

MFPHM PART I EXAMINATION

EXAMINERS' KEY POINTS AND COMMENTS

JUNE 1998

N.B: Please note that these are Key Points, not model answers.

PAPER I

1. Describe the epidemiology and control measures, in a named country, for two of the following three:

- a) Rabies
- b) Scabies
- c) Influenza.

a) Rabies

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

- Endemic in most parts of world (absent from UK and Hong Kong)
- RNA virus (rhabdovirus)
- Animal primary hosts (eg foxes in Europe)
- Incubation period usually 2 to 8 weeks (can be 9 days to 2 years)
- Verify by examining brain of suspected animal or nerve twiglets of humans by immunofluorescence or isolate virus from saliva or CSF
- Pre-exposure immunisation with vaccine (inactivated virus), post-exposure with HRIG (human rabies immunoglobulin) and vaccine.
- Quarantine imported animals.

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

- In outbreak, declare a rabies area, eradicate potential host animals, vaccinate at-risk personnel.
- Educate travellers to endemic areas, vaccinate workers to isolated endemic areas.

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 hominis*)
- Commoner in tropics, but universal
- Commoner in females than males (3:2 ratio)
- Sensitisation with irritation after 4 to 6 weeks
- Can affect whole body surface, but only including head and neck in infants
- Close or family contact required for spread
- Commoner in nursing homes and mental hospitals
- Verify with hand lens or microscopy of scrapings
- Machine clothes washing and exposure to strong, dry sunlight kills the mite
- Treat patient and household contacts with topical permethrin, malathion or benzyl benzoate

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

- Pandemics in 1918, 1945 and 1980s/1990s
- Not related to poor hygiene.

c) Influenza

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

- Pandemics every 10 to 20 years following major 'antigenic shifts'
- Attacks all age groups, especially children and adolescents
- Influenza virus types A, B and C (RNA orthomyxoviruses), of which 'A' is the commonest and most virulent
- Droplet spread, commoner in winter in temperate areas
- Fever, dry cough etc. lasts 2 to 3 days, death can follow primary pneumonia, super-added bacterial pneumonia (commonly staphylococcal) and myocarditis
- Incubation period 1 to 3 days, infectious period 1 to 2 weeks
- Closed communities likely to have dramatic outbreaks

- Vaccination (whole, split or surface antigen of inactivated viruses) against predicted strains confers immunity for one season only
- Vaccinate those at special risk, such as those (especially the elderly and those in residential homes) with chronic diseases or who are immuno-compromised.

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

- Natural immunity lasts 4 to 6 years
- International surveillance by WHO.

Examiners' Comments

Commonest weakness was in verification of cases, particularly in suspected rabies. Few candidates mentioned HRIG in post-exposure rabies control. At risk groups were often poorly identified.

2. As Consultant for Communicable Disease you are telephoned by a junior doctor at your local hospital. The doctor tells you that two cases of Legionnaire's Disease have been admitted today.

Give an account of how you would investigate this and include any control measures that might be needed.

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

- Verify diagnosis
- History of exposure to possible sources
- Movements of cases within incubation period
- Establish case definition and seek additional cases
- Assess if cases are isolated or related
- Liaise with other professionals, e.g. hospital clinicians, environmental health.

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

- Knowledge of past outbreaks and lessons from them
- Clear plan of action
- Demonstration that management of outbreak is team approach, e.g. possible media handling.

Examiners' Comments

The most frequent problem was failure to achieve a balance between general infection control measures and those specific to Legionnaires' Disease; some candidates gave the impression of having no specific knowledge of the disease, others no knowledge of infection control principles. Many did not identify the at-risk group and others did not mention forming an outbreak team. Some erroneously considered person to person spread to be a risk.

3. Write short notes on two of the following:

- Informed consent in clinical trials**
- Cluster or group randomisation**
- Intention-to-treat analysis.**

a) Informed consent in clinical trials

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

- Informed consent is necessary for clinical trials because health care workers have a duty not to harm patients and the patient is generally held to be the best judge of their own welfare.
- Informed consent is necessary for any health care intervention, but is particularly important in clinical trials because

the treatments on offer include one or more where the efficacy is not known, and that could result in harm to the patient. This harm could be directly from the unanticipated side effects of the treatment or indirectly by being denied effective treatment for their problem.

- Informed consent can only be given for an adult by an adult himself or herself, and no proxy may give it on their behalf unless decided by the courts (through reason of incapacity). Parents can consent on children's behalf, but under the Children Act a child may be deemed competent to consent to treatment, though it is unclear how this relates to trials.
- Informed consent requires that the patient is aware of the potential risks and benefits of taking the potential treatments on offer and also (usually) the fact that they will be allocated these treatments randomly.
- Informed consent is usually held to include a period for reflection, so written materials are often given.

Problems with informed consent:

- It is often not possible to give fully informed consent in emergency situations e.g. following myocardial infarction (MI). It is certainly not possible if the patient has clouding of consciousness. Then some alternative mechanism must be found.
- The act of gaining consent by informing a patient about a trial might itself change the patient's behaviour. This is important in behavioural or educational trials.
- Some trials might see it as unethical to gain consent because it raises false hopes. For example the extra-corporeal membrane oxygenation (ECMO) trial did not feel it was ethical to raise false hopes by informing parents of moribund children of a possible treatment, only to remove that hope by random allocation to the other arm.
- One solution to both these problems is Zelen's design. Patients are enrolled into trials without consent, and are told of the trial if they are randomised to receive the not usual care. This is generally held to be unethical except in special circumstances.
- AIDS trials in an informed and politically active group have extended the notion of what informed consent means. Instead of passively consenting to enter the trial, or not enter it, patients are demanding consent and participation in the design and conduct of the study and the stopping rules.

b) Cluster randomisation

- Cluster randomisation means that individuals are randomised as groups, not as individuals into alternate treatments,
- The groups have a natural affinity- for example they belong to the same class in school or the same GP surgery or community.

