muscle. This may lead to heart failure, a serious condition where the heart can’t pump blood the way that it should. An irregular heartbeat, or arrhythmia, also can develop.

If you or a loved one has CAD, watch this video to learn how to actively manage it while also reducing further risk:

YouTube Video: Living with and Managing Coronary Artery Disease. Located at:: https://www.youtube.com/watch?v=V8lEEqTvBk4&feature=youtu.be

Other Conditions Related to Heart Disease

Coronary artery disease is the most common type of heart disease, but there are many other conditions that affect the heart:

Acute coronary syndrome is a term that includes heart attack and unstable angina.

Angina, a symptom of coronary artery disease, is chest pain or discomfort that occurs when the heart muscle is not getting enough blood. Angina may feel like pressure or a squeezing pain in the chest. The pain also may occur in the shoulders, arms, neck, jaw, or back. It may feel like indigestion.

There are two forms of angina—stable or unstable:

- **Stable angina** happens during physical activity or under mental or emotional stress.
- **Unstable angina** is chest pain that occurs even while at rest, without apparent reason. This type of angina is a medical emergency.

Aortic aneurysm and dissection are conditions that can affect the aorta, the major artery that carries blood from the heart to the body. An aneurysm is an enlargement in the aorta that can rupture or burst. A dissection is a tear in the aorta. Both of these conditions are medical emergencies.

Arrhythmias are irregular or unusually fast or slow heartbeats. Arrhythmias can be serious. One example is called ventricular fibrillation. This type of arrhythmia causes an abnormal heart rhythm that leads to death unless treated right away with an electrical shock to the heart (called defibrillation). Other arrhythmias are less severe but can develop into more serious conditions, such as atrial fibrillation, which can cause a stroke.

Atherosclerosis occurs when plaque builds up in the arteries that supply blood to the heart (called coronary arteries). Plaque is made up of cholesterol deposits. Plaque buildup causes arteries to narrow over time.

Atrial fibrillation is a type of arrhythmia that can cause rapid, irregular beating of the heart's upper chambers. Blood may pool and clot inside the heart, increasing the risk for heart attack and stroke.

Cardiomyopathy occurs when the heart muscle becomes enlarged or stiff. This can lead to inadequate heart pumping (or weak heart pump) or other problems. Cardiomyopathy has many causes, including family history of the disease, prior heart attacks, uncontrolled high blood pressure, and viral or bacterial infections.

Congenital heart defects are problems with the heart that are present at birth. They are the most common type of major birth defect. Examples include abnormal heart valves or holes in the heart's walls that divide the heart's chambers. Congenital heart defects range from minor to severe.

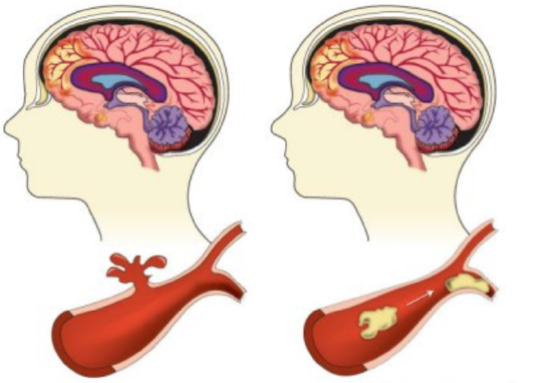
Heart failure is often called congestive heart failure because of fluid buildup in the lungs, liver, gastrointestinal tract, and the arms and legs. Heart failure is a serious condition that occurs when the heart can't pump enough blood to meet the body's needs. It does not mean that the heart has stopped but that muscle is too weak to pump enough blood. The majority of heart failure cases are chronic, or long-term heart failures.

The only cure for heart failure is a heart transplant. However, heart failure can be managed with medications or medical procedures.

Peripheral arterial disease (PAD) occurs when the arteries that supply blood to the arms and legs (the periphery) become narrow or stiff. PAD usually results from atherosclerosis, the buildup of plaque and narrowing of the arteries. With this condition, blood flow and oxygen to the arm and leg muscles are low or even fully blocked. Signs and symptoms include leg pain, numbness, and swelling in the ankles and feet.

Rheumatic heart disease is damage to the heart valves caused by a bacterial (streptococcal) infection called rheumatic fever.

Types of Strokes



The main types of stroke are:

- Ischemic stroke.
- Hemorrhagic stroke.
- Transient ischemic attack (a warning or "mini-stroke").

Ischemic Stroke

Most strokes (85%) are ischemic strokes. If you have an ischemic stroke, the artery that supplies oxygen-rich blood to the brain becomes blocked.

Blood clots often cause the blockages that lead to ischemic strokes.

Hemorrhagic Stroke

A hemorrhagic stroke occurs when an artery in the brain leaks blood or ruptures (breaks open). The leaked blood puts too much pressure on brain cells, which damages them.

High blood pressure and aneurysms—balloon-like bulges in an artery that can stretch and burst—are examples of conditions that can cause a hemorrhagic stroke.

There are two types of hemorrhagic strokes:

- Intracerebral hemorrhage is the most common type of hemorrhagic stroke. It occurs when an artery in the brain bursts, flooding the surrounding tissue with blood.
- Subarachnoid hemorrhage is a less common type of hemorrhagic stroke. It refers to bleeding in the area between the brain and the thin tissues that cover it.

Transient Ischemic Attack (TIA)

A transient ischemic attack (TIA) is sometimes called a “mini-stroke.” It is different from the major types of stroke because blood flow to the brain is blocked for only a short time—usually no more than 5 minutes.

It is important to know that:

- A TIA is a warning sign of a future stroke.
- A TIA is a medical emergency, just like a major stroke.
- Strokes and TIAs require emergency care. Call 9-1-1 right away if you feel signs of a stroke or see symptoms in someone around you.
- There is no way to know in the beginning whether symptoms are from a TIA or from a major type of stroke.
- Like ischemic strokes, blood clots often cause TIAs.
- More than a third of people who have a TIA end up having a major stroke within 1 year if they don’t receive treatment, and 10%-15% will have a major stroke within 3 months of a TIA.

Recognizing and treating TIAs can reduce the risk of a major stroke. If you have a TIA, your health care team can find the cause and take steps to prevent a major stroke.

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12.3: Risk Factors for Cardiovascular Disease

Metabolic Risk Factors

Metabolic syndrome is the name for a group of risk factors that raises your risk for heart disease and other health problems, such as diabetes and stroke. The term “metabolic” refers to the biochemical processes involved in the body’s normal functioning. Risk factors are traits, conditions, or habits that increase your chance of developing a disease.

The five conditions described below are metabolic risk factors. You can have any one of these risk factors by itself, but they tend to occur together. You must have at least three metabolic risk factors to be diagnosed with metabolic syndrome.

#1 A Large Waistline

Having a large waistline means that you carry excess weight around your waist (abdominal obesity). This is also called having an “apple-shaped” figure. Your doctor will measure your waist to find out whether you have a large waistline.

A waist measurement of 35 inches or more for women or 40 inches or more for men is a metabolic risk factor. A large waistline means you’re at increased risk for heart disease and other health problems.

#2 A High Triglyceride Level

Triglycerides are a type of fat found in the blood. A triglyceride level of 150 mg/dL or higher (or being on medicine to treat high triglycerides) is a metabolic risk factor. (The mg/dL is milligrams per deciliter—the units used to measure triglycerides, cholesterol, and blood sugar.)

#3 High Blood Pressure

A blood pressure of 130/85 mmHg or higher (or being on medicine to treat high blood pressure) is a metabolic risk factor. (The mmHg is millimeters of mercury—the units used to measure blood pressure.)

If only one of your two blood pressure numbers is high, you’re still at risk for metabolic syndrome.

#4 High Fasting Blood Sugar

A normal fasting blood sugar level is less than 100 mg/dL. A fasting blood sugar level between 100–125 mg/dL is considered prediabetes. A fasting blood sugar level of 126 mg/dL or higher is considered diabetes.

A fasting blood sugar level of 100 mg/dL or higher (or being on medicine to treat high blood sugar) is a metabolic risk factor.

