

Unit 6

Disease & Illness

Health Education

Causes of Infectious Diseases

- **Infectious Disease (*Communicable Diseases*):** Are caused by organisms or viruses that enter and multiply with the human body.
 - Your body & environment are filled with Microorganisms (only visible with a microscope). Not all of them cause diseases. You have millions that live in your mouth, skin, and digestive track).
- **Pathogens:**
 - Small microorganisms that invade & attack body tissue. (There are many types of pathogens).
- **Parasites**
 - Organisms that live in another organism and get nourishment from it.
- **Bacterium**
 - Single-celled organism / can live almost anywhere / harmful to human cells

Causes of Infectious Diseases Cont..

- **Virus**

- Smallest known type of infectious agent. (*100 times smaller than most bacteria*). Viruses take over a living cell – damage or kill it.

- **Protozoans**

- Single-celled organisms that are much larger and more complex than bacteria. Have the ability to move through fluids in search of food. (example: **Malaria** (affects red blood cells: causing weakness & nausea); **Amebic Dysentery** (stomach pain & diarrhea))

- **Fungi**

- Organisms that can't make their own food (yeasts, molds, and mushrooms).
- Grow in warm, dark, moist areas. (example: **athlete's foot, ringworm**)

How Infectious Diseases are Spread

- **Transmission**

- **Direct Contact**

- Uninfected person comes into physical contact with an infected person
- Examples: STD's (sexually transmitted diseases); Kissing (cold sore); Shaking hands

- **Indirect Contact**

- Enter lungs / tiny droplets are exhaled, coughed, or sneezed out
- Examples: Colds, Influenza, TB, measles, mumps, chickenpox



Animals Spread Disease



Examples

- Bite of an infected dog, bat, raccoon – **Rabies**: a deadly disease of the nervous system
- **Mosquito** – Malaria, West Nile
- **Tick** – Lyme Disease & Rocky Mountain Spotted Fever



How Infectious Diseases are Spread Cont...

- **Environment** (Water, Soil, Air, Food)
 - Example: **Cholera** – a bacterial disease of the digestive system that causes severe diarrhea.



How Infectious Diseases are Spread Cont...

- Contaminated Objects:
 - Eating Utensils & Glasses
 - Toothbrushes
 - Needles (piercing)
 - Towels
 - Items in the school?



- **FACT:** About 80% of infectious diseases are spread by hand contact. Washing your hands with soap and water is a simple and effective way to prevent the spread of colds & flu.

Physical & Chemical Defenses

- **Skin:** Microorganisms usually cannot get through your skin. cuts, scrapes, burns and other injuries can lead to infection.
- **Mucous Membranes:** protective lining of the mouth, eyes, and nose
- **Cilia:** Tiny hair-like structures
- **Saliva & Tears:** Contain chemicals that attack pathogens
- **Digestive System:** Chemicals & acids that harm & kill invading bacteria.
- **Inflammation:** Body's response to injury (Heat, Redness, Swelling) (cuts, scrapes, internal damage).



The Body's Defense System

- **Immune System:** Fights disease by producing a separate set of weapons for each kind of pathogen it encounters
- **White Blood Cells (Lymphocytes):** carry out most of the immune system functions.
 - 2 Types of WBCs:
 - **T-Cells** – “killer T”, “helper T”, “suppressor T”
 - **B-Cells** – produce antibodies

The Lymphatic System

- A system of vessels that collect fluid from your tissues & return it to the bloodstream.
- The lymph vessels contain hundreds of filtering stations called **Lymph Nodes**.



The Body's Defense System

- **Passive Immunity**

- Immunity acquired by receiving antibodies from a source other than one's own immune system.

- Temporary – Not life long
- Babies receive this type from their mother (during development and during breast feeding).

- **Active Immunity:**

- Results from either having a disease or from receiving a vaccine.

- **Immunizations:** An injection that causes you to become immune to the disease (Ex: measles, mumps, rubella).
- **Vaccines:** Contains small amounts of dead or modified pathogens or toxins.

Bacterial Diseases



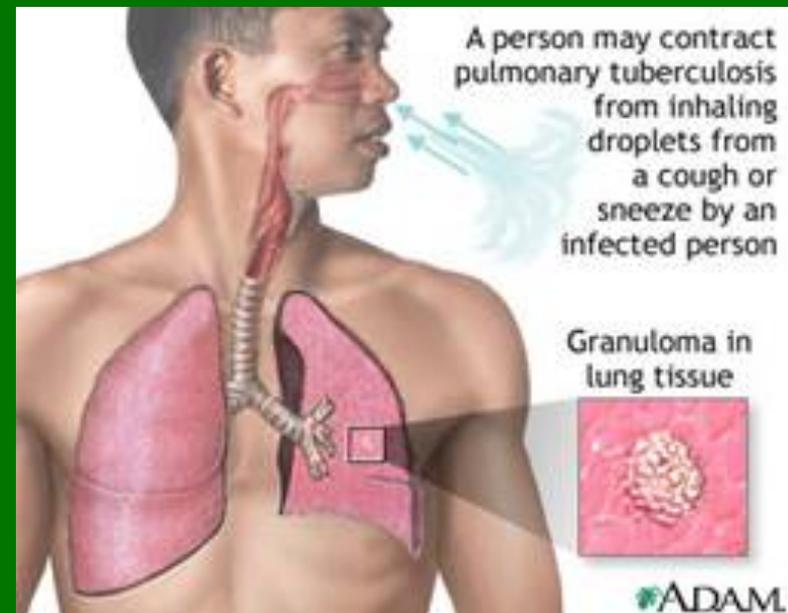
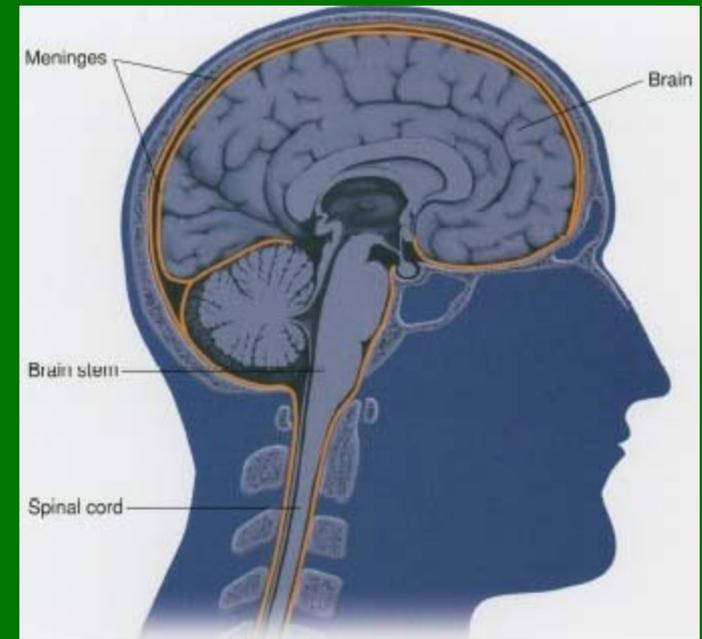
- **Strep Throat:** Streptococcus bacteria usually found in the nose & throat. Diagnosed by swabbing the back of your throat and identifying the bacteria in a sample.
- **Lyme Disease:** humans become infected with the bacteria that cause Lyme disease when bitten by an infected tick (*more than 20,000 people are infected with Lyme disease each year*)