Advantages

- Cluster randomisation avoids contamination. Some interventions, particularly health education, can be difficult to deliver to one individual and not another within communities. For example posters are seen by all within the community, also indirect effects of one person interacting with another in a community can lead to dissemination of an intervention that was intended to be given to only some individuals
- Cluster randomisation can be easier for staff, because they only have to give one type of intervention, instead of changing protocols for different patients.

Disadvantages

- Individuals within communities are more alike one another than individuals across communities. It is difficult to be sure that the results of a cluster trial are not due to baseline differences in the individuals, unless the number of clusters is large.
- A cluster trial involving a certain number of individuals is less powerful than an individual trial with the same number of individuals. The loss of precision or power comes because of the inherent similarity of individuals within natural groups. The degree of similarity, the numbers of individuals within the groups and the number of groups determine the "design effect" the effect of randomising by cluster and not individuals.

- Many cluster trials in the past have ignored clustering and analysed the results as though they were individually randomised.

c) Intention to treat analysis

Definition

- This form of analysis is applied to clinical trials where patients are allocated to two or more different treatments.
- Regardless of whether the patient allocated to one form of treatment actually takes it, and even if they take the alternative, they are still analysed with the group to which they were originally allocated.
- The other form of analysis is the on-treatment analysis, where only patients who complied with their allocated treatment are analysed.
- Intention to treat analysis is generally the primary analysis, although on-treatment analysis can add some information.

Advantages

- Drop out and non-compliance is not random, and might be different in the two (or more arms). Assuming that treatment has been allocated randomly, the distribution of confounders across the groups are equal at the start of the trial, but are unlikely to be so if only the compliant members of the groups we compared. Only the intention to treat analysis guarantees comparability of the groups. This is a scientific reason for intention to treat analysis.
- The information that we want from the trial is the effect *of offering* treatment, not the effect of taking it. From a patient's perspective, they want to know the probability of gaining benefit if they start the treatment. This is related not only to the efficacy of the treatment if they comply, but also the probability that they will not be able to comply with the treatment. Intention to treat analysis answers a pragmatic question for the health service.

Disadvantages

- Non-compliance and drop out will reduce the statistical power of the comparison. This can be overcome by increasing the numbers in the trial to account for dropout when doing power calculations, or by only enrolling compliant patients. In some trials this is done by a "wash-in" period to ensure tolerability, but this is not always feasible.

If dropout and non-compliance is substantial, the intention to treat analysis might show no worthwhile efficacy, but whether taking the treatment results in improvement can still be biologically useful. This information will not be provided by intention to treat analysis alone.

Examiners' Comments

Most candidates were able to mention the basic points required for a pass but disappointingly few did very well in what should be a rather straightforward question.

4. **In a recent study on cot deaths (sudden infant death syndrome), it was reported that the odds ratio (OR) for cot death in infants of mothers who were heavy coffee drinkers during pregnancy (four cups of coffee per day) was 2.4 (CI₉₅ 1.2-6.0).**
- Explain what Odds Ratio (OR)=2.4 means. What does this tell you about the connection between coffee drinking and cot death?**
 - What are the other main risk factors for cot death?**

The paper reported that for all the main risk factors combined the risk of cot death was increased tenfold.

The authors stated that a baby from a family with all the main risk factors would "have a very high risk of having a cot death".

- Do you agree that the risk is very high? Why or why not?**

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

- a) OR is odds of drinking coffee if a case, relative to odds of drinking coffee if a control (or vice versa). Gives estimate of relative risk (cannot calculate RR directly from case control study). Implies that heavy coffee drinkers have higher risk of cot death. Does not imply causal relationship. Could be due to chance (CI indicates $p < 0.5$ but wide confidence interval so data consistent with anything from OR just over 1, to 6), bias or confounding. Need to review criteria for causality. Although caffeine known to affect respiratory system, need to postulate that the effect on foetal respiratory system not manifested until infant is several months old.
- b) Prone sleeping position shown to be a major risk factor. Other factors include exposure to environmental cigarette smoke (dose-related to maternal smoking), over heating/swaddling, social deprivation, single parent and respiratory infection etc.
- c) No. Absolute risk not relative risk is determinant of whether an individual is at "high risk". Relationships not necessarily causal; many other causes, most of which not known.

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

- Correctly quoting rates of SID for named country.

Examiners' Comments

A large number of candidates failed to explain clearly what an odds ratio was. Some candidates did not explicitly point out that an observed association could be due to bias or confounding apart from chance or a causal relationship. Some thought that relative risk alone determines whether an individual is at high risk - a costly mistake.

5. Write short notes on the relationship between diet and cancer.

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

- Presentational structure: Short notes, preferably in some conceptual format
- Relationship: Association or causation and strength of relationship proven, probable, possible
- Evidence: Epidemiological (population correlation studies: special exposure groups: migration studies:
cohort studies: case control studies: intervention trends). Experimental in vivo or in vitro.
- Importance: Estimates that 30 - 40% of cancer world-wide may relate to diet and might be preventable
- Proposed relationships between diet and cancer have not changed much in the last 20 years

1981 Doll & Peto - input to N Y Acad. of Sci. Report on Diet and Cancer (aetiological structure).

- Ingestion of direct-acting carcinogens or their precursors
 - (a) Carcinogens in natural foodstuffs (plant products)
 - (b) Carcinogens produced in cooking
 - (c) Carcinogens produced in stored food by micro-organisms (bacterial and fungal)
- Affecting the formation of carcinogens in the body
 - (a) Providing substrates for the formation of carcinogens in the body (e.g. nitrites, nitrates secondary amines)
 - (b) Altering intake or excretion of cholesterol and bile acids (and hence the production of carcinogenic metabolites in the bowel)
 - (c) Altering the bacterial flora of the bowel (and hence the capacity to form carcinogenic metabolites).