About 85 percent of people who have type 2 diabetes—the most common type of diabetes—also have metabolic syndrome. These people have a much higher risk for heart disease than the 15 percent of people who have type 2 diabetes without metabolic syndrome.

#5 A Low HDL Cholesterol Level

HDL cholesterol sometimes is called “good” cholesterol. This is because it helps remove cholesterol from your arteries.

An HDL cholesterol level of less than 50 mg/dL for women and less than 40 mg/dL for men (or being on medicine to treat low HDL cholesterol) is a metabolic risk factor.

Cholesterol Management

What Is Cholesterol?

To understand high blood cholesterol, it helps to learn about cholesterol. Cholesterol is a waxy, fat-like substance that’s found in all cells of the body. Your body needs some cholesterol to make hormones, vitamin D, and substances that help you digest foods. Your body makes all the cholesterol it needs. However, cholesterol also is found in some of the foods you eat. Cholesterol travels through your bloodstream in small packages called lipoproteins. These packages are made of fat (lipid) on the inside and proteins on the outside.

Two kinds of lipoproteins carry cholesterol throughout your body: low-density lipoproteins (LDL) and high-density lipoproteins (HDL). Having healthy levels of both types of lipoproteins is important.

LDL cholesterol sometimes is called “bad” cholesterol. A high LDL level leads to a buildup of cholesterol in your arteries. (Arteries are blood vessels that carry blood from your heart to your body.)

HDL cholesterol sometimes is called “good” cholesterol. This is because it carries cholesterol from other parts of your body back to your liver. Your liver removes the cholesterol from your body.

What Is High Blood Cholesterol?

High blood cholesterol is a condition in which you have too much cholesterol in your blood. By itself, the condition usually has no signs or symptoms. Thus, many people don't know that their cholesterol levels are too high.

People who have high blood cholesterol have a greater chance of getting coronary heart disease, also called coronary artery disease. (In this article, the term "heart disease" refers to coronary heart disease.) The higher the level of LDL cholesterol in your blood, the GREATER your chance is of getting heart disease. The higher the level of HDL cholesterol in your blood, the LOWER your chance is of getting heart disease.

Coronary heart disease is a condition in which plaque builds up inside the coronary (heart) arteries. Plaque is made up of cholesterol, fat, calcium, and other substances found in the blood. When plaque builds up in the arteries, the condition is called atherosclerosis.

What Causes High Blood Cholesterol?

Many factors can affect the cholesterol levels in your blood. You can control some factors, but not others.

Factors You Can Control

Diet

Cholesterol is found in foods that come from animal sources, such as egg yolks, meat, and cheese. Some foods have fats that raise your cholesterol level.

For example, saturated fat raises your low-density lipoprotein (LDL) cholesterol level more than anything else in your diet. Saturated fat is found in some meats, dairy products, chocolate, baked goods, and deep-fried and processed foods.

Trans fatty acids (trans fats) raise your LDL cholesterol and lower your high-density lipoprotein (HDL) cholesterol. Trans fats are made when hydrogen is added to vegetable oil to harden it. Trans fats are found in some fried and processed foods.

Limiting foods with cholesterol, saturated fat, and trans fats can help you control your cholesterol levels.

Physical Activity and Weight

Lack of physical activity can lead to weight gain. Being overweight tends to raise your LDL level, lower your HDL level, and increase your total cholesterol level. (Total cholesterol is a measure of the total amount of cholesterol in your blood, including LDL and HDL.)

Routine physical activity can help you lose weight and lower your LDL cholesterol. Being physically active also can help you raise your HDL cholesterol level.

Factors You Can't Control

Heredity

High blood cholesterol can run in families. An inherited condition called familial hypercholesterolemia causes very high LDL cholesterol. ("Inherited" means the condition is passed from parents to children through genes.) This condition begins at birth, and it may cause a heart attack at an early age.

Age and Sex

Starting at puberty, men often have lower levels of HDL cholesterol than women. As women and men age, their LDL cholesterol levels often rise. Before age 55, women usually have lower LDL cholesterol levels than men. However, after age 55, women can have higher LDL levels than men.

How Is High Blood Cholesterol Diagnosed?

Your doctor will diagnose high blood cholesterol by checking the cholesterol levels in your blood. A blood test called a lipoprotein panel can measure your cholesterol levels. Before the test, you'll need to fast (not eat or drink anything but water) for 9 to 12 hours.

The lipoprotein panel will give your doctor information about your:

- Total cholesterol. Total cholesterol is a measure of the total amount of cholesterol in your blood, including low-density lipoprotein (LDL) cholesterol and high-density lipoprotein (HDL) cholesterol.
- LDL cholesterol. LDL, or "bad," cholesterol is the main source of cholesterol buildup and blockages in the arteries.
- HDL cholesterol. HDL, or "good," cholesterol helps remove cholesterol from your arteries.
- Triglycerides (tri-GLIH-seh-rides). Triglycerides are a type of fat found in your blood. Some studies suggest that a high level of triglycerides in the blood may raise the risk of coronary heart disease, especially in women.

If it's not possible to have a lipoprotein panel, knowing your total cholesterol and HDL cholesterol can give you a general idea about your cholesterol levels.

Testing for total and HDL cholesterol does not require fasting. If your total cholesterol is 200 mg/dL or more, or if your HDL cholesterol is less than 40 mg/dL, your doctor will likely recommend that you have a lipoprotein panel. (Cholesterol is measured as milligrams (mg) of cholesterol per deciliter (dL) of blood.)

The tables below show total, LDL, and HDL cholesterol levels and their corresponding categories. See how your cholesterol numbers compare to the numbers in the tables below.

Total Cholesterol Level	Total Cholesterol Category
Less than 200 mg/dL	Desirable
200–239 mg/dL	Borderline high
240 mg/dL and higher	High

LDL Cholesterol Level	LDL Cholesterol Category
Less than 100 mg/dL	Optimal
100–129 mg/dL	Near optimal/above optimal
130–159 mg/dL	Borderline high
160–189 mg/dL	High
190 mg/dL and higher	Very high

HDL Cholesterol Level	HDL Cholesterol Category
Less than 40 mg/dL	A major risk factor for heart disease
40–59 mg/dL	The higher, the better
60 mg/dL and higher	Considered protective against heart disease

Triglycerides also can raise your risk for heart disease. If your triglyceride level is borderline high (150–199 mg/dL) or high (200 mg/dL or higher), you may need treatment.

How Is High Blood Cholesterol Treated?

High blood cholesterol is treated with lifestyle changes and medicines. The main goal of treatment is to lower your low-density lipoprotein (LDL) cholesterol level enough to reduce your risk for coronary heart disease, heart attack, and other related health problems.

Your risk for heart disease and heart attack goes up as your LDL cholesterol level rises and your number of heart disease risk factors increases.

Some people are at high risk for heart attacks because they already have heart disease. Other people are at high risk for heart disease because they have diabetes or more than one heart disease risk factor.

Talk with your doctor about lowering your cholesterol and your risk for heart disease. Also, check the list to find out whether you have risk factors that affect your LDL cholesterol goal:

- Cigarette smoking
- High blood pressure (140/90 mmHg or higher), or you're on medicine to treat high blood pressure
- Low high-density lipoprotein (HDL) cholesterol (less than 40 mg/dL)
- Family history of early heart disease (heart disease in father or brother before age 55; heart disease in mother or sister before age 65)
- Age (men 45 years or older; women 55 years or older)

Lowering Cholesterol Using Therapeutic Lifestyle Changes

TLC is a set of lifestyle changes that can help you lower your LDL cholesterol. The main parts of the TLC program are a healthy diet, weight management, and physical activity.

The TLC Diet

With the TLC diet, less than 7 percent of your daily calories should come from saturated fat. This kind of fat is found in some meats, dairy products, chocolate, baked goods, and deep-fried and processed foods.

No more than 25 to 35 percent of your daily calories should come from all fats, including saturated, trans,monounsaturated, and polyunsaturated fats.

You also should have less than 200 mg a day of cholesterol. The amounts of cholesterol and the types of fat in prepared foods can be found on the foods' Nutrition Facts labels.

