S5 Health Management and Social Care Practice Paper 1 | BMI, epidemiology, cost-effectiveness, ageing

Senior Secondary Health Management and Social Care

S5 Health Management and Social Care practice paper with answers: BMI, epidemiology, cost-effectiveness, dependency ratio and community care.

1. BMI and health risk assessment (16 marks)

Show the working and give answers to one decimal place.

#	Question	Answer and marking notes
1	(a) A person weighs 68 kg and is 1.70 m tall. Calculate the BMI to two decimal places and classify it under the Asian adult standard, where 18.5 to 22.9 is normal.	Answer: BMI = 68 / 1.70 squared = 68 / 2.89 = 23.53, that is 23.5; above 22.9, so the person is classified as overweight.
2	(b) Another person weighs 52 kg and is 1.60 m tall. Calculate the BMI to two decimal places and find the weight range that corresponds to the normal BMI band, to one decimal place.	Answer: BMI = 52 / 1.60 squared = 52 / 2.56 = 20.31, that is 20.3, which is normal; lower limit = 18.5 x 2.56 = 47.4 kg and upper limit = 22.9 x 2.56 = 58.6 kg, giving a range of 47.4 to 58.6 kg.
3	(c) A person is 1.75 m tall and weighs 82 kg. Calculate the BMI to two decimal places and state the class; how many kilograms must be lost to bring the BMI down to 23.0, to one decimal place?	Answer: BMI = 82 / 1.75 squared = 82 / 3.0625 = 26.78, that is 26.8, in the obese band at 25 or above; a BMI of 23.0 corresponds to 23.0 x 3.0625 = 70.44 kg, so the loss required is 82 - 70.44 = 11.56, about 11.6 kg.
4	(d) State two limitations of using BMI to assess health risk.	Answer: first, BMI uses only height and weight and cannot separate muscle from fat, so athletes are wrongly classified as overweight; second, it does not show fat distribution, so the risk of central obesity is underestimated; its use for children, pregnant women and older adults is also limited.

2. Incidence, mortality and comparison of rates (18 marks)

Express rates per 1000 population and show the working.

#	Question	Answer and marking notes
5	(a) A district has a population of 250,000 and records 1,500 new cases in a year. Find the incidence rate per 1000 population.	Answer: incidence = 1,500 / 250,000 x 1000 = 6.0, that is 6.0 new cases per 1000 people.
6	(b) In the same year the district records 1,750 deaths and 12,000 confirmed cases in total. Find the crude death rate per 1000 and the case fatality rate as a percentage to one decimal place.	Answer: crude death rate = 1,750 / 250,000 x 1000 = 7.0 per 1000; case fatality rate = 1,750 / 12,000 x 100 = 14.6 per cent.

#	Question	Answer and marking notes
7	(c) District A has an ageing population and a crude death rate of 7.0 per 1000; district B has a young population and a rate of 5.0 per 1000. After age standardisation the figures are 6.2 for A and 6.8 for B. Explain the difference between the two sets of figures and the purpose of standardisation.	Answer: the crude rate depends on the age structure, and district A has a higher share of older people, so its deaths are naturally more numerous and the two crude rates cannot be compared directly; standardisation recomputes the rates on a common standard population, removing the age effect, and shows that district B actually carries the higher underlying risk, 6.8 against 6.2.
8	(d) Distinguish life expectancy from healthy life expectancy and explain why the latter matters for planning long-term care.	Answer: life expectancy is the number of years a person is expected to live from birth, whereas healthy life expectancy counts the years expected to be spent in good health; the gap between them measures years lived with illness, and a wider gap implies greater demand for long-term care, rehabilitation and primary care.

3. Health care cost and cost-effectiveness analysis (16 marks)

Show the working and the units; express money in dollars.

#	Question	Answer and marking notes
9	(a) Option A costs 480,000 dollars and gains 6 QALYs; option B costs 720,000 dollars and gains 8 QALYs. Find the average cost per QALY for each and state which option should be adopted first under a fixed budget.	Answer: option A = 480,000 / 6 = 80,000 dollars; option B = 720,000 / 8 = 90,000 dollars; option A costs less per QALY, so it should be funded first under a fixed budget.
10	(b) Taking option A as the baseline, calculate the incremental cost-effectiveness ratio (ICER) of option B. If the local threshold is 150,000 dollars per QALY, is the extra spending on option B justified?	Answer: ICER = (720,000 - 480,000) / (8 - 6) = 240,000 / 2 = 120,000 dollars; this is below the threshold of 150,000, so the extra 2 QALYs are worth funding.
11	(c) A drug costs 3,500 dollars a month and the patient co-pays 20 per cent. Find the monthly co-payment; if a monthly cap of 500 dollars applies, how much does the patient actually pay and how much does the government subsidise?	Answer: co-payment = 3,500 x 0.2 = 700 dollars; with the 500 dollar cap the patient pays 500 dollars and the government subsidises 3,500 - 500 = 3,000 dollars a month.
12	(d) Describe three common measures for controlling health care costs and identify the equity concern raised by one of them.	Answer: first, raising co-payment shares; second, restricting expensive drugs on cost-effectiveness grounds; third, strengthening primary care and prevention. The equity concern with higher co-payments is that low-income patients may delay treatment because of cost, widening health inequalities.