Look for
bullseye-
shaped
rash

Bacterial Diseases Continued...

- **Bacterial Meningitis:** Infection of the fluid in the spinal cord & surrounding the brain.
 - Symptoms: high fever, headache, vomiting, and stiff neck
 - 2 types: **Bacterial (more serious) & Viral**
- **TB (Tuberculosis):** highly infectious bacterial infection of the lungs.
 - *1/3 of the world is infected, 2 million die each year*



Viral Diseases



- **Common Cold:**
 - Inflammation of mucous membranes. (No Cure)
- **Influenza (the FLU):**
 - Viral infection of the respiratory tract
 - Chills, fever, headache, muscle ache, weakness
 - Flu virus can cause more serious illness than the cold virus (especially to infants, elderly and people with heart or lung trouble).
 - *An average of 30,000 people die each year from FLU in the U.S.*
- **Pneumonia:**
 - A serious infection of the lungs
 - Can be caused by a virus, bacteria, or even fungi
 - *Elderly people or people with heart disease or breathing problems - the flu may develop into Pneumonia.*

Stages of the Flu (Influenza)

Day 1-3 – Incubation: The virus enters your body

Day 4-5 – **First Symptoms:** You develop a sore throat & fever. You are contagious

Day 6-10 – Severe Symptoms: You have a headache, fever, and sore muscles. You are sneezing and coughing. You are contagious

Day 11-15 – Recovery: You feel a little better and your fever is down. Your immune system is winning. You may still be contagious.

Day 16-18 – End of Infection: Your aches and pains have disappeared. Your temperature is normal. You still do not feel as energetic as usual. You must continue to take care of yourself.

Viral Diseases Continued...



- **Hepatitis** – Inflammation of the liver. *A group of viruses infect the liver and can cause hepatitis.*
 - **Hepatitis A:** transmitted through human waste, contaminated food & water. A vaccine can treat this.
 - **Hepatitis B:** more serious than type A. Transmitted by blood, sexual contact, unsterilized needles (piercing & tattooing).
 - **Hepatitis C:** more serious than type B. #1 reason for liver transplants. Transmitted the same way as Type B.



Viral Disease Treatment



In most cases there is no particular medicine that will cure a viral infection.

Antibiotics only fight bacteria – not viruses.

Antiviral Medicines may shorten the length of the infection.

Best Treatment: Rest, Well-balanced diet, plenty of fluids.

There are some OTC medicines that can **make you feel better by treating the symptoms** – but do not cure the infection.

Infectious Diseases Cont...

- **Measles:**

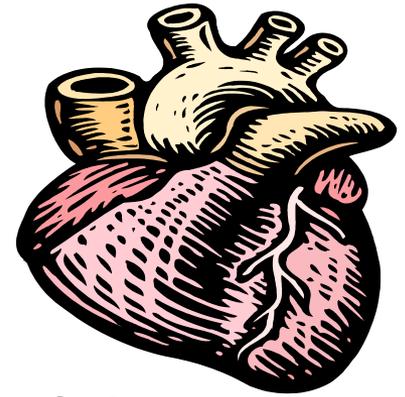
- Is a highly contagious viral disease characterized by a body rash

- **Mononucleosis – “Mono”**

- A viral infection common in young adults/ teens.
- Symptoms include chills, fever, fatigue, lasts 3-6 weeks.

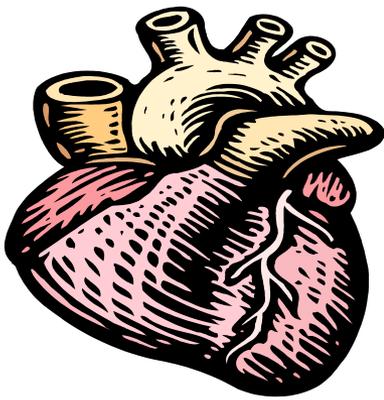


Chronic Diseases



- ***Chronic Disease:***

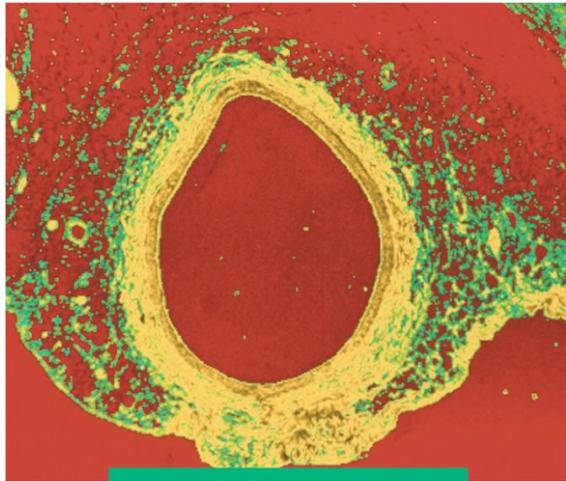
- A Disease that persists for a long period of time or may reoccur throughout life.
- Are the leading causes of death in the U.S.
- Are usually caused by risk factors that are behavioral, environmental, or heredity – not pathogens.
- Most Chronic Diseases are **Cardiovascular Diseases**: **diseases of the heart & blood vessels.**
 - **Examples:** Hypertension (high blood pressure); Atherosclerosis (hardening of the arteries); Heart Attack; Arrhythmia; Congestive Heart Failure; Stroke