Foods high in soluble fiber also are part of the TLC diet. They help prevent the digestive tract from absorbing cholesterol. These foods include:

- Whole-grain cereals such as oatmeal and oat bran
- Fruits such as apples, bananas, oranges, pears, and prunes
- Legumes such as kidney beans, lentils, chick peas, black-eyed peas, and lima beans

A diet rich in fruits and vegetables can increase important cholesterol-lowering compounds in your diet. These compounds, called plant stanols or sterols, work like soluble fiber.

A healthy diet also includes some types of fish, such as salmon, tuna (canned or fresh), and mackerel. These fish are a good source of omega-3 fatty acids. These acids may help protect the heart from blood clots and inflammation and reduce the risk of heart attack. Try to have about two fish meals every week.

You also should try to limit the amount of sodium (salt) that you eat. This means choosing low-salt and "no added salt" foods and seasonings at the table or while cooking. The Nutrition Facts label on food packaging shows the amount of sodium in the item.

Try to limit drinks with alcohol. Too much alcohol will raise your blood pressure and triglyceride level. (Triglycerides are a type of fat found in the blood.) Alcohol also adds extra calories, which will cause weight gain.

Men should have no more than two drinks containing alcohol a day. Women should have no more than one drink containing alcohol a day. One drink is a glass of wine, beer, or a small amount of hard liquor.

Weight Management

If you're overweight or obese, losing weight can help lower LDL cholesterol. Maintaining a healthy weight is especially important if you have a condition called metabolic syndrome.

Metabolic syndrome is the name for a group of risk factors that raise your risk for heart disease and other health problems, such as diabetes and stroke.

The five metabolic risk factors are a large waistline (abdominal obesity), a high triglyceride level, a low HDL cholesterol level, high blood pressure, and high blood sugar. Metabolic syndrome is diagnosed if you have at least three of these metabolic risk factors.

Physical Activity

Routine physical activity can lower LDL cholesterol and triglycerides and raise your HDL cholesterol level.

People gain health benefits from as little as 60 minutes of moderate-intensity aerobic activity per week (however, 150 minutes per week is the recommendation). The more active you are, the more you will benefit.

Cholesterol-Lowering Medicines

In addition to lifestyle changes, your doctor may prescribe medicines to help lower your cholesterol. Even with medicines, you should continue the TLC program.

Medicines can help control high blood cholesterol, but they don't cure it.

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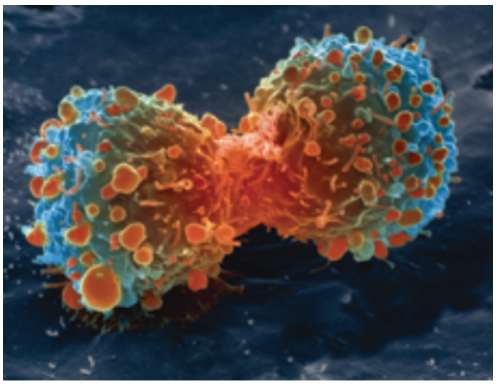
CHAPTER OVERVIEW

13: CANCER

The number of new cancer cases can be reduced and many cancer deaths can be prevented. Research shows that screening for cervical and colorectal cancers as recommended helps prevent these diseases by finding precancerous lesions so they can be treated before they become cancerous. Screening for cervical, colorectal, and breast cancers also helps find these diseases at an early stage, when treatment works best.

13.1: Cancer Overview

What Is Cancer?



Cancer is the name given to a collection of related diseases. In all types of cancer, some of the body's cells begin to divide without stopping and spread into surrounding tissues.

Cancer can start almost anywhere in the human body, which is made up of trillions of cells. Normally, human cells grow and divide to form new cells as the body needs them. When cells grow old or become damaged, they die, and new cells take their place.

When cancer develops, however, this orderly process breaks down. As cells become more and more abnormal, old or damaged cells survive when they should die, and new cells form when they are not needed. These extra cells can divide without stopping and may form growths called tumors.

Cancerous tumors are malignant, which means they can spread into, or invade, nearby tissues. In addition, as these tumors grow, some cancer cells can break off and travel to distant places in the body through the blood or the lymph system and form new tumors far from the original tumor.

Unlike malignant tumors, benign tumors do not spread into, or invade, nearby tissues. Benign tumors can sometimes be quite large, however. When removed, they usually don't grow back, whereas malignant tumors sometimes do. Unlike most benign tumors elsewhere in the body, benign brain tumors can be life threatening.

How Cancer Arises

Cancer is caused by changes to genes that control the way our cells function, especially how they grow and divide.

Genetic changes that cause cancer can be inherited from our parents. They can also arise during a person's lifetime as a result of errors that occur as cells divide or because of damage to DNA caused by certain environmental exposures. Cancer-causing environmental exposures include substances, such as the chemicals in tobacco smoke, and radiation, such as ultraviolet rays from the sun.

When Cancer Spreads

In metastasis, cancer cells break away from where they first formed (primary cancer), travel through the blood or lymph system, and form new tumors (metastatic tumors) in other parts of the body. The metastatic tumor is the same type of cancer as the primary tumor.

A cancer that has spread from the place where it first started to another place in the body is called metastatic cancer. **The process by which cancer cells spread to other parts of the body is called metastasis.**

Metastatic cancer has the same name and the same type of cancer cells as the original, or primary, cancer. For example, breast cancer that spreads to and forms a metastatic tumor in the lung is metastatic breast cancer, not lung cancer.

Under a microscope, metastatic cancer cells generally look the same as cells of the original cancer. Moreover, metastatic cancer cells and cells of the original cancer usually have some molecular features in common, such as the presence of specific chromosome changes.

Tissue Changes That Are Not Cancer

Not every change in the body's tissues is cancer. Some tissue changes may develop into cancer if they are not treated, however. Here are some examples of tissue changes that are not cancer but, in some cases, are monitored:

Hyperplasia occurs when cells within a tissue divide faster than normal and extra cells build up, or proliferate. However, the cells and the way the tissue is organized look normal under a microscope. Hyperplasia can be caused by several factors or conditions, including chronic irritation.

Dysplasia is a more serious condition than hyperplasia. In dysplasia, there is also a buildup of extra cells. But the cells look abnormal and there are changes in how the tissue is organized. In general, the more abnormal the cells and tissue look, the greater the chance that cancer will form.

Some types of dysplasia may need to be monitored or treated. An example of dysplasia is an abnormal mole (called a dysplastic nevus) that forms on the skin. A dysplastic nevus can turn into melanoma, although most do not.

Normal cells may become cancer cells. Before cancer cells form in tissues of the body, the cells go through abnormal changes called hyperplasia and dysplasia. In hyperplasia, there is an increase in the number of cells in an organ or tissue that appear normal under a microscope. In dysplasia, the cells look abnormal under a microscope but are not cancer. Hyperplasia and dysplasia may or may not become cancer.

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13.2: Types of Cancer

There are more than 100 types of cancer. Types of cancer are usually named for the organs or tissues where the cancers form. For example, lung cancer starts in cells of the lung, and brain cancer starts in cells of the brain. Cancers also may be described by the type of cell that formed them, such as an epithelial cell or a squamous cell.

Common Cancer Types

This list of common cancer types includes cancers that are diagnosed with the greatest frequency in the United States, excluding non-melanoma skin cancers:

- Bladder Cancer
- Breast Cancer
- Colon and Rectal Cancer
- Endometrial Cancer
- Kidney Cancer
- Leukemia
- Lung Cancer
- Melanoma
- Non-Hodgkin Lymphoma
- Pancreatic Cancer
- Prostate Cancer
- Thyroid Cancer

Cancer incidence and mortality statistics reported by the American Cancer Society and other resources were used to create the list. To qualify as a common cancer for the list, the estimated annual incidence for 2016 had to be 40,000 cases or more.

The most common type of cancer on the list is breast cancer, with more than 249,000 new cases expected in the United States in 2016. The next most common cancers are lung cancer and prostate cancer.

Because colon and rectal cancers are often referred to as “colorectal cancers,” these two cancer types are combined for the list. For 2016, the estimated number of new cases of colon cancer and rectal cancer are 95,270 and 39,220, respectively, adding to a total of 134,490 new cases of colorectal cancer.

