



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

NB Please note that these are key points, not model answers

Question 1

- a) Explain the difference between an efficacy trial and an effectiveness trial.
(40% of marks)
- b) A randomised controlled trial reports non-statistically significant findings by intention to treat, but statistically significant findings when analysed using a per protocol approach. Explain the meaning of the two underlined terms, and how you would interpret these findings.
(60% of marks)

Key Points

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

a) Efficacy trial: a trial (usually a randomised controlled trial) performed in **ideal** conditions, often with careful monitoring to ensure interventions are delivered in a precise fashion. For instance, drug efficacy studies will ensure that patients adhere precisely to treatment regimens.

Thus, these studies measure the extent to which a particular intervention, preventive or therapeutic regimen, or healthcare service for individuals or population(s) produces a beneficial outcome under 'ideal conditions'. The efficacy of intervention(s) is usually based on the result(s) of a RCT.

In contrast, an effectiveness trial measures the "real world" effect of an intervention. Thus, whilst an intervention may still be carefully planned, it could be delivered by a variety of clinicians. Equally, in an effectiveness trial, patients' adherence would not be so precisely monitored. Effectiveness studies are often termed "pragmatic".

b) Intention to treat: this is a term used to imply that subjects in an RCT study have been analysed in the group they were originally randomised to irrespective of the actual treatment that they subsequently received. This is important because should patients actually receive a different treatment and be analysed as such or not be compliant with the treatment and excluded from the analysis, this essentially breaks randomisation introducing potential for selection bias and/or confounding. This would be the usual approach to analysis in an effectiveness study as in practice, patients may not comply with treatment or be given a different treatment and it is felt that an ITT analysis provides a better reflection of the magnitude of effect of the intervention in real-life.

Per protocol approach: this technique analyses patients (usually in an RCT) who received their allocated treatment. Patients may be excluded from the analysis if they received another treatment, did not comply or data on outcome is incomplete. Whilst, on face value this might be considered to give a better estimate of a treatment's effect, it has the danger of introducing confounding (as it breaks the randomisation). In effect it introduces a form of selection bias, as patients may not have received their allocated treatment because of some concern over

their suitability for their originally allocated treatment, or some side effect from that treatment, or a concern the patient themselves has about a treatment. Thus, in general, per protocol estimates of effect should be treated more cautiously than those obtained by ITT analysis.

In this case, the study has identified that a treatment has a non-statistically significant effect according to ITT analysis, but a potential effect by a per protocol analysis. This should be interpreted as relatively weak evidence that this treatment is effective. It would be important to be aware of what proportion of subjects moved group; how large the difference was between the two sets of results and what the confidence intervals suggested for the two results. Depending on the study, it may have been under-powered and that together these results suggest that a larger study may yet identify that this treatment is effective.

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

Efficacy vs. effectiveness:

A drug with a complicated dosing schedule is likely to cause a smaller improvement in a given outcome in an effectiveness study, than the results obtained from an efficacy study might have suggested; similarly, for a drug with unpleasant, but otherwise harmless side effects.

Efficacy trials may have a placebo comparator even when an active comparator exists if the objective is to identify the full effect of the intervention. In an effectiveness study the control group will usually have the most effective active comparator or usual care.

ITT vs Per Protocol:

ITT and per protocol approach. A pure ITT approach can be difficult to achieve particularly concerning what to do about missing data. There is also some debate about whether those who are ineligible but recruited by mistake should remain in the analysis.

Per-protocol approach and ITT approach is needed to interpret the findings of equivalence or non-inferiority trials.

Examiners comments

Performance was generally high, and some outstanding answers were evident. Good knowledge of trials was demonstrated. Stronger candidates discussed the meaning of statistically significant and non-significant results, mentioning that both could be by chance / bias / confounding.

Those candidates who did less well did not interpret the findings as requested in the final part of the question, and so lost marks. The final part of the question ('how would you interpret these findings?') referred to the previously mentioned statistically non-significant findings by intention to treat, but statistically significant findings when analysed using a per protocol approach. Not all candidates recognised this.

Other common pitfalls included the following:

It is not necessarily true that efficacy trials always have a placebo or that effectiveness trials always have an active control. Effectiveness is not the same as cost-effectiveness and some candidates confused the two terms.

Question 2

You have been asked to undertake a formal study to estimate the prevalence of angina in your local area (population 250,000). Briefly discuss the following important methodological considerations for the design of this study.

- a) Case definition (30% of Marks)
- b) Population sampling (40% of Marks)
- c) Sample size estimation (30% of Marks)

Key Points

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

a) The use of **case definitions** is very important in epidemiology in order to standardize criteria for identification of cases. Case definitions should include the three classical dimensions of epidemiological variables: *time, place* and *person*.

A case in epidemiology is a person in the population or study group identified as having the particular disease, health disorder, or condition under investigation, in this case 'angina'. The epidemiological definition of a case is not necessarily the same as the ordinary clinical definition.

Angina is a symptom of ischaemic heart disease (IHD). Typically this is acute chest, epigastric, neck, jaw, or arm pain or discomfort or pressure without apparent non cardiac source. It is frequently precipitated by exercise.