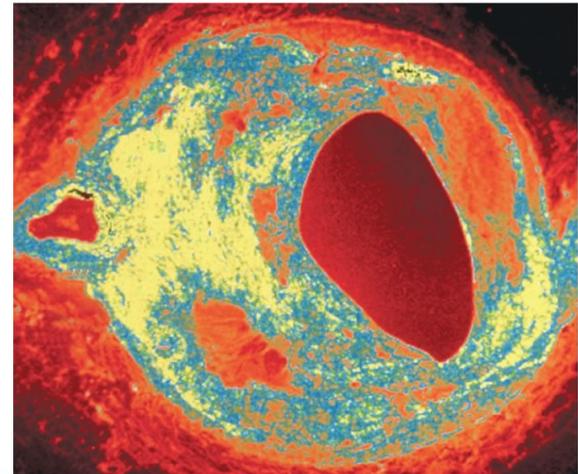
Chronic Diseases Continued...

- **Cardiovascular Disease (*5 risk factors*)**
 1. Heredity – genetic influences from parents
 2. Ethnicity – (African Americans are 2X more likely to develop a cardiovascular disease than Caucasian)
 3. Gender – men have a higher risk
 4. Age – (After 45, increased risk) (55% of all heart attacks occur after age 65)
 5. Environment – Smog, tobacco, smoke, stress

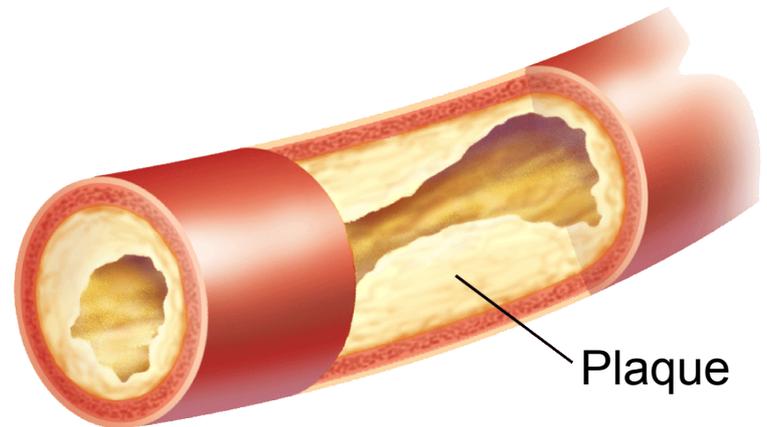
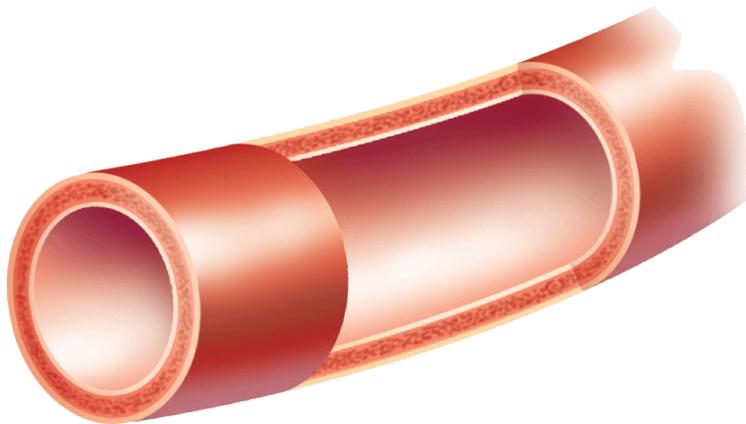
Section 23.1 Cardiovascular Diseases



Healthy Artery



Artery with Atherosclerosis



Cardiovascular Diseases Testing Tools

Electrocardiogram (EKG): Electrodes attached to the skin detect the heart's electrical activity & rhythm.

Arteriography: A flexible tube is threaded through an arm or leg until it reaches the heart. A dye is released into the coronary arteries, and X-rays are taken to reveal blockages.

Echocardiogram: A device that generates sound waves is placed against the chest. The sound waves create a moving picture of the heart. A Doctor can evaluate the heart's chambers & valves from the picture.