The following table gives the estimated numbers of new cases and deaths for each common cancer type:

Cancer Type	Estimated New Cases	Estimated Deaths
Bladder	76,960	16,390
Breast (Female – Male)	246,660 – 2,600	40,450 – 440
Colon and Rectal (Combined)	134,490	49,190
Endometrial	60,050	10,470
Kidney (Renal Cell and Renal Pelvis) Cancer	62,700	14,240
Leukemia (All Types)	60,140	24,400
Lung (Including Bronchus)	224,390	158,080
Melanoma	76,380	10,130
Non-Hodgkin Lymphoma	72,580	20,150
Pancreatic	53,070	41,780
Prostate	180,890	26,120
Thyroid	64,300	1,980

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13.3: Risk Factors for Cancer

It is usually not possible to know exactly why one person develops cancer and another doesn't. But research has shown that certain risk factors may increase a person's chances of developing cancer. (There are also factors that are linked to a lower risk of cancer. These are called protective factors.)

Cancer risk factors include exposure to chemicals or other substances, as well as certain behaviors. They also include things people cannot control, like age and family history. A family history of certain cancers can be a sign of a possible inherited cancer syndrome.

Most cancer risk (and protective) factors are initially identified in epidemiology studies. In these studies, scientists look at large groups of people and compare those who develop cancer with those who don't. These studies may show that the people who develop cancer are more or less likely to behave in certain ways or to be exposed to certain substances than those who do not develop cancer.

Such studies, on their own, cannot prove that a behavior or substance causes cancer. For example, the finding could be a result of chance, or the true risk factor could be something other than the suspected risk factor. But findings of this type sometimes get attention in the media, and this can lead to wrong ideas about how cancer starts and spreads.

When many studies all point to a similar association between a potential risk factor and an increased risk of cancer, and when a possible mechanism exists that could explain how the risk factor could actually cause cancer, scientists can be more confident about the relationship between the two.

The list below includes the most studied known or suspected risk factors for cancer. Although some of these risk factors can be avoided, others—such as growing older—cannot. Limiting your exposure to avoidable risk factors may lower your risk of developing certain cancers. Click on each risk factor below to find out more:

- Age
- Alcohol
- Cancer-Causing Substances
- Chronic Inflammation
- Diet
- Hormones
- Immunosuppression
- Infectious Agents
- Obesity
- Radiation
- Sunlight
- Tobacco

Alcohol

Tobacco

Tobacco use is a leading cause of cancer and of death from cancer. People who use tobacco products or who are regularly around environmental tobacco smoke (also called secondhand smoke) have an increased risk of cancer because tobacco

products and secondhand smoke have many chemicals that damage DNA.

Tobacco use causes many types of cancer, including cancer of the lung, larynx (voice box), mouth, esophagus, throat, bladder, kidney, liver, stomach, pancreas, colon and rectum, and cervix, as well as acute myeloid leukemia. People who use smokeless tobacco (snuff or chewing tobacco) have increased risks of cancers of the mouth, esophagus, and pancreas.

There is no safe level of tobacco use. People who use any type of tobacco product are strongly urged to quit. People who quit smoking, regardless of their age, have substantial gains in life expectancy compared with those who continue to smoke. Also, quitting smoking at the time of a cancer diagnosis reduces the risk of death.

Scientists believe that cigarette smoking causes about 30% of all cancer deaths in the United States.

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13.4: Cancer Prevention

How Can Cancer Be Prevented?

The number of new cancer cases can be reduced and many cancer deaths can be prevented. Research shows that screening for cervical and colorectal cancers as recommended helps prevent these diseases by finding precancerous lesions so they can be treated before they become cancerous. Screening for cervical, colorectal, and breast cancers also helps find these diseases at an early stage, when treatment works best.

Vaccines (shots) also help lower cancer risk. The human papillomavirus (HPV) vaccine helps prevent most cervical cancers and several other kinds of cancer, and the hepatitis B vaccine can help lower liver cancer risk.

A person's cancer risk can be reduced with healthy choices like avoiding tobacco, limiting alcohol use, protecting your skin from the sun and avoiding indoor tanning, eating a diet rich in fruits and vegetables, keeping a healthy weight, and being physically active.

Avoiding Tobacco

Cigarette Smoking

Lung cancer is the leading cause of cancer death, and cigarette smoking causes almost all cases. Compared to nonsmokers, current smokers are about 25 times more likely to die from lung cancer. Smoking causes about 80% to 90% of lung cancer deaths. Smoking also causes cancer of the mouth and throat, esophagus, stomach, colon, rectum, liver, pancreas, voicebox (larynx), trachea, bronchus, kidney and renal pelvis, urinary bladder, and cervix, and causes acute myeloid leukemia.

Visit smokefree.gov to learn how you can quit smoking.

Secondhand Smoke

Adults who are exposed to secondhand smoke at home or at work increase their risk of developing lung cancer by 20% to 30%. Concentrations of many cancer-causing and toxic chemicals are higher in secondhand smoke than in the smoke inhaled by smokers.

Protecting Your Skin

Skin cancer is the most common kind of cancer in the United States. Exposure to ultraviolet (UV) rays from the sun and tanning beds appears to be the most important environmental factor involved with developing skin cancer. To help prevent skin cancer while still having fun outdoors, protect yourself by seeking shade, applying sunscreen, and wearing sun-protective clothing, a hat, and sunglasses. For more information, visit What Can I Do to Reduce My Risk of Skin Cancer?

Detecting melanoma

Melanoma is the most serious type of skin cancer. Often the first sign of melanoma is a change in the size, shape, color, or feel of a mole. Most melanomas have a black or black-blue area. Melanoma may also appear as a new mole. It may be black, abnormal, or "ugly looking."

Thinking of "ABCDE" can help you remember what to watch for:

- Asymmetry – the shape of one half does not match the other
- Border – the edges are ragged, blurred or irregular
- Color – the color is uneven and may include shades of black, brown and tan
- Diameter – there is a change in size, usually an increase (larger than 6 millimeters or about 1/4 inch)
- Evolving – the mole has changed (in size, color, shape; it may start to itch or bleed) over the past few weeks or months

Limiting Alcohol Intake

Drinking alcohol raises the risk of some cancers. Drinking any kind of alcohol can contribute to cancers of the mouth and throat, larynx (voice box), esophagus, colon and rectum, liver, and breast (in women). The less alcohol you drink, the lower the risk of cancer.

Studies around the world have shown that drinking alcohol regularly increases the risk of getting mouth, voice box, and throat cancers.

A large number of studies provide strong evidence that drinking alcohol is a risk factor for primary liver cancer, and more than 100 studies have found an increased risk of breast cancer with increasing alcohol intake. The link between alcohol consumption and colorectal (colon) cancer has been reported in more than 50 studies.

Keeping a Healthy Weight

Research has shown that being overweight or obese substantially raises a person's risk of getting endometrial (uterine), breast, prostate, and colorectal cancers. Overweight is defined as a body mass index (BMI) of 25 to 29, and obesity is defined as a BMI of 30 or higher. Learn how to choose a healthy diet at Healthy Eating for a Healthy Weight, and read about exercise at Physical Activity for a Healthy Weight.

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CHAPTER OVERVIEW

14: ENVIRONMENTAL WELLNESS- A HEALTHY PLANET

14.1: The Importance of a Healthy Planet

What is Climate Change?

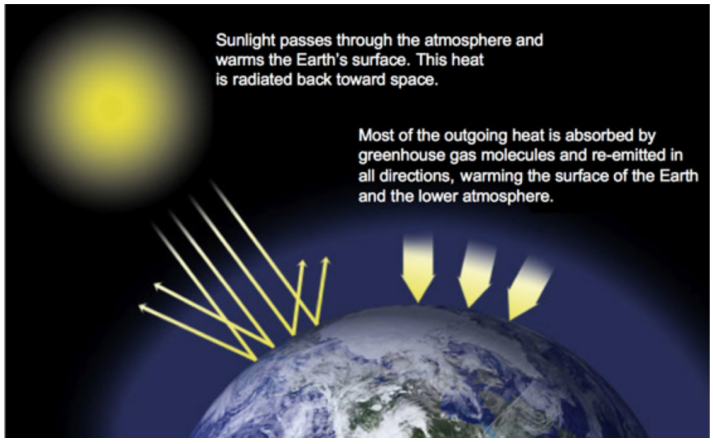
Climate change is the term used to describe the Earth's changing climate. Researchers are able to estimate climate changes that occurred in the last 650,000 years by measuring the CO2 in ice cores. The amount of CO2 in our atmosphere is directly related to temperature; the more CO2 the higher the temperature, the lower the CO2 the lower the temperature.