Affecting transport, activation or deactivation of carcinogens

- (a) Altering concentration in, or duration of contact with, faeces (fibre)
- (b) Altering transport of carcinogens to stem cells (alcohol?)
- (c) Induction or inhibition of enzymes (which affect carcinogen metabolism or catabolism)
- (d) Deactivation, or prevention of formation, of short-lived intracellular species (e.g., by use of selenium, vitamin E or C, beta carotene or by use of other antioxidants)

- Affecting “promotion” of cells that are already initiated
 - (a) Vitamin A deficiency (clinical or sub-clinical)
 - (b) Retinol Binding Protein
 - (c) Effects on hormonal factors
 - (d) Effects on stem cell differentiation.
- Over-nutrition (or underweight?)
 - (a) Age at menarche
 - (b) Adipose-tissue-derived oestrogens.

1997 AIOR / WCRF - Diet & Cancer Report (Dietary recommendations structure)

- Choose predominantly plant-based diets rich in a variety of vegetables and fruits, pulses (legumes) and minimally processed starchy staple foods.
- Avoid being underweight or overweight; limit weight gain during adulthood to less than 5kg.
- Eat 400-800 grams, or five or more portions, a day of a variety of vegetables and fruits.
- Eat 600-800 grams, or more than seven portions a day of a variety of cereals, pulses, roots tubers and plantains. Prefer minimally processed foods. Limit consumption of sugar.
- Alcohol consumption is not recommended. Limit to less than two drinks a day for men and one for women.
- If eaten at all, limit intake of red meat to less than 80 grams daily. It is preferable to choose fish, poultry and meat from non-domesticated animals in place of red meat.
- Limit consumption of fatty foods, particularly those of animal origin. Choose modest amounts of appropriate vegetable oils.
- Limit consumption of salted foods and use of cooking and table salt.
- Do not eat food which, as a result of prolonged storage at ambient temperatures, is liable to contamination with mycotoxins.
- Use refrigeration and other appropriate methods to preserve perishable foods.
- When levels of additives, contaminants and other residue are properly regulated, their presence in food and drink is not known to be harmful.
- Do not eat charred food. For meat and fish eaters, avoid burning of meat juices. Only occasionally eat meat and fish grilled (broiled) in direct flame or cured and smoked meats.
- Dietary supplements are probably unnecessary, and may be unhelpful, for reducing cancer risk in people following the dietary principles above.

Relationships between particular dietary components and particular cancers e.g.

- Bile acids or fibre - in relation to colorectal cancer
- Aflatoxins - in relation to liver cancer
- Vitamin A - in relation to cervical, laryngeal, lung cancers
- Alcohol - in relation to oesophageal, cardia of stomach, oro-pharyngeal cancers

All this type of information, preferably linked to cancer prevention strategies, should score “brownie points”.

6. Write short notes on the key issues to be considered in undertaking an economic evaluation of a new drug treatment for a chronic disease, such as Alzheimer’s Disease.

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

- Two key issues;
 - a) Is it worth using this drug?
 - b) Is it affordable locally?

To pass - the candidates must examine issue a) above and the majority of the following points need to be discussed;

- Four techniques available:
 - Cost benefit analysis (CBA)
 - Cost evaluation analysis (CEA)
 - Cost utility analysis (CUA)
 - Cost minimalisation
- A brief discussion of the advantages and disadvantages required.
- Given the chronic nature of the disease, we need to measure quality of life of both the patient as well as that of their carers as the primary measure of outcome.
- Issues to be tackled include:
 - a) Measurement of health care costs and benefits.
 - b) Measurement of costs and benefits incurred by patients and carers and in particular the quality of life issues
 - c) Measurement of costs and benefits incurred by other services such as Social Services.

Such measurements can be facilitated if the economical appraisal goes hand in hand with studies of efficacy and effectiveness.

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

- Candidates need to discuss affordability within the local context;
- Sensitivity of analysis: discounting costs/benefits.
- Understanding the costs of the drug locally. Generalisability of study results to practice, numbers of patients with Alzheimer's disease who would be eligible and modelling for different thresholds of eligibility in light of local prescribing practice. Natural history of the disease and needs assessment.

Examiners' Comments

Different candidates put different emphasis on the four key issues in providing linked answers and these were regarded by the examiners. All of these interpretations were acceptable ways for answering the question.

7. Describe briefly how you would design a study to examine post operative infection rates following day case surgery at a large general.

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

- Cohort study design. Recruit all patients or a randomised selection.
- Define population, time period, etc. (e.g. 'all day cases over a 3-month period exposed to skin-invasive surgical procedures').
- Define 'post-operative infection' (e.g. 'infected wounds presented to GP or Community Nurse within one week of surgery').
- Describe who will detect and investigate (e.g. patient, community nurse, infection control nurse, GP etc.).
- Express findings in terms of incidence (new episodes).
- Collect relevant data for each case (i.e. age, procedure, other current conditions, infecting organisms etc).
- Problems in data interpretations, eg what to use for comparative purposes, casemix issues, etc.
- The importance of verifying cases microbiologically.

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

- The difficulty of ensuring vigilance and co-operation among practitioners during the study period.
- Recognition of the value of patient information and involvement.
- A case control study 'nested' in the main study could examine statistical associations of relevant factors with post-operative infection.
- The "local politics" of sharing the results, eg. Responses of provider staff, need to share with clinicians first, dangers of misinterpretation, etc.
- Problems in data interpretation eg what to use for comparative purposes, case mix issues etc.
- The "local politics" of sharing the results eg responses of provider staff, need to share with clinicians first the dangers of misinterpretation etc.

