



Faculty of Public Health

of the Royal Colleges of Physicians of the United Kingdom

Working to improve the public's health

FPH Part A Examination

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**EXAMINATION QUESTIONS WITH KEY POINTS AND
EXAMINERS' COMMENTS**

N.B. Please note that these are key points, not model answers

Question 1

Consider each of the following pairs of terms. Briefly describe the difference between the terms in each pair using examples to illustrate how each can be used to inform public health practice.

- a) Prevalence study and incidence study. (30% of marks)
- b) Direct age-standardisation and indirect age-standardisation. (40% of marks)
- c) Focus groups and face-to-face individual qualitative interviews. (30% of marks)

Keypoints

Most or all of the following would be required for a pass:

- 1) Prevalence and incidence studies provide information on the burden of disease in a population.
Prevalence studies are designed to estimate the number of people with a particular disease in the whole population or representative population sample. They are cross-sectional in design. They may provide information on prevalence of disease in different groups in the population. Examples of the usefulness of such studies include planning the volume of services for chronic or relapsing diseases such as stroke or asthma or to tell us how many people exhibit lifestyle behaviours in different groups in the population to inform targeting of services.

Incidence studies are designed to estimate the number of new cases of disease occurring in the whole population or a representative sample over a given period of time. Therefore the population is followed up over time and the studies are longitudinal. They may provide information on the disease incidence in different groups in the population. These studies may help us plan the volume of services for acute diseases such as number of clinics needed for assessment of transient ischaemic attack (TIA); evaluation of success of lifestyle interventions through how many people are modifying their lifestyle e.g. stopping smoking.

- 2) Age-standardisation allows comparison of burden of disease between different populations by taking into account the differences in age structures of the populations. The choice of method is dependent on the frequency of disease within age-strata and the availability of data. In the direct method the age-specific rates of disease in the populations under study are applied to the age-strata of a standard population. A 'modelled' age-standardised disease rate for the study population is estimated, for example, European age-standardised incidence rate. In direct methods, if the same standard population is used, directly age-standardised rates can be directly compared. This method is not suitable when there are a number of age-strata with no or few cases, as age-specific rates will be unstable. In public health, this method can be used to examine secular trends in regional/ national/international disease rates and monitor disease control methods or identify emerging problems.

In the indirect method the age-specific rates in the standard population are applied to age-strata in the study population producing an expected number of cases which can be compared with the observed number to produce a ratio e.g. standardised mortality ratio. In indirect methods, even when the same standard population is used, standardised disease ratios for different study populations cannot be directly compared unless the same standard population has been used in the calculations for the different populations. This method is useful when information on age-specific rates in study populations is not available or when there are a number of age-strata in the study population with few or no cases. In public health, this method could be used to assess the disease burden of a locality by comparison with the larger administrative area or assess service quality by comparing in-hospital surgical mortality of a hospital with that observed for all hospitals in an area.

- 3) Both are qualitative research methods. Focus groups are undertaken with a number of participants at the same time, usually 4 to 10 with a moderator facilitating the discussion. They are particularly useful in understanding cultural norms and gaining consensus views. They can be useful for exploring sensitive topics. Examples of their use in public health include eliciting insights for developing a social marketing campaign, gaining service users' views of a service, health needs assessment, health impact assessment.

Face to face qualitative individual interviews are usually conducted with one participant at a time. This method may be better at investigating issues in depth and also in eliciting a wider range of opinions or responses than focus groups, in which some participants may acquiesce to more dominant members. Examples of use in public health practice include eliciting lived experiences to inform service developments; understanding barriers to lifestyle changes; exploring how interventions are perceived/enacted by participants

In all parts of this question, credit will be given for highlighting other relevant points.

The following are additional points which might improve the answer to "good" or "excellent"

- 1) Incidence studies can be used to investigate the association between risk factors and disease in different exposure groups – cohort studies. In general, information from cross-sectional studies of disease prevalence are not useful for this purpose as exposure is measured at the same time as disease and those with longer duration of disease will be over-represented in the sample.
- 2) The use of a different standard population will alter the estimated directly age-standardised rate for a study population and the ratio between two directly age-standardised rates.
- 3) In focus groups the interaction between participants is a key aspect and notes of these interactions should be taken by an observer and incorporated into the analysis and interpretation of the data.
- 4) Both focus group and individual qualitative interviews might base questions on topic guides – which structure the interview loosely allowing a range of material to be explored. Questioning styles should always 'open', and are therefore different to the closed style of questioning generally adopted in quantitative survey research. Qualitative interviews often start with a narrative section which is led by the interviewee followed by prompt based questions posed by the interviewer.

Examiner comments

The majority of candidates provided an adequate overall answer to this question but few did really well. Most candidates were able to provide an adequate description of the differences between focus groups and face to face individual qualitative interviews and most understood the difference between indirect and direct standardisation. Those candidates who did well were able to relate the terms to public health practice rather than just giving examples.

Those candidates who did less well on this question tended in part (a) to focus on defining incidence and prevalence and relatively few described the differences between prevalence and incidence studies. Several candidates mentioned ecological study as an example of prevalence study. In part (b) the use in public health practice of direct standardisation and of indirect standardisation were not well explained, particularly relating to direct standardisation and internationalisation and indirect standardisation and small areas. In part (c) the occasional candidate confused qualitative interviews with questionnaires.

In general candidates who did less well often did not focus on answering the specific question asked. There were two common pitfalls: first, candidates failed to provide practical examples of how the information can be used to inform public health practice; second, candidates did not outline the differences between the terms which tended to lead to answers with very detailed information about the terms themselves but which failed to deal with the differences.

Question 2

A recently published cohort study found that the relative risk of acute myocardial infarction in blood donors compared to non-donors was 0.14 (95% confidence interval 0.02 to 0.97; $p=0.047$).