The definition would include occurrence of symptoms within a specified time period (i.e. time element), and that the person's address is within the specified area (place), and person (e.g. age/gender)

A variety of criteria may be used to identify cases, e.g. individual physician's diagnoses, registries and notifications, abstracts of clinical records, surveys of the general population, and population screening, among others.

b) **Population sampling** is the process of taking a subset of the population that is representative of the entire population. The sample must have sufficient size to warrant statistical analysis. In probability sampling, every individual in the population have equal chance of being selected as a subject for the research. This method guarantees that the selection process is completely at random and without bias which is important if we want an estimate of prevalence angina.

A number of approaches to sampling (mention of at least non-probability and probability)

Non-Probability Sampling (convenience, consecutive, quota, judgmental, snowball)

Probability Sampling (simple random, systematic, stratified, cluster)

An example for angina might be to sample probabilistically men and women, e.g 35-65 years old from GP registers through random sampling. (Bias is still possible because of non-registered individuals).

For any example given, potential limitations should also be mentioned.

c) **Sample size determination** is the act of choosing the number of observations, in this example individuals from the population, to include in a statistical sample. The sample size is an important feature of any empirical study in which the goal is to make inferences about a population from a sample. The aim of sample size calculation when estimating prevalence is to estimate confidence intervals (CI) around the prevalence estimate, and the only info needed is the desired size of CI and the expected prevalence

Candidate recognises that the sample size estimate will depend on the anticipated prevalence of angina.

Sample sizes may be chosen in several different ways. In considering determinations of prevalence, two approaches might be considered:

- Expedience – for example, recruitment of individuals convenient to collect. But note needs to be made that small sample sizes, though sometimes necessary because of practical considerations, can result in wide confidence intervals when estimating prevalence (never mind issues of bias!)
- Considering the margin of error and breadth of confidence interval one wishes to accept.

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

a) Definitions of cases for epidemiology studies and clinical trials in acute CHD rest on World Health Organization (WHO) (1959) and American Heart Association (1964) reports, followed by the WHO European AMI Registry criteria. But advancing diagnostic technology, therapeutic interventions, and changing disease presentation in recent years forces a re-evaluation of case definitions for acute CHD. Rose angina scale (widely used) and other international classification also acceptable (e.g. Canadian Cardiovascular society).

b) An advantage of systematic random sampling over simple random sampling is the assurance that the population will be evenly sampled. There exists a chance in simple random sampling that allows a clustered selection of subjects. This is systematically eliminated in systematic sampling. However

Stratified random sampling is used when the researcher wants to highlight a specific subgroup within the population. This technique is useful in such researches because it ensures the presence of the key subgroup within the sample. Researchers also employ stratified random sampling when they want to observe existing relationships between two or more subgroups. With a simple random sampling technique, the researcher is not sure whether the subgroups that he wants to observe are represented equally or proportionately within the sample. However, systematic sampling often uses clusters, e.g. Health Survey for England, and these can be allowed for at the analysis stage?

c) A worked out example based on estimates of true prevalence of IHD with angina, error and confidence intervals.

Examiners' comments

A few candidates performed well, and recognised that the sample size estimation referred to the prevalence study, and not to a trial. Some candidates clearly demonstrated sound understanding of survey techniques. Most candidates understood the importance of having a representative sample.

Many candidates, however, failed to demonstrate knowledge of basic case definition & survey techniques. However of the three parts of this question the sample size element was uniformly poorly answered. Whilst most candidates understood case definition in terms of ensuring true cases were identified, few candidates recognised the importance of defining a time period for the diagnosis, and very few mentioned that a clear definition of the population to be included would be necessary. Some answers showed little understanding of angina. Relatively few revealed knowledge of the term 'probabilistic sampling'. The question about estimation of sample size was answered by nearly all candidates for trials, rather than for a prevalence study.

See above - the question about estimation of sample size was answered by nearly all candidates for trials, rather than for the prevalence study.

The importance of applying knowledge of sample size calculations to the question asked, in this case a prevalence study.

The term 'study' was sometimes interpreted to mean a trial. In this question's context, it was most likely to mean a cross-sectional study, and most candidates understood this would involve a survey of a population.

Question 3

You are working as a Public Health Practitioner in a local communicable disease control unit and are telephoned for advice by a general practitioner. One of his patients is a twenty-year-old male student who is planning to spend three months backpacking and mountaineering in East Africa and has asked for information about how to protect his health while abroad.

Write short notes on:

- a) The questions you would advise the general practitioner to ask the patient
(20% of marks)
- b) The information and advice you would advise the general practitioner to give
(80% of marks)

Key Points

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

A. Enquiries:

Full details of proposed and possible itinerary, likely modes of travel, known access to medical care, previous immunization history, previous medical history (including current illnesses and medications), and access to medical insurance.

B. Advice:

1. Personal safety

Accidents are the most important cause of morbidity amongst travellers, and particularly include road accidents (including travelling as a passenger on public transport). Additional hazards include fires, electrocution, swimming in unsafe areas, unprotected sex (with the attendant risk of HIV), robbery and violence to the person. Alcohol is an important issue for all of the above hazards.

These points should be discussed and students advised to obtain adequate medical insurance (and take sufficient supplies of any required medication).