Examiners' comments

This question had very variable standards of answers. Some candidates missed a discussion of a cohort study altogether.

8. Not everybody who is given advice about health related behaviour takes that advice. With reference to two models of behaviour change, outline why this should be the case.

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

- There are at least four models which are relevant to this answer (see below). The candidate should be able to discuss at least two of the models and show how they explain a failure to take advice.
- The health belief model - Rosenck (1969), modified by Becker (1974). This model predicts health related behaviour such as screening uptake, on the basis of the individual's rational calculation of personal utility cost and benefit. This model has been used successfully in certain limited circumstances but is criticised for attributing a higher degree of rational decision making than is observed to be the case in many individuals.
- The theory of reasoned action - Azen and Fishbein (1980). This model suggests that a person's behaviour can be predicted by their attitudes which are the result of perceived consequences of the actions and their perception of what others expect them to do (subjective norm). These two influences on attitudes combine to form an intention.
- The health action model - Tones (1987 and 1990). This is a much more complex model which considers how the individual's belief system, motivation system and normative system interact to produce a behaviour intention. The adoption, or otherwise, of the behaviour intention depends on a variety of external factors which encourage or inhibit the behaviour. The model also anticipates relapse and a complex cycle of behaviours. The health action model is considered by many practitioners to be a more realistic model of the factors influencing health related behaviour (particularly addictive behaviours).
- The stages of change model - Prochaska and DiClemente (1984), this model describes stages of behaviour change - pre-contemplation, contemplation, preparing for change, making the change and maintenance. This is the only dynamic model and has been widely adopted in many health promotion setting because of its intuitive appeal.

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

- Discussion of two other models.

Examiners' Comments

Variable standard of answers were given. Some candidates had little idea of models of behaviour change. However, with these exceptions, the questions were answered well.

PAPER IIA

A. Epidemiology

1. Describe the epidemiology of cerebrovascular disease. Outline briefly the main opportunities for reducing the impact of this disease in the population in a named country.

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

- Three main types of cerebrovascular disease (CVA): Thrombotic cerebrovascular disease, haemorrhagic cerebrovascular disease and subarachnoid haemorrhage. The commonest type in UK is thrombotic. Transient ischemic attacks are also a feature of cerebrovascular disease.
- Deaths from CVA accidents (CVAs) are included as a proposed target in 'Our Healthier Nation in England'.
- CVA accounts for about 8% of deaths in the UK and is also a major cause of disability in older people. It is said that about one third of CVA result in death about one third in significant residual disability and about one third there is complete recovery. True incidence of CVA can only be determined from dedicated surveys.
- There is marked international variation in the mortality rate from CVA mortality with low rates in developing countries higher rates in Europe North America, Australia and New Zealand and very high rates in Japan.
- The incidence of CVA increase steeply with age and is higher in males than females. CVA deaths show the usual social class gradient being highest in social class V and lowest in social class I.
- Mortality due to CVA disease is falling in the UK especially in the under 65 year olds.
- The main risk factor for CV disease is raised blood pressure. However the other risk factors for ischaemic heart disease also increase risk of CVA disease.
- Measures to reduce blood pressure will reduce risk of cardiovascular disease so that burden of disease could be reduced by vigorous detection and treatment of raised blood pressure. Intervention studies have confirmed that treatment of hypertension reduces incidence of strokes. Reduction of salt consumption may be expected to reduce incidence of CVA by reducing population mean blood pressure. Better management of transient ischaemic attacks may also reduce the incidence of full CVA.
- Better management of strokes and vigorous rehabilitation will reduce the burden of disability due to stroke. Specialised stroke rehabilitation units have been shown to give improved results.

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

- Risk is particularly high in Afro-Caribbeans (due to higher prevalence of hypertension).
- There is a J shaped relationship between alcohol consumption and thrombotic CVA but risk of thrombotic disease is lowest in abstainers and increase with alcohol consumption. There is some evidence of increase risk associated with binge drinking as opposed to a level consumption.
- Japan is an interesting exception to the rule that generally national rates of CVA mortality and ischaemic heart mortality vary together. In Japan the high rates of CVA mortality are accompanied by low rates of heart disease mortality. The haemorrhagic type accounts for a much higher proportion of CVA in Japan than in the UK.
- Mention of particular population incidence surveys
- Mention of particular intervention studies.

Examiners' Comments

In general question 1 was done reasonably well. Some answers were outstandingly good. Several were spoilt because of poor presentation including handwriting, lack of structure and clarity.

2. Discuss the epidemiology of dental caries and its prevention in a named country.

Most of the following would be required for a pass:

- Dental Caries
 - Epidemiological patterns
 - General issues
 - UK, Europe and North America, Global

Levels of Risk; Age related patterns;
Relationship to dietary sugar, tooth brush use, fluoridation

• Measures:

Prevalence, Incidence.