Magnetic Resonance Imaging (MRI): uses powerful magnets to look inside the body



EKG

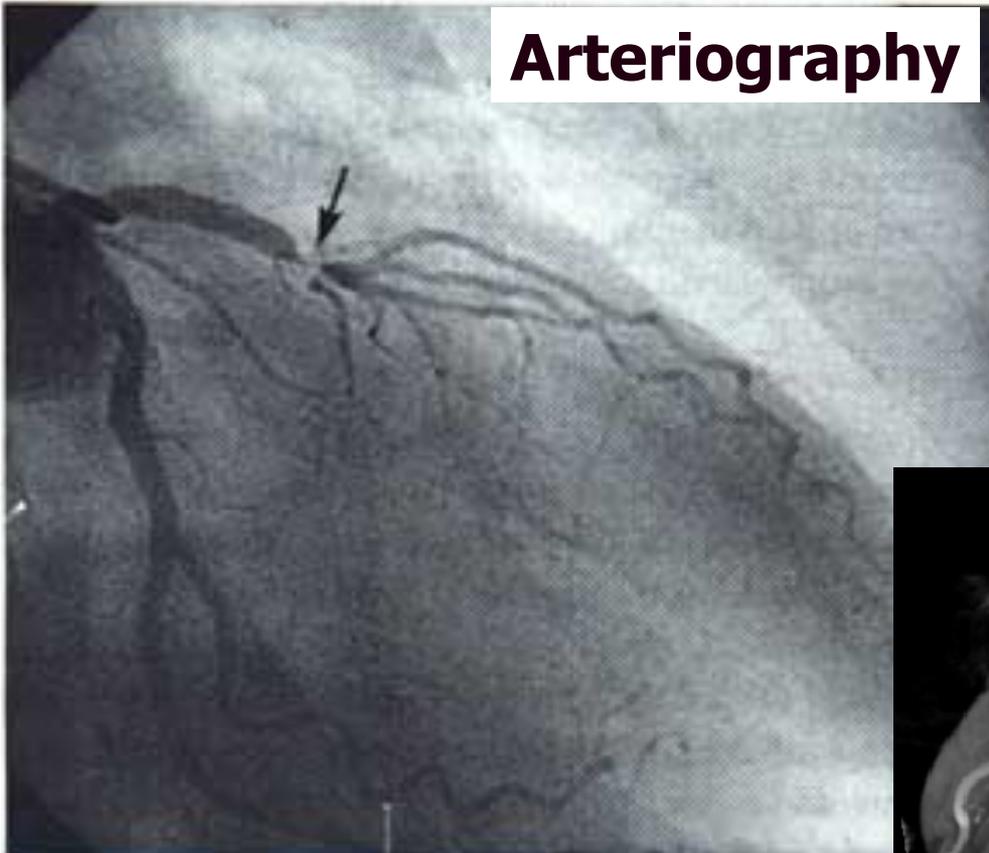


EKG



MRI

Arteriography



3D MRI



Cardiovascular Diseases Treatment Methods

Balloon Angioplasty: A thin tube with an expandable tip is guided into a coronary artery. As the tip is inflated, it flattens fatty deposits against the artery wall, improving blood flow. Other structures called **Stents** are sometimes inserted to keep the artery open.

Artificial Pacemaker: placed in and wired into the heart. Produces electrical impulses that regulate the heart.

Coronary Bypass Surgery: Surgeons use a vein (from leg or artificial) to make a detour around the blockage.

Heart Transplant: The heart may be replaced with one from a donor. *Risky procedure because the person's immune system might reject the new heart.*

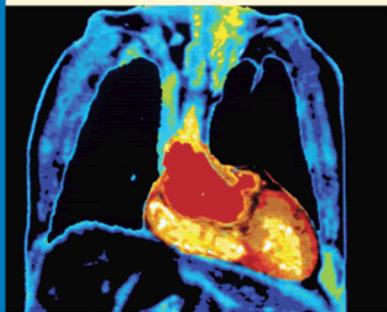


Testing and Treatment for Cardiovascular Disease

Testing Tools

Magnetic Resonance Imaging (MRI)

Magnetic energy is used to produce a clear image of the heart. Doctors can analyze the image for heart damage.



Electrocardiogram (ECG)

Electrodes attached to the skin detect the heart's electrical activity. Abnormalities in heart rhythm or other heart problems are revealed in the recorded pattern.

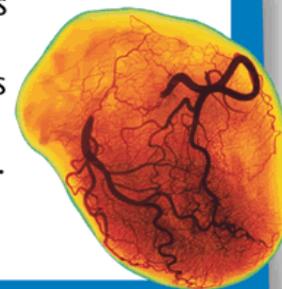


Echocardiogram

A device that generates sound waves is placed against the chest. The sound waves create a moving picture of the heart. A doctor can evaluate the heart's valves and chambers from the picture.

Arteriography

A flexible tube is threaded through an artery in an arm or leg until it reaches the heart. A dye is then released into the coronary arteries, and X-rays are taken. The X-rays can reveal blockages.

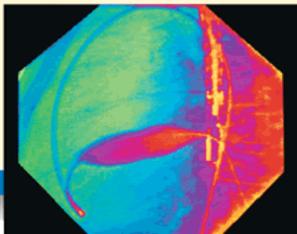


Testing and Treatment for Cardiovascular Disease

Treatment Methods

Balloon Angioplasty

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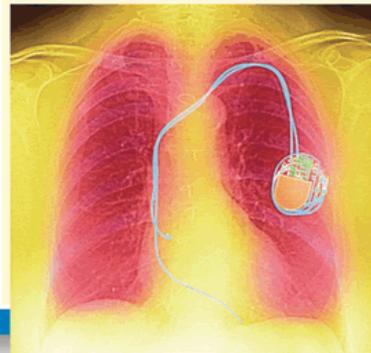


Coronary Bypass Surgery

Surgeons use a vein from the patient's leg or an artificial blood vessel to construct a detour around a blocked coronary artery. This procedure creates an alternate route for blood flow.