4. Population ageing and dependency ratios (18 marks)

Express ratios as percentages to one decimal place.

#	Question	Answer and marking notes
13	(a) A place has 10 million people: 1.2 million aged 0 to 14, 2 million aged 65 or above and 6.8 million aged 15 to 64. Find the total dependency ratio in percentage points.	Answer: dependency ratio = (1.2 + 2.0) / 6.8 x 100 = 3.2 / 6.8 x 100 = 47.1 per cent.
14	(b) Find the current old-age dependency ratio. If in ten years the older population rises to 2.8 million and the working-age population falls to 6.4 million, find the new ratio and the increase in percentage points.	Answer: current old-age dependency ratio = 2.0 / 6.8 x 100 = 29.4 per cent; in ten years = 2.8 / 6.4 x 100 = 43.8 per cent, an increase of 43.8 - 29.4 = 14.4 percentage points.
15	(c) Of the 6.8 million people aged 15 to 64, 6.46 million are employed. Find the employment rate; if average health spending per older person is 24,000 dollars a year, find the total annual spending for 2.8 million older people in ten years, in hundred million dollars.	Answer: employment rate = 6.46 / 6.8 x 100 = 95.0 per cent; total spending = 2,800,000 x 24,000 = 67,200,000,000 dollars, that is 672 hundred million dollars.
16	(d) Suggest three policy directions for responding to population ageing and state the target group of each.	Answer: first, expand community care and home support for frail older people and their carers; second, strengthen retirement protection and savings beyond the existing scheme for people in employment; third, promote employment and lifelong learning for older people who are healthy and willing to work.

5. Estimating community care needs and service planning (16 marks)

Show the working; give places and beds as whole numbers.

#	Question	Answer and marking notes
17	(a) A district has 48,000 people aged 65 or above, of whom 12 per cent have functional limitations. Find the number needing long-term care.	Answer: number needing long-term care = 48,000 x 0.12 = 5,760 people.
18	(b) The planning standard is 4.5 day care places per 100 older people. Find the number of places required and the shortfall against the 1,900 places now available.	Answer: places required = 48,000 / 100 x 4.5 = 2,160; shortfall = 2,160 - 1,900 = 260 places.
19	(c) Assume 20 per cent of older people need residential care places. Find the number of places required; if 1,800 places exist and 600 can be added each year, find the number of years needed to close the gap.	Answer: places required = 48,000 x 0.2 = 9,600; gap = 9,600 - 1,800 = 7,800; years needed = 7,800 / 600 = 13 years.

#	Question	Answer and marking notes
20	(d) Compare home care with residential care in terms of cost, autonomy and carer burden.	Answer: on cost, home care generally uses less public money but carries higher hidden family costs; on autonomy, home care preserves more control over daily life; on carer burden, home care places greater physical and emotional strain on family members, while residential care shifts daily care to the institution.

6. Health promotion and behaviour change (16 marks)

Give outcome figures in percentages to one decimal place.

#	Question	Answer and marking notes
21	(a) A smoking cessation programme has 2,500 participants and 500 quit after one year; in a comparison group of 1,250 people, 250 quit without the programme. Find the quit rate in each group and comment on the added effect of the programme.	Answer: programme group = 500 / 2,500 x 100 = 20.0 per cent; comparison group = 250 / 1,250 x 100 = 20.0 per cent; the rates are equal, so the programme shows no added effect and its design or follow-up period should be reviewed.
22	(b) The programme costs 1,200,000 dollars in total. Find the average cost per participant and the average cost per successful quitter.	Answer: per participant = 1,200,000 / 2,500 = 480 dollars; per successful quitter = 1,200,000 / 500 = 2,400 dollars.
23	(c) Using the health belief model, explain three factors affecting the intention to quit smoking, each with an example of community promotion.	Answer: first, perceived susceptibility, for example showing images of damaged lungs; second, perceived severity, for example presenting lung cancer survival data; third, perceived barriers and self-efficacy, for example free cessation medication and telephone counselling that lower the barrier of withdrawal discomfort.
24	(d) State two indicators for evaluating health promotion and one limitation of each.	Answer: first, behaviour change rates such as quit rates, limited because self-reported data may be inflated and short-term change may not last; second, service uptake such as screening attendance, limited because high attendance does not prove better health and does not capture long-term changes in incidence.