

Antibiotics & You

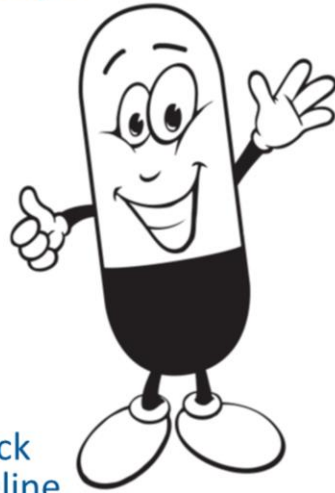
The inside story on how antibiotics
work and what you can do to
prevent antibiotic resistance.



To get the training video on this presentation (from our Michigan counterparts),
you can register your info at: <http://www.mi-marr.org/educator.php>

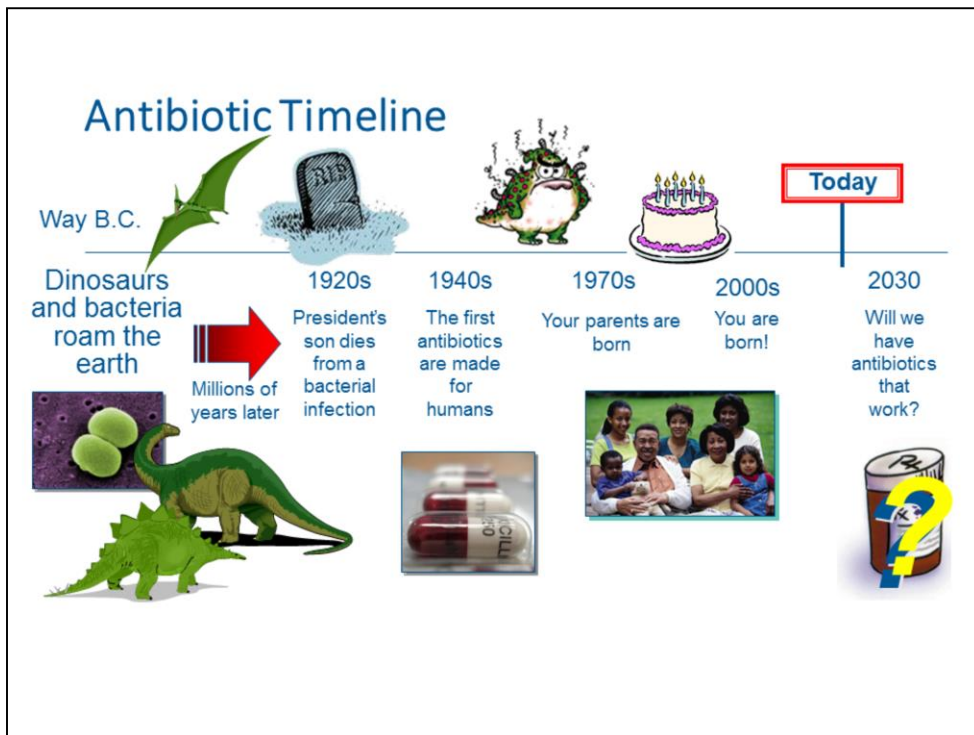
What will we learn today?

- Antibiotic timeline
- All about GERMS
 - Viruses and bacteria
 - How germs spread
 - How germs get inside you
- Your body fights back
- Antibiotics to the rescue
 - How antibiotics work
 - Antibiotic resistance
 - What to do when you get sick
 - Protecting our antibiotic lifeline



Presentation Agenda:

Lists the primary topics covered in the presentation



Antibiotic Timeline:

Bacteria have been around for a long, long time. They were one of the first forms of life on planet Earth. By the time dinosaurs appeared, bacteria had already been here for millions of years. Antibiotics have also been around since prehistoric time, since they were produced by some bacteria and other microbes to defend themselves against dangerous bacteria. Humans discovered antibiotics in the 1940s and are used to cure bacterial infections. Before antibiotics, people often died from bacterial infections. This timeline puts the evolution of antibiotics into perspective; within a few years of their introduction into use by doctors -- less than a human lifetime -- bacteria were becoming resistant to these important, life-saving medicines.

Key points:

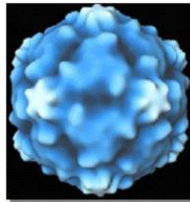
- Bacteria have been around for millions of years, surviving the ice age and the dinosaurs.
- In the 1940s, antibiotics were discovered by humans used to treat infections in people.
- Before antibiotics were known to doctors, there was no effective treatment for bacterial infections. People often died from these infections. In 1924, President Calvin Coolidge's 16-year old son, who had the best treatment available, died from an infected blister on his foot.
- Bacteria are already outsmarting our antibiotics. If we don't use these

medicines properly, they won't work anymore.