2. Avoidance of insect bites

Be aware of the risk, take particular care in the evenings, avoid highly infested areas (if possible), wear loose fitting long garments (avoid dark blue in tsetse fly areas), tuck trousers into socks to prevent ticks, use insect repellents containing DEET, and sleep in screened buildings or under mosquito nets.

3. Avoidance of food and water borne diseases

Do not drink tap water (including teeth cleaning) and avoid ice. Bottled carbonated drinks, boiled water, and drinks with boiled water are usually safe. Alternatively, chemical disinfection should kill most pathogens, though filtration is usually required to remove some parasites (e.g. Giardia or Cryptosporidium).

In general, avoid salads, uncooked fruits and vegetables (unless washed in safe water and peeled by the traveller), food allowed to stand at room temperature or exposed to flies, unpasteurised dairy produce, and food from street vendors unless freshly prepared, cooked, and served using clean utensils.

Most cases of diarrhoea can be treated with oral rehydration salts, and antispasmodics (e.g. loperamide [Imodium]) if required.

4. Sun protection and heatstroke

Avoid direct sunlight, especially in the hottest part of the day (remember altitude, and reflected light, e.g. from water), use sunscreen, wear long loose fitting clothing (sun protective if possible), use a wide brimmed hat, wear sunglasses (or goggles for climbing).

Maintain fluid intake and avoid an excess of alcohol. Mild heat stroke is characterised by defective sweating, hot dry skin and high temperature, while severe stroke may be accompanied by delirium/coma. A reduction in body temperature is required, as well as the intake of copious fluids. Exposure to sunlight should be avoided for some time afterwards.

5. Advice on immunization.

The general practitioner should seek expert advice (if necessary in addition to the public health practitioner – such as specific agencies with specific travel health expertise) depending on the planned or possible itinerary.

Ensure up to date with routine immunisations (tetanus, polio and diphtheria) and give boosters as appropriate. Protection against Salmonella typhi and hepatitis A should generally be offered if the student is intending to travel to areas where the standards of hygiene may not be adequate. Yellow fever vaccination may be offered depending on the detailed itinerary (for some parts of East Africa only). Hepatitis B should be considered for all travellers.

In addition, travellers may also be offered immunization against cholera, meningococcal meningitis, rabies, and tuberculosis (BCG) depending on their planned or possible itinerary/activities (e.g. staying in remote areas, staying with local people, long-term travellers, working with animals).

6. Advice on altitude sickness

This is a risk above 2,500m. The most important prevention measure is adequate acclimatisation. Travellers should spend a few days at intermediate altitudes (<3,000m) and further ascent to higher altitudes should be slow. Nausea, dizziness, fatigue, headaches, loss of appetite, sleeping difficulties and shortness of breath are early symptoms of altitude sickness and, once present, a descent should be made. If

this is not possible, do not proceed upwards and seek medical help as soon as possible (NB acetazolamide and corticosteroids are often used in treatment).

7. Advice on malaria

There is a high risk in some parts of the region (may be linked to bite avoidance above). Consider – ABCD – awareness, bite prevention, chemoprophylaxis, and diagnosis. Chloroquine resistance is common and up to date or expert advice on current chemoprophylaxis should be sought, taking all possible itineraries into account. No chemoprophylaxis regimen is 100% effective and travellers should be alert for symptoms (fever) from 1 week after arrival in a malaria area up to 1 year after return.

Exposure to sexually transmitted diseases including HIV infection should be discussed and advice given on their prevention. Infection with hookworm is enhanced by walking in bare feet, and swimming in lakes and rivers may lead to infection with schistosomiasis.

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

A well structured answer, covering all the points listed above.

Additional, specific advice could also include advice on avoiding hookworm (walking in bare feet), schistosomiasis (swimming in lakes and rivers), animal hazards, and the possibility of dengue fever.

Examiners' comments

Question 3 could be attempted without a wide knowledge of public health, although such an answer did not score highly. Good candidates approached the answer with a good framework and sufficient detail to demonstrate knowledge of the subject. However, very few candidates scored high marks (7 and above). In general, answers lacked sufficient detail. Often candidates provided an unfocused answer with irrelevant material. Some answers were very narrow, focusing purely on communicable diseases e.g. through food and water and sexually transmitted infections without mentions of other health risks.

Question 4

Identify and write short notes on the potential hazards posed by a fire on an industrial estate located at the edge of a town in an agricultural area.

Key Points

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

Hazards on site, adjacent and remote. (urban and rural). Hazards in the factory, under the ground, on the ground and in the air.

On site:

- fire itself
- possible risk of explosion
- mechanical risk from falling roof, walls etc.
- damage to stores of chemicals.
- mixing of chemicals and partial combustion of same with unknown toxicity of fume.
- leaching of chemicals into the ground and contamination of under ground water.
- fire hydrants draw so much water that the mains pressure falls allowing ingress of contaminants into pipes.
- heavy road traffic during the fire.

Adjacent:

- other factories on the estate may be at risk with their own chemicals etc.
- heaviest deposition of fall-out from the smoke or explosion likely to be on adjacent sites.
- interruption of water, gas or power supplies may cause new unstable and unsafe situations.

Remote:

Urban

- deposition of unknown chemicals on people.
- advice for people to remain in doors may put children or parents at risk if this occurs around times that children leave school.
- advice to evacuate may put people at new risk of increased exposure.
- any or all of the above can cause profound anxiety even if no toxic element.

