Specimen Paper A
DFPH Sample Question Paper and Mark Scheme

Please note that the following specimen paper has been compiled with 'real' questions used in recent past papers.

How is the pass mark derived?

A modified Angoff approach to standard setting was implemented for all examinations from January 2017 onwards.

Angoff standard setting involves a panel of 'judges' (standard setters) to consider each question and judge what proportion of minimally competent candidates would answer that question correctly.

Standard setters are asked to consider what mark (e.g. out of 10 for paper I) a borderline competent candidate will achieve. These marks are then collated across all standard setters and the average is calculated. That average is the pass mark for that question.

Occasionally, when standard set marks are reviewed there is clear disagreement between standard setters as to the 'difficulty' of a question. Where that occurs, a discussion is held between standard setters to elucidate the reasons for the disagreement. Standard setting is then repeated until reasonable agreement is obtained. For our purposes, we consider too much disagreement to have occurred if the standard deviation of the standard set mark is more than 10% of the marks available for that question, i.e. >1 for questions out of 10).

Read more: Link

Examiner feedback and comments

Examiners provide feedback on the questions they mark in each sitting in order to help support an understanding of the ways in which candidates and questions perform but also to help with improvements in the question in future sittings. A summary of these points are published after the exam in order to help candidates. For the questions provided in this pack, both the summary comments and where applicable the more detailed comments are provided.

Specimen Paper A Questions and Mark Scheme
Paper IA

Section A: Research Methods

Question 1:

A local study has compared the prevalence of dementia and ambient NO_2 concentrations. The data on dementia and NO_2 concentrations was obtained from two separate data sources, each aggregated at small area level (each containing approx. 1,500 people). The investigators found a positive relationship between NO_2 concentrations and the prevalence of dementia.

(a) Using the example above:
   i. What type of study design was used in this investigation and what are its characteristic features? (1 mark)
   ii. Discuss the strengths of this type of study design. (2 marks)
   iii. Discuss the weaknesses of this type of study design. (2 marks)
(b) With reference to the example, give plausible explanations for the observed relationship. (5 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)

i. What type of study design was used in this investigation and what are its characteristic features?
This is an example of an ecological (or correlational) study.
Ecologic studies compare aggregate (population or group-level) exposure and disease data across different populations over the same time period (or within the same population over time).
Any other relevant and appropriate point.

1 mark – 0.5 mark for identifying study type and 0.5 mark for features

ii. Discuss the strengths of this type of study design.
- Cheap and simple to conduct.
- Utilize routinely collected health statistics.
- Exposure data often only available at area level.
- Differences in exposure between areas may be greater than at the individual level.
- Utilize geographical information systems to examine spatial framework of disease and exposure.
- Generate hypotheses to examine at the individual level.
- Any other relevant and appropriate point.

2 marks – 0.5 mark per point explained clearly up to a maximum of 2 marks

iii. Discuss the weaknesses of this type of study design.
- Measures of exposure are only a proxy based on the average in the population. Caution needed when applying grouped results to the individual level (ecological fallacy).
- Potential for systematic differences between areas in recording disease frequency. For example, there may be differences in disease coding and classification, diagnosis and completeness of reporting.
- Potential for systematic differences between areas in the measurement of exposures.
- Lack of available data on confounding factors.

- Any other relevant and appropriate point.

2 marks – 0.5 mark per point explained clearly up to a maximum of 2 marks

(b)
A positive association suggests that as NO_2 increases prevalence of dementia increases. This may be due to:

- True – real relationship exists. Would need to meet other requirements, e.g. Bradford Hill
- Chance – small numbers in each area or small number of areas
- Bias – Area of high traffic flow and therefore NO_2 tend to have better AQ data measurements and also be areas of higher morbidity. Modelled AQ in other areas may lead to systematic differences.
- Confounding – e.g. poor air quality linked with deprivation which is linked with dementia.
- Reverse causation – people with dementia more likely to be deprived & live in poor AQ areas.
- Any other relevant and appropriate point.

1 mark = 1 point explained clearly or 2 points, but explanation unclear
2 marks = 2 points explained clearly; or 3-4 points, but explanation unclear
3 marks = 3 points explained clearly; or 5 points, but explanation unclear
4 marks = 4 points explained clearly
5 marks = 5 points explained clearly

Just listing True/Chance/Bias/Confounding/Reverse causation without explanation or reference to the example should score a maximum of 1 mark.

Examiner Comments on how candidates performed

This question asked candidates to identify and comment on the strengths and weaknesses of a particular type of epidemiological study. In general, candidates performed well in this question, demonstrating good knowledge of study design. However, candidates should note that they need not restrict the number of appropriate examples they provide unless the question specifically asks for a specified number. Where no limit is specified, candidates may get credit for offering a full range of relevant responses.

<u>In what way did candidates perform particularly well?</u>
Virtually all candidates who identified the ecological study type could list at least 3 of the weaknesses and ecological fallacy as a weakness. Most candidates could list potential types of plausible explanations. Most candidates applied these to the study given.

<u>In what way did candidates perform poorly?</u>
Poorly performing candidates did not identify the correct study type. Poorer performing candidates on the whole could explain chance/bias/confounding etc, but did not relate it to the question scenario.

<u>What were the common pitfalls in answering the question?</u>
Only giving 2 points for strengths and for weakness when four points were required to get full marks. Some candidates gave strengths/weaknesses of the specific study given in the question rather than the study type as asked for.