Two major types of germs

Viruses

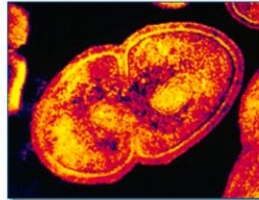
- Genetic material in a protective coat
- Parasite that attaches itself to a host cell to reproduce inside the cell



Rhinovirus (cold)

Bacteria

- Independent organism
- Able to live and reproduce outside cells



Streptococcus pneumoniae

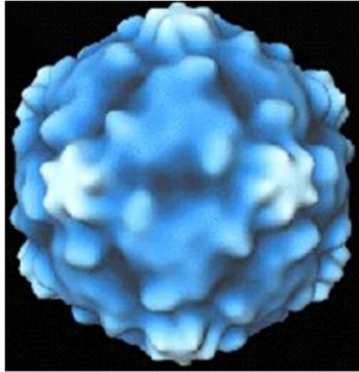
Two Major Classes of Germs

Key points:

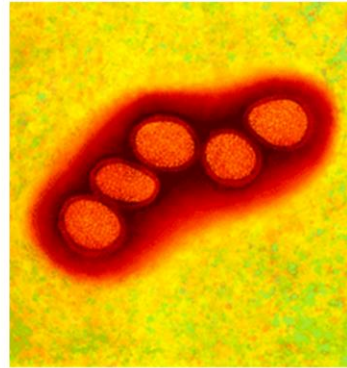
- There are two main types of germs: viruses and bacteria. These germs are very different from each other.
- Viruses are genetic material (DNA or RNA). They invade living cells, like the ones inside your body, and turn them into copy machines to make more viruses. When these virus copies are released into your body, you become sick.
- Antibiotics do not work on viruses.

- Bacteria are living, independent organisms that can survive and reproduce on their own.
- Most bacteria are good, helping us digest food and keep our systems in balance.
- Some types of bacteria can make you sick and antibiotics are used to fight those infections.
- When we use antibiotics, even to kill bad bacteria and cure infections, we are also killing some of the good bacteria.

What some viruses look like



Rhinovirus
• Common cold



Influenza Virus
• Flu

What Viruses Look Like

Key points:

- There are many different kinds of viruses and they come in all sorts of shapes
- Viruses are extremely tiny and can only be seen under special, high-powered microscopes
- The Rhinovirus causes the common cold
- The Influenza virus causes the flu

Instructor's note: You may ask the class these questions to begin a discussion:
Have you or someone you know ever had a cold or the flu? How did you feel?
What were the symptoms? Did you go to the doctor? Did you get medicine?

Virus facts

- Some viruses make you sick (flu, colds and most coughs)
- Some viral infections can be prevented by immunization and vaccines
- Antibiotics don't work on viruses
- Treat a viral infection with:
 - Rest
 - Plenty of liquids
 - Over-the-counter medicine like cough syrup or Tylenol®

Facts About Viruses

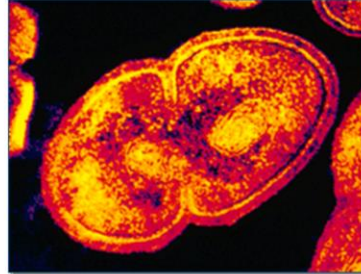
Key points:

- Some viruses can make you sick.
- The flu, colds, and most coughs are caused by viruses.
- Some viral infections can be prevented by vaccines (examples: influenza, polio, chicken pox).
- Antibiotics don't work on viruses.
- The best way to treat a viral infection, like a cold or flu, is with rest, plenty of liquids, and over-the-counter medicine, like Tylenol for body aches and fever.

What some bacteria look like



***Escherichia coli* (E coli)**
• Urinary Tract Infection



Streptococcus pneumoniae
• Ear infections and pneumonia

What Bacteria Look Like

The bacteria shown on this slide are part of your normal flora. They represent just two of the many types of bacteria that live on and in your body.

Key points:

- These are examples of common bacterial organisms that can make you sick, even these bacteria are normally in us and not causing infection.

Movie:

- Show a movie how bacteria grow and multiply by dividing in half again and again. A colony of bacteria can double in size every 30 minutes under ideal conditions.

Bacteria facts

- Bacteria are much larger than viruses
- They live on your skin, inside your mouth, nose, throat and intestines
- They help your body function and digest food
- They help protect you from harmful germs

Bacteria help me stay healthy!