- a) With reference to cohort studies, define what is meant by the term 'Person-time'.
(20% of marks)
- b) When reporting the results of epidemiological studies, why are confidence intervals preferred to p-values?
(30% of marks)
- c) Interpret the values given above for the relative risk, the 95% confidence interval and the p-value.
(50% of marks)

Keypoints

Most or all of the following would be required for a pass:

- a) Person-time: A measurement combining (i.e. adding) persons and follow-up time as the denominator in the calculation of incidence/mortality rates when individual subjects are at risk of developing disease for varying time periods (i.e. a disease(s) of interest) or dying. It is the sum of the periods of time at risk for each of the subject. The most widely used measure is *person-years at risk*. In this approach, one subject observed over 1 year contributes 1 person-year; one subject observed for over a 10-year period contributes 10 person-years (i.e. a period over which that subject has been observed to be at risk of the disease).
- b) CIs are preferable to p-values as they provide the range of possible effect sizes around the measure of impact (incidence/prevalence) or association (RR, OR) where there is a 95% probability that the true value of impact/association lies. P-values just provide a cut-off level beyond which the findings are considered to be 'statistically significant' – i.e. $p < 0.05$ or $p < 0.01$ ie are unlikely to have occurred by chance. By definition a 95% confidence interval that excludes 1, is statistically significant at $p < 0.05$.
- c) Interpret the actual values given for the relative risk, confidence interval and p-value

RR - Blood donors had 86% lower risk of MI. RR of < 1 suggests a protective effect or negative association.

CI indicates with 95% certainty that true value of the RR lies between 0.02 and 0.97 i.e. the data are consistent with both high level of protective effect (or negative association) and almost no protection (or no association).

CI does not include the null value of 1, so the data are not consistent with no association or a positive association.

By definition, the p-value is consistent with CI – just significant at conventional cut-off level of 5% that is, the result is unlikely to have occurred by chance.

Wide CI – suggest relatively small study (sample) size and/or shorter duration of follow-up, i.e. the study had a low power (or was not adequately powered).

Examiner comments

The majority of candidates provided an adequate answer to this question; few did very badly but very few did very well. Most candidates were able to provide a description of person time/person-years at risk and many demonstrated an adequate understanding of confidence intervals and p-values.

Candidates who did well were able to discuss the implications of the additional information provided by confidence intervals. Many candidates could provide an interpretation of the data in the question, but those who did very well were able to go on to discuss the possible implications of the observed data for practice/research.

For candidates who did less well, while able to provide a description of person-time/person-time at risk, answers demonstrated that these candidates had little understanding of the underlying concepts including how they person-time is calculated. About half of the candidates failed to mention that the observed relative risk implied a protective/negative association. Some candidates appeared to interpret the data as risk difference rather than relative risk. A number of candidates just rephrased or repeated the information given in the question and did not interpret the data or discuss the implications. It was also clear that some candidates were confused about the definition of terms, for example, confidential and sensitive, confidence interval and confidence limits, effect size and range of effect sizes.

Question 3

With reference to the criteria for population-based screening, write short notes on the natural history and risk factors for abdominal aortic aneurysm.

Keypoints

Most or all of the following would be required for a pass:

- Structured answer based on Principles of Screening (eg. Wilson & Junger 1968)
- Natural history. Example headings might include: incidence and mortality
- Natural history, tests available, diagnostic test, treatments for screen detected disease, evidence of effectiveness of screening.

Screening:

- Specific examination of well individuals to identify an existing illness at a pre-symptomatic stage or to identify susceptibility to a specific disease.

Importance of problem:

- Around 1 in 25 men aged between 65 and 74 in the UK have an abdominal aortic aneurysm. Men are at six times greater risk than women. Risk factors include smoking, hypertension and family history.

Natural history in relation to screening:

- Most abdominal aortic aneurysms (AAA) are symptom free. Over time they can increase in size with an increased risk of rupture. Large aneurysms can be detected by ultrasound screening.
- If an abdominal aortic aneurysm ruptures it is a surgical emergency as it can lead to serious blood loss. The death rate after rupture is about 80 per cent because many patients die before they reach hospital.
- The aim of the screening programme is to detect and treat large abdominal aortic aneurysms early in order to reduce the number of deaths from rupture.
- In the UK it is estimated that for every 200 men screened by the NHS AAA Screening Programme, eight will have an aneurysm, but only one will have a large aneurysm that may require treatment.
- The greater risk of developing an AAA for older men compared with women is one element which led to the decision to implement a screening programme in the UK for only men 65yrs and over.

Effectiveness of treatment:

- Small aneurysms may be kept under surveillance and advice given to stopping smoking, eat a balanced diet, ensuring their weight is at a normal level and take regular exercise.
- Almost all large abdominal aortic aneurysms can be treated through surgery if they are detected early. The vascular surgeon will discuss treatments options once an aneurysm has been diagnosed. Generally there are two types of treatment available:
 - Most aneurysms are treated by an operation in which the aneurysm is replaced with an artificial artery made of a very strong plastic. This 'artificial artery' should last for the rest of the man's life and will protect the aorta against possible rupture
 - Some aneurysms are suitable for a form of keyhole surgery called Endovascular Aneurysm Repair (EVAR). This involves threading thin tubes through the arteries from the groin, until they reach the aorta. The tubes are used to carry stents to the site of the aneurysm. A stent is a special type of tube which expands to line the inside of the aorta and protect against possible rupture.

The following are additional points which might improve the answer to "good" or "excellent"

- Operative mortality figures
- Implications for insurance and driving
- Psychological implications of having an aneurysm detected

Examiner comments

This was a generally well answered question overall. Candidates had a generally sound knowledge of the criteria for population based screening although many lacked knowledge about its application to abdominal aortic aneurysm screening.

Candidates who provided excellent answers applied the criteria for screening systematically to the elements of the programme for screening of abdominal aortic aneurysm. Candidates who scored well gave well-structured and easily legible answers.