Artificial Pacemaker

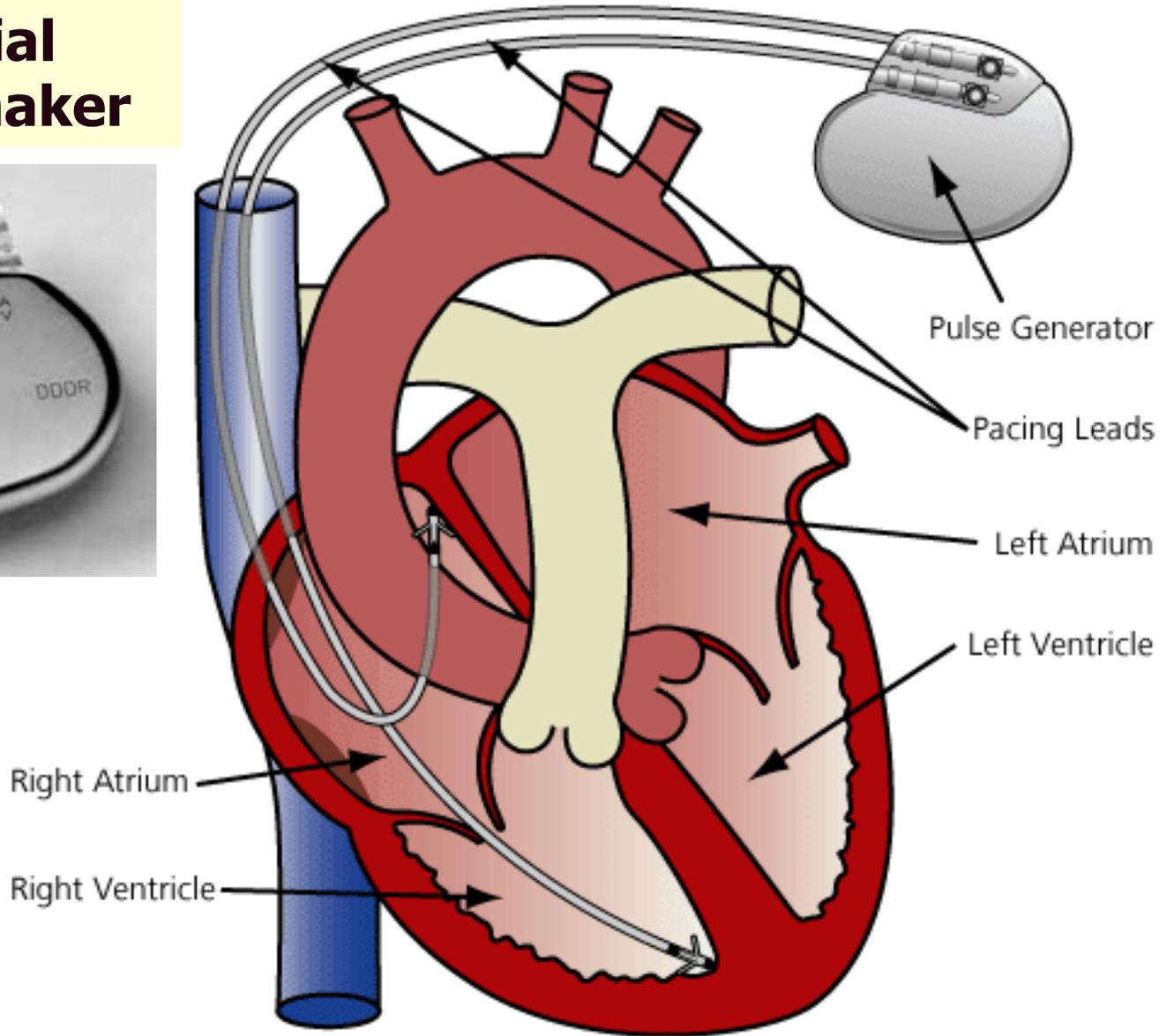
An artificial pacemaker is a small, battery-operated device that is surgically implanted in the chest. It produces electrical impulses that regulate the heartbeat.



Heart Transplant

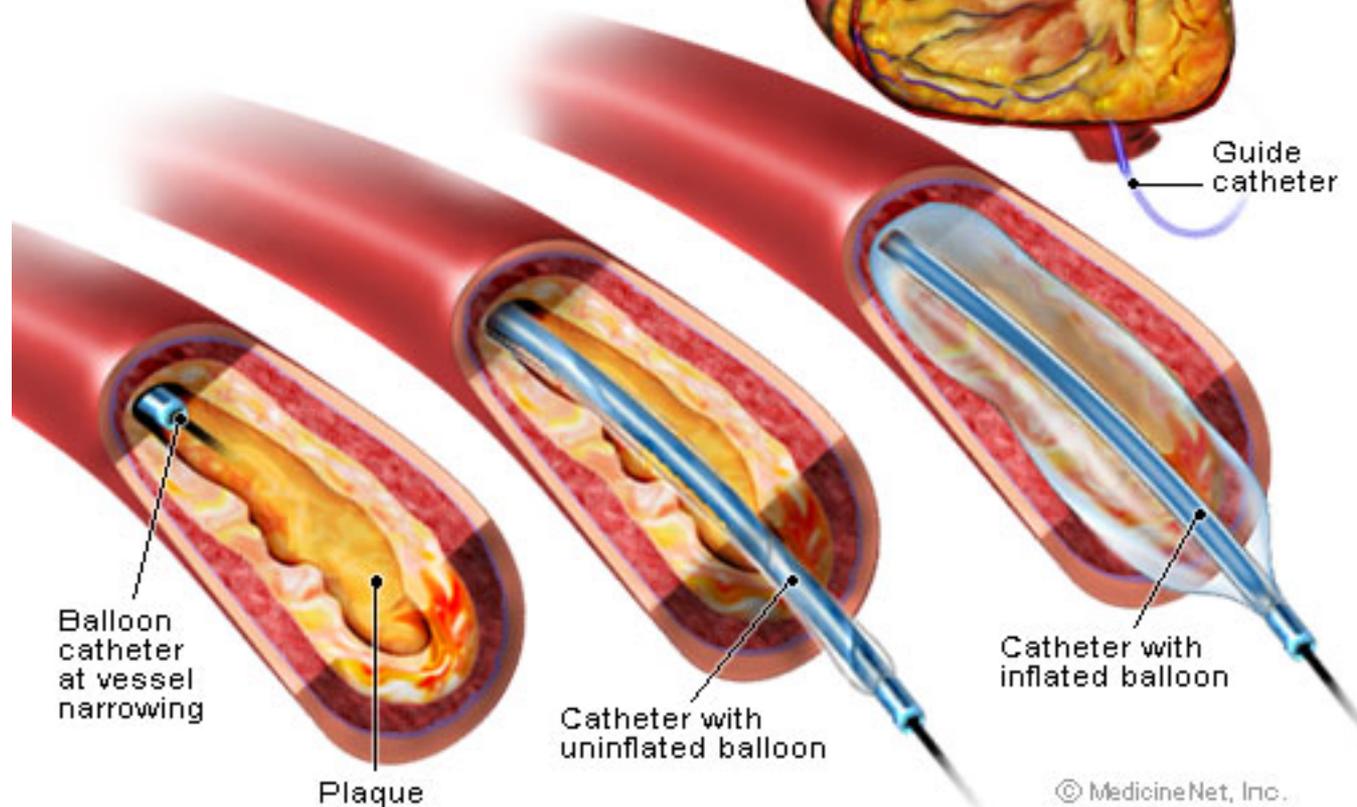
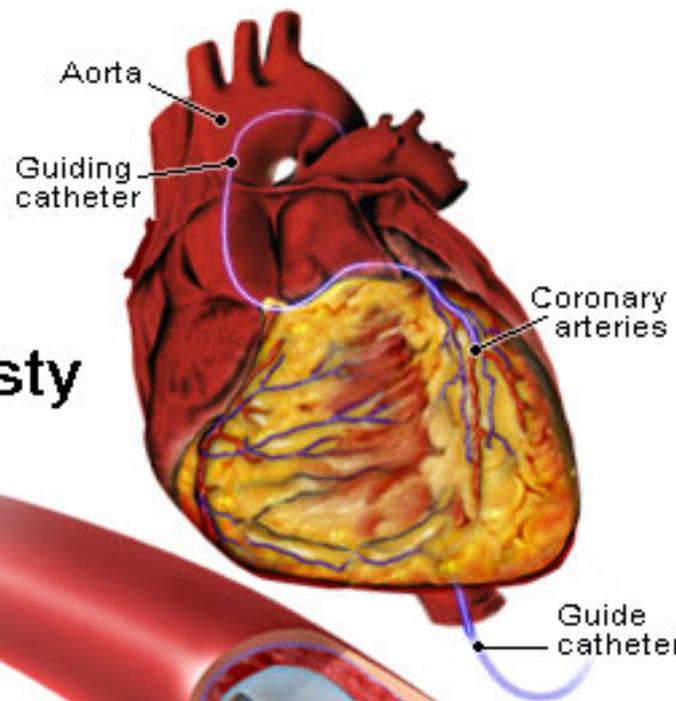
When a person's heart cannot function adequately, it may be replaced with a heart from an organ donor. This surgical procedure carries some risk because the immune system may reject the new heart. To lower rejection rates, doctors use drugs to suppress the immune system.

