

Name: _____ Date: _____

Herd Immunity and Zoonotic Shifts: A 10th Grade Disease Biology Safari

Epidemiology, transmission vectors, and pharmaceutical interventions — apply critical analysis to these 10 real-world public health scenarios.

1. Which biological mechanism allows a pathogen like the Avian Influenza virus to 'jump' from an animal host to a human host, potentially leading to a pandemic?

- A. Passive immunization through maternal antibodies
- B. Antigenic shift resulting from genetic recombination
- C. The stabilization of the bacterial cell wall
- D. A reduction in the pathogen's reproductive rate (R_0)

2. True or False: Bacteriostatic antibiotics function by directly destroying the cell membrane of the target pathogen, leading to immediate cell death.

- A. True
- B. False

3. The concept of _____ immunity occurs when a large percentage of a population is vaccinated, indirectly protecting those who are immunocompromised.

- A. Innate
- B. Adaptive
- C. Herd
- D. Passive

4. In the context of the 'Hygiene Hypothesis,' why might over-sanitizing an infant's environment potentially lead to an increase in certain chronic conditions?

- A. It prevents the development of secondary active transport
- B. It strengthens the innate immune system too quickly
- C. Lack of early microbial exposure may lead to immune system hypersensitivity or allergies
- D. It increases the rate of viral mutation within the home

5. True or False: Vectors, such as the Anopheles mosquito, are the causative agents of disease rather than the vehicles for pathogen transmission.

- A. True
- B. False

6. Lyme disease is categorized as a _____ disease because it is transmitted to humans through the bite of infected black-legged ticks.

- A. Vector-borne
- B. Food-borne
- C. Airborne

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D. Water-borne

7. Which of the following best describes the function of Memory B-cells following a second exposure to the same pathogen?

- A. They undergo apoptosis to prevent inflammation
- B. They produce a rapid and intense antibody response
- C. They convert into T-helper cells to signal the skin barrier
- D. They initiate the inflammatory response via histamine release

8. When a disease is constantly present in a specific geographic area or population group, it is referred to as being ____.

- A. Epidemic
- B. Pandemic
- C. Endemic
- D. Sporadic

9. True or False: The use of alcohol-based hand sanitizers is more effective than soap and water at removing spores from the *Clostridioides difficile* (C. diff) bacterium.

- A. True
- B. False

10. How does the practice of 'contact tracing' serve as a preventative measure during an outbreak of a disease like Ebola?

- A. It modifies the genetic structure of the virus in the environment
- B. It identifies and isolates exposed individuals to break the chain of transmission
- C. It provides immediate artificial active immunity to the general public
- D. It eliminates the need for personal protective equipment (PPE)