

**Notes: Spread, Treatment, and Prevention of Disease**

<p><b>What is a disease outbreak?</b></p>	<ul style="list-style-type: none"> <li>• A disease <u>outbreak</u> happens when a disease occurs in greater numbers than expected in a community or <u>region</u>, or during a <u>season</u>.</li> <li>• An outbreak may occur in one <u>community</u> or even extend to several <u>countries</u>. It can last from days to <u>years</u>. Sometimes a <u>single</u> case of a contagious disease is considered an outbreak. This may be true if it is an <u>unknown</u> disease, is new to a community, or has been <u>absent</u> from a population for a long time. An outbreak can be considered an <u>epidemic</u> or pandemic.</li> </ul>
<p><b>How do diseases spread?</b></p>	<ul style="list-style-type: none"> <li>• Infectious diseases <u>spread</u> in many ways. <ul style="list-style-type: none"> <li>○ <u>Pathogens</u> can be found in many places including food, <u>air</u>, <u>water</u>, surfaces.</li> <li>○ Contact with <u>insects</u> and other animals <ul style="list-style-type: none"> <li>▪ Insects and animals can also carry <u>organisms</u> that cause disease. <ul style="list-style-type: none"> <li>• Ex. <u>Lyme</u> Disease is caused by <u>bacteria</u> that inhabit ticks.</li> <li>• Rabies, a deadly central <u>nervous</u> system infection is caused by a <u>virus</u> and is found in the <u>saliva</u> of infected animals, such as <u>bats</u>, raccoons, etc.</li> </ul> </li> </ul> </li> <li>○ Person-to-Person Contact <ul style="list-style-type: none"> <li>▪ Most of the <u>illnesses</u> you have had have probably been passed to you by another <u>person</u>.</li> <li>▪ To avoid giving/receiving pathogens, you should <u>wash your hands</u>.</li> </ul> </li> </ul> </li> </ul>
<p><b>What are Carriers and Vectors?</b></p>	<ul style="list-style-type: none"> <li>• Carriers and vectors can <u>spread disease</u>, but generally do not get <u>sick</u> themselves.</li> <li>• <u>Carrier</u>: a person or animal that has a disease and can <u>pass it on</u>, but does not show any <u>symptoms</u>.</li> <li>• <u>Vector</u>: an organism (like a mosquito or tick) that <u>carry</u> pathogens from one organism to <u>another</u>.</li> </ul>
<p><b>How do we treat and prevent diseases?</b></p>	<ul style="list-style-type: none"> <li>• Diseases caused by <u>bacteria</u> can be treated with medicines that contain <u>antibiotics</u>. <ul style="list-style-type: none"> <li>○ The first antibiotics were discovered in <u>1928</u> by a scientist named Fleming.</li> </ul> </li> <li>• Antimicrobial: something that kills <u>germs</u> (includes hand sanitizer, <u>antibiotics</u>, etc.)</li> <li>• Scientists continue efforts to <u>prevent</u> and <u>treat</u> illness. <ul style="list-style-type: none"> <li>○ <u>Vaccine</u>: a substance that contains a <u>weakened</u> or <u>killed</u> pathogen, such as a bacterium or <u>virus</u>, that stimulates <u>antibody</u> production or cellular <u>immunity</u> against the pathogen but cannot cause <u>severe</u> infection. Vaccines <u>prevent</u> illnesses (not <u>treat</u> them!). The use of vaccines has made some diseases nearly <u>extinct</u>.</li> <li>○ Antibiotics fight <u>pathogens</u> (bacteria), but they can also lead to <u>changes</u> in them. <ul style="list-style-type: none"> <li>▪ When an antibiotic is used too <u>often</u>, bacteria can develop <u>resistance</u>, meaning it is no longer <u>affected</u> by the antibiotic.</li> <li>▪ The next time those bacteria <u>invade</u> your body, that particular antibiotic will not <u>stop</u> the disease.</li> </ul> </li> </ul> </li> </ul>
<p><b>What is the difference between an epidemic and a pandemic?</b></p>	<ul style="list-style-type: none"> <li>• Epidemic and <u>pandemic</u> refer to the spread of <u>infectious</u> diseases among a population. <ul style="list-style-type: none"> <li>○ Epidemic: when a disease spreads to a <u>large</u> number of people, but remains in a <u>specific</u>, <u>local</u> area.</li> <li>○ Pandemic: when a disease spreads to <u>numerous</u> places around the <u>world</u>. A widespread epidemic. In the most extreme case, the entire <u>global</u> population would be affected by a pandemic.</li> </ul> </li> <li>• The terms epidemic and pandemic usually refer to the <u>rate</u> of infection, the <u>area</u> that is affected or both. <ul style="list-style-type: none"> <li>○ An <u>epidemic</u> is defined as an illness or health-related issue that is showing up in <u>more</u> cases than would normally be expected. It occurs when an</li> </ul> </li> </ul>

