**Chapter 1: Overview of Epidemiology: Concepts and History**

1. Discuss the impact a lack of herd immunity might have on a population.

Suggested answer: Answers may vary, but should include the observation that a lack of herd immunity will make the population less resistant and thus more likely to develop a disease. This could impact mortality rates within a population. In the case of measles, for instance, there could be a rise in overall deaths due in some part to the increased incidence of the disease. A population that experiences the disease may also see an increase in the frequency of disability. These effects also have a social and economic impact on the population. Those suffering from disease and/or disability, as well as those who are caring for them, may miss work, incur more medical expenses, and suffer social consequences such as isolation. Disability may lead to loss of employment, again impacting the social and economic aspects of one’s life. In short, a lack of herd immunity can have a serious and detrimental impact on a population.

2. Search the CDC Current Outbreak List, found at <https://www.cdc.gov/outbreaks/index.html>. Choose a current outbreak listed and discuss ways one might use primary, secondary, and tertiary prevention measures to reduce the impact of the disease.

Suggested answer: Answers will vary, especially related to the disease chosen. However, students should address primary prevention— including health education, prevention, and promotion—as a means to prevent transmission of the disease. For example, the outbreak of hepatitis A among people experiencing homelessness and those who use drugs is a listed outbreak. Primary prevention of hepatitis includes vaccination, education about transmission, and promoting safe practices. Secondary prevention includes screening those who are listed as at risk for symptoms of hepatitis A. Tertiary prevention will include treatment of those who have been exposed but have not received the vaccination. Additionally, treatment would include management of symptoms for those who contract hepatitis A.

3. In what ways can each factor in the epidemiology triangle contribute to an outbreak?

Suggested answer: Student answers may vary, but the main components of each factor should be addressed. The three factors in the epidemiology triangle are the host, the agent, and the environment. The host can contribute to an outbreak by harboring the infectious agent, providing a home where it can grow and reproduce before being shed and infecting another person. The agent is the item that is causing the condition, for example an infectious agent such as a virus or bacteria, which can be passed from one host to another susceptible person before symptoms of illness develop. The agent can be stopped when the host ceases contact with others who are susceptible. The environment allows for the transmission of the agent. For example, it could consist of hard surfaces like door handles and counters, where agents survive until they are unwittingly picked up by a susceptible host. The environment can be altered to prevent transmission of an agent, but it can also be in a state that promotes transmission. For example, in the case of flooding, the agent is more likely to be spread through the excess water.