For candidates who did less well the main consistent error was providing what were often good answers but without sufficient practical detail. For example the question was often answered in theoretical terms and with great detail regarding Wilson and Junger but without much consideration of practical implementation to AAA screening.

Question 4

Describe the epidemiology and control measures for the following diseases in a named country:

- a) Verocytotoxin-producing *Escherichia coli* (VTEC) also known as Shiga toxin-producing *Escherichia coli* (STEC) (50% of marks)
- b) Human papillomavirus. (50% of marks)

Keypoints

The following are additional points which might improve the answer to "good" or "excellent"

a) E.coli O157

Most or all of the following would be required for a pass:

Epidemiology

- Most common serotype in UK is E.coli O157
- Disease is a zoonosis . Principal reservoir is cattle , also found in other animals e.g. sheep, goats.
- Infection can be acquired in the following ways :
 - o Consumption of contaminated food from infected animals e.g. undercooked beef dishes , unpasteurised milk or milk products
 - o Consumption of herbs, salad or fruit contaminated by faeces from cattle or irrigation water or use of organic fertilisers
 - o Consumption of ready to eat foods e.g. cooked meats that has been contaminated by cross contamination from raw meat or by a food handler
 - o Consumption of contaminated water from for example private water supplies
 - o Direct contact with infected animals or their faeces e.g. visiting open farms
 - o Exposure to water in ponds , rivers etc that has been contaminated by faeces from local wildlife or run off from fields
 - o Secondary transmission can occur directly from person to person e.g. in nurseries, residential care homes
- Symptoms range from mild to severe bloody diarrhoea. Can lead to two severe illnesses with associated mortality - haemolytic uraemic syndrome and thrombotic thrombocytopenic purpura (TTP). The illness is caused by production of toxins by the organism.
- Is a rare cause of gastro-intestinal illness. Most cases are sporadic. Several high profile outbreaks –eg. outbreak in Germany in 2011.

Control

- In England and Wales HUS and infectious bloody diarrhoea are notifiable diseases
- Prevention of human to human transmission by advising case /carer of standard enteric precautions ; screening and exclusion of cases and contacts in risk groups for transmission (ie food handlers, children in nurseries,clinical and social care staff , people with doubtful hygiene)
- Microbiological clearance is required for those cases and contacts in risk groups
- Controls in place in butchers , shops,restaurants etc to ensure that raw beef products do not come into contact with cooked products
- Open farms – controls in place to prevent contamination of parts of farm open to public; hand washing facilities ; advice on hygiene for public ; supervision of young children

b) HPV

- Is a DNA virus. Of over 100 types of HPV about 40 infect the genital tract and are sexually acquired.
- Some HPV types cause cancer and are called "high risk " others are called "low risk "
- HPV infections are extremely common in the sexually active population particularly in the first few years after commencement of sexual intercourse.

- Infection is transient and mainly asymptomatic. 90% resolve spontaneously within 2 years.
- Cervical cancer is caused by persistent HPV infection . Over 70% of cervical cancers in UK are caused by HPV types 16 and 18. Time from infection to invasive cervical cancer is approximately 15 years
- HPV infection is also associated with cancers of the penis, vulva,vagina , anus, mouth and oro-pharynx
- Warts are most common viral sexually transmitted infection in UK – highest rates in young men and women. Low risk HPV types 6 and 11 cause most genital warts.

Control

- Cervical screening detects pre-cancerous changes and cervical cancers at an early stage when they can be treated and prevent progression. Screening programme in place in UK for many years – screens 25 - 64 every 5 years. Now moving towards HPV triage and testing
- HPV vaccine – in UK all 12 – 13 year old girls are offered HPV vaccination in schools. This programme currently uses Cervarix which protects against HPV types 16 and 18. Another vaccine is available – Gardasil which in addition protects against genital warts.
- Condoms may reduce the risk of HPV infection but are not completely protective

The following are additional points which might improve the answer to "good" or "excellent"

a) Reference to high profile E coli VTEC outbreaks

b) Any sexual contact and not just intercourse can spread HPV infection

Recent switch to Gardasil from Cervarix in UK

Possible impact of HPV vaccination on the need for cervical screening programmes

Examiner comments

This was a generally well answered question although overall candidates gave better answers to the section on E coli O157 than the HPV part.

Excellent answers tended to be well structured and to demonstrate for part (a) good knowledge about E coli O157 and knowledge of high profile outbreaks, and for part (b) up-to-date knowledge of the HPV vaccination programme and its future implications for cervical screening. Candidates who scored well provided well-structured and easily legible answers.

Candidates who did less well demonstrated a poor level of knowledge of HPV infection; features of the virus; the existence of high and low risk serotypes; and the natural history of the infection.

Question 5

Describe the practical aspects of the different ways of protecting the confidentiality of personal information:

a) collected on participants in a questionnaire based survey. (50% of marks)

and

b) in a record linkage study, in which there will be no contact made with the individuals whose data will be linked. (50% of marks)

Keypoints

Most or all of the following would be required for a pass:

Many of the aspects of security are common across these two types of data handling.

1. Physical; Security of data – hard copies of data kept in secure areas,
2. Computer held data kept on encrypted machines with password access only, any data transfers governed by strict information governance procedures including consideration of not using laptops, using encrypted data sticks etc.
3. Define who has access to the physical and electronic data and what level of access they have – different staff are likely to have different levels of access.
4. Ensure that any staff involved have had suitable training and have signed appropriate declarations.
5. Proper ethical approval and governance should be in place before starting

Survey data

1. Administration of survey: If this is a postal survey, use of registered or protected mail for transmitting forms in both ways. If collected using IT, ensuring properly password protected and encrypted data are collected and if sent over internet, secure systems are used.
2. Minimise the need for confidential data, in particular through avoiding collection of personal identifiers including postcode e.g. don't collect names unless needed. This must be balanced against the purpose and use and thus value of the data collected.
3. Once survey data are in the office then if the surveys include personal data (names and addresses etc) then these should be physically separated from the rest of the data and stored separately – ideally this would be considered at the design stage of the form with easy tear off pages, or consideration of whether it is actually necessary to collect these personal data at all (as noted in 2).
4. Electronic handling of survey data should certainly separate any personal data from the rest of the data in separate although linkable databases – if there is ever going to be a need to link the two sets of data together and if there is not then consider why you are keeping the personal data.
5. Use of identifying numbers to enable checking back between the physical and electronic data.
6. If postcode is being used for generation of an area-based measure of deprivation generate that early and then remove postcode from the dataset. Similarly use of dates to generate age etc – do this early and generate age which is less identifiable than a date of birth.