The term Ice Age has been used to describe seven cyclical periods in the last 650,000 years when the planet cooled dramatically. The cyclical cooling and warming of the past was prior to human civilization and was attributed to slight changes of the Earth's rotation that changed the amount of solar radiation the planet received.

Using the term climate change today, in modern times, reflects the change that is occurring most likely due to the human population. Prior to 1950, the atmospheric level of CO2 had never reached 300 parts per million and the current level today is about 400 parts per million. During the Ice Ages the level of CO2 was about 180 parts per million

Global Warming

The sun provides solar radiation to our planet. When the Sun's solar rays hit our planet the solar radiation turns to heat. CO2 is one of several gases in our atmosphere that block heat from escaping the planet. When there is more CO2 there is more heat trapped. The trapping of heat has been termed **Global Warming**.



To help you understand how the sun's rays turn to heat and then get trapped in by greenhouse gases, just imagine stepping into a greenhouse. The temperature inside and outside of a greenhouse can be very different. Outside of a greenhouse you can feel the heat from the sun's rays, but the heat can escape to the atmosphere. Inside the greenhouse, the sun's rays are turned to heat and the heat is trapped by the greenhouse. The way the greenhouse traps heat is similar to how the greenhouses gases, such as CO2 trap heat and increase the temperature of the planet.

Evidence of Rapid Climate Change:

- Global temperature rise
  - The planet's temperature has risen about 2 degrees fahrenheit since the late 19th century. 16 of the 17 warmest years ever recorded have occurred since 2001.
- Warming oceans
  - Oceans absorb the heat and thus our oceans have increased in temperature by about .302 degree fahrenheit since 1969.
- Shrinking ice sheets
  - Both Greenland and the Antarctica are losing Ice. Greenland lost 36-60 cubic miles of ice per year from 2002-2006 and Antarctica lost about 36 cubic miles of ice from 2002-2005.
- Glacial retreat
  - Glaciers are disappearing around the world.
- Decreased snow cover
  - Snow cover has decreased in the northern hemisphere over the past 50 years and snow is melting earlier.
- Sea level rise
  - Sea level has risen about 8 inches in the last 100 years. The last 20 years sea level has risen double the amount from the last century.
- Declining arctic sea ice
  - Arctic sea ice has decreased in size and depth.
- Extreme events
  - Extreme weather events have risen.
- Ocean acidification
  - Ocean waters have become more acidic due to more CO2

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14.2: The Impact of the Environment on Public Health

The Center for Disease Control developed a program called the Environmental Public Health Tracking Program. This program collects data from both diseases and the environment to better understand the role the environment plays in the health of our population.

YouTube Video: Better Information for Better Health: CDC's Environmental Public Health Tracking Program

(https://www.youtube.com/watch?v=T1Ad79HGeJE)

Climate Change and Health

Climate change can impact health in many ways. Extreme weather events, such as extreme heat, hurricanes, flooding, droughts, pollution, and increased in sea level can all potentially create harmful environments.

Table: Health Impacts from Climate Change from CDC

Weather Event	Health Effects	Populations Most Affected
Heat waves	Heat stress	Extremes of age, athletes, people with respiratory disease
Extreme weather events,(rain, hurricane, tornado, flooding)	Injuries, drowning	Coastal, low-lying land dwellers, low SES
Droughts, floods, increased mean temperature	Vector – food – and water-borne diseases	Multiple populations at risk
Sea-level rise	Injuries, drowning, water and soil salinization, ecosystem and economic disruption	Coastal, low SES
Drought, ecosystem migration	Food and water shortages, malnutrition	Low SES, elderly, children
Extreme weather events, drought	Mass population movement, international conflict	General population
Increases in ground-level ozone, airborne allergens, and other pollutants	Respiratory disease exacerbations (COPD, asthma, allergic rhinitis, bronchitis)	Elderly, children, those with respiratory disease
Climate change generally; extreme events	Mental health	Young, displaced, agricultural sector, low SES

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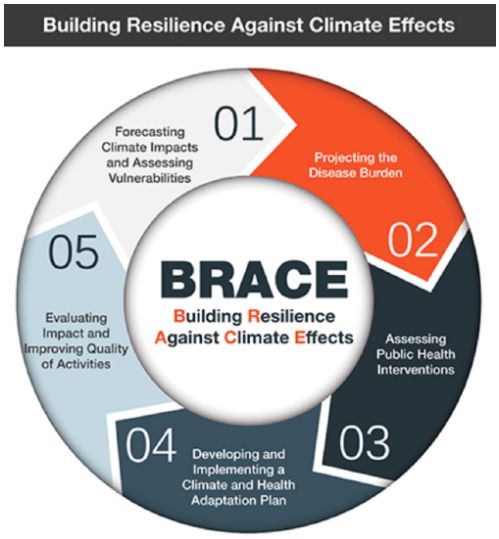
14.3: Creating a Healthier Planet

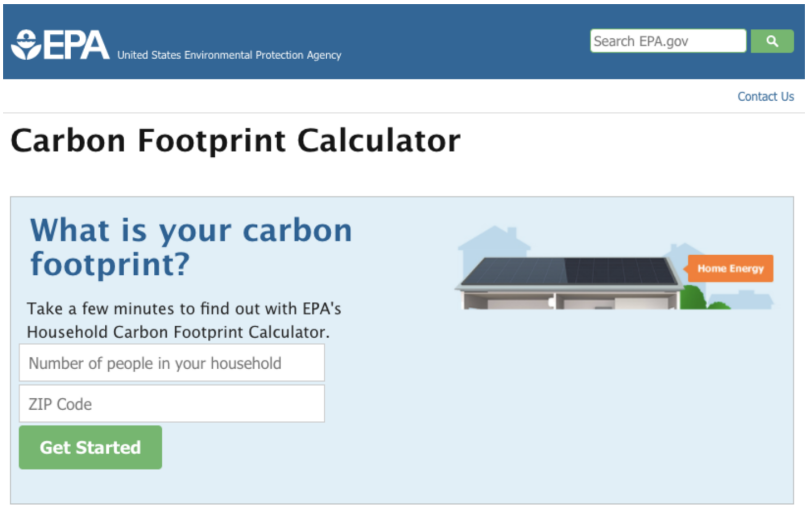
CDC's Building Resilience Against Climate Effects (BRACE) Framework



The Building Resilience Against Climate Effects (BRACE) framework was created by the CDC to help cities include climate change in city planning. The five-step process that allows health officials to develop strategies and programs to help communities prepare for the health effects of climate change. This helps cities effectively anticipate, prepare for, and respond to a range of climate sensitive health impacts.

Living a Sustainable Lifestyle

Living a sustainable lifestyle, or a “green” lifestyle, means taking into consideration the health of the planet with decisions we make every day. Before considering what changes you could make, you may first want to get a better understanding how you personally contribute to global warming. What is your carbon footprint? There are many different carbon footprint calculators you can use, one is available on the Environmental Protection Agency’s website.



Reduce, Reuse, Recycle

To reduce your impact on the planet you can start by reducing your consumption of water and energy. You can also become a more conscious consumer by reducing purchases and buying sustainable products.