Artificial Pacemaker

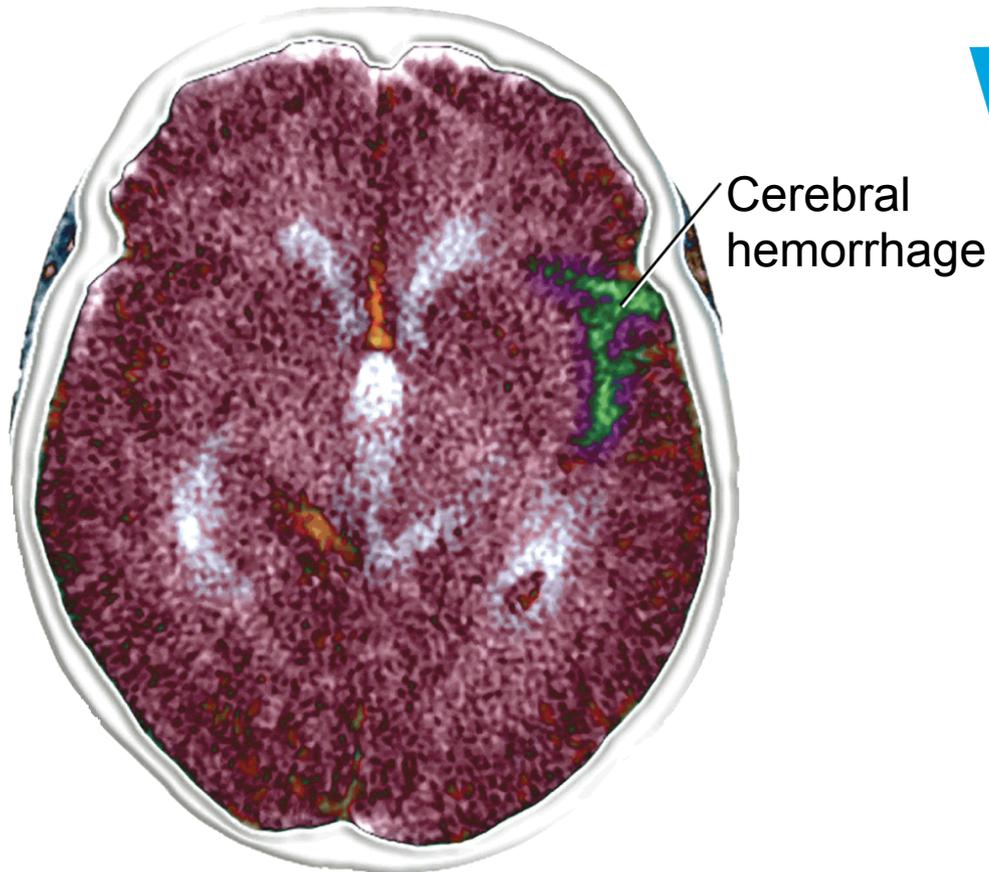




Balloon Angioplasty



Top View of Brain

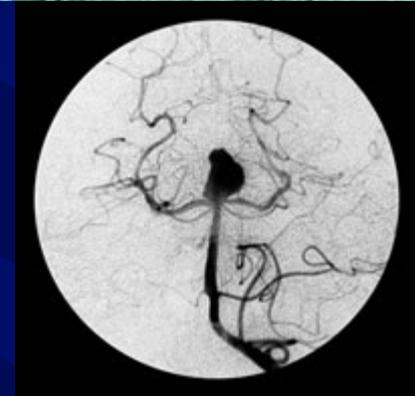
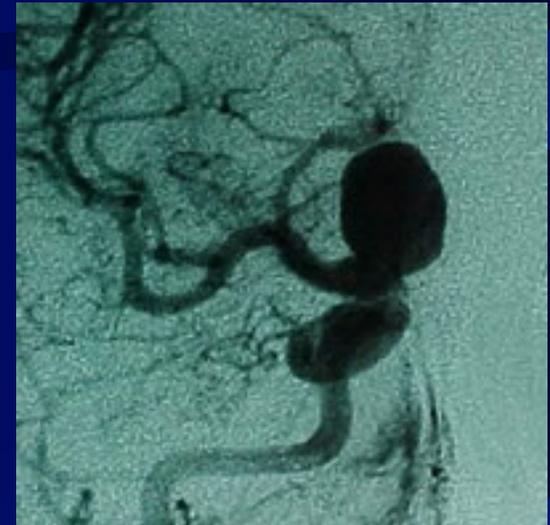