Rural

- contamination of rivers with water from the firefighters. Fish killed. Drinking water inlets polluted.
- deposition of chemicals from the plume across crops. Main problem if these are leafy vegetables, or land used for grazing.

General point: - fumes may contain dioxin, a known carcinogen.

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

- How the multi-agency response to an incident like this would be coordinated (e.g. in UK through Local Resilience Forum; will vary in other countries)
- Use of the media to disseminate public health messages

Examiners' comments

Many candidates used an appropriate approach to answer the question. However, as with question 3, answers often lacked sufficient detail and in particular often failed to take into consideration the particular geographical location of the industrial estate that was on fire. Many candidates did not seem familiar with the topic. There was more emphasis on risk assessment rather than health hazards.

Question 5

- a) What is meant by the term 'information governance'? (10% of marks)
- b) Why is information governance important? (40% of marks)
- c) With reference to a named country of your choice, what structures and processes exist to ensure that a high standard of information governance is delivered in a health organisation? (50% of marks)

Key Points

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

- a) Information governance ensures the necessary safeguards for an appropriate use of patient and personal information
- b) It is important to protect the confidentiality of individuals, as patients and public have a right to expect their personal information to be kept confidential:
- Political expectation that personal data is held securely
 - A public suspicion of large databases 'big brother'
 - Maintains patients trust in the health organisation
 - The continuation of important public health data collection systems is important for on-going surveillance, for improving understanding of disease and treatment (e.g. in cancer)
- c) Structures and Processes (***note these would be appropriate for the setting of the candidate e.g. HK:***)
- Legislative framework (i.e. Data Protection legislation, Freedom of Information legislation, Human Rights legislation)
 - Central guidance put in place by Departments of Health (Information Governance Requirements, Standards)
 - Monitoring arrangements such as Regulators (e.g Information Commissioner in England)
 - Responsible Individual within hospitals (e.g Caldicott Guardians in England)
 - Physical security / lockable storage for paper records
 - Computer security / firewalls / smart cards / passwords etc
 - Destruction of personal information when no longer needed
 - Handling of small numbers to prevent identification
 - Clear guidance and policies for the release of data which may be identifiable

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

- The implications of failure of good information governance, the relationship between information governance and corporate governance
- Some examples of where information governance systems have failed

Examiners' comments

This question was generally very well answered by candidates across the board. Almost all candidates provided a well structured and comprehensive answer, which suggested that they had enough time to answer the question. The answers included many good descriptions of information governance, with explanations of its importance. Most candidates provided a variety of examples of the various structures and processes that support high standards of information governance. Relatively few answers described what can happen when information governance processes break down. There were no major pitfalls in answering the question. The majority of candidates understood what the question was seeking, and provided the relevant answers. Candidates scoring higher marks gave practical examples of information governance systems and processes. A few candidates did not know what information governance was and answers relating to governance in general were not relevant.

Question 6

- a) Describe, with examples three uses to which disease registers may be put. (30% of marks)
- b) Outline the advantages and limitations of using disease registers. Illustrate your answer with reference to examples of specific registers. (70% of marks)

Key Points

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

Uses: Comprehensive picture of disease, incidence, and outcome and changes over time. Could include prevalence, distribution and severity

Research - can provide detailed information on prognosis and factors influencing prognosis over a long time period.

Can be used to plan and to deliver services e.g. regular recall

Many **examples** could be given, from cancer registries to community based coronary heart disease, stroke or other chronic diseases such as cystic fibrosis, artificial joint implants, heart valves etc. Clinical as well as population-based registers should be mentioned

Advantages and limitations

Advantages: can provide invaluable data on population rates of disease and prognostic factors that cannot be collected any other way; in a fast changing field such as prosthesis can be the only real way to monitor long term effectiveness or otherwise. Where linked to service delivery can enhance care. Some examples of how this might happen – e.g. quality outcome framework payments for GPs for disease registers.

Limitations: Can be expensive and require a high level of administrative support and detailed input; of dubious value if there is not a high level of completeness of data; can be developed in isolation separate from other information systems and not tie into them. Answers should make mention of ethical and governance considerations which potentially can limit their scope and use.

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

Better candidates may well refer to the future of registries and the implications of new technologies. This might include a discussion on the implications of the development of new 'real time approaches.

Examiners' comments

This question was generally very well answered. Almost all candidates provided a well structured and comprehensive answer, which suggested that they had enough time to answer the question. Most candidates gave a variety of practical examples of disease registers. Some candidates provided very few or no named examples of registers and they lost marks because of this. There were no major pitfalls in answering the question, although surprisingly a few candidates scored very poorly considering the question was very straightforward. The majority of candidates understood what the question was seeking, and provided the relevant answers. Candidates are advised to read the question carefully. If it asks for examples (and both parts of this question said exactly that), give them. Those describing the three uses of Disease Registry are "for surveillance, monitoring disease and keep track of the trend" gained only one third of marks because of repetition. Weaker answers limited their answers to only one disease register.

Paper IB

Question 7

Outline the steps you would take to formulate and implement a policy to address the health needs of socially excluded groups in your population in a named location of your choice.