Reduce Water

- Installing watersense labeled appliances will reduce your water use. Watersense is both a label for water-efficient products and a resource for helping you save water.
- Fix leaking faucets.
- Water plants at night or early in the morning.
- Turn off sink when brushing teeth
- Take short showers instead of using the bath tub.
- Only run the dishwasher or clothes washer when full.
- Collect rainwater to use for watering plants
- Additional resources from Washington State Department of Ecology:
  - Water Conservation Resource Community - American Water Works Association
    - Water Conservation Communications Guide - American Water Works Association
  - Water Use Efficiency (WUE) - Washington State Department of Health
  - Water Conservation & The Possibilities - Learn About The Remarkable Opportunities Available Through Water Conservation
  - Saving Water for the Future - Cascade Water Alliance
  - Water Use it Wisely - Water-saving tips, for a variety of settings (indoor, outdoor, office etc.)
    - 100+ Ways to Conserve
  - How to Save Water - Grace Communications Foundation has tips for saving water, including shopping smarter and food choices.
  - Saving Water Partnership - Seattle and participating water utilities; includes information for both residential and business water use.
  - Water Smart, not Water Short - 5 ways to secure water for Washington's future. Ecology publication #09-11-008

Reduce Energy

- Energysaver.gov provides numerous tips for reducing energy such as:
  - Turn off and unplug appliances
  - Insulate your home
  - Choose energy efficient lighting and appliances
  - Use renewable energy sources
  - Choose energy efficient transportation options
  - Install energy saving windows and doors

Reduce Waste: Reuse and Recycle

- Buy used materials
- Buy products with minimal packaging
- Buy reusable and not disposable products
- Fix products rather than throwing them away.
- Borrow or rent items that are used infrequently.
- Recycle to reduce the amount of waste sent to the landfill

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CHAPTER OVERVIEW

15: CONSUMER HEALTH AND AGING

15.1: Finding Reliable Health Information

Millions of consumers get health information from magazines, TV or the Internet. Some of the information is reliable and up to date; some is not. How can you tell the good from the bad?

First, consider the source. If you use the Web, look for an “about us” page. Check to see who runs the site: Is it a branch of the government, a university, a health organization, a hospital or a business? Focus on quality. Does the site have an editorial board? Is the information reviewed before it is posted? Be skeptical. Things that sound too good to be true often are. You want current, unbiased information based on research.

Consider the source–Use recognized authorities

Know who is responsible for the content.

- Look for an “about us” page. Check to see who runs the site: is it a branch of the Federal Government, a non-profit institution, a professional organization, a health system, a commercial organization or an individual.
- There is a big difference between a site that says, “I developed this site after my heart attack” and one that says, “This page on heart attack was developed by health professionals at the American Heart Association.”
- Web sites should have a way to contact the organization or webmaster. If the site provides no contact information, or if you can’t easily find out who runs the site, use caution.

Focus on quality–All Web sites are not created equal

Does the site have an editorial board? Is the information reviewed before it is posted?

- This information is often on the “about us” page, or it may be under the organization’s mission statement, or part of the annual report.
- See if the board members are experts in the subject of the site. For example, a site on osteoporosis whose medical advisory board is composed of attorneys and accountants is not medically authoritative.
- Look for a description of the process of selecting or approving information on the site. It is usually in the “about us” section and may be called “editorial policy” or “selection policy” or “review policy.”
- Sometimes the site will have information “about our writers” or “about our authors” instead of an editorial policy. Review this section to find out who has written the information.

Be a cyberskeptic–Quackery abounds on the Web

Does the site make health claims that seem too good to be true? Does the information use deliberately obscure, “scientific” sounding language? Does it promise quick, dramatic, miraculous results? Is this the only site making these claims?

- Beware of claims that one remedy will cure a variety of illnesses, that it is a “breakthrough,” or that it relies on a “secret ingredient.”
- Use caution if the site uses a sensational writing style (lots of exclamation points, for example.)
- A health Web site for consumers should use simple language, not technical jargon.
- Get a second opinion! Check more than one site.

YouTube: Evaluating Online Sources of Health Information (https://www.youtube.com/watch?v=augrvuHd1OM)

Look for the evidence–Rely on medical research, not opinion

Does the site identify the author? Does it rely on testimonials?

- Look for the author of the information, either an individual or an organization. Good examples are “Written by Jane Smith, R.N.,” or “Copyright 2013, American Cancer Society.”
- If there are case histories or testimonials on the Web site, look for contact information such as an email address or telephone number. If the testimonials are anonymous or hard to track down (“Jane from California”), use caution.

Check for currency–Look for the latest information

Is the information current?

- Look for dates on documents. A document on coping with the loss of a loved one doesn't need to be current, but a document on the latest treatment of AIDS needs to be current.
- Click on a few links on the site. If there are a lot of broken links, the site may not be kept up-to-date.

Beware of bias–What is the purpose? Who is providing the funding?

Who pays for the site?

- Check to see if the site is supported by public funds, donations or by commercial advertising.
- Advertisements should be labeled. They should say "Advertisement" or "From our Sponsor."
- Look at a page on the site, and see if it is clear when content is coming from a non-commercial source and when an advertiser provides it. For example, if a page about treatment of depression recommends one drug by name, see if you can tell if the company that manufactures the drug provides that information. If it does, you should consult other sources to see what they say about the same drug.

Protect your privacy–Health information should be confidential

Does the site have a privacy policy and tell you what information they collect?

- There should be a link saying "Privacy" or "Privacy Policy." Read the privacy policy to see if your privacy is really being protected. For example, if the site says "We share information with companies that can provide you with useful products," then your information isn't private.
- If there is a registration form, notice what types of questions you must answer before you can view content. If you must provide personal information (such as name, address, date of birth, gender, mother's maiden name, credit card number) you should refer to their privacy policy to see what they can do with your information.

> Consult with your health professional–Patient/provider partnerships lead to the best medical decisions.

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15.2: Health Fraud

6 Tip-offs to Rip-offs: Don’t Fall for Health Fraud Scams

Bogus product! Danger! Health fraud alert!

You’ll never see these warnings on health products, but that’s what you ought to be thinking when you see claims like “miracle cure,” “revolutionary scientific breakthrough,” or “alternative to drugs or surgery.”

Health fraud scams have been around for hundreds of years. The snake oil salesmen of old have morphed into the deceptive, high-tech marketers of today. They prey on people’s desires for easy solutions to difficult health problems—from losing weight to curing serious diseases like cancer.

According to the Food and Drug Administration (FDA), a health product is fraudulent if it is deceptively promoted as being effective against a disease or health condition but has not been scientifically proven safe and effective for that purpose.

Scammers promote their products through newspapers, magazines, TV infomercials and cyberspace. You can find health fraud scams in retail stores and on countless websites, in popup ads and spam, and on social media sites like Facebook and Twitter.

YouTube: Health Fraud Scams (https://www.youtube.com/watch?v=KsPlwKbGxE8)

Not Worth the Risk

Health fraud scams can do more than waste your money. They can cause serious injury or even death, says Gary Coody, R.Ph., FDA’s national health fraud coordinator. “Using unproven treatments can delay getting a potentially life-saving diagnosis and medication that actually works. Also, fraudulent products sometimes contain hidden drug ingredients that can be harmful when unknowingly taken by consumers.”

Fraudulent products often make claims related to:

- weight loss
- sexual performance
- memory loss
- serious diseases such as cancer, diabetes, heart disease, arthritis and Alzheimer’s.

A Pervasive Problem

Fraudulent products not only won’t work—they could cause serious injury. In the past few years, FDA laboratories have found more than 100 weight-loss products, illegally marketed as dietary supplements, that contained sibutramine, the active ingredient in the prescription weight-loss drug Meridia. In 2010, Meridia was withdrawn from the U.S. market after studies showed that it was associated with an increased risk of heart attack and stroke.

Fraudulent products marketed as drugs or dietary supplements are not the only health scams on the market. FDA found a fraudulent and expensive light therapy device with cure-all claims to treat fungal meningitis, Alzheimer’s, skin cancer,

concussions and many other unrelated diseases. Generally, making health claims about a medical device without FDA clearance or approval of the device is illegal.

“Health fraud is a pervasive problem,” says Coody, “especially when scammers sell online. It’s difficult to track down the responsible parties. When we do find them and tell them their products are illegal, some will shut down their website. Unfortunately, however, these same products may reappear later on a different website, and sometimes may reappear with a different name.”

Health Fraud Tip-Offs

FDA offers some tip-offs to help you identify rip-offs.