Facts About Bacteria

Key points:

- Bacteria are living, single-cell organisms that come in many different types and shapes.
- Bacteria are much larger than viruses.
- Most bacteria are good and help keep us healthy.
- Bacteria live in our bodies and on our skin. These bacteria help our bodies function, digest food, and keep our systems in balance.

More bacteria facts

- Bacteria can also make you sick
 - When they get where they are not supposed to be
 - When conditions allow them to grow quickly
- Bacteria can cause:
 - Sinus infections
 - Strep throat
 - Some ear infections
 - Food poisoning (salmonella)
- Bacterial illnesses **can** be treated with antibiotics

How bacteria make you sick

Key points:

- Disease is caused by a “bad bug” or sometimes a “good bug” that is somewhere inside your body where it shouldn’t be.
- For example, bacteria that live inside your nose can make you sick if they get into your lungs.
- Almost all bacterial infections can be treated with antibiotics.
- Only your doctor can determine if your infection needs to be treated with antibiotics.

Instructor’s note: To help students understand how good bacteria can go bad, use this analogy:

- Even good bacteria can cause problems when they get where they are not supposed to be. Think of a squirrel -- a cute, furry little animal -- but, if it gets inside your house, it can cause a lot of trouble. It’s the same thing with bacteria. Bacteria that normally live in your belly to help you digest food, for example, can make you sick if they get into your blood. Examples of bacterial infections that can be treated with antibiotics include sinus infections, strep throat and some ear infections.

Getting sick



- You're feeling fine and suddenly your nose starts running, you start coughing and your head aches
- What makes this happen?

Getting Sick

Key points:

- You know when you don't feel well, but did you ever wonder how you got that way?

How germs spread

Passing germs from one person to another is called “transmission”



- Ways germs can find you and make you sick:

- Contact with a sick person
- Touching contaminated surfaces like desks, door knobs or keyboards
- Eating improperly cooked or unclean food
- Drinking contaminated water
- Bites from ticks, mosquitoes, fleas and flies



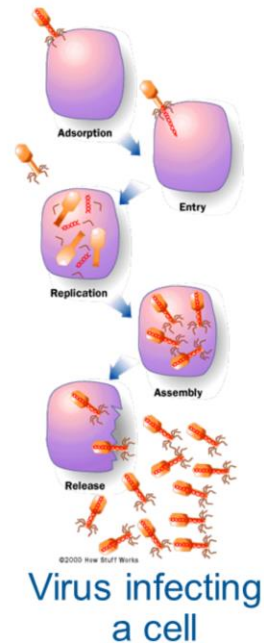
How Germs Spread

Key points:

- Germs can be “transmitted” from one person to another very easily.
- When you touch a contaminated surface and then put your fingers in your mouth or scratch your skin, you help germs get into your body. Once they are inside, they can sometimes make you sick.
- Germs can also be transmitted by other sick people, improperly cooked food, from pets, and bug bites.

How germs get inside you

- Germs enter your body through any opening they can find
 - Nose
 - Mouth
 - Cuts in the skin
- Once they get in they multiply quickly



How Viruses Make You Sick

Key points:

- Germs enter your body through any opening they can find.
- Viruses infect a cell in your body and turn it into a virus copy machine.
- This graphic shows the stages of a viral infection:
 - **Adsorption:** the virus finds a suitable cell and attaches itself
 - **Entry:** the virus injects its genetic information (DNA or RNA) into the cell and takes control
 - **Replication:** the virus transforms the cell into a miniature copy machine and makes millions of copies of its genetic information
 - **Assembly:** new copies of the virus are assembled inside the cell
 - **Release:** the new viruses are released and the process starts all over again, spreading the infection to more and more healthy cells

Your body fights back

- Your immune system defends your body against invading germs
- Healthy bodies can fight off most germs
- But sometimes the germs are stronger than you are...



Your Body Fights Back

Key points:

- You are not helpless to an infection.
- Your body's immune system is designed to defend against invading germs
- A healthy body is your best defense against an infection, viral and bacterial
- Your skin is your largest organ and it is like a coat of armor that protects you from infections