Pass mark: 5.5 marks

Question 2:

Researchers examined the contribution of risk factors to excess mortality in isolated and lonely individuals using data from the UK Biobank cohort study. The main outcome was all-cause mortality. Almost half a million men and women were included in the analyses, with a mean follow-up of 6·5 years (SD 0·8). The hazard ratio for all-cause mortality for social isolation compared with no social isolation was 1·73 (95% CI 1·65–1·82) after adjustment for age, sex, ethnic origin, and chronic disease and was 1·26 (95% CI 1·20–1·33) after further adjustment for socioeconomic factors, health related behaviours, depressive symptoms, biological factors, cognitive performance, and self-rated health.

(a) Why did the researchers adjust for factors such as age and sex? (3 marks)
(b) Interpret the hazard ratios for all-cause mortality for social isolation compared with no social isolation. (5 marks)
(c) Suggest why the measurement of loneliness is problematic and how it should be measured. (2 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a) Factors such as age and sex are potential confounders. (1 mark)
Show, by application to this example, that they understand that confounders e.g. age are related to both the exposure (loneliness/social isolation) and the outcome (all-cause mortality)

Any other relevant and appropriate point will also receive credit.

(2 marks)

(b) People who are socially isolated (however measured) have a 73% increased all-cause mortality over the study period when compared to those who are not socially isolated, when adjusted for age, sex, ethnicity and chronic disease, further adjustment for additional potential confounders reduced the estimate to a 26% increase. (1 mark for naming outcome & exposure. 1 mark for interpretation of the two HRs)

The 95% CI of 1.65 to 1.82 suggest that the true value lies between an increase of 65 and 82% and the 95% CI of 1·20–1·33 suggest that the further adjusted 'true' value lies between an increase of 20 and 33% (1 mark). In both cases, these were statistically significant as the CIs do not cross 1. (1 mark)
The fact that the HR decreases with additional adjustment suggests that socioeconomic factors, health related behaviours, depressive symptoms, biological factors, cognitive performance, and self-rated health are likely to be confounders too (1 mark)

Any other relevant and appropriate point will also receive credit.

(c) Loneliness is a subjective experience unlike the outcome, mortality. It therefore is more difficult to capture/quantify. (1 mark)
Need to use a validated scale (1 mark)

Any other relevant and appropriate point will also receive credit.

Examiner Comments on how candidates performed

This question asked candidates to interpret numerical information and comment on the measurement of an issue of public health importance. Candidates generally performed well on this question, with more focussed

answers scoring particularly highly. Extraneous details that were not requested and repetition of information already provided in the question did not attract credit.

In what way did candidates perform particularly well?
Virtually all identified confounding as an issue.

In what way did candidates perform poorly?
Some candidates restated the information in the text (e.g. a hazard ratio of 1.73) rather than demonstrating understanding of the interpretation (a 73% increase in risk…).

What were the common pitfalls in answering the question?
Not clearly defining confounding and/or not explaining how age & sex could be confounders in the context of the question.

Pass mark: 5.5 marks

B: Disease causation and the diagnostic process in relation to public health; prevention and health promotion

Question 3:

You are asked to provide public health advice to inform the development of a healthy ageing strategy for your local population.

(a) Discuss, with examples, the benefits of a healthy lifestyle in older age (over 75 years). (5 marks)
(b) What are the wider determinants of good health and wellbeing in older age (over 75 years)? (5 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)
The following points should attract credit as described below. Additional pertinent points will also receive credit up to the maximum of 5 marks.

- Physical activity maintains muscle strength and balance to prevent falls.
- A healthy diet (protein, carbohydrate, fruit and vegetables) maintains strength (conditioning) to prevent falls and frailty and good oral health.
- Maintaining a healthy weight (BMI 18.5-25) prevents frailty associated with being underweight and prevents immobility and diseases associated with being overweight/obese.
- Not smoking or giving up smoking reduces the risk of cardiovascular disease, cancer and other diseases that have an increasing risk with age.
- Not drinking alcohol or drinking only small amounts reduces the risk of falls and alcohol attributable disease because alcohol metabolism changes with age and older people are more sensitive to the toxic effects.
- Healthy lifestyle and exercise (outdoors especially) may improve mental wellbeing.
- Any other relevant and appropriate point will also receive credit.

(b)
The following points should attract credit as described above. Additional pertinent points will also receive credit up to the maximum of 5 marks.

- A social network of family and/or friends prevents social isolation and promotes mental wellbeing.
- A warm home prevents respiratory and other diseases associated with cold homes.
- An accessible home enables independent living e.g. doorways wide enough for a mobility aid, a bathroom room to turn and a walk-in shower, no steps or stairs.
- Access to (public) transport and/or safe walking routes in a safe physical environment enables older people to leave their home e.g. to go to the shops, to take part in community activities, to maintain hobbies and interests.
- Access to appropriate and accessible (primary) healthcare, social care and other relevant statutory services allows benefits of prevention, treatment and care services.
- Public policy on pension income, housing and other benefits prevents poverty in older age which promotes health and wellbeing by enabling older people to afford e.g. to eat a healthy diet, to heat their home and stay warm, to take part in social activities.
- Determinants of healthy aging also include an individual's family history/genetic makeup and educational attainment.

- Depending on context, living in overcrowded accommodation or multiple occupancy accommodation may also be relevant.
- Any other relevant and appropriate point will also receive credit.

