

10. Infectious diseases

1.

Which feature of the disease cholera decreases the spread of the pathogen *Vibrio cholerae*?

- A** Immunity to cholera after vaccination is short lived, lasting less than two years after vaccination in 50% of people.
- B** Up to 98% of people infected with *Vibrio cholerae* are symptomless carriers.
- C** Cholera rapidly kills up to 50% of people with symptoms if they are not treated.
- D** Simple rehydration therapy successfully treats about 99% of people with symptoms of cholera.

Ans: C

If the person dies, they can't transmit

2.

Which row shows how penicillin kills bacteria?

	process inhibited by penicillin	effect on bacteria
A	formation of peptidoglycan cross-links	water enters and bacteria burst
B	breakdown of peptidoglycan cross-links	water enters and bacteria burst
C	formation of peptidoglycan cross-links	water leaves and bacteria dehydrate
D	breakdown of peptidoglycan cross-links	water leaves and bacteria dehydrate

Ans: A

3.

What will reduce the rate at which bacteria become resistant to antibiotics?

- 1 prescribing two antibiotics with different modes of action
- 2 prescribing different antibiotics for the same bacterium
- 3 finishing a prescribed course of antibiotics

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

Ans: A

4.

Why is it difficult to control the spread of tuberculosis?

- 1 Global air travel for commerce and tourism has increased.
- 2 The bacterium that causes tuberculosis has evolved resistance to some antibiotics.
- 3 The bacterium that causes tuberculosis shows great antigenic variability.
- 4 Civil unrest and poverty result in overcrowded living conditions.

A 1, 2 and 4 **B** 1 and 4 only **C** 2 and 3 **D** 4 only

Ans: A

- Option 1 increases droplet transmission, due to overcrowded airplanes
- Option 3 = antigenic variability affects treatment not spread

5.

Which terms can be used to describe the role of mosquitoes in the transmission of malaria?

- 1 malarial parasite
- 2 pathogen
- 3 vector

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 3 only

Ans: D

6.

A hurricane destroys a large town on an island. People move away from the town and set up tents, where sanitation is poor.

Which disease is most likely to spread within a week of the change in living conditions?

- A** cholera
- B** HIV
- C** malaria
- D** TB

Ans: A

7.

Some of the processes which result in the formation of a population of bacteria that are resistant to a new antibiotic are listed.

- 1 change in reproductive success of bacteria
- 2 increase in frequency of the resistance allele in the population
- 3 increase in genetic variation within the population
- 4 random mutation occurs in bacterial DNA

What is the correct order of these processes?

- A** 1 → 3 → 2 → 4
B 2 → 1 → 3 → 4
C 3 → 4 → 1 → 2
D 4 → 3 → 1 → 2

Ans: D

8.

Three statements about cholera and its transmission are listed.

- 1 The pathogen causes watery faeces.
- 2 Frequent air flight has led to mobile populations.
- 3 The pathogen is transmitted through water.

Which statements are reasons why outbreaks of cholera are likely to occur?

- A** 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

Ans: A

9.

Which row is correct for the control or prevention methods for each disease?

	TB	malaria	cholera
A	vaccination	chlorination of water	vaccination
B	chlorination of water	contact tracing	destruction of the vector
C	contact tracing	destruction of the vector	chlorination of water
D	destruction of the vector	vaccination	contact tracing

Ans: C

10.

The average sizes of some pathogens are shown.

pathogen	average size / nm
HIV particle	100
<i>Mycobacterium tuberculosis</i>	3 000
<i>Plasmodium</i>	20 000
<i>Vibrio cholerae</i>	1 500

One type of air filter has been shown to be effective at preventing any pathogens of $1\ \mu\text{m}$ or larger from entering the air system of a room.

Based on their size **and** mode of transmission, which diseases would the air filter prevent from entering the air system of a room?

	HIV infection	TB	malaria	cholera
A	x	✓	✓	✓
B	x	x	✓	✓
C	✓	x	x	x
D	x	✓	x	x

key

✓ = prevented

x = not prevented

Ans: D

- Size AND mode of transmission!!
- Malaria and cholera are not transmitted by air, so cannot be prevented by an air filter!