

Viruses · supported focus

Supported focus · HL

Supported scope

- Supported HL focus. First assessment 2025; current subject brief acquired; full Biology guide not acquired. Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

Infection · 1.1

Reasoning

An antibiotic may help against a bacterial infection but fail against a viral illness. Treatment depends on the causal organism and the evidence supporting diagnosis. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

Infection · 2.1

Reasoning

Pathogens cause infectious disease. Physical barriers, phagocytosis and specific immune responses reduce infection. Antibodies bind particular antigens.

Vaccination exposes the immune system to antigen safely enough to develop memory.

pathogen: An agent that causes disease; antigen: A structure recognized by a specific immune response.

Infection · 3.1

Reasoning

After vaccination, memory cells can support a faster secondary response. Antibiotic resistance arises through heritable variation and selection; an individual bacterium does not choose to become resistant because it needs to survive. Use published infection data to compare rates per equal population size. Distinguish prevalence at a time from new cases over a period. In school, use safe simulations or approved cultures rather than collecting unknown pathogens.

Infection · 4.1

Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: 18 cases occur in 900 people.

Rate per 1,000 = cases / population $\times$ 1,000. Rate = $18/900 \times 1,000 = 20$ cases per 1,000. A second group with 10 cases in 250 people has 40 per 1,000, even though it has fewer cases.

Infection · 4.2

Reasoning

12 cases occur among 600 people. Find cases per 1,000 people. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

Infection · 5.1

Reasoning

Antibiotics do not act on viruses in the same way they act on bacteria. A vaccine is not an immediate cure for an established infection. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Infection · 5.2

Reasoning

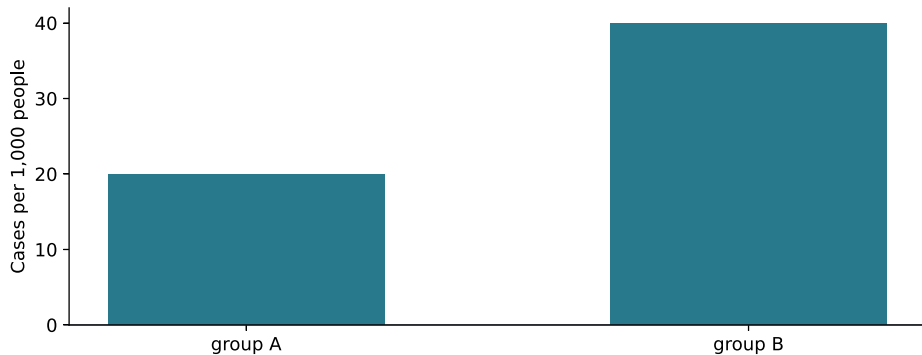
Every antibiotic is effective against every viral infection. This claim is false: Antibiotics do not act on viruses in the same way they act on bacteria. A vaccine is not an immediate cure for an established infection.

Infection · 5.3

Reasoning

Disease transmission and immune response: After vaccination, memory cells can support a faster secondary response. Antibiotic resistance arises through heritable variation and selection; an individual bacterium does not choose to become resistant because it needs to survive.

Infection · diagram



- Original teaching diagram: Disease transmission and immune response
- Use the labels and the stated model together.

Infection · original transfer

Your turn

Fictional samples report 12 cases in 600 people and 8 in 200. Compare rates and identify what else is needed before concluding one exposure caused disease.

Infection · transfer reasoning

Method and interpretation

Rates 20 and 40 per 1,000. Compare time windows, definitions, sampling and confounders. These proportions do not establish causation or an individual diagnosis.

Check yourself

- Explain pathogen using the stated model.
- Explain antigen using the stated model.
- Change one value in the original transfer; explain which assumption still matters.