Naming the lifestyle behaviour (e.g. smoking) is not sufficient for a mark without any further detail.
1 mark for 1 of the key points or part of 2 key points
1.5 for 1 key point in more detail or 1 key point plus part of a 2nd key point
2 marks for 2 key points or part of 3 key points
2.5 for 2 key points in more detail or 2 key points plus part of a 3rd key point
3 marks for 3 of the key points or part of 4 key points
3.5 marks for 3 key points in more detail or 3 key points plus part of a 4th key point
4 marks for 4 of the key points or part of 5 key points
4.5 marks for more detail on 4 of the key points or 4 key points plus part of a 5th key point
5.0 marks for 5 of the key points

Examiner Comments on how candidates performed

These questions were generally well answered.

<u>In what way did candidates perform particularly well?</u>
Candidates who structured their answer clearly performed much better.
The strongest answers also described a) the role of social factors such as social networks and family support. They also talked about the wider social benefits of health to the individual, community and society generally, talked about the economic impacts of compressed morbidity, and avoided statements that were not based on the evidence.
In b), the strongest answers were clearly focused on the wider determinants of health, structured their answer, and provided a clear explanation of the role of income, work (now and historically), housing, the physical environment, and the social environment. The explanations were rooted in the evidence base and any uncertainties were recognised.

<u>In what way did candidates perform poorly?</u>
Candidates who were only able to describe one or two aspects of a healthy lifestyle, or who only discussed the direct health benefits for individuals did not score as well. Candidates who make non-evidence informed and inaccurate statements did not score as well.
In part b), some candidates confused the non-modifiable factors of genetics, age, sex, ethnicity with the wider determinants of health and spent too much time on this, but this scored no marks. The Dahlgren and Whitehead diagram needs to be interpreted such that only the outer layers reflect the wider determinants of health. This meant that some candidates either described those wider determinants only cursorily, perhaps just listing them rather than giving a sufficient explanation.

<u>What were the common pitfalls in answering the question?</u>
The phrase ‘wider determinants’ was misinterpreted by many candidates.

Pass mark: 5.5 marks

Question 4:

Members of a local environmental pressure group are seeking your support, as a public health specialist, to prevent the siting of a waste incinerator near to their village on the grounds of the perceived risk to their children's health.

(a) What potential public health effects of the construction and operation of such a facility might give rise to public concern? (3 marks)
(b) List two potential health benefits that might arise from such a development. (1 mark)
(c) Outline the steps that you would take when deciding how to respond to this group? (6 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)

- Construction phase – increase in traffic and accident risk
- Anxiety and other mental health issues
- Noise
- Smell
- Occupational risks
- Road accidents
- Air pollution – particulates: respiratory and cardiovascular admissions
- Air pollution – dioxins: cancers

3 marks comprising 0.5 marks per point below, or any other reasonable point up to a maximum of 6 points

(b)

- Employment opportunities
- Reduced use of landfill
- Reduced use of fossil fuels for generating energy

1 mark comprising 2 X 0.5 marks per point below, or any other reasonable point.

(c)
Ascertain the facts of the situation

- Is an incinerator to be built near to the village and if so, exactly what, where, when and by whom?
- What is the membership, nature and influence of the pressure group, and what are their concerns?
- Are there likely to be other agendas?
- Who is/are the responsible authority/ies and to what extent have they been or should they be involved?
- Results of any impact assessments undertaken so far, as part of the regulatory process
- Mechanisms/processes available for obtaining the facts

2 marks. 0.5 for saying they would establish the facts or similar and the remaining 1.5 allocated at 0.5 per point below, or any other reasonable point.

Decide on whether there is a need for the involvement of a public health practitioner and if so the nature and extent of that involvement

- Personal/professional
- Any likely conflict of interest, if incinerator is for clinical waste?

- Independent advice to the pressure group/advice to the responsible authority/ies
- Expertise/resources available
- Mechanisms/processes available for deciding on the involvement
- Legislative framework for regulating construction and operation
- Scoping of the problem before embarking on full health impact assessment

2 marks. 0.5 for saying they would make this assessment and the remaining 1.5 allocated at 0.5 per point below, or any other reasonable point.

Assuming a professional involvement, obtain and interpret the relevant and available data and information, make recommendations and facilitate their implementation

- Emissions e.g. atmosphere, soil, water, and relationship to defined standards
- Past and current health risk and health data of the population in question
- Known health risks and health effects of exposure/proximity to clinical waste incinerator
- Likely health risks to and health effects in the population in question of exposure/proximity to the proposed clinical waste incinerator, including any sub-groups at risk
- Mechanisms for consultation/involvement
- Sources of data and expertise, including statutory regulators
- Risk communication
- Mechanisms/processes available for implementation of findings/recommendations

2 marks. 0.5 for saying they would undertake this risk assessment process and the remaining 1.5 allocated at 0.5 per point below, or any other reasonable point.

Examiner Comments on how candidates performed

On contentious issues candidates should try to give a balanced answer recognising that there are both positive and negative impacts in scenarios. Better performing candidates did not jump straight to what actions were required without considering whether action was in fact appropriate. Better performing candidates structured their answers well, using headings and bullet points rather than giving prose-style answers.

<u>In what way did candidates perform particularly well?</u>
Better performing candidates structured their answers well, using headings and bullet points.

<u>In what way did candidates perform poorly?</u>
Poorly performing candidates gave responses to (a) that were either repetitive or overlapping, rather than 3 discrete examples as implied by the marking scheme. Jumping into discussion of HIAs without determining whether or not one was warranted.