Warning Signs of a Stroke

- ▶ Sudden, severe headache with no apparent cause
- ▶ Sudden weakness or numbness of the face, arm, or leg on one side of the body
- ▶ Loss of speech, trouble talking, or trouble understanding speech
- ▶ Sudden dimness or loss of vision, particularly in one eye
- ▶ Unexplained dizziness, nausea, unsteadiness, or sudden falls

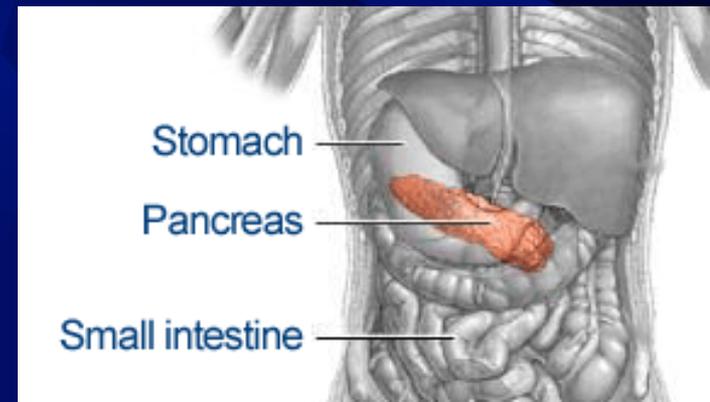
Aneurysms

- Are abnormal bulges of the arteries of the brain.
- An estimated 1 in 15 people will develop a brain aneurysm in their lifetime.
 - Most are discovered when they rupture and start internal bleeding
 - Can cause a stroke, brain damage and death
- The main goal of treatment is to stop the internal bleeding & prevent damage
- 10-15% of people die before reaching the hospital
- Most common for ages 35-60 (women are more likely to have them by a ratio of 3:2)



Diabetes

- A disease in which the body's ability to use glucose (blood sugar) is impaired.
- Diabetes involves **Insulin**: a hormone produced in the pancreas that stimulates the cells to take up & use blood sugar.



Diabetes - Type I

- Produces Little or No Insulin.
- Without Insulin, glucose levels in the blood remain high.
- Usually appears in children.
- Need to monitor glucose levels closely & may need to given themselves injections.



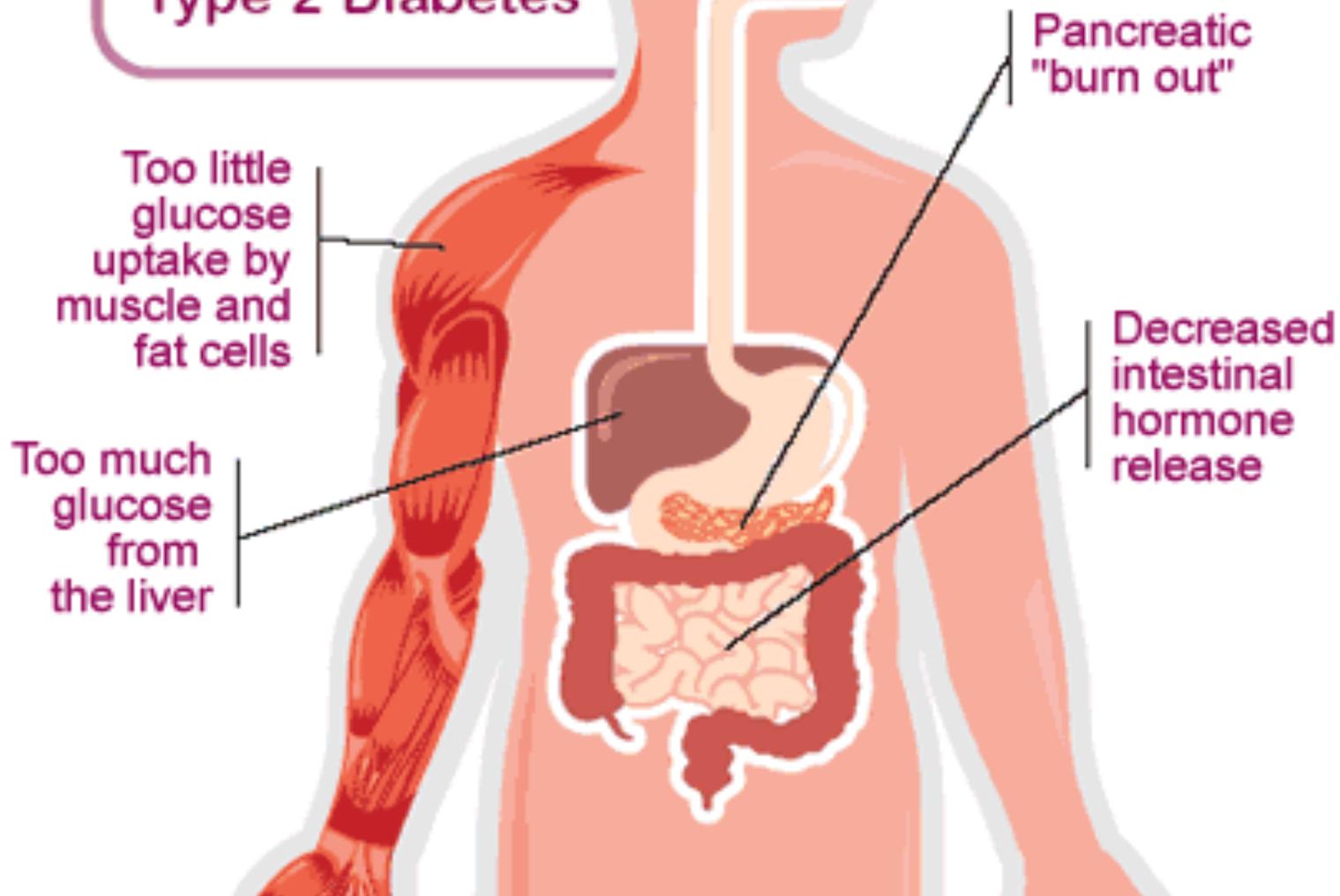
Diabetes - Type II

- **Type II: Noninsulin-Dependant Diabetes.**
- Most cases occur over age 30 (overweight & low exercise)
- People with Type II produce sufficient Insulin, but their body cells do not respond normally to the Insulin.
- As a result, (like type I) the person has high glucose levels in the blood.

