

AS Level Biology B

H022/02 Biology in depth

Question Set 18

1 Influenza (flu) is caused by a virus that is spread by droplet infection.

Fig. 1 shows the mortality rate from flu in the UK in 2011.

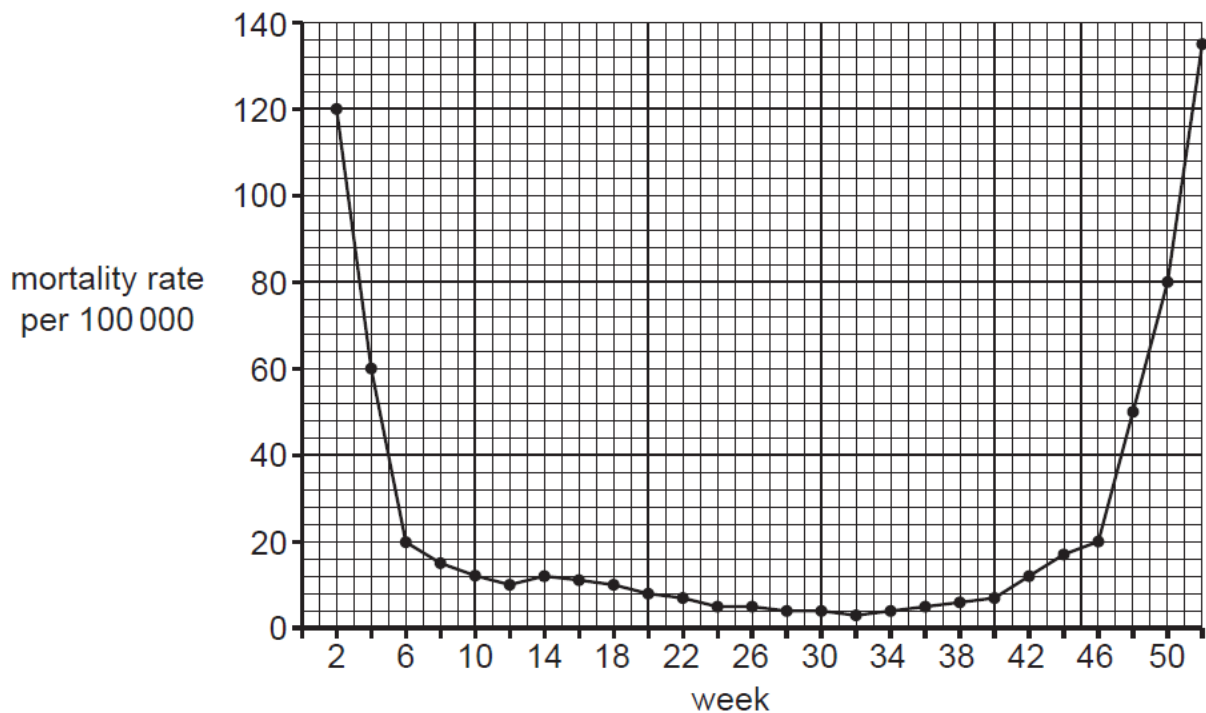


Fig. 1

(a) Using the information in Fig. 1, suggest why the mortality rate from flu changes throughout the year.

[2]

(b) Droplets containing the flu virus are released into the air when an infected person coughs.

Assume that:

- approximately 3000 droplets are produced in a single cough
- the volume of a flu virus is $5.0 \times 10^{-4} \mu\text{m}^3$ and the average diameter of a spherical droplet is $10 \mu\text{m}$.

Calculate the maximum number of virus particles that could be released into the air in one cough.

Use the formula: volume of a sphere =

$$\frac{4}{3}\pi r^3$$

Give your answer to 2 decimal places in standard form.

[2]

- (c) (i) The UK has a routine flu vaccination programme which is free for 'at risk' groups. 'At risk' groups include diabetic and immuno-compromised patients.

Describe the role of the vaccination programme in reducing the number of deaths in 'at risk' groups.

[2]

- (ii) Suggest why a **different** flu vaccine is required each year.

[2]

- (d) In young children, the flu vaccine can be administered using a nasal spray containing antigens.

Explain how these antigens in the nasal spray cause an increase in antibody concentration of the blood.

[4]

Total Marks for Question Set 18: 12



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