



# Faculty of Public Health

of the Royal Colleges of Physicians of the United Kingdom

Working to improve the public's health

## PART A EXAMINATION FOR MEMBERSHIP OF THE FACULTY OF PUBLIC HEALTH

*Of the Royal Colleges of Physicians of the United Kingdom*

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

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

<b>Paper IA</b>
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**Question 1**

A study was conducted to determine the association between *per capita* alcohol consumption and mortality rates from coronary heart disease (CHD) in ten countries in Europe. The investigators found a positive correlation between *per capita* alcohol consumption and CHD mortality.

- a) What type of study design was used in this investigation and what are its characteristic features?  
(40% of marks)
- b) Discuss the limitations of this type of study design using the example above to illustrate your answer.  
(30% of marks)
- c) Give three plausible explanations for the observed correlation between *per capita* alcohol consumption and CHD mortality.  
(30% of marks)

**KEY POINTS**

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

- a) This is an example of an ecological study.  
Key features of ecologic studies:
1. Ecologic studies compare aggregate (population or group-level) exposure and disease data across different populations over the same time period or within the same population over time.
  2. They are excellent for generating hypotheses.
  3. They are generally inexpensive and quick to conduct when data on exposure (e.g., per capita consumption of alcohol) and disease (e.g. incidence/mortality rates, prevalence) are routinely available.
  4. They can be used to evaluate the impact of public health interventions, when it is not feasible to undertake a trial, by comparing aggregate-level information before and after the intervention, for example, fluoridation of drinking water and dental caries; seat belt law and road traffic accidents.
- b) Ecologic fallacy or ecologic bias – these terms refer to fact that the association between exposure and disease on a group basis does not necessarily imply an association on an individual basis. An average measure of exposure and outcome are used, not individual level consumption or CHD death. For example, it may be that only a small proportion of the population drink very heavily so overall the population has a high consumption but low mortality.

These studies are subject to confounding. Information on potential confounder(s) at an individual level cannot be taken into account and may not be available. In this particular study, smoking, gender, socioeconomic status would be possible confounders.

Routine data on the exposure of interest might not be available and then proxy measures are used – an example would be if revenue from alcohol tax was used to estimate alcohol consumption.

This type of study cannot establish temporality.

It can be difficult to identify non-linear or more complex associations such as j-shaped curves which might be of interest in a study of alcohol consumption.

- c) A positive association suggests that as per capita alcohol consumption increases mortality from coronary heart disease increases. The possible explanations for this are:
1. This may be a true association between CHD and alcohol consumption or the “explanatory variable” is correlated with an underlying “real variable”, e.g., affluence/socioeconomic status leading to a higher consumption of meat and dairy products as well as a higher alcohol consumption;
  2. A confounding variable, e.g., smoking might be present and not adjusted for;
  3. This may be a chance finding, the sample size (countries are the units of analysis) is small in this study.

## EXAMINER COMMENTS

Most candidates performed satisfactorily on this question; most were able to identify the study design and were aware of the design features. A few candidates performed very badly but conversely a few did very well.

Those who did less well tended to outline general study design issues and did not focus their answers on the study design or the research study particular to this question; thus they often included points in their answer which were not pertinent to the question. Candidates tended to discuss methodological limitations in general terms and did not elaborate on why this was a particular issue in this study or study design. For example, most stated that confounding was a limitation but failed to discuss that this is a particular problem in this situation because information on confounders is usually not available at the appropriate level. Furthermore, candidates were asked to illustrate the limitations of the study design using the particular study outlined in the question but many did not.

Those candidates who achieved higher marks demonstrated not just knowledge of study methodology, but an understanding of key methodological issues pertinent to this study design through relating these to the particular study outlined in the question and discussing the implications for interpreting study results.

## Question 2

You are designing a randomised controlled trial to test the effect of dietary advice on serum cholesterol. You approach a statistician to assist with the sample size calculation.

- a) What information would you need to provide to, and discuss with, the statistician?  
(60% of marks)
- b) Where would you get that information from?  
(20% of marks)
- c) In this study you are likely to identify a reasonably large standard deviation (relative to the mean) and you are likely only to expect a small change to occur in the intervention group. What are the implications of this for the design of the trial?  
(20% of marks)

## KEY POINTS

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

- a) Outcome: you would need to define the comparison to be made; any of the following would be acceptable:
- a comparison of mean serum cholesterol in both groups at follow-up
  - a comparison of mean change in serum cholesterol observed in both groups over follow-up
  - a comparison of mean serum cholesterol in both groups at follow-up adjusted for baseline serum cholesterol levels

The simplest is a comparison of mean serum cholesterol at follow-up. For this the statistician would require estimated mean serum cholesterol in the population your sample is drawn from. The standard deviation expected in your sample groups. The smallest clinically relevant difference in mean serum cholesterol that you believe could be observed.

You will also need to specify:

Power (or 1- beta): i.e. the proportion of such studies of the defined size where you would show a statistically significant difference where such a difference truly exists. Generally, this is now recommended to be set at 90%, though in the past this was often set at 80%.