Record linkage data

1. Governance considerations will need to include consideration of the fact that these data will almost certainly be linked without the consent of the individuals involved. So rights and approvals for access will need to be sought, for example approval by NIGB in England under section 251 of the Health and Social Care Act, or other relevant governance bodies.
2. Consider aggregating identifiable data and removing identifiers prior to analysis.
3. Consider anonymisation techniques such as Soundex codes prior to analysis.
4. Specific consideration of the potential to breach confidentiality resulting from bringing together more than one dataset which makes data identifiable or even more identifiable than in the original datasets.

The following are additional points which might improve the answer to "good" or "excellent"

A good example with clear understanding of the survey/study described

Ideally physical storage of survey forms by number rather than alphabetically to make finding information about a specific individual difficult.

In the publication and reporting of data ensure that deductive identification cannot occur especially when small numbers are involved – for example consult ONS guidance regarding suppression of small number reporting and use your common sense

Examiner comments

Most candidates provided adequate answers to this question but very few covered all the key points. Candidates who provided better answers provided details of the security issues which were common to both sources of data and then well-structured answers giving specific details for the two different data sources and their implications.

A small proportion of candidates did not appear to have knowledge of any key pieces of guidance on the topic of data protection and confidentiality. Those candidates who provided poorer answers tended to fail to mention even basic approaches to security such as locking storage facilities, using encryption etc. Very few candidates mentioned the additional risk posed by linkage of data and indeed some candidates demonstrated their lack of understanding about data linkage by making inaccurate statements about consent. Others provided too much explanation about the process of record linkage whilst failing to concentrate on the issues of protecting confidentiality and failing to recognise the additional risk of identification posed by linking records. A number of candidates answered the question from the perspective of a question on research methods or questionnaire design rather than a question about information governance.

Question 6

A local government authority administers a major city (population 500,000) which has a declining population of mixed ethnic composition, and has major social problems in some areas. The authority is proposing to carry out sample surveys of its population at four and seven years after the last national ten year census. A major aim is to update the national census information and to correct for suspected under-reporting at the last census. Outline the specific advice you would give on the following:

- a) The aspects that you would need to consider when choosing questions to update census information and to support policy development with respect to health. (30% of marks)
- b) The sampling strategy, bearing in mind that resources will only be available to cover a 5% sample and very limited field worker support. (30% of marks)
- c) Methods to maximise the response to the survey. (40% of marks)

Keypoints

Most or all of the following would be required for a pass:

- a) Aspects to consider when choosing questions:
- Comparability with national census - questions should cover similar areas and ideally to meet the major aim census questions used in this survey must be worded identically to allow comparison over time
 - Is it an individual level questionnaire or a household level? May influence reliability of responses for different aspects of questionnaire particularly in relation to health if the head of household is completing on behalf of others
 - Order of questions is important – early questions can bias later ones
 - Questions must be able to be translated into relevant other languages without altering meaning
 - Consider convening multi-agency group for development and selection of questions relating to health policy
- b) Sampling strategy:
- 5% sample = 25,000 – still a lot of questionnaires
 - Could consider household level survey rather than individual level
 - Need to identify a suitable sampling frame and a method of randomly selecting individuals/households
 - Need to consider the appropriate sampling units (individual/household) to ensure that survey is representative
 - Mode of delivery impacts on sampling e.g. written questionnaires may not illicit a response from people with poor literacy skills, telephone questionnaires will miss people without telephones. If aim is to 'mimic' the census then should consider using same methods as census.
 - Sample size calculations may not help if sample size is ultimately constrained by resources
 - Consider specific groups such as students that might be underrepresented
 - Might consider oversampling of groups of importance in the population who are nevertheless relatively small in number or are more likely to have a poor response. (See aim above in the question)
- c) Maximising response:
- Personalised covering letter/email conveying the reasons for the survey and its value
 - Clear statements of confidentiality
 - Use simple language, short sentences etc.
 - Use appropriately timed reminders
 - Consider use of telephone and web based administration of survey – but may introduce biases
 - Keep survey as short as possible
 - Clear layout and careful design of questionnaire

- Involve potential respondents and pilot the questionnaire
- Ensure adequate training for field workers
- Ensure that written materials are available in appropriate languages
- Offer help to specific groups (e.g. elderly, blind, poor literacy skills)
- Review response from census and target groups with known poor response
- Other techniques such as incentives would not be appropriate in this context

The following are additional points which might improve the answer to "good" or "excellent"

- A well-structured answer that reflects the aim of the survey and the multi-agency nature of the policy response.
- Consider use of standardised instruments for aspects of data collection (SF-36, EQ5D etc)
- Could consider more complex sampling approaches, specifically weighted sampling or cluster sampling. Care required to ensure that overall sample is representative; down side of weighted sampling is the increased complexity of the analysis

Examiner comments

This was a question that should have been straightforward with high mark possible. However, while most candidates provided adequate answers very few covered all the key points.