<u>What were the common pitfalls in answering the question?</u>
Failing to read the question properly, especially section c, and failing to give an answer appropriately weighted in depth according to the marking scheme.

Pass mark: 6 marks

C: Health information

Question 5:

You have been asked to prepare a report on children's health needs, to include a selection of key indicators of local needs, for the Director of Public Health's annual report for a local district of population 200,000.

(a) Describe 4 characteristics that should be considered when selecting indicators of population health needs. (4 marks)
(b) Discuss 3 different types of key indicator of children's health for inclusion in your report, giving strengths and weaknesses for each. (6 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)
Characteristics of indicators:

- Recognition that indicators are simply alerting mechanism and that they should provide an alert to something of interest, and therefore be worthy of further investigation/action/monitoring, i.e. both important and relevant
- Validity: Does the indicator actually measure what it is claiming to measure, e.g. do they reflect the underlying population need, rather than supply or demand
- Reliability: is the indicator well defined, and collected in the same way across the population and over time?
- Feasibility: is it practical for the indicator be populated with meaningful data (i.e. not too demanding of time/resources, etc.)
- Are there available comparators, e.g. consistent trend data (over time), and regional/national data (across areas)
- Population coverage: is the denominator to which the indicator relates clearly delineated (leaky boundaries)
- Meaning: What is the indicator telling you and how much precision is there in that?
- Timeliness: is the indicator sensitive to changes in a timely manner.
- Candidates may use other appropriate structures to their answer, e.g. SMART, to describe the characteristics of indicators.
- Any other relevant and appropriate point will also receive credit.

1 mark for each separate characteristic described clearly, up to 4 marks. Note that simply listing characteristics does not attract credit.

(b)
Key indicators of children's health needs:

- Examples should reflect indicators from different sources and measuring different aspects of health and wellbeing – typically these might be drawn from mortality records, hospital care, community healthcare (including primary care), or wider social or population data. The indicators should be chosen to illustrate different and contrasting strengths and weaknesses.
- Examples could include: infant and/or child mortality, prevalence of overweight/obesity, hospital admissions caused by injuries, hospital admissions for alcohol specific conditions, hospital admissions for self-harm, teenage conception rate, chlamydia detection rate, breastfeeding rate, immunisation coverage, and any other relevant measure.
- These could also include measures of child poverty, school readiness, educational attainment, and other relevant measures if their link to health is clearly explained.

- Strengths and weaknesses: how well each proposed indicator measures up against the attributes above.
- Any other relevant and appropriate point will also receive credit.

1 mark for clearly described indicator, with an additional 0.5 marks for strengths and 0.5 marks for weaknesses, i.e. up to 2 marks for each of three indicators - 6 marks in total. NB a simple list of indicators does not attract credit.

Examiner Comments on how candidates performed

In what way did candidates perform particularly well?
Well performing candidates framed their answers in the context provided in the question.

In what way did candidates perform poorly?
Providing generic lists with no rationale or explanation.

What were the common pitfalls in answering the question?
Failure to apply the response to reflect the context provided in the question, i.e. a response to a question about rates of a specific disease and associated mortality in a local area.
Repetition of indicator types – e.g. infant mortality rate, child mortality rate.

Pass mark: 6 marks

Question 6:

In recent years the use of digital health technologies by individuals and health services has increased rapidly.

(a) List three digital technologies and describe how they may be used in health promotion. (3 marks)
(b) Discuss three advantages of using digital technology for health promotion. (3 marks)
(c) Discuss four challenges associated with the use of digital technology for health promotion. (4 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)

- Apps for Behaviour change – e.g. healthy lifestyles (e.g. PHE's SugarSmart app, Couch to 5K, Active 10, DrinksTracker), self-manage long term conditions, CBT
- Fitness trackers/wearable tech for monitoring activity/fitness, compliance
- Social media for healthy lifestyle campaigns, marketing health promotion services, delivery of information campaigns/behaviour change marketing, Facebook chatbots, Amazon Echo/Alexa 'friends'
- Text messaging/Skype for delivery of health promotion interactions
- Big data - Use of data generated to provide intelligence e.g. for monitoring (by tracking popular search terms) or for planning services in the context of health promotion.
- Any other relevant and appropriate point will also receive credit.

1 mark for each item identified with example, up to a maximum of 3 items.

(b)
Advantages:

- Increased efficiency - cheaper to offer than 'face to face' services, less paperwork and traveling
- Greater reach – can offer to more people than traditional 'face to face'
- Convenient for services users, greater user control e.g. over where and when they engage
- May help reach some harder to reach groups e.g. those less likely to access health promotion services.
- Any other relevant and appropriate point will also receive credit.

1 mark for each advantage discussed, with a maximum of 3 marks.

(c)
Challenges:

- Not all patients are able to use or engage with digital health tools, particularly the elderly, disadvantaged
- For some people, the encouragement/support of health professionals face to face plays a big part in maintaining healthy behaviours which may be missing in digital tools
- Need to build digital services, not just websites and apps
- Public acceptability (including 'big brother' concerns)
- Potential to drive inequalities if variation in access to technology within population take up/use is greater amongst motivated/worried well
- Assumptions about impact on services may not play out – could increase demand from worried well
- Rapidly changing picture – 'stickiness' of apps, new apps emerging all the time so challenge to stay relevant and 'fresh', plus need to quality assure apps/digital services
- Keeping information update needs to be resourced, e.g. directory of services, link to external websites
- Staff may lack skills, knowledge and confidence in use of digital technology

- Information governance compliance.
- Evidence of effectiveness.
- Any other relevant and appropriate point will also receive credit.