DMFT (dmft) scores for Secondary (Primary) teeth:

Diseased

Missing

Filled

Teeth

• Low risk high risk areas in 1990's for Secondary School Children:

DMFT score 3.0± Low: UK, USA. Scandinavia, Netherlands

DMFT score 2-3- High: Portugal; Eastern Europe; former countries of USSR

DMFT score 1.1-2 Intermediate: Italy, Germany, Spain, Albania

- In 1990s general European pattern is a decline in caries prevalence; but no continuing decrease in countries with previously low levels. The decline appears to have stabilized (“bottomed-out”) in low risk countries
- Scores tend to stabilize at 1.3 - 1.6 DMFT in low risk countries.
- Scores lower in 1990s in communities with longer exposure to fluoridation (eg Ireland DMFT 0.9 in Eastern Health Board).
- High risk in central and eastern European countries.
- Few data on adults but benefits of prevention now apparent and evidence stronger. For example reduction of permanent tooth caries in young adults in those countries where caries decline began in the mid seventies. However specific data on tooth brushing, fluoridation and other interventions do not clearly indicate the precise cause(s) of the decline in caries.
- Better epidemiological identification of the relationship between specific interventions and changing patterns of caries would assist the development of health promotion guidelines in this area.
- There may be marked variation within countries; eg prevalence higher in the North than the South of the UK. Also the DMFT (dmft) components may vary between countries with high scores.

Risk factors/mechanisms

- Cariogenic microbiological flora
Streptococcus Mutans: S. Mutans salivary counts modify observed relationship between sugary food consumption and caries
- *Sugar consumption*: low sucrose content of diet positively associated with caries in non-fluoride protected children
- *Socioeconomic status*: in UK significant correlations in small areas ($r=0.46$ to 0.88) between DMFT scores and Jarman underprivileged area scores. Efficacy of fluoridation demonstrated at electoral ward level. In Arizona, children whose caregivers were in the lowest education category had four times the dmft score. Mother's smoking habit is an indicator of risk for child caries.
- *Access* to and utilisation of *preventive* dental care services and advice.
- *Culture and lifestyles*: in the past in Australia, Aboriginal groups have had lower caries; now with deterioration in health of Aboriginal children the trend is reversed.

Postulated reasons for caries decline:

- Association of DMFT age 12 with sugar consumption ($r^2 = 50\%$) but confounding with other prevention measures; adjusted value for $r^2 = 26\%$
- Mode of consumption of sugar is important and extent to which food preparations promote carbohydrate fermentation in the (microbial) dental plaque.
- Fluoride dentifrices: accepted to be most important factor responsible for decline in industrialized countries.
- Techniques of brushing and rinsing important in cariostatic effect of dentifrices.
- Oral hygiene generally; but no studies to support causal associations with caries decline *in populations*.
- Between countries, broad socio-economic variables explained up to 65 % of the variation in declines in prevalence, but did not necessarily help directly with the biological explanations of cariostasis. However social variables and

biological factors are correlated.

- Other types of data, from areas groups showing an increase in caries prevalence support the above findings:
 - areas where water was defluoridated
 - children who did not receive supervised tooth brushing and rinsing
 - countries where school programmes for topical fluoride treatment are stopped.

Prevention and control

- Large sections of most populations required additional control measures. With population growth in many countries the overall burden of caries will continue to increase.
- Fluoridation of water supplies most cost-effective approach, particularly in developing countries; equitable approach which tends to protect against effects of socioeconomic deprivation. Coverage of the population even in industrial/post-industrial countries often below 60%.
- Arguments against fluoridation include adulteration of a public utility and infringement of individual rights.

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

- More detail on the geographic, socioeconomic variation in caries
- Causal associations with oral flora and models for the prediction of caries
- Molecular biological studies of S. Mutans (cloning of genes) as an approach to development of specific interventions (eg vaccine).

Examiners' Comments

This question was only answered by a few candidates. It was not particularly well done. The oral biology was not discussed from an epidemiological or prevention point of view. Few candidates, unfortunately, provided a properly structured, comprehensive and legible summary.

B. Environmental Health & Communicable Disease

3. A greater than expected number of cases of gastro-enteritis have been reported by a nursing home. Describe an appropriate public health response to:

- a) exclude/verify an outbreak of a communicable disease**
- b) investigate, manage and control such an outbreak if confirmed.**

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

- Verify the known facts in time, place and person.
- Establish a diagnosis; clinical and laboratory.
- Establish whether the problem is real or apparent.
- Instigate immediate control measures.

- Outbreak investigation: outbreak control team
membership
remit
actions
descriptive study
analytical study

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

- Reference to relevant guidance.
- Reference to relevant legislation.
- Clarity of roles and responsibilities of individuals and organisations.

Examiners' Comments

Most candidates answered this question. All but a handful achieved a pass but there were very few “good” answers. In general, “textbook” responses and a lack of logical sequential framework to the responses revealed a general lack of real practical experience in dealing with a very common communicable disease control incident which was disappointing. Many candidates did not mention the role of an outbreak control team.

4. In a country of your choice, using infection specific examples where possible, discuss the factors to be considered in deciding whether a population based vaccination programme should be introduced nationally.

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

The answer needs to be in an essay format and must include:

- Size of the problem through the epidemiology of infectious diseases.
- Types of vaccination.
- Effectiveness of vaccination programmes in different age groups
- Identification of age groups for vaccination, eg. children
- Availability of vaccines and vaccine delivery infrastructure.
- Costs-benefits of the vaccination programme.
- Side effects of individual vaccination.
- Transport and storage of vaccines.
- Primary health care provision, particularly for children.
- Availability of trained professionals.

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

- Vaccination of ‘at risk’ groups. ie. laboratory workers.
- Selective vaccination.
- Surveillance of adverse reactions.
- Vaccine coverage.

Examiners' Comments

Not many candidates answered this question. Those that did achieved a “clear” or better pass. The application of the Junger and Wilson criteria for the introduction of population based screening programmes provided an easily transferred structure with which to answer the question and was used by most candidates. It was gratifying to see that most candidates had a knowledge and understanding of recently published papers discussing the UK’s position in relation to the introduction of hepatitis B immunisation at a population level.

C. Health Information

5. Mastectomy rates (OPCS B27) per 100,000 women aged 55-74 years population by district of health authority residence for 1994/5 are shown below.