KEY POINTS

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

- 1) A clear indication of the structure/components of the policy;
- 2) Stating how it addresses the wider determinants of health and health inequalities;
- 3) A definition of the socially excluded population;
- 4) Specifically how to engage with the socially excluded groups and involve them in the process;
- 5) How to identify their needs (work elsewhere; "expert" views including socially excluded population and voluntary sector; routine data; special local studies etc.);
- 6) Recognition of national drivers, policies and guidance;
- 7) Interventions based on evidence of effectiveness where possible;
- 8) Adaptation of these interventions in order to meet the needs of socially excluded population
- 9) How to achieve multi-agency ownership and commitment (including voluntary sector) in development and implementation;
- 10) How to agree an implementation plan with a clear outline of the roles and responsibilities of partners involved in the policy;
- 11) How to monitor its implementation.
- 12) How to evaluate the impact of implementing this policy

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

- 1) Description of specific approaches e.g. a community development approach; Participatory Action Research. Asset-based approach
- 2) Examples involving specific groups e.g. homeless, traveller community, children excluded from school.
- 3) Use of a framework in answering the question.
- 4) Explaining tensions (and trade-offs) between equity and efficiency in implementing policies and programmes in socially excluded groups
- 5) In the evaluation, assessing the impact on health inequalities

Examiners' comments

Across the board, a disappointing performance by candidates answering this question. There was nothing tricky or difficult: this was a very straightforward question. Answers tended to be better when an essay structure was used: most candidates did not use an essay structure. Better answers were written clearly and had been proofread by the candidate. Candidates tended to launch straight into their answer without defining key terms (e.g. straight into the components of health needs assessment (HNA)). The time allotted should have been appropriate but good time management was crucial.

Good answers were clearly written and showed that they had been proofread. While there were no excellent answers, answers achieving a pass showed that the candidate:

- had an understanding of the distinction between policies and programmes.
- included budgetary/financing as well as an understanding of legislative issues.

Some demonstrated poor utilisation of basic question-answering techniques. Candidates must not rely upon the examiner to deduce their intentions. Many candidates gave a generic explanation of policy formulation that did not specifically relate to a named location or group. Candidates used single statements or disjointed words. Some candidates used inappropriate and/or meaningless jargon/statements:

- "policies are important documents in public health";
- "written so as to address the issue";
- "barriers to good policy implementation should be addressed at all times"
- "consider sending out newsletters to celebrate achievements"

Lack of understanding of the basic terms:

- Answers tended to discuss programme development not policy development.
- Few candidates defined the terms being used. e.g. social exclusion: an essential component to this question.
 - Quite a few candidates define socially excluded groups by saying "this could mean different things to different people" or "who are they? how will we id?"
 - Quite a few listed groups that are socially excluded, but without any explanation as to what makes them socially excluded.
- Few candidates gave the impression that they could manage this task in practice.
- Many candidates spent too long describing needs assessment which is only one component of the task.
- Too many candidates seemed to be doing all the work. Formulating and implementing a policy/strategy is a group task.
- Nearly every candidate assumed that a needs assessment would have to be done from scratch, rather than seeing what had already been done
- Few explicitly mentioned health inequalities.

Question 8

Write short notes on the following terms as used in health economics in the context of evaluating a childhood vaccination programme:

- a) Opportunity cost (50% of marks)
- b) Direct and indirect costs; average and marginal costs (50% of marks)

KEY POINTS

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

a) In a publicly funded healthcare system such as the UK NHS, resources are limited. Economics and health economics require choices between alternate uses of resources to meet different wants and needs.

The concept of "opportunity cost" relates to what benefits are foregone when one use of resources is chosen over another. Opportunity cost refers to the benefits that would have been accrued from the next best use of those resources.

The UK government has introduced the National Institute for Health and clinical excellence to examine evidence on the relative effectiveness and cost effectiveness of health technologies. In terms of a childhood vaccination programme, the term opportunity cost refers to what other healthcare interventions must be foregone through a policy decision to fund a childhood vaccination programme. (If answer is non UK based, e.g. HK, concept of opportunity cost needs to be set within health policy planning and finance of the healthcare system concerned)

b) With respect to the provision of a childhood immunisation programme, direct costs cover hospital or primary care building overheads, staff salaries, staff travel time, vaccinations etc, Indirect costs cover losses to the wider economy, costs to patients in attending a healthcare facility for receiving vaccinations, loss of classroom time if delivered at school.

Average costs= total cost of vaccination programme divided by number of children receiving programme in a given time period.

Marginal costs refer to the cost of vaccination 1 more child above and beyond the current levels of vaccination programme provision

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

a) An example of a childhood vaccination programme to which added resources are devoted to extend uptake to improve herd immunity. This extension has an opportunity cost in terms of other services that cannot be funded.

b) Marginal cost is usually less than average cost
We usually know more about marginal costs than average costs

Examiners' comments

Candidates' answers were disappointing for this question, despite a straightforward question which should have scored high marks. Few candidates used an essay plan. Answers tended to be better when an essay structure was used and demonstrated clear understanding of terms used. Better answers were written clearly and had been proofread by the candidate. Answers may be weak for many reasons as illustrated below.

- Candidates defined a concept by using the word in the concept, e.g. "an average cost is the average."
- Candidates used inappropriate and/or meaningless statements to define the concept:
 - "an average cost is a simple average";
 - "average costs are the mean average costs";
- Candidates used incomplete sentences.

