



H14-test Crude and Standardised Rates: Test Pack

EDEXCEL 1ST0 · Calculator allowed · about 20 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 For each statement about crude rates and the SMR, write down whether it is True or False.

(i) An SMR of 100 means the observed number of deaths exactly matches the number expected from the standard population's age-specific rates. **(1)**

(ii) A crude rate always gives a fairer comparison between two areas than a standardised rate. **(1)**

(iii) The standard population's age-specific rates are applied to each area's own local population in each age band; the standard population's total size does not need to match the local area's total size. **(1)**

(Total for Question 1 is 3 marks)

2 A health analyst wants to investigate whether Health Trust Kelwood has an unusually high number of deaths, once the age of its patients is taken into account.

(a) (Plan) State what data the analyst needs to collect about Kelwood in order to calculate its SMR. (1)

(b) (Collect) Give one appropriate source the analyst could use to obtain reliable data on deaths and population numbers. (1)

(c) (Process) Kelwood has a population of 15,000, split by age band as shown. (4)

Age band	Population	Standard age-specific death rate (per 1000)
Under 40	6,000	1
40-64	4,000	5
65 and over	5,000	50

Kelwood recorded 345 actual deaths that year. Calculate the expected number of deaths and the SMR for Kelwood.

(d) (Interpret) Interpret Kelwood's SMR, and suggest one action the analyst might recommend as a result. (2)

(Total for Question 2 is 8 marks)

- 3** The table summarises the crude death rate and SMR for Denby and Sandmoor, both found in earlier questions.

District	Crude death rate (per 1000)	SMR
Denby	15	125
Sandmoor	19.8	90

- (a) Write down which district has the higher crude death rate. (1)

-
- (b) Write down which district has the higher SMR. (1)

-
- (c) Using both sets of figures, explain why the crude death rates alone give a misleading impression of which district truly has worse-than-expected mortality, and state what the SMR values reveal instead. (4)

(Total for Question 3 is 6 marks)

Mark scheme · H14-test Crude and Standardised Rates: Test Pack

Question 1

- (i) **B1** True cao
- (i) **Answer: True**
- (ii) **B1** False cao
- (ii) **Answer: False**
- (iii) **B1** True cao
- (iii) **Answer: True**

Question 2

- (a) **B1** the observed number of deaths at Kelwood in a year, and Kelwood's local population split by age band, oe
- (a) **Answer: The number of observed deaths at Kelwood in a year, and Kelwood's population split by age band.**
- (b) **B1** any valid source, e.g. official health service administrative records, or a national statistics agency's mortality data, oe
- (b) **Answer: Official health service records, or mortality data published by a national statistics agency.**
- (c) **M1** $6 \times 1 + 4 \times 5 + 5 \times 50$, oe
- (c) **A1** 276 cao (expected deaths)
- (c) **M1** $345 / 276 \times 100$, oe (ft their expected deaths)
- (c) **A1** 125 cao (SMR)
- (c) **Answer: Expected deaths = 276; SMR = 125.**
- (d) **B1** Kelwood recorded 25% more deaths than expected, given its patients' age structure, oe
- (d) **B1** suggests a sensible follow-up action, e.g. investigating Kelwood's care standards or other risk factors further, or comparing with other trusts to see if the pattern is unusual, oe
- (d) **Answer: Kelwood recorded 25% more deaths than expected for its age structure (SMR = 125). The analyst might recommend investigating Kelwood's care standards or other risk factors further to understand why.**

Question 3

- (a) **B1** Sandmoor cao
- (a) **Answer: Sandmoor**
- (b) **B1** Denby cao
- (b) **Answer: Denby**
- (c) **B1** recognises that Sandmoor's higher crude rate (19.8 vs 15) might suggest Sandmoor has worse mortality, oe
- (c) **B1** but Sandmoor also has an older population, so a higher crude rate is expected anyway, oe
- (c) **B1** the SMR values show the opposite once age structure is accounted for: Denby's SMR (125) is higher than Sandmoor's (90), meaning Denby has more deaths than expected for its own age structure while Sandmoor has fewer, oe
- (c) **B1** concludes that Denby, not Sandmoor, is the district with the worse-than-expected mortality outcomes, oe
- (c) **Answer: The crude rates alone suggest Sandmoor (19.8) has worse mortality than Denby (15), but this is misleading because Sandmoor has an older population, which naturally raises its crude rate. Once age structure is accounted for, the SMR values show the opposite: Denby's SMR of 125 is higher than Sandmoor's 90, meaning Denby actually has more deaths than expected for its own age structure, while Sandmoor has fewer. So Denby, not Sandmoor, is the district with worse-than-expected mortality.**