Candidates who provided better answers demonstrated a reasonable understanding of the approaches that could be used for increasing survey response rates. In contrast few candidates appeared to understand the importance of comparability between the census and the proposed survey. A number of candidates demonstrated a poor understanding of sampling methodology and, in particular, confused qualitative and quantitative methods; a few candidates made simple mathematical errors in calculating the number of surveys in a 5% sample of 500,000. Some candidates saw this as an opportunity to write all they knew about the census without actually answering the question. Many candidates also just provided a long list of possible variables without further comment. Again attention to the details of the question actually asked was key to achieving a good mark on this question.

Paper IB

Question 7

What is 'social norms' theory? (20% of marks)

How can 'social norms' theory be used to influence health behaviour? Illustrate your answer using two contrasting public health examples.

(80% of marks)

Keypoints

Most or all of the following would be required for a pass:

What is 'social norms' theory:

A description of social norms theory that makes reference to: (a) individuals try to match their behaviour to what they consider as group norms; (b) these group norms are based on their perceptions of their peers behaviour; and (c) generally there is a dissonance between their perceptions and the actual behaviour

Use of 'social norms' theory to influence health behaviour:

Basis for using social norms theory in influencing health behaviour is that individuals perceive their peers to behave in a less healthy and socially responsible manner than their actual behaviour and if this dissonance is communicated to individuals, they will adopt a more healthier lifestyle.

At least four out of six of the following stages in using social norms theory to influence behaviour change

1. Preparation that involves identifying a health issue, target population, reference group and involving stakeholders
2. Baseline data collection of a reference population involving designing a data collection tool and having a sampling strategy
3. Analysing baseline data and highlighting dissonance between perceived and actual behaviour
4. Intervention phase: designing communicating tools and disseminating information based on baseline data
5. Follow up: a post-intervention data collection
6. Evaluation: assessing a change in behaviour

Any of the following ways to illustrate answers with two contrasting examples is acceptable

- Use of social norms approach to influence two contrasting behaviours e.g. alcohol related behaviour, sexual behaviour in young people, smoking
- Use of two different settings to address a particular health behaviour e.g. schools (or six form colleges) to influence health behaviours in young people, work places, other community settings
- Use of descriptive and injunctive social norms
- Use of paper based data collection and traditional methods of dissemination e.g. collecting information in a school lesson and getting young people to design communication tools or using web based tools to collect data and communicate information via web e.g. social network sites, UNITCHECK etc.

The following are additional points which might improve the answer to "good" or "excellent"

At least one example from literature which gave rise to using social norms approach in influencing health behaviour e.g. study in USA college system about their peers alcohol-related behaviour.

Explaining that using social norms theory to change behaviour neither relies on communicating hazards associated with poor health behaviour nor directing people towards a healthy behaviour.

Social norms approach to behaviour change often involve communities taking part in data collection and designing communication messages

Explanation of different ways of communicating social norms messages in target communities e.g. use of social marketing.

Explanation of the differences between injunctive and descriptive social norms

Examiner comments

The vast majority of answers to this question fell short of what was required and on the whole candidates did not demonstrate additional reading or acknowledge theories.

Most candidates were aware of the role of social norms in health behaviours, and were able to present the two examples asked for by the question, however most answers were superficial. Candidates who did write about behaviour change, in most cases could not articulate the distinction between social norm and other theories. A number of candidates wrote about the negative influences of social norms on health, which was not the focus of the question. Some of the examples were not relevant to social norms and were more related to stigma. Very few candidates were able to give appropriate examples of using social norms theory in influencing behaviour change by showing how to correct misconceptions about the prevalence of particular behaviours.

Question 8

How are cost-effectiveness thresholds used in a publicly funded health service?
(70% of marks)

What are the circumstances where it might be justifiable to cross these thresholds?
(30% of marks)

Keypoints

Most or all of the following would be required for a pass:

How are cost-effectiveness thresholds used in a publically funded health service?

Concept of scarcity, demand for health care will always exceed supply.

Resource allocation - a practice used to deploy finite resources.

Economic evaluation is the comparative analysis of costs and expenses between alternatives.

Economic evaluation used to improve efficiency in the context of a finitely funded health service.

Several types of economic analysis exist e.g. cost minimisation, cost effectiveness analysis, cost-utility analysis, cost of benefit analysis; there are pros and cons of each.

Cost utility and cost benefit analysis allow interventions with quite different outcomes to be compared with one another using the same scale.

In a publicly funded health service cost utility analysis is often used.

By using for example QALYs to measure benefits, alternative interventions with different outcomes can be compared.

Thresholds may be set by a health service above which it will not fund an intervention e.g. UK National Institute of Health & Clinical Excellence set an upper limit of £30,000 per QALY.

What are the circumstances where it might be justifiable to cross these thresholds?

Conflict between equity and efficiency;

Efficiency is about getting the greatest benefit achievable for a population from a finite budget.

Equitable distribution of resources means that they are distributed fairly within a population.

Overall improvement in a population health may hide some of the inequities within the population. Therefore some population groups may be hard to reach and therefore require extra resources. This may increase the cost utility ratios.

Other examples include the particular features of the condition and population receiving the technology e.g. expensive treatment for a rare genetic/metabolic disorder that maybe valued more highly than estimated in the cost utility analysis.

The following are additional points which might improve the answer to "good" or "excellent"

Other ways cost-effectiveness thresholds are used in a publically funded health service?

Use ranking tables with different interventions and their incremental cost utilising ratio e.g. cost per QALY.

Lower the cost per QALY the higher the priority.

Favouring measures below a certain cost per QALY is a means of improving allocative efficiency.

Other factors that may influence the decision to cross a threshold include:

The degree of uncertainty surrounding the cost-utilising ratio (and it not being significantly different to the threshold value)

The innovative nature of the technology.

Where there are wider benefits to society that haven't been considered in the analysis.

Examiner comments

Most answers to this question were satisfactory. Most candidates were aware of the need for health economic evaluation. The majority of candidates understood the need to apply health economics in a public funded health care system and had a good working knowledge of situation where thresholds would be breached.