Antibiotics to the rescue

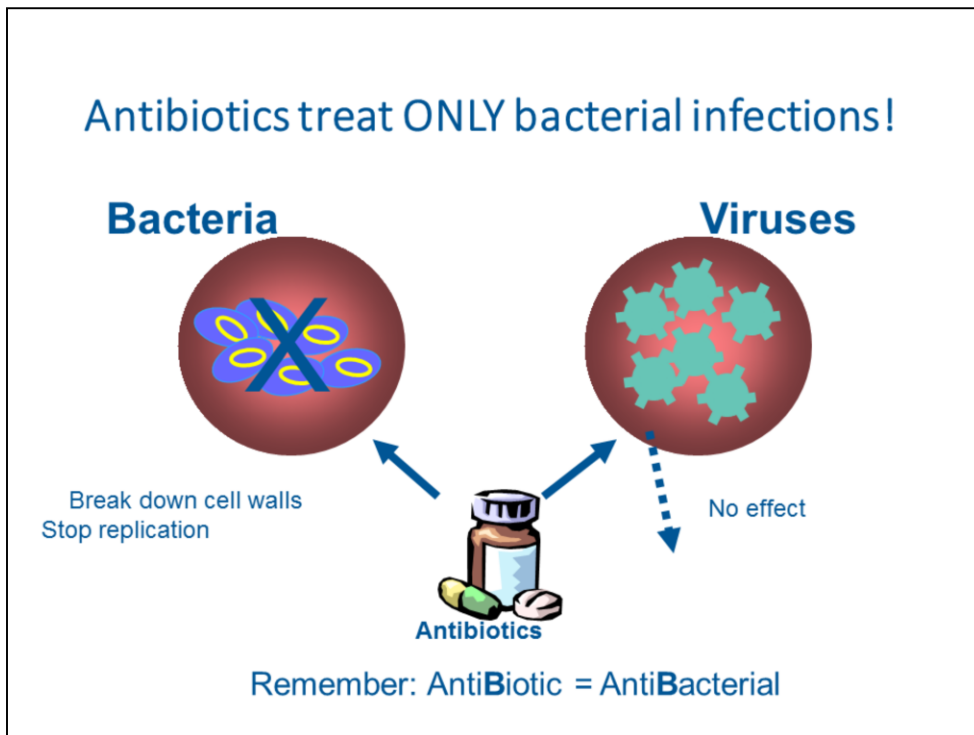
If your immune system cannot fight a bacterial infection, your doctor may give you an antibiotic



Antibiotics to the Rescue

Key points:

- Sometimes your immune system can't fight a bacterial infection on its own; it may need help.
- Antibiotics help your immune system fight bacterial infections.
- Only your doctor can prescribe the right antibiotic for your illness.



Antibiotics ONLY Treat Bacterial Infections

Key points:

- Antibiotics are Antibacterial, which means they kill bacteria or stop them from growing.
- Antibiotics are only effective against bacterial infections.
- Antibiotics DO NOT work on viruses.

How do we fight viral infections like colds and flu?

- Lots of rest
- Plenty of liquids
- Healthy foods
- Medicine like Tylenol® or cough syrup
- Vaccines can help prevent the flu



What is an Antibiotic?

- A chemical that kills bacteria or stops them from growing
- Antibiotics are specialized medicines
 - They only work on specific types of bacteria
- Antibiotics work **only against bacteria**, not viruses



What is an antibiotic?

Key points:

- Antibiotics are chemicals that kill bacteria or stop them from growing.
- There are different types of antibiotics, each designed to work on specific types of bacteria.
- Only your doctor can prescribe the right drug for your bug.

Instructor's note:

Ask the children if they have ever taken an antibiotic. Ask them about their experience: did they visit the doctor? Did they take all of the medicine? Did the medicine make them feel better?

How antibiotics work

- Think of bacteria as a lock, and antibiotics as a key
- Antibiotics get inside the bacteria's wall of defense and stop them from
- Virus "locks" are different so the antibiotic "key" does not work.

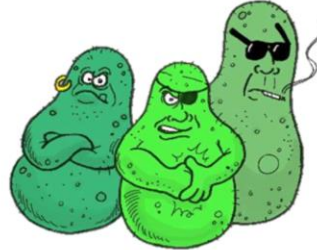


Think of a bacteria as a lock and an antibiotic as a key. Every lock needs its own, special key to open it. Just as you can't start your car with your house key, you can't "unlock" or kill a virus with an antibiotic key. The antibiotic key only works on bacterial locks.

If you try to push the antibiotic key into the viral lock, you will eventually ruin the key. It will never work on the viral lock. And once it is damaged, it won't work on the bacterial lock either. This, in essence, is what antibiotic resistance does: it changes the locks, so our keys don't work anymore.