Significance level (alpha): i.e. the proportion of studies of the defined size where you would detect a statistically significant difference between groups when such a difference does not truly exist. This is generally set at 5% (i.e.  $p=0.05$ ).

b) Power and significance level are standard and specified by the investigator  
The mean and standard deviation for cholesterol level for the population you wish to study may be available from:

- up-to-date literature review
- local surveys
- local primary care data if you are seeking to recruit from a primary care or community population
- hospital data if you are seeking to recruit from a hospital population

Data on smallest clinically meaningful difference – this is a judgement, but reasonable values for this may be provided by a literature review, where values used by other researchers in their

sample size calculations should be reported, and/or the change in cholesterol identified by similar types of interventions.

c) A reasonably large standard deviation (relative to the mean) and small effect will inevitably lead to you identifying the need for a very large sample size, making such a study very difficult to undertake in one local area alone. Hence, you are likely to need to develop a large, multi-centre trial to evaluate your intervention. Large trials are expensive. It can be difficult to recruit a number of centres. A multicentre trial will need additional trial administration for training of sites, co-ordination and monitoring of adherence to protocol which further increases the costs.

*The following are additional points which might improve the answer to 'good' or 'excellent':* Understanding shown of the meaning of the terms "power" and "significance level"; investigators often calculate a variety of sample sizes varying the various input parameters (including power and statistical significance), thereby allowing for variation in these from the values that are anticipated.

## **EXAMINER COMMENTS**

Most candidates performed satisfactorily on this question; most candidates correctly identified the statistical issues such as power, significance level and effect size. A few performed very badly; likewise only a few did very well.

Very few candidates defined outcomes that would need to be measured or stated that the mean was an important measure and candidates seldom considered the feasibility issues of increasing sample size, the expense, or the possibility of a multicentre trial. Candidates described principles but seldom drew upon these to inform the design considerations of the proposed study.

### Question 3

Write short notes on the epidemiology and control measures for the following two conditions in a named country of your choice:

- a) Hepatitis B (50% of marks)
- b) Scabies (50% of marks)

### KEY POINTS

#### a) Hepatitis B

#### Epidemiology

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

- Approximately 700 cases per year in UK and carriage rate of 1-2/1,000. In endemic areas (Africa, SE Asia) carriage may rise as high as 10%. 20% children and 30-50% adults have icteric disease. 15-25% with chronic infection progress to cirrhosis/hepatocellular carcinoma. Hepatitis B is a statutory notifiable disease in the UK.

Vertical transmission is the commonest route worldwide. Around 10% adults but around 90% infants, if infected, become carriers. In low endemicity countries (e.g. UK) transmission mainly occurs by sexual transmission or by blood to blood contact, mostly in young adults in high risk groups. In low endemicity countries 90% fully recover and have life-long immunity.

- Viral hepatitis has been a statutory notifiable disease in Hong Kong since 1974. Virtually all of the notified cases are acute viral hepatitis. The number of reported hepatitis B virus (HBV) infections has been relatively stable over the last decade, with an apparent drop to below 100 cases a year in recent years.
- In Southeast Asia (including Hong Kong), the overall prevalence of chronic hepatitis B infection is high (>8%).

#### Control

- Adequate public health surveillance (notifiable in UK). Adequate access to laboratory diagnoses should ideally be established.
- Screening of blood and organ donations.
- Adequate sterilisation of invasive equipment (including that used in non-healthcare settings, e.g. tattooists). Safe disposal of 'sharps'.
- Identification and vaccination of those at risk (infants born to mothers who are carriers, sexual contacts of cases/carriers, occupationally exposed) or those who may pose a risk to others (e.g. health care workers performing invasive procedures). Hong Kong implemented a universal hepatitis B vaccination programme for newborns.
- Advice on breast feeding for hep B positive mothers

- Education regarding safer sex and needle sharing.
- Universal precautions practiced by health care workers.

*The following are additional points which might improve the answer to 'good' or 'excellent':*

- Discussion of case for universal childhood vaccination and/or universal antenatal screening.
- In Hong Kong, several features about the current pattern of hepatitis B virus (HBV) infection can be observed from the serologic investigations, namely (a) chronic HBV infection is in a general declining trend, (b) HBV prevalence increases with increasing age, and (c) chronic HBV infection is commoner in male than female.

## **b) Scabies**

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

- Skin infestation with a 30-year cycle of pandemics by mite (*Sarcoptes scabiei*)
- Reservoir : Humans
- Commoner in tropics, but universal
- Commoner in females than males (3:2 ratio)
- Sensitisation with irritation after 4 to 6 weeks
- Itching may be intense, especially at night
- Can affect whole body surface, but including head and neck in infants
- Close or family contact required for spread via prolonged, direct contact with infested skin
- Can also be acquired during sexual contact
- Commoner in long stay homes and mental hospitals
- Diagnosis with hand lens or microscopy of scrapings
- Machine clothes washing with detergent kills the mite
- Period of communicability: until mites and eggs are destroyed by treatment
- Treat patient and household contacts with topical permethrin, malathion or benzyl benzoate. Two treatments one week apart are required.