- **One product does it all.** Be suspicious of products that claim to cure a wide range of diseases. A New York firm claimed its products marketed as dietary supplements could treat or cure senile dementia, brain atrophy, atherosclerosis, kidney dysfunction, gangrene, depression, osteoarthritis, dysuria, and lung, cervical and prostate cancer. In October 2012, at FDA’s request, U.S. marshals seized these products.
- **Personal testimonials.** Success stories, such as, “It cured my diabetes” or “My tumors are gone,” are easy to make up and are not a substitute for scientific evidence.
- **Quick fixes**. Few diseases or conditions can be treated quickly, even with legitimate products. Beware of language such as, “Lose 30 pounds in 30 days” or “eliminates skin cancer in days.”
- **“All natural.**” Some plants found in nature (such as poisonous mushrooms) can kill when consumed. Moreover, FDA has found numerous products promoted as “all natural” but that contain hidden and dangerously high doses of prescription drug ingredients or even untested active artificial ingredients.
- **“Miracle cure.”** Alarms should go off when you see this claim or others like it such as, “new discovery,” “scientific breakthrough” or “secret ingredient.” If a real cure for a serious disease were discovered, it would be widely reported through the media and prescribed by health professionals—not buried in print ads, TV infomercials or on Internet sites.
- **Conspiracy theories**. Claims like “The pharmaceutical industry and the government are working together to hide information about a miracle cure” are always untrue and unfounded. These statements are used to distract consumers from the obvious, common-sense questions about the so-called miracle cure.

Even with these tips, fraudulent health products are not always easy to spot. If you’re tempted to buy an unproven product or one with questionable claims, check with your doctor or other health care professional first.

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15.3: Quick Tips for Evaluating Health Websites

Content on the Internet is unregulated; anyone can publish anything on the Internet. There is sound medical information on the Internet along with dangerous information. You need to be able to tell the difference.

Ask yourself the following:

- Why did the person create the page?
- What's in it for them?
- Are they trying to sell me something?

Criteria for evaluating information from the web:

Accuracy

- Is the information based on sound medical research? Can the information on the web page be verified by another source?
- Are the sources cited reliable?
- Are there grammatical and spelling errors?
- Are there footnotes, bibliographies, or references so that you can verify the information? Are these reliable? (a citation to Parade magazine does not have the same weight as an article from JAMA)

Authority

- Who published the page? What are the person's credentials? What do you know about them?
- Is the person backed by a known organization? (the American Association for Cancer Therapy may be a made-up name for something operating out of someone's basement.)
- Is the person affiliated with a university? If so, is the person a student or a faculty member?
- Can you easily find contact information on the web page? Check the "about us" link, usually found at the beginning or the end of a webpage. What does the "About Us" section tell you about the purpose of the organization? Can you find a physical location for the organization? Or is the only way to contact the organization through a webform?
- What is the domain name? (.edu, .gov) Is it a personal page or supported by the organization? The tilde (~) means that the site is a personal page (compare an address like med.harvard.edu/~jsmith/headache to med.harvard.edu/neurology/headache)

Bias/Objectivity

- Is the information showing just one point of view?
- What kind of institution sponsored the webpage? A pharmaceutical company? A non-profit organization?
- Is advertising clearly marked?
- Can you tell if the information you are reading is advertisement?
- Do the graphics, fonts, and verbiage play upon emotions? Beware of CAPITAL LETTERS, EXCLAMATION POINTS!!!!! Or words like MIRACLE CURE!!!
- Is the author using data improperly to promote a position or a product?

Currency/Timeliness

- Is there a date on the page?
- When was the page last updated?
- Do the links work?
- Has there been more recent research on the subject? Many medical treatments change with the publication of new studies. What was published a year ago may be outdated now.

Coverage

- Is the information complete?
- Are there sources given for additional information?

Additional Resources

- MedlinePlus Guide to Healthy Web Surfing: http://www.nlm.nih.gov/medlineplus/healthywebsurfing.html
- Trust It or Trash It? (evaluation tool)
- Trust It or Trash It? (printer-friendly handout)

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15.4: Complementary and Integrative Health

Complementary, Alternative, or Integrative Health: What's In a Name?

We've all seen the words "complementary," "alternative," and "integrative," but what do they really mean?

Note: Also has been referred to as "complementary and alternative medicine," or "CAM" as an abbreviation.

Complementary Versus Alternative

Many Americans—more than 30 percent of adults and about 12 percent of children—use health care approaches developed outside of mainstream Western, or conventional, medicine. When describing these approaches, people often use "alternative" and "complementary" interchangeably, but the two terms refer to different concepts:

- If a non-mainstream practice is used together with conventional medicine, it's considered "complementary."
- If a non-mainstream practice is used in place of conventional medicine, it's considered "alternative."

True alternative medicine is uncommon. Most people who use non-mainstream approaches use them along with conventional treatments.

Integrative Medicine

There are many definitions of "integrative" health care, but all involve bringing conventional and complementary approaches together in a coordinated way. The use of integrative approaches to health and wellness has grown within care settings across the United States. Researchers are currently exploring the potential benefits of integrative health in a variety of situations, including pain management for military personnel and veterans, relief of symptoms in cancer patients and survivors, and programs to promote healthy behaviors.

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15.5: Types of Complementary Health Approaches

Most complementary health approaches fall into one of two subgroups—natural products or mind and body practices.

To learn more about specific products, practices, and approaches, click on each underlined item below.

Natural Products

This group includes a variety of products, such as herbs (also known as botanicals), vitamins and minerals, and probiotics. They are widely marketed, readily available to consumers, and often sold as dietary supplements.

According to the 2012 National Health Interview Survey (NHIS), which included a comprehensive survey on the use of complementary health approaches by Americans, 17.7 percent of American adults had used a dietary supplement other than vitamins and minerals in the past year. These products were the most popular complementary health approach in the survey. The most commonly used natural product was fish oil.

Researchers have done large, rigorous studies on a few natural products, but the results often showed that the products didn't work. Research on others is in progress. While there are indications that some may be helpful, more needs to be learned about the effects of these products in the human body and about their safety and potential interactions with medicines and other natural products.

Mind and Body Practices

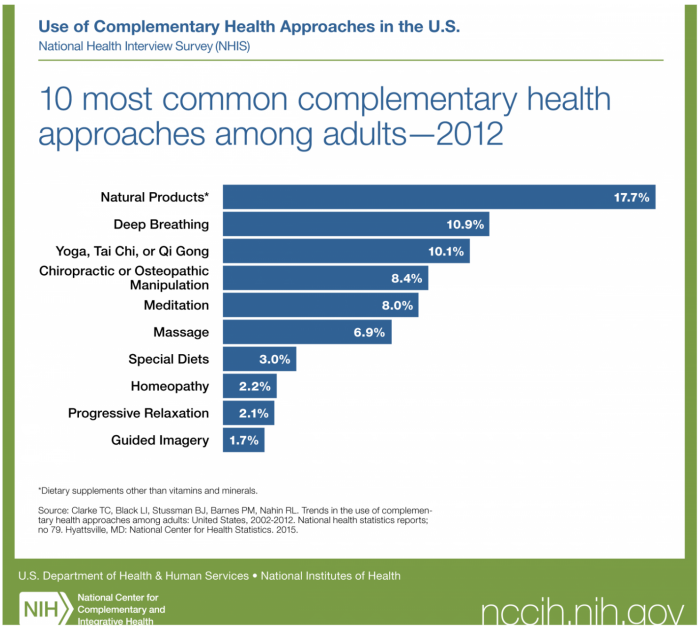
Mind and body practices include a large and diverse group of procedures or techniques administered or taught by a trained practitioner or teacher. The 2012 NHIS showed that yoga, chiropractic and osteopathic manipulation, meditation, and massage therapy are among the most popular mind and body practices used by adults. The popularity of yoga has grown dramatically in recent years, with almost twice as many U.S. adults practicing yoga in 2012 as in 2002.

Other mind and body practices include acupuncture, relaxation techniques (such as breathing exercises, guided imagery, and progressive muscle relaxation), tai chi, qi gong, healing touch, hypnotherapy, and movement therapies (such as Feldenkrais method, Alexander technique, Pilates, Rolfing Structural Integration, and Trager psychophysical integration).

The amount of research on mind and body approaches varies widely depending on the practice. For example, researchers have done many studies on acupuncture, yoga, spinal manipulation, and meditation, but there have been fewer studies on some other practices.