Lack of understanding of the basic terms:

- Opportunity costs. Nearly all candidates saw this in purely money terms but it also reflects use of finite resources e.g. doctors, nurses, buildings.
- Marginal costs. Nearly everyone defined this in terms of one more but it equally relates to one less.
- Indirect costs were frequently misunderstood to mean support costs.

Question 9

- a) Briefly define what is meant by strategic planning. (10% of marks)
- b) You are responsible for developing a strategy to reduce health inequalities in your local population. Using this context, write a strategy outline that describes how you would approach each of the key steps used in strategy development. (90% of marks)

Key Points

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

a) Definition should include mention of a process whereby an organisation decides on key strategies to deliver its objectives and results in the production of a corporate strategic plan. For example 'A systematic, formally documented process for deciding what is the handful of key decisions that an organisation, viewed as a corporate whole must get right in order to thrive over the next few years. The process results in the production of a corporate strategic plan'.

b) To pass candidates will describe the four steps in context (or utilise a similar framework to achieve this). Good answers will demonstrate a clear understanding and application of the tools and techniques used in developing a strategy to reduce health inequalities. NB the answer will need to relate clearly to health inequalities rather than just a generic framework.

STEP 1: Where are we now?

Situation analysis

Benchmarking (observatories/ national reports)

Health needs assessment (e.g. a named document such as the JSNA)

STEP 2: Where do we want to get to?

Aims & objectives

Targets (SMART): national/ local

STEP 3: How are we going to get there?

Need for a project to deliver the strategy; tasks/ milestones

Description of stakeholder involvement/ joint working. Role of other agencies external to your own

Describe alternative approaches: e.g. Community versus individual versus Society.

Communication/ Publicity

STEP 4: How will we know when we have got there?

Monitoring/ evaluation

Strategic assessment measures

Examiners' comments

Candidates performed better than in previous years for this section. There were fewer illegible scripts. The question was well answered in general. Candidates using frameworks to structure their answers performed better. However, one or two candidates seemed very ill-prepared.

Project management and delivery of projects on time is an important facet of public health and candidates are advised to ensure that they have a good working knowledge of this area.

Candidates generally showed a good understanding and evidence of experience in strategy formulation. Most answers were well focused on health inequalities. Some candidates applied a wider knowledge such as the health and wellbeing strategy. Good answers addressed the need to review the organisation's capability to deliver the strategy.

Part B was mostly well answered. Many candidates used the steps outlined in the key points. Some use the framework of situation, target, plan.

Few candidates mentioned patient and public involvement, which is disappointing.

Most candidates who answered the first part of the question poorly were unable to display knowledge of strategic planning. Unfortunately a few candidates then answered part B as if it were a question about planning rather than strategy. Poorer answers failed to mention drivers around national targets.

Question 10

Your organisation is planning a short-term project to reconfigure a service. You are a public health practitioner who has been asked to lead this project with a multidisciplinary team and responsible for its delivery within one year.

- (a) Describe your initial approach using a suitable example of your choice. (20% of marks)
- (b) Describe how you would use change management theory and practice to improve the success of the project. (30% of marks)
- (c) Identify the main components for a suitable project plan, and highlight the activities required to ensure its effective completion. (50% of marks)

Key Points

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

(a) Initial approach (20% of marks)

- Example used must be of a suitable service, appropriate for reconfiguration in a short timeframe
- Outline project management methodology, appropriately adapted to short timescale
- People: identify stakeholders, pull together appropriate project group;
- Strategic approach necessary to deliver including allocation of team roles
- Gather knowledge: understand the service issues: evidence, literature, key opinions
- Governance: reporting lines, accountability
- Patient involvement
- Talked to the deliverers- find out what works and what needs fixing, get them on board.
- Learnt from others (peer support, professional forums).
- Write a plan

(b) 30% of marks for a suitable description of a theory or tool appropriate to a short time scale:

Change management theory described, appropriate to short timescale: e.g. Lewin (unfreeze-change-refreeze) force field analysis; SWOT or PEST(ELI) in context, Gleicher's formula, McKinseys 7S:

Understand the problems and where resistance might arise

Suggest strategies for overcoming that resistance and modifying behaviours and attitudes as appropriate

(c) 50% of marks for the outline of the project plan

- Goal or vision

- Objectives and scope (including stakeholder involvement)
- Milestones/ key deliverables (outputs, outcomes, financial savings)
- Data collection, monitoring of progress (Gantt or other visual management aid) and reporting
- Communications

Good candidates will discuss:

- Risk/hazard analysis on key deliverables
- Budget management
- HR and OD issues
- Evaluation from the outset

Additional marks could be awarded for:

- Suitable and well argued rationale for choice of service used as example
- Networks: looking beyond the immediate organisation to add value / performance
- Good description of **why** a particular change management model is appropriate in this task

Points may be deducted for:

- Grossly inappropriate change management methodology
- Methodology or process which is not feasible within 1 year timescale

Examiners' comments

Candidates performed better than in previous years for this section. There were fewer illegible scripts. One or two candidates seemed very ill-prepared.

Question 10 was poorly answered. Candidates using frameworks to structure their answers performed better.