*The following are additional points that might improve the answer to "good" or "excellent":*

- Treatment is undertaken in a co-ordinated mass basis.
- After treatment it may take 3 weeks before itching stops.
- Pandemics in 1918, 1945 and 1980s/1990s
- Not related to poor hygiene.
- Norwegian scabies, also known as "crusted scabies" – highly infectious as difficult to treat

## **EXAMINER COMMENTS**

In general candidates did not present their answers well and many answers would have benefited from greater structure and the use of sub-headings. The answers relating to Hepatitis B were in general better than for Scabies with answers to the former being more structured and covering most essential points. Answers to the latter generally lacked depth. There was some confusion in some cases with the features of other infections. Candidates who tended to do less

well provided points relating to all aspects of the two infections rather than concentrating on the epidemiological and control features; such a 'scattergun' approach is discouraged since only points relating to the specific question asked attract credit.

## Question 4

An individual undergoes a routine screening test for a particular cancer. She can be thought of as a typical member of a population in which the prevalence of the cancer is 1/500.

The test has a sensitivity of 98% and a specificity of 94%.

- a) What information should be given to this woman to ensure fully informed consent before she has the screening test?  
(30% of marks)
- b) This woman is told that the result of the test is positive. She is very worried, and says that obviously it is 100% certain that she has the cancer. Using the information provided calculate and advise her what, in fact, is the probability that she has the cancer.  
(20% of marks)
- c) In your view, is this particular test suitable for use in screening the population for the cancer? Justify your answer in concise notes.  
(50% of marks)

## KEY POINTS

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

For ease of calculation and interpretation, we construct a table, for 50,000 representative people in the population group:

	disease +	disease -	total
test +	98	2994	3092
test -	2	46906	46908
total	100	49900	50000

Using the facts that 1 person in 500 has the disease; 98 of the notional persons will test positive; and 6% of the 49900 without the disease will test positive)

- a) Include:
- Details of the test and any possible side-effects
  - The likelihood that a positive test will be a false positive (in the absence of specific risk factors)
  - The possibility that disease which is present will not be detected (false negative)
  - The possible need for further tests and the possible delay
- b) The probability that the individual who is tested positive has the disease is 98/3092, i.e. approximately 3% (3.2%).
- c) Either “yes” or “no” could be justified, depending on associated circumstances (credit will be given for a coherent argument for either answer). Reference to Wilson and Junger Criteria are expected. Relevant points in the argument will cover:
- standard points about screening tests: existence of effective treatment for disease detected, importance of health problem, acceptability of test, overall cost benefit ;
  - personal and health consequences for individuals of false positive (and false negative) test results: as shown, about 97% of those tested positive will turn out to not to have the disease, and may suffer anxiety and additional interventions while this is established;

- organisation and management (and opportunity cost) of overall screening programme within the test is just one component.

*The following are additional points which might improve the answer to “good” or “excellent”:*

- Depends on the precise population group designated to be screened (for example, age range)
- Explicit mention that (b) is the positive predictive value
- Mention or demonstration of sensitivity of predictive values to precision of sensitivity and specificity, which are often not known accurately.

## **EXAMINER COMMENTS**

Answers to this question were rather mixed with some candidates giving well structured answers demonstrating clear understanding of the issues relating to screening tests. Poorer candidates tended to give answers lacking in structure and failing to demonstrate good understanding of the issues being discussed. A substantial number of candidates did not calculate the positive predictive value correctly and as this is a fundamental quantity in assessing the validity of a screening test this was surprising.

## Question 5

The table below shows the number of deaths and the direct age-standardised death rate (deaths per 100,000) from accidents in men aged 65 and over for the years 1995-97, in eight regions making up a country of 45 million people.

Regions	Number of deaths	Age-standardised death rate per 100,000 men
A	807	67.99
B	639	64.37
C	625	61.88
D	669	55.27
E	676	48.69
F	822	54.77
G	668	68.16
H	728	59.75
Country	5634	59.43

- a) Outline how the direct age-standardised death rates were calculated. (30% of marks)
- b) What are the limitations of the data in giving a picture of accidents in older people? (35% of marks)
- c) How would you, as a public health practitioner, monitor this aspect of the health of older people? (35% of marks)

### KEY POINTS

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

- a) Candidates are expected to have a clear understanding of the mechanics of age-standardised rates. These are 65+ men and so the process would be:
- Select suitable age bands, say 65-69 ... 80-84 ... 85+
  - Calculate the age-specific death rates for each of the age bands
  - Apply these stratum specific rates to a standard population. This could be the national population, or more conventionally a 'made-up' standard population such as the European standard population.
  - The calculated number of deaths in the standard population is then divided by the population size to give the standardised death rate.
- b) Limitations of approach: The exact figure arrived at depends to some extent on the standard population chosen. Hence it may be best to stick to an accepted standard such as the European standard reference population. If the true age distribution of any one region is markedly different from the standard then the results may be misleading. Standardised rates do not have intuitive meaning for lay people. Their main use is to allow a fair comparison across areas or over time intervals.