District Code	Number of procedures	Rate per 100,000 women aged 55-74 years
1	36	63.7
2	58	82.2
3	42	83.9
4	50	105.7
5	55	127.3
6	60	127.8
7	96	159.9
England and Wales		111.1

Source: HES data: OPCS population data.

- a) Briefly describe what the data in the table show. Comment of any limitations on the data as presented.
- b) You are a public health physician in District 7; concern has been expressed about the relatively high rate of mastectomy procedures in your area.
- Describe any further analyses that you might wish to make from the data sources used to prepare the table.
 - Indicate other data sources that you might access in order to understand more fully the situation in your district. Highlight strengths and weaknesses of each with reference to this specific situation.

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

a)

- Over 2 fold difference in rates between the districts; 3 out of 7 districts have a rate higher than that for England and Wales.
- Limitations to the data presented include small numbers, data for one year only; rates for the age band 55-74 years are presented, not standardised by 5 or 10 year age bands to England and Wales or regional populations. No indication of the breakdown of mastectomy by diagnosis or whether it is primary or secondary procedure is given.

b)

- Further analyses should include an examination of historical data or 3 year rolling averages to take into account small numbers; preparation of confidence intervals on data; standardising for age structure of population. Examination of the rates of other procedures related to the treatment of breast cancer eg lumpectomy would be beneficial. The possibility of coding error should be considered.
- Other data sources should include: number of deaths from breast cancer and SMR for district using CIC and OPCS tapes; numbers of hospital admissions for breast cancer broken down by procedure codes; numbers of new cases of breast cancer and standardised registration ratios for breast cancer for the district; standard performance measures from local breast screening programme; results of local audits of breast cancer care done by local clinicians. The candidate should be able to discuss the usefulness of each source in terms of how likely it is to illuminate the problem presented.

The following are additional points which might improve answers to "good" or "excellent":

- Candidates would be expected to provide a logical and coherent approach throughout, and to demonstrate an understanding of the importance and limitations of examining variations in health care intervention rates within an overall picture of the situation for a given condition across the primary and secondary care interface.

Examiners' Comments

Many candidates failed to appreciate the problems of interpretation of small numbers and did not suggest any basic strategies for dealing with this important issue, eg. review of past years data, use of three year rolling averages, calculation of confidence issues. A number were unclear that the data presented related to place of residence and assumed high rates reflected tertiary referral centres.

6. Describe the characteristics and discuss the use, strengths and weaknesses of the following as tools in collecting health information:

- Registers**
- Questionnaires**
- National census in a named country**

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

a) REGISTERS - Four main characteristics:

- Identities individuals with:
 - particular feature in common (the focus of interest)
 - longitudinal
 - based on geographical population.
- Requires skilled organisation adequate resources and adequate storage retrieval and dissemination of information.
 - USES: Incidence, prevalence, temporal trends, patient follow up, treatment outcomes, facilitate service evaluation, audit research and planning services.
 - STRENGTHS: Central to running service for particular group good source of data for Audit/Research. Unique collection of data for Audit/Research longitudinal.
 - WEAKNESSES: Validity and comprehensiveness of data, updating laborious cost lack of comparability with other data without standardised definitions and practice.

b) QUESTIONNAIRES - Characteristics:

- Specific measurable objectives, sound research design, sound choice of population and sample, reliable and valid instrument, appropriate analysis, accurate reporting of survey results. Face to face, telephone, postal. Appropriate questions. Length.
- USES: Information on many subjects.
- STRENGTHS: Easy to administer, cheap factual information about anything.
- WEAKNESSES: Limited application reliability, validity failure to respond, not easy to ensure appropriate questions
(eg: closed/open, short, long, etc)

c) NATIONAL CENSUS (U.K.) Characteristics

- Started 1801. Carried out every 10 years, except 1942 because of Second World War. Authority enshrined in 1920 Census Act - Extensive public consultation on conduct and contents Law requires that all people alive on night of census are enumerated in the household of establishment where they spent the night.
- Organised through Enumeration Districts.
- Head of household completes a form given details of every person in that household on night of census.
- Data collected = post code, type of building, number of rooms, tenure, presence of amenities (bath, WC, CH, etc).
- People in house - name, dob, sex, marital status, usual address, relationship to head of household, country of birth, ethnic group.

- Long term illness, handicap, employed/unemployed, occupation, higher education (if more than 18 years), higher qualification
- SCOTLAND/WALES - ability to speak and write Gaelic or Welsh.

Management of data

- Census coordinated by O.P.C.S. Confidential. Names not put on computer.
- All data about householders <16 processed fully.
- Publication - Report/ Analysis on request/ Mapping.
- USES: General report on collected data Analysis of population trends/long term illness/handicap/deprivation or associations Mapping.
- STRENGTHS: Amount of socio-economic data collected across entire country at one period of time and over time. Comparisons - useful for health planning at national to post code level. Determine needs of minority group.
- WEAKNESSES: Incomplete data (very young children & homeless) Accuracy difficult to assess. Only done at 10 year interval.

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

- Well thought out answer that is precise, clear, comprehensive and well laid out with good examples.

Examiners' Comments

The overall standards of answers as adequate with a good pass rate. However presentation was often poorly organised, poorly presented with a poor standard of composition. Questions were often not addressed precisely.

D. Statistics

7. **Two hospitals (A and B) are involved in an audit of care. As part of the audit, random samples of 80 people attending the hospitals are asked to judge the quality of services as excellent, good, fair, poor or very poor. The data are coded numerically as follows:**

Excellent = 5
Good = 4
Fair = 3
Poor = 2
Very poor = 1

Following the audit, hospital A make some changes and re-audits the same patients on their next visit (planned visit at 6 months).