Project management and delivery of projects on time is an important facet of public health and candidates are advised to ensure that they have a good working knowledge of this area.

Most candidates mentioned an appropriate change management model, but this was not always well described. Some candidates used a detailed approach rather than taking a strategic outline approach, but in many cases this demonstrated sufficient knowledge for a pass answer. Part B asked how you would use change management theory and practice to improve the success of the project and many candidates chose one theory and applied it for good marks. Most candidates accepted the challenge of a one year timescale and gave examples. These answers were clear and it appeared that approaching it in this way was an advantage to the candidates. There was some good knowledge of project management methodology and some well structured answers even where there was less detailed knowledge of project management methods. It is good to make more use of actual examples to illustrate answers, and learning from real situations. It was good to see most pass answers building evaluation in at the outset and to see a good level of awareness of risk analysis on delivery.

Many candidates confused parts a) (outline your initial approach) and c) (project plan)

The introduction appeared to confuse some candidates who answered this as though it were a leadership question. Many candidates failed to outline project management methods

Part B asked how you would use change management theory and practice to improve the success of the project and some answered with bullet points on all of the theories the candidate could remember. These answers were penalised

Few candidates mentioned the need to gather knowledge or patient involvement. Many who failed part B lacked enough detail and examples over and above the bare bones of the theory or tool. Poor answers failed to connect theory with the project

A common pitfall in this section is to use a scattergun approach. For example:

'This would include a SWOT analysis of the current situation, drawing on tools such as the McKinsey 7S to assess the internal strengths and weaknesses of current strategy and a PESTELI analysis to assess the external determinants of health inequalities.'

Paper IIA

You are a public health practitioner working in an area which has seen a marked increase in obesity over the past 10 years.

Public health officials in your local area are keen to tackle this public health problem through a range of methods. One of them has brought the attached paper about calorie-labelling foods to your attention and asked whether something similar could be developed locally.

Dumanosky et al. *BMJ* 2011;343:d4464 doi: 10.1136/bmj.d4464

Note to candidates: the paper has been reduced in length by deleting results presented in the original paper for linear regression. You will therefore not be expected to comment on the linear regression. The section on strengths and limitations of the paper has also been removed – you are expected to make an assessment of these factors as part of the critical appraisal.

1. Critically appraise the paper (40% of marks)
2. The authors report that “two-tailed t-tests with $\alpha < 0.05$ were used to test for differences...” Explain what is meant by a two-tailed t-test and why it was used in this analysis (10% of marks).
3. An initial meeting has been called to decide whether, if a pledge were signed by many chain fast-food providers, it would have a direct impact on the out-of-home calories consumed in your area and how local implementation could be further strengthened in your area – describe who you would involve and what the key areas for discussion would be. (25% of marks)
4. Following the meeting which successfully engaged the relevant participants, you are asked to write a press release (max 300 words) explaining the public health implications and a possible way to evaluate the programme.(25% 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 focused question? Is there a clear rationale for the study?

- There is a clearly focused question – measuring the impact of calorie labelling on fast food consumption
- The authors comment previously cited evidence is limited and has been conducted in experimental, rather than “real life”, settings
- There is a plausible theory as to how calorie labelling might lead to both behaviour change in the individual as well as in the food manufacturers, but neither has been tested

What was the study design and was the choice appropriate?

- A cross-sectional before- and after- study following the introduction of legislation in New York City
- Cross-sectional studies are one of the lower classifications in the hierarchy of evidence, but can provide useful snapshot of population behaviours.

Were the sources of information used appropriate?

- Information gathered was limited by the practical ways in which it was gathered.
- Till receipts were gathered from participants (customers at a range of food outlets and specific times of day)
- Self-reporting about whether or not calorie-display was used in decision about purchases
- Only looked at what was purchased, not what was eaten, and only looked at purchases at that particular outlet, so cannot comment on any changes to overall calorie intake (and hence overall impact on tackling obesity)

Was the analysis appropriate?

Presentation of results

- Results are presented in a series of tables including demographic data on participants, mean energy content pre- and post-legislation and mean energy content by use / non-use of calorie-labelling information

Precision of results

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

What were the results?

- The main outcome variable used is the difference in mean energy content between before and after the intervention
- For the overall sample, there was no reduction in calories per purchase following the introduction of calorie-labelling
- However, there were statistically significant reductions in calories per purchase at three chains
- 15% of customers reported using calorie labelling to make decisions about their purchase – women more than men, wealthier customers more than customers from poorer areas, older more than younger customers
- Customers who reported using calorie-labelling purchased fewer calories than those that did not see or use the labelling

Were all outcomes considered?

- Authors commented on the limitations of reporting calories per purchase, rather than actual consumption
- Authors also comment that not all meals were assessed in terms of overall calorie intake
- Authors comment that calorie-labelling is only one part of the approach required to tackle obesity

How valid are the findings?

- Consider bias including selection bias – only asked English speaking customers
- Power calculation reported to be 10 000 participants per study period; reported numbers of participants is lower than this.

- The increase in costs during a period of economic downturn may have been a confounding variable (this is considered in the regression analyses and as part of the strengths and limitations section but candidates do not have access to these)
- This intervention was carried out in an inner urban city area (NYC) where most people consume meals outside home, so it would not be generalizable e.g. in a rural county where most meals may be consumed at home, and there is more availability of fresh local products etc.