Other limitations: These are death rates, and the basis for such data is the death certificate. Certification practices tend to vary a great deal and whether or not a death is ascribed to an accident depends upon the accuracy and completeness of the information provided in the

certificate. Many more accidents occur in the elderly than result in deaths attributable to them. Hence death rates provide only a limited picture of the burden of morbidity due to accidents in the elderly

- c) Monitoring this aspect of the health of older people:
- Carry out the same direct standardisation exercise (including calculation of confidence intervals) retrospectively, in both males and females, to establish trends over time at both regional and national level. For monitoring purposes undertake the same exercise prospectively – for, say, a five-year period.
  - Formally compare age-standardised death rates from accidents in a comparable elderly population (e.g., a neighbouring country).
  - Analyse relevant, routinely-collected data from other sources (e.g., hospital in-patient datasets, A&E department records, and nursing home reports).
  - Where appropriate, commission special surveys of the local elderly population.

## **EXAMINER COMMENTS**

There were a few very good answers to this question but overall the standard was generally poor. Candidates who performed well tended to have a sound technical understanding of the construction and use of age-standardised death rates, the importance of monitoring trends over time, and the use of other surveillance systems to monitor accidents among older people. They also give a strong indication that they understood the importance of the quality of the data underlying mortality rates and that this derives from death certification data which can be of variable quality.

A surprising number of candidates were wholly unable to outline how age-standardised rates are calculated. A variety of techniques were offered, including summing the rates, proportional mortality, or SMRs; many candidates confused direct and indirect age-standardisation. Poor marks on this technical section of the question meant that many candidates failed the question overall even though they gave adequate answers for the other two sections. Few candidates were able to point out the fact that death rates provide only a limited picture of the burden of morbidity from accidents in the elderly.

## Question 6

What are the public health principles that should guide the creation of a health outcome indicator? Illustrate your answer with an example.

### KEY POINTS

1. Is the indicator important and relevant?
  - a. Does the indicator measure a sufficiently important question or service?
  - b. Is it part of a balanced set of indicators, since very rarely will one single indicator be sufficient
  - c. Will the set of indicators provide an overall picture of the service/outcome you wish to assess and provide a framework for improvement
  
2. Is the indicator valid (ie. does it measure what it sets out to measure)?
  - a. Some indicators may claim to measure a crucial part of the system but in many cases fail to do so
  
3. Practical Issues
  - a. Are the data available which are sufficiently up to date and accurate to provide the basis for an indicator?
  - b. Will the cost in constructing and utilising the indicator outweigh the benefits?
  - c. Is there a clear method for constructing the indicator?
  
4. Meaning
  - a. Will the indicator be able to detect and display variations (or trends) that are sufficiently important enough to warrant further investigation?
  - b. Can the indicator be deconstructed in order that it is clear what can be done to improve the service or outcome being measured?
  - c. Is it clear what are important outliers and when to proceed with further investigation?
  - d. Will the target audience/stakeholders be able to understand the indicator?
  
5. Implications
  - a. Is the system able to respond to change to improve?
  - b. Is the indicator likely to introduce any perverse incentives or unintentional consequences?
  - c. Can the indicator be monitored frequently enough to ensure change can occur earlier rather than later?

Candidates would be expected to discuss the advantages and disadvantage of their chosen indicator against the criteria in the earlier part of their answer.

### Examples

1. Is suicide a good indicator of mental health?
2. Is life expectancy a good indicator of overall health and wellbeing?
3. Infant mortality rates are often used as an indicator of health inequalities.

Candidates would be expected to discuss the advantages and disadvantage of their chosen indicator against the criteria in the earlier part of their answer.

## EXAMINER COMMENTS

The concept underlying this question represents one of the cornerstones for public health. Candidates need to think what they would practically do in the real setting, rather than just writing down key words from textbooks.

The question asked for the answer to be illustrated using an example. Candidates who performed well were able to show how their chosen example indicator could be influenced in terms of its construction, meaning and usage.

Candidates who did less well on this question tended to concentrate on the policies and interventions that would be required to achieve a particular health outcome, rather than considering the usage and meaning of health outcome indicators; a small number appeared to miss the point of the question completely. A number of candidates used only 'SMART' which was insufficient to answer this question. Others gave examples that were irrelevant to the question. Very few mentioned the costs of constructing indicators in relation to their benefits, or the perverse incentives that may arise from their use. A small number of candidates did not give any example of a health outcome indicator and thereby missed a substantial number of credit points.

<b>Paper IB</b>
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**Question 7**

Outline how the concept of 'labelling' may be relevant in relation to the consequences of genetic screening.