Other Complementary Health Approaches

The two broad areas discussed above—natural products and mind and body practices—capture most complementary health approaches. However, some approaches may not neatly fit into either of these groups—for example, the practices of traditional healers, Ayurvedic medicine, traditional Chinese medicine, homeopathy, and naturopathy.



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15.6: Dietary Supplements

Like many Americans, you may take dietary supplements in an effort to stay healthy. With so many dietary supplements available and so many claims made about their health benefits, how can you decide whether a supplement is safe or useful? This fact sheet provides a general overview of dietary supplements, discusses safety considerations, and suggests sources for additional information.

Federal Regulation of Dietary Supplements

The Federal Government regulates dietary supplements through the FDA. The regulations for dietary supplements are not the same as those for prescription or over-the-counter drugs.

- Manufacturers of dietary supplements are responsible for ensuring that their products are safe and that the label information is truthful and not misleading. However, a manufacturer of a dietary supplement does not have to provide the FDA with data that demonstrate the safety of the product before it is marketed.1 In contrast, manufacturers of drugs have to provide the FDA with evidence that their products are both safe and effective before the drugs can be sold.
- Manufacturers may make three types of claims for their dietary supplements: health claims, structure/function claims, and nutrient content claims. Some of these claims describe the link between a food substance and a disease or health-related condition; the intended benefits of using the product; or the amount of a nutrient or dietary substance in a product. Different requirements apply to each type of claim. If a dietary supplement manufacturer makes a claim about a product's effects, the manufacturer must have data to support the claim. Claims about how a supplement affects the structure or function of the body must be followed by the words "This statement has not been evaluated by the U.S. Food and Drug Administration (FDA). This product is not intended to diagnose, treat, cure, or prevent any disease."
- Manufacturers must follow "current good manufacturing practices" for dietary supplements to ensure that these products are processed, labeled, and packaged consistently and meet quality standards.
- Once a dietary supplement is on the market, the FDA evaluates safety by doing research and keeping track of any side effects reported by consumers, health care providers, and supplement companies. If the FDA finds a product to be unsafe, it can take action against the manufacturer and/or distributor, and may issue a warning or require that the product be removed from the marketplace.

Sources of Science-Based Information

It's important to look for reliable sources of information on dietary supplements so you can evaluate the claims that are made about them. The most reliable information on dietary supplements is based on the results of rigorous scientific testing.

To get reliable information on a particular dietary supplement:

- Ask your health care providers. Even if they don't know about a specific dietary supplement, they may be able to access the latest medical guidance about its uses and risks.
- Look for scientific research findings on the dietary supplement. The National Center for Complementary and Integrative Health (NCCIH) and the National Institutes of Health (NIH) Office of Dietary Supplements (ODS), as well as other Federal agencies, have free publications, clearinghouses, and information on their Web sites.

Safety Considerations

If you're thinking about or currently using a dietary supplement, here are some points to keep in mind.

- Tell all your health care providers about any complementary health approaches you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.
- It's especially important to talk to your health care providers if you:
  - Take any medications (whether prescription or over-the-counter). Some dietary supplements have been found to interact with medications. For example, the herbal supplement St. John's wort interacts with many medications, making them less effective.
  - Are thinking about replacing your regular medication with one or more dietary supplements.

- Expect to have surgery. Certain dietary supplements may increase the risk of bleeding or affect the response to anesthesia.
- Are pregnant, nursing a baby, attempting to become pregnant, or considering giving a child a dietary supplement. Most dietary supplements have not been tested in pregnant women, nursing mothers, or children.
- Have any medical conditions. Some dietary supplements may harm you if you have particular medical conditions. For example, by taking supplements that contain iron, people with hemochromatosis, a hereditary disease in which too much iron accumulates in the body, could further increase their iron levels and therefore their risk of complications such as liver disease.

- If you're taking a dietary supplement, follow the label instructions. Talk to your health care provider if you have any questions, particularly about the best dosage for you to take. If you experience any side effects that concern you, stop taking the dietary supplement, and contact your health care provider. You can report serious problems suspected with dietary supplements to the U.S. Food and Drug Administration and the National Institutes of Health through the Safety Reporting Portal.
- Keep in mind that although many dietary supplements (and some prescription drugs) come from natural sources, "natural" does not always mean "safe." For example, the herbs comfrey and kava can cause serious harm to the liver. Also, a manufacturer's use of the term "standardized" (or "verified" or "certified") does not necessarily guarantee product quality or consistency.
- Be aware that an herbal supplement may contain dozens of compounds and that all of its ingredients may not be known. Researchers are studying many of these products in an effort to identify what ingredients may be active and understand their effects in the body. Also consider the possibility that what's on the label may not be what's in the bottle. Analyses of dietary supplements sometimes find differences between labeled and actual ingredients. For example:
  - An herbal supplement may not contain the correct plant species.
  - The amounts of the ingredients may be lower or higher than the label states. That means you may be taking less—or more—of the dietary supplement than you realize.
  - The dietary supplement may be contaminated with other herbs, pesticides, or metals, or even adulterated with unlabeled, illegal ingredients such as prescription drugs.

Key Points about Supplements

- Dietary supplements contain a variety of ingredients, such as vitamins, minerals, amino acids, and herbs or other botanicals. Research has confirmed health benefits of some dietary supplements but not others.
- To use dietary supplements safely, read and follow the label instructions, and recognize that "natural" does not always mean "safe." Be aware that an herbal supplement may contain dozens of compounds and that all of its ingredients may not be known.
- Some dietary supplements may interact with medications or pose risks if you have medical problems or are going to have surgery. Most dietary supplements have not been tested in pregnant women, nursing mothers, or children.
- The U.S. Food and Drug Administration (FDA) regulates dietary supplements, but the regulations for dietary supplements are different and less strict than those for prescription or over-the-counter drugs.
- Tell all your health care providers about any complementary health approaches you use. Give them a full picture of what you do to manage your health. This will help ensure coordinated and safe care.

For current information from the Federal Government on the safety of particular dietary supplements, check the "Dietary Supplement Alerts and Safety Information" section of the FDA Web site or the "Alerts and Advisories" section of the NCCIH Web site.

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15.7: Aging

Every year we get one year older chronologically, does this mean we also get one year older biologically? Our biological age is the age of our body and this is not dependent on our chronological age. You can be a 30 year old who is very healthy and has a biological age closer to 20 year old, or you can be a 30 year old who lives an unhealthy lifestyle and has a biological age closer to 40. Our biological age is highly influenced by the lifestyle choices we make.

The good news is that Americans are living longer lives, but the bad news is that the increase in our older population brings an increase in chronic diseases, such as hypertension, diabetes, arthritis, and dementia. It is estimated that 80% of older adults have a chronic health condition. With so many older adults having chronic health conditions we know there will continue to be an increased need for caregivers. This creates a potential problem because although our older population is growing, or birth rates are declining which may reduce the amount of people to serve as caretakers.

Aging Data

- 10,000 people each day turn 65, this will continue through 2030
- Between 2012 and 2050, the number of adults age 65 and older will nearly double in the US, reaching 84 million
  - By 2030, 1 in 5 Americans will be age 65 or older
- In 2033, the number of adults age 65 and older will outnumber people younger than 18 for the first time in the US
- The number of people age 85 and older will roughly triple in the U.S. between 2012 and 2050
- By 2050, more than 18 million Americans will be age 85 or older
- By 2050, more than 439,000 Americans will be age 100 or older
- 80% of older adults, aged 60 and older, have at least one chronic condition
- 1 in 3 older adults 65+ have Activities of Daily Living (ADL) limitations (managing money, shopping, telephone use, travel in community, housekeeping, preparing meals, and taking medications correctly)

Guiding Model for Healthy Aging

The CDC recommends a three prong approach to healthy aging which includes:

1. Promote health, prevent injury, and manage chronic conditions
2. Optimize physical, cognitive, and mental health
3. Facilitate social engagement

Challenges of Aging

There are many challenges associated with aging. Here is a list of common challenges.

Advance Care Planning (ACP)

Alzheimer's disease

Caregiving

Arthritis

Hearing loss

Motor-vehicle safety

Osteoporosis

Vision loss

Contributors and Attributions

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16: Footnote

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