12.3 Bias, confounding and causation

Name: _____ Class: _____ Date: _____ **Total: 24 marks**

KEY WORDS confounding • selection bias

Objective

Name the failure mode; run the stratification test.

1 Key knowledge and worked examples

■ Three failures

Selection bias (who counts), information/recall bias (what is measured or remembered), confounding (a third variable on both paths) ✓. Randomisation balances the unknowns prospectively.

■ Worked example: the stratified verdict

Crude RR 2.0 → strata RR 1.0 and 1.0: confounded; strata RR 2.0 and 1.9: the signal survives ✓. Hill's viewpoints judge causation, temporality first.

2 Practice

2.1 Sick patients recall exposures more keenly – name the bias. [3]

2.2 What must a confounder be associated with (two things)? [3]

2.3 Which Hill viewpoint is non-negotiable? [3]

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3 Exam-style questions

3.1 A synthetic crude table: exposed 24/200 events; unexposed 12/200 (RR 2.0). Stratification by a third variable: stratum A 20/100 vs 10/100; stratum B 4/100 vs 2/100.

Compute the stratum RRs (2.0 and 2.0) ✓ and conclude that the third variable is NOT the confounder here (the association survives within strata) ✓. Explain what result WOULD have indicted the third variable (RR $\approx$ 1.0 inside every stratum) and why ✓. [8]

3.2 A fictional abstract: coffee drinkers show twice the disease rate.

List the three appraisal questions (who was selected; how was exposure measured; what confounder would need both links) ✓. Apply two Hill viewpoints (temporality: exposure measured before disease? dose-response: more coffee, more disease?) and state what each would demand ✓. [7]