**KEY POINTS**

*Most of the following would be required for a pass:*

- Labelling occurs when individual attributes and characteristics are identified by others and given a negative label.
- Becker's original work in 1963 on labelling theory (also called Social Reaction Theory) showed how the audience for our behaviour/state is important in the creation of identities.
- Self identity and behaviour of society may be determined by the terms which describe them and is associated with the concepts of self fulfilling prophecy and stereotyping. Genetic labelling can lead to 'secondary deviance'. The public identifying a person as 'deviant' can lead the person to change their behaviour. Thus the label constitutes a self fulfilling prophecy and may lead to changes in persons behaviour e.g. in relation to reproduction.
- The disease label has the power to spoil the sufferer's identity, both personal and social. The social stigma that occurs because of labelling results in discriminatory experiences (enacted stigma) but also changes the persons self identity (felt stigma). For example, even if we claim confidentiality over our genetic information we cannot hide the discrediting attribute from oneself.
- Genetic labelling could, in social terms, represent a way of differentiating and identifying people that could lead to a form of prejudice and discrimination.
- The issue of labelling in genetic disease emphasises the ethical, social, economic and political aspects of this form of screening and it may be that disbenefits to individuals could outweigh benefits e.g. unable to get life insurance. The framing of informed consent in genetic screening is especially important.
- Ways of reducing the negative aspects of labelling or stigma associated with genetic screening include raising population awareness and genetic counselling.

*The following are additional points which might improve answers to 'good' or 'excellent'*

- Consider how much do we actually know about what is and isn't genetic?
- Labelling effects, in relation to genetic screening are still under researched. However, there appears to be a phenomenon of 'non carrier/non affected guilt'. This is seen for example, in those who turn out not to carry the Huntington's disease gene.
- Genetic labelling carries implications for relatives and reproduction.

**EXAMINER COMMENTS**

This question was generally adequately answered although there were very few good or exceptional answers. The question was about applying a sociological concept, in this case labelling and its consequences, to a health intervention, in this case genetic screening. Candidates who performed well were able to describe both the concept of labelling and genetic screening and apply the former to the latter with clarity and demonstrating understanding of each concept and the relationship of one to the other. Candidates who performed less well tended to describe labelling and genetic screening separately but failed to discuss how the former might apply to the latter. Furthermore, a detailed discussion about the genetic basis of disease and the mendelian and non-mendelian inheritance patterns was not necessary for this question and resulted in time wasted making points which did not attract credit since such a discussion did not answer the question directly asked.

## Question 8

- a) Describe the approach to priority-setting known as 'programme budgeting and marginal analysis'. (60% of marks)
- b) Discuss the value of this approach. (40% of marks)

### KEY POINTS

*Most of the following would be required for a pass:*

- a)
- Programme budgeting and marginal analysis (PBMA) involves planning and allocating expenditures across health programmes and allocation of resources between prevention, primary, secondary and tertiary care. The goal is to balance spending across disease areas to ensure an appropriate balance is attained for the population covered.
  - The approach includes identifying the following:
    - How much do we spend and what sort of outputs and outcomes do we see?
    - How do we compare with other health bodies/authorities (spend, productivity and efficiency)?
    - What are the programme objectives (prevention, rapid diagnosis and treatment, support for patients and their carers)?
    - How can we deliver programme objectives with the given level of resources?
    - Marginal analysis informs the direction of travel – added (lost) benefits and added (lost) costs of a proposed change in the allocation of resources.
- b)
- PBMA is a tool for managing scarcity of resources and competing demands. It is an economics based approach to managing finite resources.
  - Meeting the health needs of a population and improving health within a finite budget is a challenge for many health systems, but is a challenge which it is essential to address.
  - PBMA assumes rational behaviour i.e. the decision maker chooses the course of action that offers the highest ratio of marginal benefits to marginal costs.
  - PBMA can be used to address both technical efficiency and allocative efficiency.
  - Problems with the PMBA approach include variable coding of data by healthcare organisation, year on year differences in the way the programme budget information is collecting, hence reducing the ability to compare year on year trends.

### EXAMINER COMMENTS

This question was generally not very well answered. The candidates who performed well showed an understanding of how PBMA can be used in practice and demonstrated a clear train of logic and understanding in well structured answers; however, such answers were few and far between. Candidates who performed less well tended to discuss PBMA as if it were simply a budgetary tool and did not appear to understand the basic premise of PBMA as a health economics tool which is to understand spending in the context of output/outcome. Such answers failed to demonstrate thought, assessment and appropriate application of the concepts. The value of the PBMA approach (part b) was particularly poorly answered and despite attracting 40% of the credit, very short answers were frequently provided. Candidates are reminded to use the distribution of marks as an indication of the effort required on different sections of particular questions.

