

Exercise walk-through

Infectious diseases ■ 10.1

eXercise

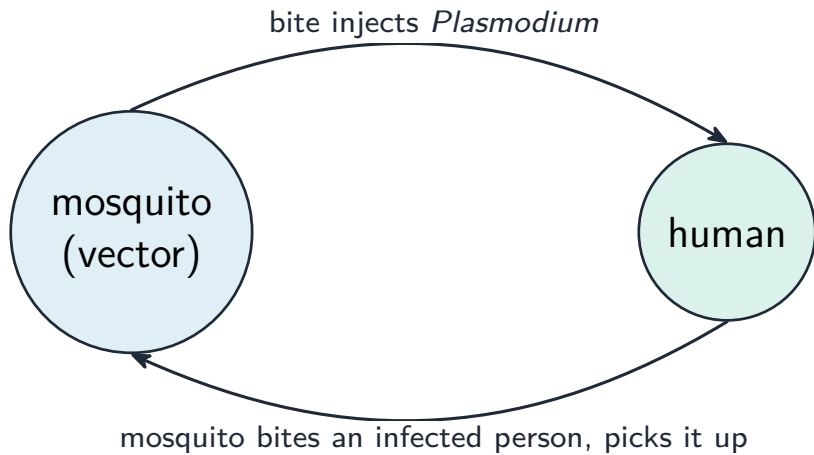
You must be able to

- name the pathogen and type for cholera, malaria, TB and HIV/AIDS
- explain how each disease is transmitted
- discuss biological, social and economic factors in prevention and control

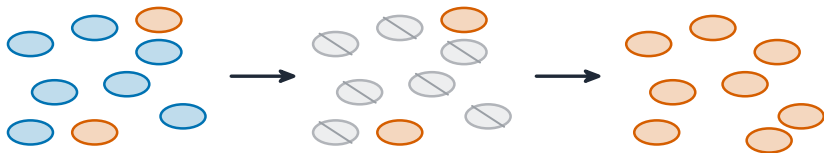
Method — The four diseases

disease	pathogen (type)	transmission
cholera 霍乱	<i>Vibrio cholerae</i> (bacterium 细菌)	water/food contaminated with faeces
malaria 疟疾	<i>Plasmodium</i> (protocist 原生生物)	bite of an infected mosquito (vector 媒介); infected blood
TB 结核 病	<i>Mycobacterium</i> (bacterium)	airborne droplets 飞沫 from coughs/sneezes
HIV/AIDS	HIV (virus 病毒)	unprotected sex; infected blood; mother to baby

Method — The four diseases



1. a few are resistant
2. antibiotic kills non-resistant
3. resistant multiply



(red = resistant mutant)

Antibiotic resistance complicates treating infectious disease

Method — Prevention and control

Control has **biological**, **social** and **economic** sides. Examples: cholera — clean water and sewage treatment; malaria — nets, drain still water, insecticides, drugs; TB — find and treat with antibiotics, BCG vaccine, reduce crowding; HIV — condoms, clean needles, test blood, education (no cure/vaccine yet).

Practice 2.1 ■ 2 marks

Name the type of pathogen that causes (a) malaria and (b) HIV/AIDS.

Solution 2.1

Method: The four diseases

Worked steps

(a) a protist (*Plasmodium*) **B1**; (b) a virus (HIV) **B1**.

Practice 2.2 ■ 1 mark

State how tuberculosis is transmitted from person to person.

Solution 2.2

Worked steps

by airborne droplets from coughing/sneezing **B1**.

Exam-style 3.1 ■ 1 mark

Which disease is caused by a protist and spread by a vector?

- A** cholera
- B** HIV/AIDS
- C** malaria
- D** tuberculosis

Solution 3.1

Method: The four diseases

A cholera

B HIV/AIDS

C malaria



D tuberculosis

Worked steps

C. Malaria is caused by the protoctist *Plasmodium* and spread by the mosquito vector.

Exam-style 3.2 ■ 1 mark

Cholera is best prevented by:

- A** sleeping under a mosquito net
- B** providing clean water and treating sewage
- C** using condoms
- D** taking a long course of antibiotics

Solution 3.2

- A sleeping under a mosquito net
- B providing clean water and treating sewage** 
- C using condoms
- D taking a long course of antibiotics

Worked steps

B. Cholera spreads via faeces-contaminated water, so clean water and sewage treatment prevent it.

Exam-style 3.3 ■ 2 marks

- (a) Explain why providing clean drinking water reduces the spread of cholera.
- (b) Discuss **one** social and **one** economic factor that make malaria hard to control in some countries.

Solution 3.3

Method: Prevention and control

Worked steps

- (a) the cholera bacterium spreads in water contaminated with faeces **M1**; clean water removes this route of transmission **A1**.
- (b) social, e.g. people may not use nets / lack of education; economic, e.g. cost of nets, drugs or insecticides is too high **B1** *each*.

Exam-style 3.4 ■ 2 marks

A region recorded 4000 malaria cases in 2015. After a mosquito-net programme, this fell to 1500 cases in 2020.

- (a) Calculate the percentage decrease in cases.
- (b) Explain why targeting the mosquito reduces malaria.

Solution 3.4

Method: The four diseases

Worked steps

(a) decrease = $4000 - 1500 = 2500$ (M1); percentage = $\frac{2500}{4000} \times 100 = 62.5\%$ (A1).

(b) the mosquito is the vector that transmits *Plasmodium* (M1); killing mosquitoes / stopping bites breaks the transmission cycle (A1).