Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

measles: **airborne**

norovirus: **faecal–oral** (and contact)

hepatitis B: **blood and sexual**

2.2

$R = 4 \times (1 - 0.6)$

$= \mathbf{1.6}$

2.3

the time from infection to the first symptoms

a person still well at the end of it is very unlikely to be infected

2.4

normal flora use up food and space

they make substances that stop pathogens growing

antibiotics kill the normal flora, so *C. difficile* can grow and make toxin

3.1

(a) **74**

(b) **point source**: one sharp rise and fall within about one incubation period, with no later waves

(c) $74 \div 1850 = \mathbf{4\%}$

(d) ill passengers stay in their cabins until 48 hours after symptoms stop; hand washing with soap and water and chlorine cleaning, because alcohol does not kill norovirus

3.2

(a) **airborne**

(b) they share the same air for many more hours, in a small closed space, so they breathe in more bacteria

(c) live bacteria are held in check by the immune system, with no disease and no spread; about 5–10% later become active, and treatment prevents this

3.3

(a) $0.85 \times 0.97 = 0.82$

(b) $15 \times (1 - 0.82) = \mathbf{2.7}$

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(c) yes, because $R > 1$

(d) people spread it before anyone knows they have it

(e) the virus infects and kills memory lymphocytes, so protection against other infections is lost (“immune amnesia”)