## Question 9

The head of your organisation is strongly in favour of environmental sustainability and has asked you to develop a sustainable development programme for your organisation which is currently facing significant financial challenge

- a) Define 'sustainable development' and explain how this is related to health (30% of marks)
- b) Describe how you might implement this programme successfully, choosing one organisational change management theory to do so (40% of marks)
- c) Show, giving examples, how you would use an appropriate management tool to overcome possible barriers to its implementation (30% of marks)

### KEY POINTS

- a) A standard definition (10% of marks)

Examples are 'meeting our needs today without compromising the ability of others to meet their needs tomorrow' or 'leaving the planet behind us in a condition fit for our ancestors to inherit'

3 components:           Financial / economic  
                                   Social  
                                   Environmental

Relationship to health: (20% of marks)

-through climate change:

- stormier weather: flooding (mental health, drowning, financial insecurity, loss of shelter); wind and gales; disruption to transport systems; tropical storms, hurricanes etc.
- warmer weather: vector-borne diseases (e.g. malaria); air pollution (COPD, asthma); food poisoning (poorly cooked BBQ food); reduction in winter excess death (significant improvement in population health); heat waves (heat excess deaths due to inadequate ventilation, dehydration).
- agronomics- food insecurity; droughts; famines; floods.

-unhealthy activities are often carbon intensive

- reliance on car travel;
- high red meat consumption.

-health service provision has a high carbon footprint

- large estates to manage: opportunity for carbon reduction.
- major contributor to traffic congestion in developed countries.
- major procurer of goods, esp. food, drugs.

examples and case studies might include e.g. Freiburg,  
 Lancet series 2010 (climate change is biggest global threat to health)

- b) Appropriate credit will be given for any appropriately mentioned and described change management theory.

Examples include:

- Force field analysis (+/- unfreeze, change, freeze)
- ADKAR model (awareness, desire, knowledge, ability, reinforcement)
- Beckhard change equation (dissatisfaction, vision, first steps to change)

Demonstrate an understanding of the role of stakeholders in developing and implementing health policy and strategy; different approaches used in stakeholder engagement and the facilitators and barriers.

c) Appropriate credit will be given for any appropriately mentioned and described management tool, such as

- PESTELI
- SWOT
- PDSA

Good answers will include mention of the following enabling factors:

- legal (e.g. Climate Change legislation)
- financial (e.g. improved insulation, building design, use of biomass, reduced travel costs to organizations)
- public health (physical activity, diet, mental wellbeing)
- workforce (healthier if walk and cycle more, organizational sign up and involvement)

Points relating to-

- environment, buildings or system design that could facilitate the changes;
- accountable governance structure

### **Hong Kong specific comments:**

HK does not have many incentives to hospitals/ health services but there are some initiatives applicable to all industry/individuals recently.

The Government is offering funding scheme as an incentive for owners to conduct energy-cum-carbon audits in the public areas of their buildings, and if they so choose, followed by enhancement works. This funding scheme have resulted in electricity saving.

Next year, the Building Energy Efficiency legislation will come into force to stipulate the energy efficiency standards of new buildings, as well as existing ones undergoing major renovation works. At the same time, the Hong Kong Green Building Council is developing Hong Kong's standard of building energy efficiency to accredit the top performers in the field.

Incentives are being given to encourage the early replacement of the more polluting vehicles. E.g. tax reduction is applicable for environmental friendly cars (Hybrid).

The environmental levy scheme (paid by customers) on plastic shopping bags is implemented to discourage the indiscriminate use of plastic bags.

The HK Government initiated the 'Green Hong Kong Campaign'. It focuses mainly on Educational Activities, Community Activities and there is not much high level concrete policy to take forward further actions.

**EXAMINER COMMENTS:**

This question was generally well answered. There were some good definitions of sustainable development. A few answers were excellent and some of the better answers included the enabling factors of public health and workforce. Candidates who performed well clearly demonstrated that they understood the differences between a management theory and a management tool. Of the three sections, the second part of section (a), explaining how sustainable development is related to health, was least well answered with few candidates able to identify the impact of warmer weather, agronomics and high red meat consumption; many applied a narrow definition of sustainable development, mainly around 'green' offices. Some candidates appeared specifically to have misunderstood Gleicher's formula. Very few answers demonstrated an understanding of the role of stakeholders. Candidates who performed less well confused management theories and with management tools and tended to take a 'scattergun' approach in relation to management theory.

## Question 10

Road traffic injuries are the leading cause of death globally among 15–19 year-olds, with those from economically poor backgrounds at greatest risk. The World Health Organisation recommends a 'systems approach' to road safety which considers risk factors related to the road and its environment, the road user and the vehicle.

In a named country of your choice, describe how you would set about reducing the burden of health inequalities caused by road traffic injury to adolescents using a systems approach.