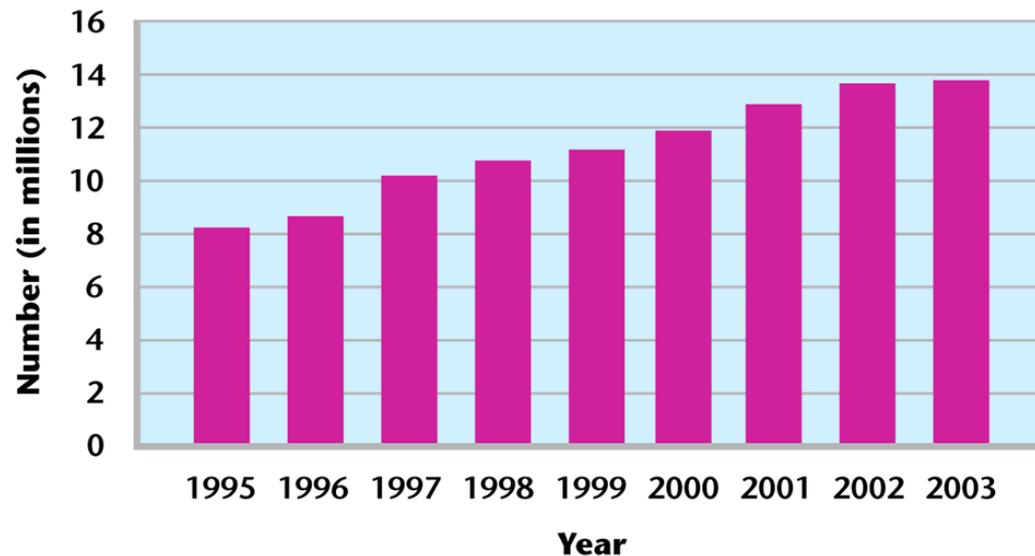
FACT: The number of Americans with Diabetes increased every year between 1995-2003.



Causes of High Blood Sugar in Type 2 Diabetes



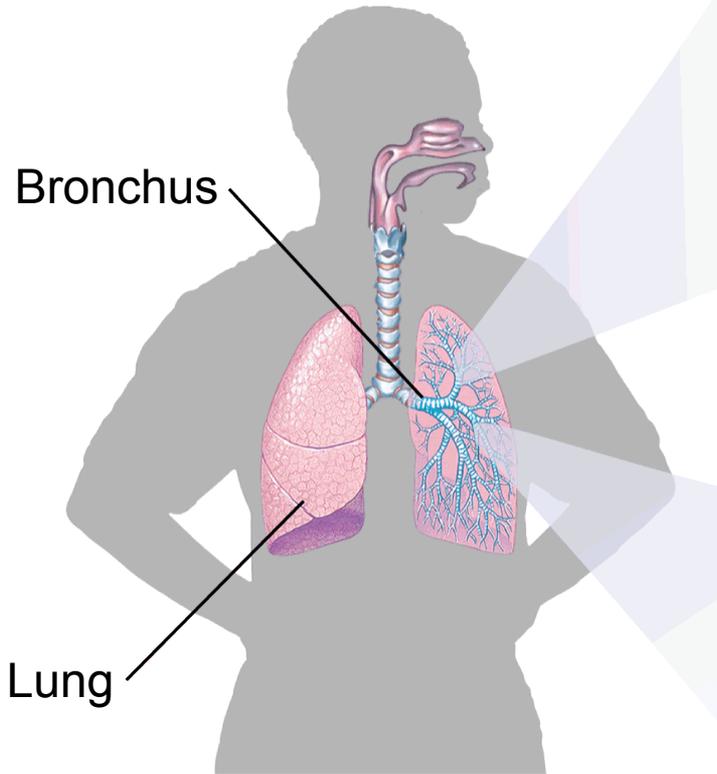
Americans With Diabetes



Tips for Preventing Type 2 Diabetes

- Maintain a healthy body weight.
- Eat nutritious meals low in sugar and saturated fats.
- Exercise for at least 30 minutes everyday.

An Asthma Attack



Normal Airway



Constricted Airway



Arthritis

- Inflammation or irritation of a joint is known as **arthritis** (ahr THRY tis).
- Arthritis is not life-threatening, but it can be extremely painful and disabling.
- Arthritis results in joint stiffness, joint pain, or swelling in one or more joints.
- There is no cure for most types of arthritis.

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Osteoarthritis

- The most common type of arthritis is **osteoarthritis** (ahs tee oh ahr THRY tis).
- This form of arthritis is caused by wear and tear on a joint after years of use or by repeated injuries to a joint.
- Osteoarthritis can occur in almost any joint, but most commonly occurs in hips, knees, spine, and fingers.
- Treatment for osteoarthritis may involve drugs, heat and cold treatments, and exercise.

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Rheumatoid Arthritis

- In **rheumatoid arthritis** (ROO muh toyd), the membrane surrounding a joint becomes inflamed.
- The inflammation then spreads to other areas of the joint.
- Any joint in the body may be affected by rheumatoid arthritis, although joints in the wrist and knuckles are most commonly affected.
- Treatment includes aspirin or other anti-inflammatory drugs, exercise, and rest.

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About **70%** of
people with
rheumatoid arthritis
are **female**.

The End

