Solutions

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

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

2.1

A: **yes**, the CI does not include 0

B: **no**, the CI includes 1

C: **yes**, the CI does not include 1

2.2

SE $= 1.0/\sqrt{400} = 0.05$

CI $= 5.2 \pm 0.098$: **5.10 to 5.30 mmol/L**

2.3

A: **paired t-test**

B: **chi-squared test**

C: **Mann–Whitney U test**

2.4

if the drug truly had no effect

there would be a 3% chance of seeing a difference this large or larger by chance

3.1

(a) the proportion of people still alive over time with each drug

(b) at any time, people on drug A have 25% less risk (hazard) of death than people on drug B

(c) yes: the CI does not include 1; $p = 0.003$ is below 0.05

(d) the **log-rank test**

(e) people join at different times and some leave early, and the curve uses each person's follow-up time (censoring)

3.2

(a) no: the CI includes a useful benefit of up to 2.9 points, so the study was too small to tell

(b) a **type II error**

(c) any two of: more patients; a more precise outcome measure; a group with a bigger expected effect; a higher α (rarely)

3.3

(a) a weak positive correlation

(b) the sample is very large, so even a small effect is unlikely to be chance

(c) no: it is an observational link and could be confounded (e.g. by exercise or diet) or reversed

(d) $r^2 = 0.0225$: about **2%**

(e) with 20 tests, one is likely to be "significant" by chance at $p < 0.05$ (multiple testing)

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