1 mark for each item identified and described up to a maximum of 4 marks items.

Examiner Comments on how candidates performed

In this question, candidates were asked to consider a rapidly growing issue and to discuss its implications for public health practice and population health along with appropriate examples. Candidates who scored highly provided well-structured and logically argued responses and could illustrate these with clear examples. More limited answers focused only on the individual patient and clinician perspective and failed to consider the issue and its potential impacts from a population perspective. These answers did not score highly.

In what way did candidates perform particularly well?
Candidates who performed well went beyond listing technologies gave descriptions of how the technology could be used with examples. Remained focused on primary prevention and the value to population level health improvement, e.g. through reach. A number highlighted the potential offered by social media for the proliferation of misinformation. Many candidates recognised the potential to drive inequalities, through differential take up or differential access to technology, e.g. from skills, confidence, affordability, infrastructure.

In what way did candidates perform poorly?
Failure to offer examples. Focusing on health care and/or management of existing conditions.

What were the common pitfalls in answering the question?
Focus on a clinical or individual/patient perspective. This question was about how digital technology can be used for improving the public's health, so the focus was on the general public and not patients.
Comments about information governance often failed to appreciate the importance of public trust and instead offered generic data governance response. Lots of candidates talked about data being misused or hacked. The important point here was that users have to trust the brand or the technology otherwise they won't use it.

Some candidates failed to distinguish between technology more broadly and digital technology more specifically. Digital technology = electronic tools, systems, devices and resources that generate, store or process data. So includes social media, online games, mobile phones, internet, multimedia, wearables like fitness tracker watches linked to apps. Excludes mechanical pedometers, CO monitors, e-cigs.
Some referred to the use of celebrities – only got marks if this was specifically as an example of using an existing social media profile. Celebrities are not a digital technology.

Pass mark: 6.5 marks

Specimen Paper A Questions and Mark Scheme
Paper IB

D: Medical Sociology, Social Policy and Health Economics

Question 7:

Using a public health or health service intervention as an example to illustrate your answers define and describe each of the following health economic concepts:
(a) Discounting (3 marks)
(b) Supply and demand (3 marks)
(c) Efficiency, including description of different forms of efficiency (4 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)
Discounting is the process of determining the present value of a payment or a stream of payments (or costs) in the future, which involves adjusting these costs (and benefits) according to a notional discount rate.

- Time preference. Discounting values current costs and benefits higher than those occurring in the future because there is an opportunity cost to spending money now and we wish to enjoy benefits now rather than in the future.
- Discounting is particularly useful in comparing interventions and outcomes with a different time profile e.g. prevention and treatment
- Choice of discount rates e.g. social opportunity cost approach, social rate of time preference, shadow price of capital, (in the UK) public sector discount rate
- Discounting future costs is uncontroversial. Discounting future benefits is controversial as health, unlike money, cannot be invested to produce future gains.
- Because of the long-time lag between investment and outcome that is often the case in prevention, public health interventions often seem to be poor value for money when a discount rate is applied.
- Sensitivity analysis should normally be applied to any economic analysis where a discount rate is used.
- Any other relevant and appropriate point will also receive credit.

0.5 mark = a clear and correct definition of this term; 0.5 mark = an appropriate example

1 additional mark (up to a maximum 2) for a relevant point clearly and correctly explained, or two relevant points briefly described, taken from one of the following:

- description of how the discount rate is calculated,
- its uses,
- and the impact on the evaluation of public health interventions.

(b)
Supply and demand

- Supply is the amount of goods or services that the market can offer. Demand is how much of a good or service is desired by consumers/purchasers.
- In a perfect market, the balance of supply and demand determines price i.e. if the supply increases and demand stays the same then the price will fall; if the demand increases and supply stays the same then the price will rise.

- Demand requires the desire to consume something plus the willingness and ability to pay for it
- Healthcare isn't a perfect market e.g. there is an imbalance in information/knowledge between provider and consumer; the supply of many components of healthcare is relatively inelastic
- Any other relevant and appropriate point will also receive credit.

0.5 mark = a clear and correct definition of these two terms; 0.5 mark = an appropriate example

1 additional mark (up to a maximum 2) for a relevant point clearly and correctly explained, or two relevant points briefly described, describing the impact that the interaction of supply and demand has on the provision of public health interventions.

(c)
Efficiency

- Resources are scarce. We want to use scarce resources to maximise the delivery of what we are trying to achieve.
- Productive efficiency can be defined as the production of goods and services with the optimal combination of inputs to produce maximum output for the minimum cost. Thus, the maximization of health outcome for a given cost, or the minimization of cost for a given outcome. Productive efficiency allows comparison of interventions which have directly comparable outcomes.
- Pareto efficiency can be defined as the point at which no-one can gain without someone else being made worse off.
- Technical efficiency can be defined as the production of most outputs from a given set of inputs, or the production of a set output from the least inputs e.g. if the maximum output that we could expect a team of staff in one operating theatre session is to carry out six operations then it is technically inefficient if they operate on only five patients. Or, alternatively, if we want to operate on seven patients then we need additional staff/theatre time etc.
- An intervention that is technically efficient may be inequitable or may not be the best way to maximise health gain.
- Allocative efficiency is concerned with the allocation and distribution of resources. Allocative efficiency is about selecting the right mix of healthcare interventions to maximise the overall gain in health for society.
- Allocative efficiency occurs when marginal benefit equals marginal cost.
- Social efficiency is the optimal distribution of resources in society, taking into account all external costs and benefits, as well as internal costs and benefits.
- Any other relevant and appropriate point will also receive credit.

