

## 8.7 Infection prevention and control

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Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Total: 23 marks**

**KEY WORDS** standard precautions • sterilisation

### Objective

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Match precaution levels to the physics of the route.

### 1 Key knowledge and worked examples

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#### ■ Levels and physics

Standard precautions for every patient; add contact, droplet or airborne to match the route ✓. Droplets ( $> 5 \mu\text{m}$ ) fall within  $\sim 1\text{--}2 \text{ m}$ ; airborne particles ( $\leq 5 \mu\text{m}$ ) drift for hours – only a fitted respirator plus ventilation breaks that link.

#### ■ Worked example: the ladders

Decontamination: cleaning  $\rightarrow$  disinfection (vegetative cells only)  $\rightarrow$  sterilisation (steam  $121\text{--}134^\circ\text{C}$  or chemical sterilants) ✓. Staff vaccination  $40\% \rightarrow 90\%$ : susceptible-staff fraction  $60\% \rightarrow 10\%$ , a six-fold drop.

### 2 Practice

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**2.1** Why does a surgical mask within  $1\text{--}2 \text{ m}$  suffice for droplet spread? [3]

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**2.2** Measles vs influenza: which needs airborne precautions? [3]

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**2.3** What survives disinfection but not sterilisation? [3]

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### 3 Exam-style questions

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**3.1** A fictional clinic raises staff influenza vaccination from 40 % to 90 % uptake.

Calculate the fall in the susceptible-staff fraction (60 %  $\rightarrow$  10 %, six-fold). Explain why the ward effect exceeds the sum of individual protections (each vaccinated staff member is also a blocked link between patients). State which chain link vaccination breaks. [7]

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**3.2** A fictional surgical unit reports a cluster of surgical-site infections presenting on post-operative days 5–7.

Use incubation arithmetic to date the acquisition window (the theatre or the first 48 h of aftercare). Map the investigation onto the chain (reservoir: cases/environment; route: contact; entry: the wound) and name one intervention per link. [7]

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## Solutions

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### 2.1

- Droplets exceed 5  $\mu\text{m}$  and fall within  $\sim 1\text{--}2$  m of the source – the mask breaks the chain at that range ✓.

### 2.2

- Measles (and tuberculosis) – airborne; influenza is primarily droplet ✓.

### 2.3

- Spores ✓.

### 3.1

- Susceptible fraction:  $1 - 0.40 = 60\%$   $\rightarrow 1 - 0.90 = 10\%$ ;  $60/10 = 6\text{-fold}$  ✓.
- Each vaccinated worker also stops patient $\rightarrow$ worker $\rightarrow$ patient chains – blocked links multiply ✓.
- Vaccination breaks the SUSCEPTIBLE-HOST link ✓.

### 3.2

- Days 5–7 post-operation date the breach to the theatre or the first 48 h of aftercare ✓.
- Reservoir (ill staff/environment)  $\rightarrow$  route (hands, instruments)  $\rightarrow$  entry (the wound) ✓.
- Interventions: screen/isolate carriers (reservoir), theatre hygiene and instrument sterilisation (route), wound care protocols (entry) ✓.