Notes: Spread, Treatment, and Prevention of Disease

What is a disease outbreak?

- A disease outbreak happens when a disease occurs in greater numbers than expected in a community or region, or during a season.
- An outbreak may occur in one community or even extend to several countries. It can last from days to years. Sometimes a single case of a contagious disease is considered an outbreak. This may be true if it is an unknown disease, is new to a community, or has been absent from a population for a long time. An outbreak can be considered an epidemic or pandemic.

How do diseases spread?

- Infectious diseases spread in many ways.
  - Pathogens can be found in many places including food, air, water, surfaces.
  - Contact with insects and other animals
    - Insects and animals can also carry organisms that cause disease.
      - Ex. Lyme Disease is caused by bacteria that inhabit ticks.
      - Rabies, a deadly central nervous system infection is caused by a virus and is found in the saliva of infected animals, such as bats, raccoons, etc.
  - Person-to-Person Contact
    - Most of the illnesses you have had have probably been passed to you by another person.
- To avoid giving/receiving pathogens, you should wash your hands.

What are Carriers and Vectors?

- Carriers and vectors can spread disease, but generally do not get sick themselves.
- Carrier: a person or animal that has a disease and can pass it on, but does not show any symptoms.
- Vector: an organism (like a mosquito or tick) that carry pathogens from one organism to another.

How do we treat and prevent diseases?

- Diseases caused by bacteria can be treated with medicines that contain antibiotics.
  - The first antibiotics were discovered in 1928 by a scientist named Flemming.
- Antimicrobial: something that kills germs (includes hand sanitizer, antibiotics, etc.)

- Scientists continue efforts to prevent and treat illness.
  - Vaccine: a substance that contains a weakened or killed pathogen, such as a bacterium or virus, that stimulates antibody production or cellular immunity against the pathogen but cannot cause severe infection. Vaccines prevent illnesses (not treat them!). The use of vaccines has made some diseases nearly extinct.
  - Antibiotics fight pathogens (bacteria), but they can also lead to changes in them.
    - When an antibiotic is used too often, bacteria can develop resistance, meaning it is no longer affected by the antibiotic.
- The next time those bacteria invade your body, that particular antibiotic will not stop the disease.

What is the difference between an epidemic and a pandemic?

- Epidemic and pandemic refer to the spread of infectious diseases among a population.
  - Epidemic: when a disease spreads to a large number of people, but remains in a specific, local area.
  - Pandemic: when a disease spreads to numerous places around the world. A widespread epidemic. In the most extreme case, the entire global population would be affected by a pandemic.

Epidemic vs. Pandemic (cont.)

- The terms epidemic and pandemic usually refer to the rate of infection, the area that is affected or both.
  - An epidemic is defined as an illness or health-related issue that is showing up in more cases than would normally be expected. It occurs when an infectious disease spreads rapidly to many people. In 2003, the severe acute respiratory syndrome (SARS) epidemic took the lives of nearly 800 people worldwide.

- In the case of a pandemic, even more of the population is affected than in an epidemic. A pandemic typically is in a widespread area (usually worldwide) rather than being confined to a particular location or region and affect global populations. An epidemic is not worldwide. For example, malaria can reach epidemic levels in regions of Africa but is not a threat globally. However, a flu strain can begin locally (epidemic) but eventually spread globally (pandemic). This is not unusual for a new virus, because if people have not been exposed to the virus before, their immune systems are not ready to fight it off, and more people become ill. Swine flu started in Mexico city, and it was feared to lead to epidemic proportions in North America. Now that the flu has been found in New Zealand, Israel, Scotland and many other countries, it has become pandemic. The 1918 Spanish flu and the Black Plague are extreme examples of pandemics. Keep in mind, though, that a pandemic doesn't necessarily mean millions of deaths—it means a geographically widespread epidemic.

Influenza Pandemics

- Influenza pandemics have occurred more than once. Spanish influenza killed 40-50 million people in 1918. The Asian influenza killed 2 million people in 1957. The Hong Kong influenza killed 1 million people in 1968.
- An influenza pandemic occurs when a new subtype of virus arises. This means humans have little or no immunity to it; therefore, everyone is at risk. The virus spreads easily from person to person, such as through sneezing or coughing. As it spreads, the virus can begin to cause serious illness worldwide. With past flu pandemics, the virus reached all parts of the globe within six to nine months. With the speed of air travel today, public health experts believe an influenza pandemic could spread much more quickly. A pandemic can occur in waves, and all parts of the world may not be affected at the same time.

Homework:

- Finish the notes questions
- Finish the worksheet on Carriers and Vectors (Typhoid Mary and Lyme Disease). I will pass out to you now.