Antibiotic Resistance

- Term used to describe bacteria that don't respond to antibiotic treatment
 - Antibiotic overuse and misuse speeds up this naturally occurring process
- Bacteria are very smart and they learn to work around the antibiotic very quickly



Antibiotic Resistance

Key points:

- Bacteria that are not affected by antibiotics are called “antibiotic resistant”
- Bacteria naturally evolve and change to protect themselves from harm -- that is how they have survived for millions of years
- Since antibiotics are designed to kill bacteria or stop them from growing, the bacteria try to defeat them by changing and evolving
- Antibiotic overuse and misuse speeds up the natural process of evolution by exposing the bacteria to the medicine more often than necessary

Instructor's note: Earlier, we compared antibiotics and bacteria to keys and locks. Every time you take an antibiotic, you give the bacteria a chance to pick the lock. So, the more you take, the faster the bacteria will evolve, changing itself until the antibiotic doesn't work anymore.

Preventing Germs is the Best Medicine!

- Wash your hands properly
 - Before eating
 - After going to the bathroom
 - After a sneeze or cough
- Cover your coughs and sneezes
- Take care of your body
 - Eat healthy foods
 - Exercise regularly
 - Get plenty of sleep every night
- **NEVER** take an antibiotic for a viral infection, like a cold or flu



Protect Our Antibiotic Lifeline

Key points:

- Prevention is the best medicine -- take care of your body and it will take care of you!
- Keep your hands clean! Wash them with soap and water or use an alcohol-based hand rub, like Purell.
- Remember, if you get sick, only your doctor can determine whether you have a viral or bacterial infection
- Never take an antibiotic for a viral infection!

Instructor's note: demonstrate proper hand washing technique using the “ABC song.” Use the Glo Germ lotion and black light to demonstrate how germs spread.

Instructions: Arrange the children in rows of 6. Place a little bit of Glo Germ lotion on the first child's hands in each row. Have the child rub it in and shake hands with the person next to him, repeating the handshaking to the end of the row.

Turn off the lights in the room. Turn on the black light and hold it over the children's hands to illuminate the white lotion. Just like germs, the lotion is

spread by hands touching.

Antibiotic resistance

Antibiotic resistance is a very serious problem.

We need your help to stop it!



Antibiotic Resistance

Key points:

- Antibiotic resistance is a very serious problem.
- Many bacterial infections that were once easy to treat no longer respond to some antibiotics.
- Antibiotic resistance is a natural process and we can't stop it, but we can slow it down considerably by using antibiotics properly and only when necessary.
- It's up to you!

What to do if you get sick



See the doctor
and tell her how
you feel



If your doctor gives you an antibiotic:

- Take your medicine exactly as prescribed
- Take all of your medicine, even if you're feeling better
- Never share your medicine or save it for the next time you get sick



Help your body
fight back by
drinking lots of
liquids and getting
plenty of rest

What to do When You Get Sick

Key points:

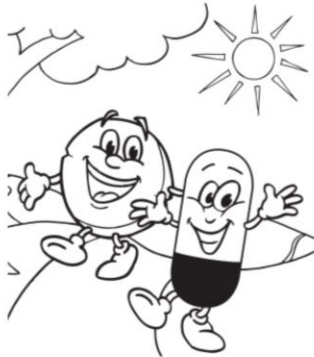
- See your doctor and tell her how you feel. Remember, only your doctor can determine whether you have a viral or bacterial infection
- Take antibiotics exactly as prescribed or they will not work properly
- Take all of the medicine, even if you are feeling better
- Never share antibiotics with someone else or save leftover medicine to take next time you are sick
- Help your body fight infection with plenty of rest, liquids and good food

Instructor's note: If students ask what happens if they don't take all of their medicine, share it or save it, you may use this explanation:

When you have a bacterial infection, your doctor prescribes the right type and amount of antibiotic that you need to get better. If you don't take all of the medicine, some of the bad bacteria may still be left in your system and may make you sick again. You should not share or save medicine, because it may not be the right drug for the bug or there may not be enough to get rid of the infection.

Antibiotics & You

For antibiotics the rule is clear.
It's simple, it's easy, it's important to hear.
These drugs fight bacteria, not viruses, you see.
But take as directed and better you'll be.
Don't misuse them or share them or save them, my dear.
Or else they won't work when you need them, I fear.



Antibiotics and You

Key points:

- Recite the poem with the class to reinforce the message.
- Thank you for helping the AWARE Coalition educate a new generation of students and for helping protect our antibiotic lifeline!

Instructor's note: For more information on the AWARE Coalition and antibiotic resistance, visit <http://www.healthoregon.org/antibiotics>

Other resources:

- <http://www.cdc.gov/drugresistance/community> -- Centers for Disease Control and Prevention website dedicated to antibiotic resistance
- www.apua.org -- Alliance for the Prudent Use of Antibiotics
- www.howstuffworks.com -- contains excellent background information on how antibiotics work, how bacteria become resistant and other related topics