### KEY POINTS

*Most of the following would be required for a pass:*

- Define a systems approach
- Name the country and explain the inequalities context
- Bringing together key interest groups
- Assessing the evidence and prioritising actions which would maximise influence
- Mapping the influences (local, national, global)
- Designing interventions which implement effective strategies using examples of enforcement, engineering and education
- Mention risk factors relating to road, environment, road user and vehicle (social & behavioural)

*The following are additional points which might improve answers to 'good' or 'excellent'*

- Social marketing approaches used to segment the key messages to particular populations
- Burden of injury disproportionately borne by vulnerable road users (pedestrians cyclists and powered two-wheelers)
- (in developing countries) increasing rates of injury as motor traffic increases
- (in developed countries) fatalities generally reducing, but morbidity rates remain high.
- (in rural communities) fatalities to young drivers and to cyclists
- Data from death reviews may provide insights
- 'Years of life' and 'disability-adjusted life years' lost because of relative youth of road collision victims
- Recognition of need to guard against perverse consequences of interventions (e.g. pedestrian underpasses may be perceived as more risky than crossing the road)
- Recognition of power imbalance between perpetrators and victims of road collisions
- Reference to specific evidence relevant to jurisdiction of choice
- Balance of arguments- e.g. pilot projects to remove street furniture
- Role of insurance schemes

### EXAMINER COMMENTS

Answers to this question were generally very disappointing with answers focused on very specific points for example, many candidates approached this entirely from a health promotion perspective, ignoring the need to take a systems approach. There were a few good answers where candidates were able to define a systems approach and went on to use a framework that assessed the problem, analysed the data, identified key stakeholders and the need to work in partnership and then went on to identify key themes, challenges and implementation using local and national levers. Few candidates framed their answers around health inequalities reduction. In general candidates who performed less well gave answers containing too much of 'what' and

not enough 'how'; and these candidates tended to structure their answer around the wording in the question - risk factors grouped into environment, the road user and the vehicle and listed the potential risk factors and possible interventions. Whereas answers that began by defining a system approach were generally then framed to meet the requirement of the question.

<b>Paper IIA</b>
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You are working in a public health department covering a population of 250,000. Your area has a very deep water-filled gorge, spanned by a suspension bridge that is over 75 metres high. Every year there are a number of suicide jumps from the bridge with a case fatality of 95%. The director of a national charity which counsels people at high risk of suicide has written to you requesting that action is urgently taken to erect a barrier at the bridge. The director points out the high case fatality and states that there is strong evidence that preventing access to lethal means is a highly effective measure to reduce acts of suicides. You have recently read the following published paper:

*Sinyor M, Levitt AJ. Effect of a barrier at Bloor Street Viaduct on suicide rates in Toronto: natural experiment. BMJ 2010;341:c2884. doi:10.1136/bmj.c2884*

1. Write a critical appraisal of the paper. (40% of marks)
  
2. Outline the key points you would include in a letter of response to the national charity. Include consideration of the main findings of the published BMJ paper as well as relevant local policy issues. (30% of marks)
  
3. A decision is made to consider safety measures at the bridge for the prevention of suicide by jumping. Who would you invite to join a working group to discuss this and what information would you prepare ahead of the meeting to present to the working group? (30% of marks)

## Key points

### **Q1. 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: Prior to the study it was not known whether the barrier had any impact on Toronto's overall rate of suicides and on the rate of suicides by jumping
- Aim of the current study is clearly defined: to determine whether suicide rates had changed and whether or not there was any substitution of locations or means of suicide.

*What was the study design and was the choice appropriate?*

- Ecological time series analysis. The authors assessed annual rates of suicide by jumping at the Bloor Street Viaduct from 1993 to 2001 (nine years before the barrier) and from July 2003 to June 2007 (four years after the barrier).
- An ecological study is appropriate for assessing the impact of public health interventions but limitations in ascribing causality must be recognised.

*Were the sources of information used appropriate?*

- Coroner's records covering the study period were examined with clear inclusion criteria. Important was a clear case definition: the cause of death had to be ruled as suicide with a high degree of probability.

- Data provided were for the whole of Ontario allowing investigation of substitution of locations or means of suicide and sociodemographic information allowed subgroup analyses.
- Census data were obtained at 5 yearly intervals – this is appropriate to estimate population growth and calculate suicide rates corrected for changes in population over time.

#### *Was the analysis appropriate?*

- Poisson regression analyses is appropriate for the analysis of rates; it uses all data points; and allows for serial autocorrelation.

#### *Presentation of results*

- Data are presented graphically to display the temporal trends in relation to the barrier construction. A table displays the mean annual number of suicides after versus before the barrier by location and method. Incidence rate ratios (IRR, comparing after versus before the barrier) are presented. The IRR indicates the % reduction in suicides per annum after the barrier versus before the barrier.

#### *Precision of results*

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

#### *What were the results?*

- Although the barrier prevented suicides from the bridge - deaths fell from 9.3 a year to zero ( $p < 0.01$ ) - this had no effect on the rates of suicide by jumping in the region as a whole ( $p=0.95$ ) (although suicide rates overall fell). There was a possible compensatory rise in suicides from other bridges (IRR = 1.64 (1.13 to 2.39);  $p = 0.01$ ).

#### *Were all outcomes considered?*

- Yes. The authors appropriately examined annual suicide rate in the whole of Ontario, and Toronto by jumping from other bridges/buildings; and suicides by other means.