Are the results of clinical or public health significance?

- Authors comment that the observed reduction of calories per purchase (average of 96 calories in those customers who reported using the calorie-labelling) translates into 11% reduction in calorie intake, which could have a “substantial public health impact”

The following are additional points which might improve this answer to “good” or “excellent”

Qu 1. Critically appraise the paper

- Candidates acknowledge that the project needs to link into wider public health action plans for tackling obesity including raising general awareness of calorie content and simple measures to reduce calorie intake in all settings, not just fast food consumption
- Authors admit that it is not clear which components of the intervention actually led to behaviour change and so which merit further development / roll-out.

Qu 2. The authors report that “two-tailed t-tests with $\alpha < 0.05$ were used to test for differences...” Explain what is meant by a two-tailed t-test and why it was used in this analysis.

A test of non-directional hypothesis and was used because the authors could not be sure in which direction the effect of calorie labelling would be on calories purchased, could be increased as well as decreased.

Qu 3. An initial meeting has been called to decide whether, if a pledge were signed by many chain fast-food providers, it would have a direct impact on the out-of-home calories consumed in your area and how local implementation could be further strengthened in your area – describe who you would involve and what the key areas for discussion would be. (25% of marks)

Who to involve

- Director of Public Health (or representative)
- Colleagues from local authority – legislative / enforcement powers; working with food businesses, promoting healthy eating
- Nutritionist / experts from Food Standards Agency
- Communications
- Representatives from any wider obesity campaigns
- Representative from businesses (chamber of commerce or equivalent)
- Lay representative
- ?local research groups or university

Key areas for discussion

- Brief summary of the findings from the New York City study

- Brief summary of local epidemiology and any trends in obesity, consumption etc that are available
- Brief overview of existing projects / initiatives in the local area and the impact that they have had – including any evaluation, user feedback etc
- Identify food outlets in the local area that might be suitable – consider whether you want to do a direct replication of the study or whether the principles involved could be adapted to support local working.
- Are there known local issues re high-calorie foods that are particularly popular and might be amenable to this approach
- Practical steps – piloting, support from key businesses as well as public health stakeholders
- How will it be evaluated – outcome measures/

Qu 4. Following the meeting which successfully engaged the relevant participants, you are asked to write a press release (max 300 words) explaining the public health implications and a possible way to evaluate the programme.(25% of marks)

Key issues to include

- Acknowledge that rising levels of obesity are one of the key public health challenges for the area
- Acknowledge that tackling obesity requires a mixed / multi-faceted approach including actions at the level of society as well as individual behaviour change
- Helping people make healthy choices by providing easily available and easily understood messages about calories and the impact that they can have; present the information to people at the time that they are making their choices about what to eat
- Outline the approach that has been agreed by the working group

Examiners' comments

Overall good pass rate. The paper was not too technically difficult in terms of methodology or statistics, though it was fairly long. Candidates should not be put off by redactions which are to make the paper manageable within the time allowed. Candidates who seemed to spend too long on question 1 appeared to run out of time. Those candidates who had a well-structured critical appraisal received better marks. In general, question 3 was well answered. Some people did the press release style in Question 4 very well.

Some candidates who did not do well appeared not to understand possible bias and confounding. They did badly in how the paper interpretation and results could be generalised and their public health implications. In particular, it is important for candidates to be able to distinguish between generalizability (related to whether the study population is representative of the target population) versus e.g. selection bias (a systematic difference in the likelihood of selecting subjects to take part in the study) and confounding (which occurs when the effects of two associated exposures have not been separated, resulting in the interpretation that the effect is due to one variable rather than the other).

Q2- poor candidates could not answer: explanation of the technical terms was very poor.

Q3- minimal appropriate areas for discussion were included and / or they were not essential areas.

Q4- inappropriate content and style.

Common pitfalls

Question 1-

- a) Some did a long summary introduction of the paper, which was not asked for or necessary.
- b) Some seem to have copied and pasted from the paper the most relevant facts (e.g. objectives of the study), without any critical interpretation and so could not get necessary marks.
- c) A lot of candidates were not clear about possible bias/ confounding and generalizability of results (see comment above).
- d) Some included comments on linear regression, which were specifically not asked for and so wasted time.
- e) Sources of information/ definition of variables- not included by some and poor information for the majority, e.g. a discussion on obtaining food information from receipts and then looking at companies' website - was this accurate/ valid.

Question 2- some answered the question in relation to 2-tailed test but not a t-test as well.

Question 3- some listed everybody they could possibly think of to invite to a meeting, which in some cases was far too many for a constructive first meeting. Better candidates who had a very long list, indicated that a smaller group would be invited to an initial meeting.

Question 4- Some forgot to say how the programme would be evaluated. Some did not use appropriate style for a press release.

Paper IIB Examiners' comments

In its current 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.

There was generally a high standard of responses with some outstanding answers. There were very few uncompleted scripts and some scripts were quite verbose. Time allotted seemed adequate to allow full responses to questions.

However, some candidates struggled with statistical calculations and in the selection of statistical tests. Some candidates wrote extensively without addressing the specific exam question, or following the instructions (e.g. "in four sentences describe...").