UNIVERSITY MEDICINE • EXERCISE SHEET

8.7 Infection prevention and control

Name: _____ Class: _____ Date: _____ **Total: 23 marks**

KEY WORDS standard precautions • sterilisation

Objective

Match precaution levels to the physics of the route.

1 Key knowledge and worked examples

■ Levels and physics

Standard precautions for every patient; add contact, droplet or airborne to match the route ✓. Droplets (> 5 µm) fall within ~1–2 m; airborne particles (≤ 5 µm) drift for hours – only a fitted respirator plus ventilation breaks that link.

■ Worked example: the ladders

Decontamination: cleaning → disinfection (vegetative cells only) → sterilisation (steam 121–134 °C or chemical sterilants) ✓. Staff vaccination 40 % → 90 %: susceptible-staff fraction 60 % → 10 %, a six-fold drop.

2 Practice

2.1 Why does a surgical mask within 1–2 m suffice for droplet spread? [3]

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

2.3 What survives disinfection but not sterilisation? [3]

3 Exam-style questions

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

Calculate the fall in the susceptible-staff fraction (60 % → 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]

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]

Solutions

2.1

- Droplets exceed 5 µm and fall within ~1–2 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: $1 - 0.40 = 60\ \% \rightarrow 1 - 0.90 = 10\ \%$; $60/10 = 6$-fold ✓.
- Each vaccinated worker also stops patient→worker→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) → route (hands, instruments) → entry (the wound) ✓.
- Interventions: screen/isolate carriers (reservoir), theatre hygiene and instrument sterilisation (route), wound care protocols (entry) ✓.