0.5 mark = a clear and correct definition of this term; ½ mark = an appropriate example

1 additional mark (up to a maximum 3) for a relevant point clearly and correctly explained, or two relevant points briefly described, taken from one of the following:

- technical efficiency
- pareto efficiency
- social efficiency
- allocative efficiency
- or the impact that consideration of efficiency has on the provision of public health interventions.

Examiner Comments on how candidates performed

This question asked candidates to define and describe three core concepts in health economic analysis, with application to relevant public health interventions. Better candidates structured their answers and

demonstrated thoughtful understanding of the question posed. Some candidates illustrated their examples with graphs, and explained these correctly within their answers, helping them to score well. Several candidates failed to note that the last question was weighted more highly than the two previous sections (40% vs 30% and 30%) as there was more content to be described than in elements (a) and (b).

In what way did candidates perform particularly well?
Good answers were clearly written, well organised and showed that they had been proofread.
Nearly all candidates referenced public health in their answers.

In what way did candidates perform poorly?
Poor utilisation of basic knowledge. This was not a trick question. Very few candidates formally defined the terms used in the question or presented any sociological theory. As this was the specialty area being examined, it is surprising that more candidates did not reference the leading theorists. There were a large number of barely acceptable answers: while candidates may have "ticked some of the boxes" in their answers, there was a shocking lack of outstanding answers to a simple, straightforward question.

What were the common pitfalls in answering the question?
The most common pitfall was failing to pay attention to the question posed and using adequate insight. Few candidates used an essay plan. As an essay plan organises one's thoughts; using one would have helped candidates ensure that answers dealt with the question asked.

Pass mark: 5 marks

Question 8:

Public health specialists have a crucial role to play in the prioritisation of healthcare interventions. You are a public health specialist working in a healthcare system where there is a fixed budget. The budget allocated to cancer treatments is not sufficient to fund all the drugs that are licensed to treat cancer. Consequently, some cancer drugs are funded routinely, and some are not.

You have been asked to advise how the economic benefit from each cancer drug can be compared.

(a) Define the term 'quality adjusted life year' and describe how this is calculated. (3 marks)
(b) Using drugs to treat cancer as an example, describe how the economic concept of quality adjusted life years can be used to decide which drugs should be funded and which should not, identifying advantages and disadvantages of this approach in this context (7 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)

- Quality adjusted life years is a method used in cost effectiveness studies.
- Healthcare interventions can result in an increased life expectancy and/or an improvement (or reduction) in the quality of life. We wish to convert the benefits of healthcare interventions into a common currency which measures both the quality of life and the quantity of life, so that their benefits can be compared.
- Many healthcare interventions increase life expectancy but do not result in perfect health. For example, a patient may have continuing pain or disability.
- We assume that a year of perfect health is valued at 1, and death is valued at 0. Very poor health states can be assigned a negative value.
- If a healthcare intervention results in an additional five years of life, that are valued at 80% of perfect health, then the number of additional quality adjusted life years would be 5 x 0.8 i.e. 4 quality adjusted life years.
- If a healthcare intervention did not lead to an increase in life expectancy but did lead to an additional five years where level of health was measured at 70% of perfect health rather than 60% of perfect health, then the number of additional quality adjusted life years would be 5 x 0.1 (0.7-0.6) i.e. 0.5 quality adjusted life years.
- A number of different methods have been used to weight the utility of health status between 0 and 1. These include time trade off, standard gamble, visual analogue scales and questionnaires.
- Any other relevant and appropriate point will also receive credit.

1 mark for a definition reflecting that QALY is a concept that attempts to take account of both quality and quantity of life gained by an intervention.
1 mark for showing clearly how QALY are calculated.
1 mark for discussion of the different methods used to weight utility.

(b)
Use in prioritisation in the context of cancer treatments.

- There is usually sufficient information available from published studies to calculate the additional number of months or years of life that can be expected from treatment with a named cancer drug.

- It is much more difficult to estimate the impact on quality of life. Many cancer drugs have significant side effects, and thus at least in the short term can lead to a reduction in quality of life.
- There are few published studies of cost effectiveness of individual cancer drugs.
- Quality of life calculations are highly sensitive to subjective assumptions and thus calculations should always include a sensitivity analysis.
- The cost of treatment with each drug will be known. If a value for the number of additional quality adjusted life years can be calculated, then relatively straightforward to calculate the ratio of cost per quality adjusted life year.
- Cost per quality adjusted life years should be calculated for each cancer drug that is already funded routinely within the healthcare system and should be calculated for drugs that are not currently funded routinely, so that in a prioritisation process the new treatment is compared with current standard treatment in terms of incremental cost and benefit.
- Different cancer drugs can be compared and a decision made as to which should be funded and which should not.
- Use of cost per QALY allows comparison of cancer treatments with therapeutic interventions in other clinical areas, or of alternative means of improving outcomes from cancer e.g. smoking cessation; it provides a 'common currency'.
- Where funding policy sets a maximum acceptable cost effectiveness threshold in terms of QALY (for example, in England NICE apply a cost per QALY threshold; similar restrictions apply in other jurisdictions), new and novel drugs, or drugs for rarer conditions (including rare cancers) tend to be disadvantaged in any prioritisation process as the evidence base will be limited and the cost of treatment is usually high. This can result in patients not having funded access to new drugs unless specific mechanisms are put in place (an example of this in England is the Cancer Drugs Fund, although there are schemes in other countries with similar intent)
- Gaming is possible. Estimates of cost per QALY produced by pharmaceutical companies are often different to those produced by independent units (e.g. academic departments) and are often calculated to come within a published threshold value.
- Recognition that economic considerations are not the only factors in most prioritization processes.
- Many published studies of cancer drugs use outcome measures that are difficult or impossible to translate into additional years of life gained. For example, the use of progression free survival or event free survival rather than overall survival.
- Any other relevant and appropriate point will also receive credit.

