



Pandemic A pandemic is an outbreak of an infectious disease or a condition that spreads through a large part of the human population. There have been numerous pandemics throughout history such as smallpox and tuberculosis. Current pandemics include HIV and certain strains of influenza. Once a pandemic reaches Phase 6, the number of infected people can grow exponentially. In Exercises 7–10, use exponential growth models. (See Examples 3 and 4.)

Stages of a Pandemic

Interpandemic period

Phase 1: No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk of human infection or disease is considered to be low.

Phase 2: No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk of human disease.

Pandemic alert period

Phase 3: Human infection(s) with a new subtype but no human-to-human spread, or at most rare instances of spread to a close contact.

Phase 4: Small cluster(s) with limited human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans.

Phase 5: Larger cluster(s) but human-to-human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans but may not yet be fully transmissible (substantial pandemic risk).

Pandemic period

Phase 6: Pandemic: increased and sustained transmission in general population.

Source: Centers for Disease Control and Prevention

- From June 2009 through August 2010, the swine flu (H1N1) was considered a pandemic by the World Health Organization. Ten people in a community are infected with the swine flu. The next day, 26 people are infected. The growth rate is 160% per day. At this rate, how many people will be infected in 1 week? Graph the results.
- Use the rate in Exercise 7 to find the number of people who will be infected after 1 week when the initial number of people infected is 50.
- The 1918–1920 flu pandemic, commonly known as the Spanish flu, killed about 40 million people worldwide. That is more than twice the number of lives claimed by World War I. Estimates for the growth rate vary. Suppose 2 people are infected and the number of infected people triples every 3 days. How many people will be infected in 21 days? Graph the results.
- Use the rate in Exercise 9. How many people will be infected in 42 days?
- Graph** Describe the graph of an exponential growth model.
- Growth Rate** Many factors affect the spread of a disease. Describe some factors that would influence the growth rate of an infectious disease. Would these factors increase or decrease the growth rate?



To help prevent the spread of germs, you should cough or sneeze into your elbow.