However, there was a general inability to apply health economics principles to decision making in health care. Candidates who performed poorly demonstrated general confusion about health economics and its application in making funding decisions, and an inability to articulate the trade-off between equity and efficiency

Question 9

You have been asked to lead the implementation of a local strategy to reduce the prevalence of obesity in a population of 150,000. Outline the approach you would take in a named country.

Keypoints

Most or all of the following would be required for a pass:

The major headings are major key points; the points decrease in order of importance according to the degree of indent.

- Familiarise yourself with the key action points of the strategy
 - Talk with the author(s) of the strategy
 - Talk with the sponsors of the project and be clear about their expectations
 - Analyse the political base
 - Satisfy yourself with regard to the rigorousness of the strategy specifically noting:
 - Is it for children and young people, adults or both groups?
 - Is it a population or a targeted strategy or a combination of both approaches?
 - Does it cover monitoring the population, prevention and treatment?
 - Does it give a balanced approach to both health eating and promoting physical activity?
 - The content of the recommendations
 - The level of evidence for the action points recommended
 - The cost (including staff time costs) of implementing the recommendations
 - Identify the agencies and personnel that will be involved
 - E.g. Local authorities (including leisure and education departments), local health commissioning agencies, health service providers, schools, media, catering companies both small and large, retail outlets
 - Identify funding streams
 - Identify local opinion leaders
- Implementation phase
 - Set up a group of key stakeholders
 - Acknowledge that members of the multidisciplinary group will have a variety of different backgrounds e.g. dietetics, leisure, primary and secondary care, school nursing, local government, local industry, students and parents, general public, patient groups
 - Agree terms of reference, clarify membership, decide frequency of meetings, reporting within the team, with sponsors and with the wider constituency
 - Identify the activities, deliverables and timescale, for implementation (using for example project management methods such as Gantt charts)
 - Assess and agree on financial, materials, technical and human resources needs
 - Agree on key indicators and monitoring mechanisms
 - Develop membership of the group as a team/ sub-teams, mutual understanding of roles
 - Identify barriers to success (e.g. force field analysis)
 - Prioritise work and achieve early successes
 - Dissemination strategy e.g. newsletters, web publishing, workshops, etc; training and monitoring arrangements
- Post handover project
 - Check integration of recommendations into everyday practice
 - Analyse process of implementation, effectiveness of actions (in achieving the objectives) and lessons learnt

Candidates should hopefully mention population v targeted approaches.

The following are additional points which might improve the answer to "good" or "excellent"

- Discuss in a systematic way what are the key elements of implementation of strategies within the context of a named country
- Discuss the essential factors to be considered for successful change management (change in culture, behaviours, business)
- Include identification and management of risks / unexpected changes in the discussion

Examiner comments

This was a straightforward question about strategy implementation using obesity as the example. In general this question was poorly answered.

Candidates who performed well on this question gave well-structured answers which clearly demonstrated the necessary and sensible steps one needed to take for strategy implementation, and showed a good understanding about the need to assess feasibility and priority of actions, as well as the facilitators and barriers.

Candidates who performed less well generally failed to answer the question which was asked with many focusing on strategy development rather than implementation which is what the question was about. Long essays about obesity lacking structure or a focus on the question also attracted little credit.

Question 10

Herzberg, Maslow and McGregor have each developed motivational theories.

- a) Describe one of these three theories in detail. (50% of marks)
- b) You are leading a public health team in a period of major organisational change. Critically evaluate how you would use the theory you have described in detail above to support the management of your team through this period of change. (50% of marks)

Keypoints

Most or all of the following would be required for a pass:

a) The three theories – from which the candidate should describe in detail one

Herzberg: In order to pass candidates will need to list most or all of the motivator factors and hygiene factors listed below, and to describe at least two motivators and two hygiene factors in detail, and the role of dissatisfaction.

Motivation-Hygiene Theory, or two factor theory

'The factors which motivate people at work are different to and not simply the opposite of the factors which cause dissatisfaction'

Motivator Factors	Hygiene Factors (equally important)
• Achievement	• Pay and Benefits
• Recognition	• Company Policy and Administration
• Work Itself	• Relationships with co-workers
• Responsibility	• Supervision
• Promotion	• Status
• Growth	• Job Security
	• Working Conditions
	• Personal life

1. People are made dissatisfied by a bad working environment, but rarely satisfied by a good environment.
2. Prevention of dissatisfaction as important as encouragement of satisfaction
3. Hygiene factors operate independently of motivation factors.
4. Hygiene improvements have short-term effects.
5. Hygiene needs are cyclical in nature and come back to a starting point. This leads to the "What have you done for me lately?" syndrome.

Maslow: In order to pass, candidates will need to mention each level of the hierarchy of needs, with an example of each (eg safety needs include a working environment where hazards are minimised, and job security).

Biological & physical needs
Safety needs
Belonginess and love needs
Esteem needs
Self actualisation

Candidates are expected to state that many workers will require some or all of these levels.

McGregor X/Y: In order to pass, candidates will need to mention at least two characteristics of Theory X and two of theory Y managers and the resulting cultural style.

Theory X- managers assume inherent laziness requiring close supervision/ systems of control
Hierarchical structure
Workers avoid responsibility

Theory Y – managers assume ambition/ self motivation

Workers want to do well

Climate of trust

Shared decision making

Commitment to objectives

Theory Y Bottom up. -Liberating and developmental. Continuous improvement achieved by enabling, empowering and giving responsibility.