1 mark for each relevant and correct point applied in the context of cancer drug prioritization (0.5 points for a partial explanation or a correct point that is not applied in this context), subject to a maximum of seven marks.

Examiner Comments on how candidates performed

This question asked candidates about a key health economic measure. This proved to be the hardest (least well answered) question in this paper, despite the topic being central to public health practice. Whilst most candidates could describe how the measure was calculated, far fewer could describe its use in practice, specifically linked to the area specified in the question.

<u>In what way did candidates perform particularly well?</u>
No candidate badly misinterpreted the question.
Nearly all candidates had some understanding of how QALYs are calculated. Candidates answered less well in (b) where they asked for practical application of this technique.

In what way did candidates perform poorly?
Some candidates did not illustrate their answers using cancer drugs, despite this being explicitly asked for in the question.
A few candidates repeated information in both parts of the question.

Pass mark: 5.5 marks

E: Organisation and Management of Health Care, and Health Care Programmes

Question 9:

For each of the following, give a brief description of what it is, why it is relevant to public health, its strengths and limitations, and an example of its use in a public health setting:

(a) Weighted capitation (5 marks)
(b) Programme budgeting (5 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)
Description: the assignment of financial resources to a population based on the population size (capitation) with adjustments for specified needs (age, sex, or other needs-related measures).

Its strengths lie in the ability to better match resources to the needs of a population (and promote equity). It does not encourage supplier induced demand (helpful if compared with fee for service) and administrative burden is low.
Weighted capitation encourages prevention, because spending on prevention might mean people need less healthcare and thus it reduces spend per person

Limitations include uncertainty over definitions of equity and need, extent to which resource allocation can address differences in need, and ability of any formula to capture all aspects of need for all sub-populations of interest. It might lead to under-provision, waiting times and rationing.

Possible answer on relevance: It is relevant to public health because in some jurisdictions it is used to determine health budgets, including public health budgets, and thus determines the resources available for public health activity. An example needs to give enough detail that an examiner outside of their healthcare system could award it marks, e.g. if answers state it is a method for allocating national funds to GPs in England, then in order to award that answer a mark, it needs to include that a set amount is given based on the size of a general practice's registered population, weighted for need, e.g. more older people, worse health and higher levels of deprivation. It might also take account of other area characteristics such as remoteness.

Any other relevant and appropriate point will also receive credit.

Award 1 mark each for description, strengths and limitations and 2 marks for PH relevance (an example would be awarded one mark within relevance).
Candidates may vary in where they cover certain characteristics between the definition, strength or relevance so they don't need to structure their answer in these subheadings to be awarded the marks.

(b)
Description: *[note for examiners: there is no consensus in the literature about what this term means and it appears it is applied in different ways internationally than how the English NHS use it.] To get a mark for description, ensure the answer includes:* Programme budgeting considers how a budget is or should be spent across programmes and takes into account the objectives/goals and outcomes achieved. It gives details of all the activities that take place within a given budget

Strengths**:** This allows clarity on the priority of individual programmes/areas of work/projects and assists their planning and delivery, allowing identification of areas within programmes requiring additional funding. It is important to public health because it reduces lots of detail into a single document and makes oversight and planning of individual programmes/groups of activities easier.

Limitations: However, it may be more resource intensive to provide as it has higher information requirements and may fail to recognise synergies across programmes. Other possible weaknesses that would obtain marks:

- Lack of data, or data contested on costs and/or outcomes, particularly with long time horizons (e.g. public health interventions)
- Cost-(effectiveness) is only one consideration for whether a service should continue to be funded (or not)

Possible answer on relevance: Any reasonable answer (e.g. including resource allocation across priorities, etc) will accrue marks. For example, programme budgeting supports resource allocation across programmes of work that meet local needs, including with regard to health prevention, and in some jurisdictions, programme budgeting is used to allocate public health budgets in terms of areas of activity. Answers can vary across jurisdictions and should link with the definition of programme budgeting given.

Any other relevant and appropriate point will also receive credit.

Award 1 mark each for description, strengths and limitations and 2 marks for PH relevance (an example would be awarded one mark within relevance).
Candidates may vary in where they cover certain characteristics between the definition, strength or relevance so they don't need to structure their answer in these subheadings to be awarded the marks.

Examiner Comments on how candidates performed

Demonstrating application of principles and theories led to higher marks. Candidates are reminded to answer questions fully, e.g. if three points are requested, three points should be provided for full marks.

In what way did candidates perform particularly well?
Some candidates referred to other budgeting approaches to draw out the advantages and disadvantages of the one being asked about. Examples often came across as particularly convincing when they related to examples from the candidates' own practice or examples in the literature.