	<p>infectious disease spreads <u>rapidly</u> to many people. In <u>2003</u>, the severe acute respiratory syndrome (<u>SARS</u>) epidemic took the lives of nearly <u>800</u> people worldwide.</p> <ul style="list-style-type: none"> <li>○ In the case of a pandemic, even more of the <u>population</u> is affected than in an epidemic. A pandemic typically is in a <u>widespread</u> area (usually worldwide) rather than being confined to a particular <u>location</u> or region and affect global populations. An epidemic is not <u>worldwide</u>. For example, malaria can reach <u>epidemic</u> levels in regions of <u>Africa</u> but is not a threat globally. However, a <u>flu</u> strain can begin <u>locally</u> (epidemic) but eventually spread <u>globally</u> (pandemic). This is not unusual for a <u>new</u> virus, because if people have not been <u>exposed</u> to the virus before, their immune systems are not ready to <u>fight</u> it off, and more people become ill. <u>Swine flu</u> started in Mexico city, and it was feared to lead to <u>epidemic</u> proportions in North America. Now that the flu has been found in New Zealand, Israel, Scotland and many other <u>countries</u>, it has become <u>pandemic</u>. The 1918 <u>Spanish flu</u> and the Black Plague are extreme examples of pandemics. Keep in mind, though, that a pandemic doesn't necessarily mean millions of <u>deaths</u>—it means a geographically <u>widespread</u> epidemic.</li> </ul>
<p><b>Influenza Pandemics</b></p>	<ul style="list-style-type: none"> <li>● <u>Influenza</u> pandemics have occurred more than once. Spanish influenza killed <u>40-50</u> million people in <u>1918</u>. The Asian influenza killed <u>2</u> million people in <u>1957</u>. The Hong Kong influenza killed <u>1</u> million people in <u>1968</u>.</li> <li>● An influenza <u>pandemic</u> occurs when a new <u>subtype</u> of <u>virus</u> arises. This means humans have little or no <u>immunity</u> to it; therefore, <u>everyone</u> is at risk. The virus spreads easily from <u>person</u> to person, such as through <u>sneezing</u> or coughing. As it spreads, the virus can begin to cause <u>serious</u> illness worldwide. With past flu pandemics, the virus reached all parts of the <u>globe</u> within <u>six</u> to <u>nine</u> months. With the speed of <u>air</u> travel today, public health experts believe an influenza pandemic could spread much more <u>quickly</u>. A pandemic can occur in <u>waves</u>, and all parts of the world may not be affected at the same <u>time</u>.</li> </ul>

**Questions:**

1. In your own words, explain the difference between an epidemic and pandemic.
2. Why is an epidemic bad?
3. Why is a pandemic bad?
4. Which do you think is worse, an epidemic, or a pandemic? Why?
5. List 2 ways that we can treat or prevent a disease.
6. List 3 ways a disease can be spread.
7. Why is it bad when a new subtype of influenza virus arises?
8. Explain how carriers and vectors are related. Why are they so harmful?