Theory X – Top down. Authoritarian style. Tight control. Limited culture

A good answer would compare the chosen theory with more modern concepts such as the psychological contract.

b) Critical evaluation of the use of one of the theories

In order to pass, candidates will be expected to

1. Describe the team they are leading
2. Mention motivation and its effect on team functioning
3. Choose one theory
4. Illustrate the theory in practice

Good answers will critique the theory in their ability to influence team functioning

Leading a public health department in a period of organisational change

- For example the candidate might have chosen Herzberg
- Describe the team they are leading
- Introduce the need for motivation in order to ensure effective team functioning
- Use a structure to outline the key issues facing the workers in the team: For example, job uncertainty, financial concerns, stress, professional credibility, job security
And some of the key opportunities facing the team: e.g. joint working, clarity of purpose (shared vision/ outcomes)
- And then critique the theory in its ability to motivate: Whilst Herzberg defines the different needs that motivate, it doesn't take account of the fact that factors which motivate people at work are different to and not simply the opposite of the factors which cause dissatisfaction and hence the need to ensure short term motivation (hygiene factors) to ensure a long term effective team

Examiner comments

In general this was a poorly answered question although for candidates who knew something about motivational theories and their application in public health good marks were achievable.

Candidates who answered well gave well-structured answers that showed they had a good level of knowledge about the model they chose to describe, understood its limitations, could apply it and critically evaluate its usefulness, in particular drawing on examples in their answer. These candidates demonstrated a systematic way of thinking.

For candidates who performed less well in part (a) a substantial number of candidates could not accurately describe the model they chose to describe. For part (b), many candidates provided poorly-structured answers in discussing how one could apply one of these models and failed to critique its applicability/ usefulness.

Paper 2A

You are a Director of Public Health with responsibility for cardiovascular disease prevention. You work at both a regional and national level. Your press office informs you that the internationally influential Cochrane Library has issued a press release stating that "Cutting down on salt does not reduce your chance of dying." The regional TV news station has asked you to attend that evening to be interviewed about the implications of this statement for current public health recommendations to reduce salt intake in the whole population. They will also be interviewing the editor of a leading newspaper that has issued the following front page headline "Now salt is safe to eat." The press-release is based on the attached paper which reports a meta-analysis of randomized controlled trials.

Taylor RS, et al. American Journal of Hypertension, advance online publication 6 July 2011;doi:10.1038/ajh.2011.115

Note to candidates: the paper has been reduced in length by deleting results presented in the original paper for blood pressure and urinary sodium excretion, apart from in the abstract. You will therefore not be expected to comment on the blood pressure and urinary sodium excretion results.

1. Write a critical appraisal of the paper. (40% of marks)
2. The authors state that they "planned to explore various potential moderator effects" but that "an insufficient number of included studies prevented us from undertaking these analyses." Explain what is meant by "potential moderator effects" and why having an insufficient number of included studies is a problem. (10% of marks)
3. The authors also intended to examine for a "small-study effect." Explain what is meant by small-study effect and how this effect may differ from publication bias. (10% of marks)
4. Write a list of key points that you would wish to get across in the TV interview, bearing in mind your national role and the plan to also interview the newspaper editor. (40% of marks)

Key points

Most or all of the following would be required for a pass

Qu 1. Critically appraise the paper

The candidate should demonstrate a systematic approach, covering the following areas:

Was there a clearly focussed question? Is there a clear rationale for the study?

- Scientific background and rationale is clearly defined: Although a meta-analysis of previous observational studies has shown an association between high salt intake and stroke, the impact on mortality and cardiovascular disease is uncertain.

- Aim of the current study is clearly defined: to assess whether a reduction in dietary salt is associated with improvements in mortality and CVD events using a meta-analysis of RCTs.
- Appropriate to focus on RCTs as these provide the most robust evidence on causality.

What was the study design and was the choice appropriate?

- Systematic review and meta-analysis carried out according to the methods recommended by the Cochrane Collaboration.
- A systematic review and meta-analysis is appropriate given the small number of events within individual trials. The individual studies were based on a variety of populations, including one where participants had been hospitalized for uncompensated heart failure. Appropriately, these divergent populations were not pooled in a single meta-analysis, but stratified meta-analyses presented (by normotensive, hypertensive or heart failure).

Were the sources of information used appropriate?

- Several clinical databases were searched with no restriction on language
- Reference lists of reviews and included articles were also examined for additional studies.
- There were clear inclusion / exclusion criteria. Included studies that randomly assigned adults to an intervention aimed at dietary salt reduction (restricted salt dietary intervention or advice to reduce salt intake) or a comparator arm that did not receive that intervention. Studies included had at least 6 months of follow-up and described either cardiovascular morbidity/mortality and/or all-cause mortality between arms.
- There was no indication of whether the 'grey' literature was searched.
- Selection of studies was performed blind by two reviewers
- However, data extraction was only performed by one reviewer, with the data checked by a second reviewer ie both do the data extraction and then compare, this would entail relatively little extra work since there was only a total of seven studies. It would have been better to undertake blind data extraction to avoid the checker being influenced by the person who did the original extraction.
- Similarly, the risk of bias of included studies was only undertaken by a single reviewer and the check was unblinded.
- Included study authors were contacted to clarify any missing outcome data or issues of risk of bias assessment.

Was the analysis appropriate?

- For mortality and CVD events, a relative risk and 95% CI was calculated for each trial. This approach is appropriate.
- Results were pooled using fixed-effect meta-analysis but if statistical heterogeneity was evident, based on a clear definition, then a random effects model was used. This is appropriate.
- Heterogeneity amongst included studies was explored both qualitatively and quantitatively using appropriate criteria and statistics.
- A number of key 'risk of bias domains' were assessed. However, the impact of including potentially biased studies was not assessed in either stratified meta-analyses or in meta-regression analyses: this could have been because there were too few studies to undertake such analyses.
- An insufficient number of included studies prevented stratification by potential moderator effects and exploration of publication and small study bias.

Presentation of results

- A detailed flow chart of study selection is presented and the characteristics of included studies are tabulated – this is required practice in published systematic reviews.
- Forest plots are presented for each outcome, stratified by normotensive, hypertensive or heart failure. This allows the effect in different subgroups to be determined, as well as presenting an overall pooled effect.
- Pooled effect estimates were presented (a pooled risk ratio and 95% CI for binary outcomes), along with heterogeneity statistics.