In what way did candidates perform poorly?
Candidates lost marks in some cases because they did not give a full explanation of the budgetary approach asked about (e.g., for weighted capitation not mentioning it is based on size of the population and weighted for measures of population need). Some made generic comments about resource limitations or fairness, without showing how these related directly to what had been asked, and these comments received no marks.

What were the common pitfalls in answering the question*?*
Pitfalls were not giving a full answer, not answering all the elements (definition, PH relevance, pros, cons, example).

Pass mark: 5.5 marks

Question 10:

Conflict within organisations can take several forms.

(a) Name four forms of conflict that might arise within a healthcare organisation and, for each, describe the circumstances in which it might arise (4 marks)
(b) Name three potential effects of conflict on a healthcare team and, for each, briefly describe how this could impact quality of care (3 marks)
(c) Describe two approaches to resolving conflict in health or social care teams. For each approach, identify one strength and one weakness (3 marks)

(Total 10 marks)

Key Points and Mark Scheme

(a)
Relevant forms of conflict include, but are not limited to:

- Task-based conflict, such as differing ideas about how to perform a work-related task or make a work-related decision. This might arise in a healthcare setting when there is no consensus (from evidence) on the most effective way to perform a procedure
- Relationship/Interpersonal conflict: this type of personal conflict develops over disagreements and differences between individuals or groups with conflict over personal issues and not work-related. Personality differences might become problematic in urgent or pressurised situations such as emergency care
- Value-based conflict: when an employee or team values don't align with the job itself or the values of the company. This might arise in healthcare when work cultures or ethical frameworks differ between professional groups
- Resource-based conflict: conflict arising from competition for resources between groups (such as departments) or individuals – more likely to arise when resources, whether financial or otherwise, are stretched or cuts need to be made due to limited healthcare budgets

Marks: 0.5 mark for each form of conflict - these may differ from those listed but should be distinct from each other - and 0.5 mark for description of circumstances relevant to healthcare settings

(b)
Potential answers include:

- Impact on staff mental health, which could mean staff lack the personal resources to ensure patient or population health needs are met
- Increased levels of staff sickness (or turnover): lower staffing levels, or reliance on locums, is associated with reduced quality of provision
- Breakdowns in communication between staff could mean that important information about patients is not passed on or delay provision of care
- Arguments or disagreements between staff members in front of patients could impact patient wellbeing
- Leadership and management resources might be directed towards resolving conflict rather than to ensuring effective and efficient delivery of care

Marks: 0.5 mark for each relevant consequence of conflict and 0.5 marks for how it affects care. Answers describing beneficial effects of conflict are also acceptable

(c)

Possible answers might use a theoretical framework such as the Thomas-Kilmann Conflict Model (there are various others that would also work): avoiding, accommodating, compromising, competing, and collaborating. If this model was used, answers could include (note that only two are asked for):

- Avoiding – a passive approach that involves not addressing the conflict but letting it run its course. A strength is that it means you don't spend energy on trivial issues; a weakness is that it attempts to bury the conflict with the risk that, unresolved, it escalates
- Accommodating - one side gives ground, and (like avoiding) this may be worth doing if the conflict is waste of time or energy; a weakness is that one side must be willing to give in, which may be harmful (see *Chamberlain, Neville*)
- Competing - one side asserts superiority and uses power, of one form or another, to get its own way. A strength is that conflicts can often be dealt with quickly by this method; weaknesses are that it may create longer-term resentments or entrench existing power differences.
- Any other relevant and appropriate point will also receive credit.

Marks should also be given for answers that take a more practical approach. An example would be:

- Team building away-days, in which team members work on practical problems together in a novel setting. A strength of this is that interpersonal connections and trust can be developed; a weakness is that such events can be expensive and may be seen as a poor use of money

Marks: 0.5 mark for an appropriate approach, 0.5 mark each for a relevant strength and weakness.

Examiner Comments on how candidates performed

Demonstrating application of principles and theories led to higher marks. Candidates are reminded to answer questions fully, e.g. if three points are requested, three points should be provided for full marks.

<u>In what way did candidates perform particularly well?</u>
Candidates who based answers around theoretical frameworks or models did well. For example, those who were able to frame their answer to 10(a) ("name four forms of conflict") in terms of intrapersonal – interpersonal – intragroup – intergroup conflict tended to score well – not because this is the only correct answer but because having a model in mind makes structuring the answer easier.

In 10(b), the best answers included a logical description of the potential effects of conflict on a workplace, its effects on how individuals might feel and how it might affect their actions and gave tangible instances of aspects of care that could be affected.

<u>In what way did candidates perform poorly?</u>
In 10(b) some candidates did not make clear how conflict could affect the health care team and in turn quality of care – i.e. in what ways conflict could affect team working, and/or what aspects of quality (i.e. safety, effectiveness, efficiency, patient experience) could be affected. For example, saying "conflict can lead to poor communication, and this can affect quality of care" was insufficient to attract a good mark.

<u>What were the common pitfalls in answering the question?</u>
A few candidates did not give the required number of items – for example, 10(a) said "name four forms of conflict" and some gave only three. The same applies to (b) and (c).

In 10(a) some candidates described situations in which conflict might occur but did not refer to the form of conflict, which is what was asked for. For example, saying only ""high levels of workplace stress may lead to conflict" would not gain any marks.

Pass mark: 6 marks