

Name: _____

Infectious Diseases Student Worksheet

Part I (Complete the following table and questions for homework.)

Bacteria, viruses, fungi, and protozoa are microscopic organisms that can cause infectious diseases in humans. These microscopic organisms are what most people call germs.

Fill out the following table. Use your own experience and interview those of the generation of your parents and grandparents (The interview doesn't have to be with your actual parent or grandparent. That might not be possible. It'd be great to find a friend of the family or neighbor who is of the more mature generation to interview.)

| Infectious Diseases I've Had | Infectious Diseases My Parents Have Had, But I Never Did | Infectious Diseases My Grandparents Had, But I Never Did | Infectious Diseases I've Heard About |
|------------------------------|--|--|--------------------------------------|
| | | | |

You have just done a simple epidemiological study – learning how diseases occur in place and time.

1. What conclusions can you draw from your chart?

2. Why do you think diseases vary from generation to generation?

Part I (Continued – Complete in Class)

Class Summary of Infectious Diseases Chart – Fill out this chart, noting what other students wrote as well. Write the number of cases in the column "Infectious Diseases I've Had". For instance, if 24 students have had colds, note this as colds (24), and if 13 students have had ear infections, note this as ear infections (13) in that column.

| Infectious Diseases I've Had | Infectious Diseases My Parents Have Had, But I Never Did | Infectious Diseases My Grandparents Had, But I Never Did | Infectious Diseases I've Heard About |
|------------------------------|--|--|--------------------------------------|
| | | | |

1. Are some infectious diseases very common? Give examples.
2. Hypothesize how this chart might have changed if the person filling it out was from a different part of the world. Give examples.
3. Are the infectious diseases you've heard about found in your country or are they mostly found in a different region of the world?

Answer these questions from the **Changing Planet: Infectious Diseases episode:**

1. Cholera is a disease that claims 100,000 lives a year. How is it spread?

2. Dengue fever is spread in a different way. Explain how it is spread and why climate change might increase the spread of Dengue fever.

Answer these questions from the **Infectious Diseases PowerPoint presentation:**

1. In the slide Vector-borne diseases, what is the most common distribution (location) of these diseases? Do you think vector-borne diseases thrive in warmer climates or colder climates?

2. Creatures that carry and transmit diseases are known as vectors. Different vectors carry different diseases such as malaria, dengue, African sleeping sickness, and yellow fever. Name at least three different vectors you learned about in this presentation and the disease they carry:

3. Name one new disease that you learned about – how is it spread and what kind of climate does it thrive in?

Climate change is having a major impact on many infectious diseases. In some cases, warmer and wetter weather is allowing vectors (the insect or animal that spreads a disease) to grow more easily and spread the disease more freely. In other cases, climate change is causing increasingly frequent catastrophic weather events like storms or flooding, and these events drive people from safe living conditions to conditions where diseases like cholera can quickly become a problem. Many of these diseases are difficult to treat or prevent medically, so it is important that we understand how they might be affected by climate change so we can predict and prepare for them. Complete the last two columns of the table below to demonstrate how a warming climate is increasing the spread of many infectious diseases. Use the following formulas:

New cases each year x % increase = New cases yearly in 2050

Population at risk x % increase = Population at risk in 2050

Example for Yellow Fever (New cases yearly in 2050)
 $5,000 \times (0.25 \times 5,000) = 6,250$ New cases yearly in 2050

After completing the last two columns of the chart, map the diseases onto the world map provided. Use a different color for each disease and note that “key” by coloring column one (disease name) separate colors.

Answer the following questions using your completed chart and colored world map:

1. Which disease on the chart currently affects the most people worldwide? What about in 2050?
2. Which vector currently spreads the most diseases to people? Explain an idea to limit human exposure to this vector.
3. Which diseases are most likely to become bigger problems worldwide because of climate change in the next decades?

DATA TABLE:INCIDENCE AND LOCATIONS OF INFECTIOUS DISEASES (1994-2050)

| DISEASE | VECTOR | POPULATION AT RISK 1994 (MILLIONS) | NEW CASES YEARLY | Present distribution | Probability (%) of increase | New cases yearly | Population at risk by 2050 |
|-------------------|----------------|------------------------------------|------------------|---------------------------------|-----------------------------|------------------|----------------------------|
| Malaria | Mosquito | 2400 | 300-500 m | Tropics subtropics | 40% | | |
| Schistosomiasis | Fluke | 600 | 200 m | Tropics Subtropics | 25% | | |
| Filariasis | Mosquito | 1094 | 117 m | Tropics Subtropics | 12.5% | | |
| Sleeping sickness | Tsetse fly | 55 | 300000 | Tropical Africa | 12.5% | | |
| Guinea worm | Crustacean | 100 | 100000 | S. Asia Arabian Pen. C/W Africa | No Data available | | |
| Leishmaniasis | Sand fly | 350 | 500000 | Asia S. Europe Africa Americas | 12.5% | | |
| River blindness | Black fly | 123 | 17.5 m | Africa Latin America | 25% | | |
| Chagas disease | Triatomine bug | 100 | 18 m | Central/ South America | 12.5% | | |
| Dengue fever | Mosquito | 1800 | 10-30 m | All tropical regions | 25% | | |
| Yellow fever | Mosquito | 450 | <5,000 | Tropical S. America and Africa | 25% | | |

Chart courtesy of *NOAA Earth System Research Laboratory*

