



ANSWER BOOK

Diet, energy and how to read a health claim

Nutrition, digestion and health evidence · Unit B10

AQA 3.3.4.2 (evaluating risk-factor data) · OCR A 2.1.2 (the molecules a diet supplies)
Edexcel A Topic 1.7–1.10 · CAIE not examined as a topic

5 questions · 19 marks

NAVY EDITION

SECTION A · Short, 1 to 2 marks

- A1** **B1** at complete rest, awake, at a comfortable temperature and twelve hours or more after a meal. **B1** lean body mass: muscle, liver, kidney and brain are metabolically expensive tissues while adipose tissue is cheap. [2]
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SECTION B · Standard, 3 to 5 marks

- B1** **B1** in support: the sample is large, so random error is small and the association is unlikely to have arisen by chance alone. **B1** in support: an association of this kind is a reasonable hypothesis to generate, and it can be tested directly by a design that settles the question. **B1** against: the design is cross-sectional, measuring a population at one moment, so it cannot say which came first. People already diagnosed may have started or stopped taking supplements because of the diagnosis. **B1** against: nobody allocated the supplement, so the two groups differ in many ways at once; people who take supplements tend to smoke less, exercise more and earn more, and a relative risk of 0.88 is close enough to 1 to be produced by residual confounding alone. **B1** judgement: the conclusion is not supported by this study, which reports an association as though it were a cause; what would settle it is a randomised controlled trial of the supplement against a placebo, since randomisation balances the confounders nobody measured. [5]
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- B2** **M1** the absolute risk in the exposed group is the baseline absolute risk multiplied by the relative risk. **A1** $4.0 \times 1.25 = 5.0$ per cent, so about 5 people in every 100 rather than 4. **A1** the increase in absolute risk is $5.0 - 4.0 = 1.0$ percentage point. **M1** the number needed for one extra case is $1 \div 0.010 = 100$ people. [4]
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- B3** **B1** a cohort recruits people who are free of the disease and follows them forward in time, whereas a case-control starts with people who already have the disease and compares them with matched people who do not. **B1** a cohort records exposure before the disease appears, so the time order is right by construction, whereas a case-control asks both groups about past exposure and cannot establish which came first. **B1** a cohort gives incidence and a relative risk, whereas a case-control gives an odds ratio, because the investigator chose how many cases and controls to recruit and so cannot know the risk in either group. **B1** a cohort needs very large numbers and many years and is still open to confounding, whereas a case-control is quick and efficient for a rare disease but is open to recall bias and to unfair choice of controls. [4]
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B4 **B1** confounding: people who eat more fruit also tend to smoke less, exercise more and be wealthier, and each of those affects cancer risk independently. **B1** that could be tested by adjusting for cigarettes smoked per day rather than for smoking as a yes-or-no variable, and by repeating the analysis in people who have never smoked. **B1** reverse causation: undiagnosed disease changes appetite and diet years before a diagnosis, so people who were already ill may have eaten less fruit because of the illness rather than the other way round. **B1** that could be tested by discarding the first few years of follow-up and re-running the analysis; if the association survives, reverse causation is a weaker explanation.