#### *How valid are the findings?*

- Consider bias, chance, and confounding.
- Study takes advantage of a natural experiment.
- Case-ascertainment: all suicides come to the attention of the coroner but records may have been incomplete or inaccurate and the outcomes biased by location of the body.
- There were a relatively small number of suicides from the Bloor Street Viaduct (about 9.3 a year before the barrier; <4% of suicides in Toronto), so it is difficult to draw conclusions about the net effect of the barrier on suicide deaths overall.
- Figure 2 suggests that suicides from other bridges may have been increasing in the years before the barrier was erected. Thus, the rise in suicides from other bridges may have resulted from an increase in the popularity of bridge jumping rather than substitution (ecological fallacy).
- Any reductions may have been masked by uncontrolled confounding.
- It is unclear whether the barrier spanned the whole bridge.
- The authors point out that other studies of bridge barriers (with similar sample size limitations) have been more favourable e.g. Clifton Suspension Bridge. The differences may be explained by the fact that studies of bridge barriers may not be generalisable: e.g. Bloor Street Bridge may not have had the notoriety like icons such as the Golden Gate.

#### *Are the results of clinical or public health significance?*

- Means restriction may not work everywhere but evidence suggests it does work in some circumstances.
- Suicide barriers reduce the number of people who witness gruesome, public suicides and the kind of high profile coverage of these violent deaths that may, in turn, trigger additional suicides.

### **Q2. Letter of response**

- Use of appropriate language for correspondence
- Thank the charity for their interest and acknowledge the local problem
- Give brief summary of findings highlighting the key points (not just re-doing the critical appraisal) and results: how applicable to local situation, any key limitations, any practical issues re implementation?
- Consider paying more attention to the results of other favourable studies, if your local bridge is regarded as a 'suicide magnate.'
- Acknowledge the often public nature of a death by jumping (distress to witnesses who can be traumatically affected).
- Point out that other interventions have had a major impact (e.g. restriction on paracetamol pack sizes).
- Suggest undertaking audits of suicide sites, not just at the suspension bridge e.g. railways.

### **Q3. Working group**

Identify key players and the importance of engaging appropriate professionals and other interested parties/how to engage them

- Consider inviting: Chair of group – possibly DPH or PH consultant; Structural engineers; architects; police (negotiation team); ambulance; local psychiatric unit; A&E; trustees of the bridge; local government representative.

Recognise the challenge of having a manageable size group to take work forward/versus engaging all interested parties. One suggestion might be to have a "workshop" to start the work/gather ideas about local issues then identify a smaller working group to develop a possible action plan etc

Preparing for the meeting:

- Briefing paper outlining the context and the key findings from the paper for the meeting
- Relevant local information
- Results of any local audits
- Terms of reference for the group
- Suggested timescale for the work of the group

## EXAMINER COMMENTS

Few candidates performed well. The critical appraisal answers on the whole were reasonable but as in previous sittings, candidates often repeated or paraphrased the text of the paper they were supposed to comment on. Often instead of giving relevant comments, time was wasted in writing in more general terms about issues involved, the so called 'carpet bombing' response which attracted few marks.

Some candidates appeared to have a poor knowledge of basic statistics. Several stated that methods used were appropriate for the study being carried out, without saying why. It is insufficient to state that t tests were used to examine the difference between variable means of interval (continuous) data and chi-square on categorical variables without stating the variables being referred to. It is insufficient to write vague statements, such as "coding issues may have introduced bias" – a better answer would state clearly how such a bias may operate, whether it is differential or non-differential and the effect the bias could have on the results, if any. Rather than state "occupation and social class may be confounders", a better answer would explain the exact nature of the confounding (trends in alternative explanations that were associated with the time of the barrier erection).

It was obvious from the majority of answer papers that candidates left themselves with insufficient time to answer the second and third parts of this paper, which attracted 60% of the marks available. There was a sense that candidates left too little time for sections 2 and 3 but that there would have been enough time if they had divided up their time in accordance with the marks available for each section. Time wasted in not keeping to relevant comments in section one would have resulted in less time available for sections two and three.

The majority of candidates performed poorly in answering section three concerning the setting up of a working group. It was evident from their answers that many had little experience of doing this, which would suggest that they are either taking the exam before they are ready to do so, or they are not involving themselves sufficiently in this aspect of basic public health work.

Letters of reply to the charity (although not specifically asked for, only key points were required) when provided were often of a patronising nature despite candidates saying that they would avoid this. A lack of experience of professional letter writing was often evident.

## **Paper IIB**

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

### **General observations on the performance of candidates**

Overall the performance of candidates was about average compared to previous sittings of the new format Paper IIB. As in previous sittings, while most candidates gave reasonable answers to data interpretation, a number struggled with carrying out simple analysis (even to the extent of not being able to add numbers together correctly) and describing some of the key concepts in epidemiology.

### **Advice from examiners**

Candidates need to:

Brush-up on which statistical tests are appropriate for which specific type of data;

Brush-up on basic epidemiological definitions and terms;

Manage their time better between questions;

Ensure precision and brevity in their answers rather than extensive details; that is, candidates need to concentrate on answering the questions asked and not providing additional unnecessary detail since the latter will not attract credit in this tightly marked paper.