Precision of results

- The effect estimates are presented with their 95% confidence intervals and p-values

What were the results?

- No strong evidence that salt reduction reduced all-cause mortality or CVD morbidity in normotensives or hypertensives.
- Confidence intervals were wide and neither important protective or adverse effects on cardiovascular morbidity/mortality or all-cause mortality could be ruled out.
- Salt restriction interventions *increased* the risk for all-cause mortality in those with heart failure

Were all outcomes considered?

- Yes. The authors appropriately stratified by a number of key endpoints,

How valid are the findings?

- Consider bias, chance, and confounding.
- Study takes advantage of meta-analysis to obtain larger numbers of events than could be achieved in a single trial.
- Nevertheless, there were too few events to produce precise effect estimates and all confidence intervals were wide (limited power to demonstrate an effect). Indeed in the discussion the authors provided an estimate of the number of events needed for sufficient power to detect as statistically significant the effect sizes found.
- Uncontrolled confounding unlikely as the meta-analysis was based on RCTs.
- Bias possible as most trials failed to adequately report generation and concealment of random allocation sequence

Are the results of clinical or public health significance?

- Yes. Most countries have adopted policies to reduce salt intake by persuading the food industry to reformulate food with less salt, and also by encouraging people to use less salt in their own cooking and at the table. WHO has recommended salt reduction as one of the top three priority actions to tackle global non-communicable diseases.
- This study seems to suggest that this advice may not result in expected reductions in mortality and morbidity at the population level.

Qu 2. Potential moderator effects

- These are factors that could influence the impact of salt reduction on the outcomes.
- These are sub-group analyses and so may be prone to confounding or bias because it is unlikely that randomisation by these sub-groups was performed.

- If there are too few studies, then it is difficult to assess whether there are differences in the impact of salt reduction on the outcomes by sub-groups, because apparent differences may have arisen by chance. Large numbers of studies are required to rule out type 1 error.

Qu 3. Small study bias

- Is the tendency for the smaller studies in a meta-analysis to show larger treatment effects
- Factors other than publication bias can introduce small study bias eg chance, poor methodological design of small studies, fraud, inadequate analysis, differences in intensity of intervention, in underlying risk or choice of effect measure

Qu 4. Points for TV interview

- Recognise the potential to confuse the public and misleading notions by food industry that they do not need to volunteer to reduce hidden salt.
- Most countries have adopted policies to reduce salt intake by persuading the food industry to reformulate food with less salt, and also by encouraging people to use less salt in their own cooking and at the table.
- WHO has recommended salt reduction as one of the top three priority actions to tackle the global non-communicable disease crisis.
- It may be that these studies were simply not large enough, so even by pooling them together the effect of the reduction in dietary salt on number of cardiovascular deaths and events is apparent but not statistically significant.
- There is a need to consider the totality of evidence, including epidemiology and animal studies.
- Results may simply be pointing to a need for more effective interventions to reduce salt intake.
- Further large long-term randomised trials of salt reduction on clinical outcomes are required before advice is changed (but such a trial would have to be huge with long follow-up and so may be impracticable).
- As the authors state it is "important to evaluate the effects of voluntary salt reductions by food industries as these may hold greater opportunities for practicable and inexpensive means of reducing salt intake in the population"

Examiner comments

Overall this paper was answered reasonably well by most candidates. The critical appraisals were generally well structured and, in most cases, followed a logical approach which ensured that the key points were adequately covered.

Candidates who performed well provided well-structured critical appraisals working logically through the process and providing comment on the practical implications of the paper. The candidates who performed best on Q4 (the TV interview) considered the practical aspects of preparing for an interview and the fact that conflicting public health messages are confusing for the public. The better candidates also managed to strike a good balance between commenting on the paper and using lay language appropriate for such an interview.

Relatively few candidates gave very clear answers to questions 2 and 3 (the more technical aspects of the paper). Regarding Question 2, the best candidates recognised that a moderator variable is one that modifies (.e.g. moderates) the

way in which the exposure and the outcome of interest are related. When an exposure has different effects on the outcome at different values of a variable, that variable is called an effect modifier or moderator. If the number of studies is small type 1 error cannot be ruled out.

In general, questions 2 and 3 were less well answered than the critical appraisal and TV interview questions. Being able to clearly explain technical terms such as moderator effect, publication bias, and small study effect should be straightforward – these were not well done by a large number of candidates. Candidates also demonstrated some confusion when drawing funnel plots to demonstrate publication bias and small study bias, e.g. by omitting to label the x and y axis on the plot.

Some candidates' handwriting and general layout of scripts was poor and made the examiners' job difficult; answers which it is not possible to read cannot by definition attract credit.

Paper 2B

In its new format Paper IIB questions, key points and detailed examiner comments on each section are not released. The comments below are general remarks on candidate performance received from the examiners.

General observations on the performance of candidates

Overall the performance of candidates was similar to previous sittings of the new format Paper IIB. As in previous sittings, while most candidates gave reasonable answers to data interpretation questions, a number struggled with carrying out simple calculations and describing key concepts. For example some candidates confused statistical terms and concepts e.g. confusing attributable risk and absolute risk, which resulted in erroneous arguments.

A number of candidates failed to address the questions asked. For example if a question asked the candidate to use the data provided then this is what was required and not a general answer on the topic in question. Questions which required interpretation of data attracted less marks when a purely descriptive, non-interpretive answer was given.

Candidates also need to be aware that they should follow closely any instructions in the question. If a question asks, for example, "...in four sentences describe.....", then only the first four sentences of any answer provided will be marked. Time pressure might be alleviated for some candidates by following such instructions and not providing mini-essays when a specified number of sentences are asked for. Similarly when a 'bullet point' answer is required then a page of prose will attract little credit. The number of marks available to any particular question in a section also provides a guide as to the length of answer required.