The following table gives the results:

Hospital	Number				
	Excellent	Good	Fair	Poor	Very Poor
A - Initial	15	10	18	22	15
B	19	21	16	14	10
A - follow up	21	17	15	16	11

You are asked to test whether there is a statistical difference between hospital A and B and also a statistically significant change in hospital A following the audit.

- How would you describe and present the data?**
- What statistical tests are appropriate to carry out the A versus B analysis? What test would you choose and why?**
- What statistical tests are available to carry out the A versus A analysis? Which test would you choose and why?**

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

- The data are ordinal even though coded as metric data.
- Bar charts are a suitable way of displaying the data.
- There are a variety of statistical tests available for the A vs B comparisons including categorical analysis using Chi Square test or ordinal analysis using the Mann Whitney U test, Wilcoxon two sample Rank sum test, and Kendall's S test. **The Chi Square test for trend is equivalent to the Mann Whitney test with ties.**
- Ranked tests are more powerful than categorical tests as they take the ordering of the data into account. The test statistics do not include the magnitude of difference between groups and inspection of category specific frequencies or medians is required.
- For the A vs A comparison it is important to recognise this as a paired comparison and the data should be re-organised into a table of before minus after differences. A variety of statistical tests are available depending on how the data are arranged. If the data are recorded as better, unchanged, worse than the analysis can be undertaken using the Sign test or Binominal test. Tied pairs (= unchanged) do not contribute to the analysis.
- The Wilcoxon signed rank test is a more powerful test than the Sign test in that the magnitude of the difference contributes to the test statistic.

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

- A description of how the tests for ordinal data are carried out (how the ranking is organised).
 - Mention that Rank tests which take into account the magnitude of the difference between categories assume that the difference between categories is of similar magnitude e.g. size of difference between categories 1 and 2 = size between categories 2 and 3.
 - Problems can arise if there are too many ties in the data.
 - **One tailed tests would increase power, where appropriate**
 - Confidence intervals for differences in medians can be calculated but are computationally difficult and not found in all computer packages.
 - Rank tests assume an underlying continuous distribution which is similar in different groups to be compared, **apart from location.**
8. a) **What is meant by a “transformation” in statistics?**
b) **What are the main purposes of transformations in statistics?**
c) **Outline the advantages and disadvantages of using transformations.**

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

- a) A mathematical operation that changes the measurement scale of a variable.
- b) The main purposes are:
- Stabilise variance (eg square root and log)
 - Make distributions approximately Normal (eg square root for Poisson, and log for odds)
 - Reduce the effect of awkward features such as outliers (eg by reciprocal transformation)
 - Produce results in a meaningful scale of measurement (eg transforming absolute risk reduction into NNT)
 - Linearise relationships between variables (eg body weight $\propto L^3$ but bone strength $\propto L^2$ so to get a linear relation between risk of hip fracture and body weight we should plot risk vs weight^{2/3})
 - Create new variables (eg BMI = weight/height²)
- c) Advantages: simplify significance tests by using familiar methods. Make relationships obvious. May be necessary to “make sense”.
- Disadvantages: can make interpretation harder.
Needn't be 1:1 so information can be lost (eg ranks).

Back transformation can introduce bias (this can be corrected).

The following are additional points that might improve a pass to good or excellent:

- a) Ranking is a form of transformation as well, which pulls in both tails. Negative values cause problems for log and square root transformations

Transformations can be evaluated:-

Formally

eg. Box-Cox transformation scheme: $y = (x^\lambda - 1)/\lambda$ for $X > 0$, $y = \log_e(x)$ for $\lambda = 0$

Manley's scheme (allows negative values): $y = (\exp(\lambda) - 1)/\lambda$

$Y = \sinh^{-1}(x)$ a good substitute for log transform if values are zero or negative

MLE can be used to simultaneously fit the Box Cox parameter and the distribution

Informally: using a Ladder of powers:

x^2
 x^1 progressively "pulls in the right hand tail"¹¹
 $x^{1/2}$
 $\log(x)$

with check on Normality by QQ plot, skewness index etc; check on linearity by scatterplot (and correlation coefficient)

- b) The best transformation to produce variance stabilisation can be worked out mathematically. In general, variance does alter with the mean, and in general transformations which stabilise variance also normalise.
- c) It may pay to use more sophisticated methods eg GLM

Key words: Transformation, Box-Cox, Linearisation, Normalisation, Variance Stabilisation

PAPER IIB

D. Disease Prevention

1. A vocal pressure group is lobbying the media stating that measures to tackle obesity merely increase discrimination and make obesity a social stigma.

- a) Discuss the benefits and limitations of current approaches available to public health to encourage changes in population behaviour.**
- b) Discuss the advice you would give to your local Health Promotion Department to include in the action plan to tackle obesity.**
- c) What arguments would you put to the local group to persuade them of the benefits of reducing obesity?**

a) The benefits and limitations of current approaches available to public health to encourage changes in population behaviour.

Most of the following would be required for a pass:

- Description of the current approaches available.
- One aim of health promotion is “to make healthy choices the easy choices”.
- Population approaches would aim to influence the key variables e.g. calorie intake and exercise.
- Problem that few studies have evaluated policy initiatives such as the taxation of high fat foods. More studies are needed on identifying and targeting specific groups who are at risk of developing obesity as opposed to targeting the general population.
- Description of how to influence the food chain including agricultural policy to be in line with food and nutrition policy.
- Problems in that the public perceives nutrition advice as confusing. Weight gain is common post intervention and maintenance programmes are required.

b) The advice you would give to your local Health promotion Department to include in the action plan.

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

- Statement that reviews of effective interventions is available e.g. “Systematic Review of Interventions in the treatment and Prevention of Obesity.”
- Importance of combining strategies on dietary education, and exercise education, with group and individual behavioural techniques and maintenance programmes.
- Dialogue with food suppliers on substitution of low fat foods, pricing, accessibility, education, social influences e.g. marketing and use of media.
- Understanding of the effectiveness of community based education strategies, especially when combined with financial incentives.
- Strategies for different groups e.g. children and families, elderly, adults, ethnic groupings, low income.

c) What arguments would you put to the local group to persuade them of the benefits of reducing obesity?

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

- Description of the health risks of obesity, including coronary heart disease, degenerative joint disease, psychological problems etc.
- Discussion on the rising trends in obesity in developed countries.
- Summary of how the existing evidence shows that avoiding overweight and obesity and achieving weight loss in obese or overweight persons is beneficial to health.

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

- Full discussion of effective interventions e.g. meal plans and grocery lists for obese women, cue avoidance, self help peer groups in addition to therapist led booster sessions, support services for the individual e.g. hotlines.
- Discussion that more research is needed especially on predictors of treatment outcomes.
- Examples of countries which have been successful in reducing fat intake e.g. Norway.

Examiners' Comments

Most candidates approached this question with an emphasis on behaviour approaches for changes at the individual level. Candidates who got higher marks discussed the structural approaches and policy issues, although few discussed the food industry. Most candidates demonstrated ability in the way they reasoned their way through the question.

2. Discuss the elements required in a health promotion programme targeted at teenagers aged 13-16 years.

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

- Brief description of the principles underlying health promotion.
- Determinants of health.
- Discussion of the health needs of teenagers and the relevant targets: accidents, smoking, substance misuse, teenage pregnancy, S.T.Ds., obesity, deliberate self-harm (English candidates to mention ‘Health of the Nation’).
- Discussion of how a particular programme might be achieved.
 - Identification of local need.
 - Role of health professionals
 - Involvement of teenagers themselves.
 - Outcomes.

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

- Awareness of the latest Government’s Green Paper for English candidates.
- Knowledge of some health promotion programme models or Health Gain Investment programmes.

Examiners' Comments

The area which had less coverage than expected in this question was the identification of health needs. The role of health professionals was rarely discussed. Candidates need to demonstrate that they could apply some theoretical models of health promotion to pass the question. Most candidates identified the key areas to include in the programme. Candidates who got the best marks described how particular programs could be implemented and outcomes evaluated.

E. Social Policy & Health Economics

3. How can quality of life be measured in the context of cost utility analysis? Discuss the principal criticisms of the approaches used.

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

- In cost-utility analysis, the benefit of an intervention is measured in the form of a composite measure which combines length of life and quality of life, the most frequent example being a QALY (quality adjusted life years).
- In order to calculate the number of QALYs gained we need data on the average length of time which the person who undergoes an intervention will spend in different states of health. We then need a value (or utility) to be placed on each of these states of health. This question focuses on the methods available to calculate these values.
- The two major issues in calculating values for states of health relate to who is asked and how they are asked.
- Concerning who is asked the alternatives include; a random sample of the population; patients with the condition concerned (rarely carers particularly for treatments affecting children) or health care professionals. Classical utility

theory would favour a sample of the population at large but it is methodologically difficult to inform them about different states of health and it is at least open to question whether their views of states of health which are unfamiliar to them are meaningful. Patients and carers may have more practical experience of some of the states of health but may display views which change with time as their own health changes. Many studies have relied on the views of clinicians, but dissonance between health professionals and patients concerning the value of some health states is common.

- Concerning how they are asked there exist a complex set of alternatives. The commonest approaches are:
 - The use of rating scales in which subjects are asked to rank or attribute a value between 0 and 1 to a series of states of health.
 - Standard gamble methods briefly described
 - Time trade off analysis, briefly described
- Each method has critics, though all have been and continue to be used. Criticisms centre on the theoretical nature of the options being faced, the vast number of alternatives which may be offered under standard gamble and time trade off methods and the extent to which the questions are clearly understood.
- More recently people carrying out these studies are tending to use data collected from very large studies in which validated quality of life values have been established using standard instruments which are then also used to measure quality of life in the study itself; thus obviating the need for researchers to do their own preference measurements.

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

- Good descriptions of some of the methods used eg the development of the Rosser Index (a ratio scaling method which is commonly quoted but probably unique to that study)
- Standard Gamble method (in which the subject is asked to consider two alternatives one in which a treatment has a probability (p) of either becoming perfectly healthy and living for t years or dying instantly. In the second alternative they adopt a named state of health. They are asked to choose between the two, then p is varied until they are indifferent between the two).
- Time trade off method (in which the subject is asked to choose between two alternatives one of which is a number of years of perfect health followed by death, the other being a longer period of time at a health state which is less than perfect health.)
- Knowledge of one or more of the classification systems which have come into use recently eg:
 - Euroqol
 - Quality of Well Being
 - Health Utilities Index.

Examiners' Comments

Most candidates covered a majority of relevant points.

- 4. It is claimed that a widening gap in income in society is associated with an overall worsening of the health experience of that society. Discuss any evidence which might support or refute these claims.**

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

- The hypothesis that mortality in a country is related more to relative than to absolute living standards is based on three pieces of evidence:
- Mortality is more closely correlated with distribution of income within countries than to differences in absolute income between them.
- Mortality rates tend to be lower in countries that have smaller income differences and thus lower levels of deprivation.
- Most of the long term increase in life expectancy seems to be unrelated to long term economic growth rates.
- The main proponent of this hypothesis has been Richard Wilkinson. The evidence is drawn from studies of trends in mortality and income distribution, principally in the 23 OECD countries. He applies this hypothesis to the UK which

saw a marked increase in the scale of inequality of income during the 80s, along with evidence of increased inequality in health.

- Aspects of the hypothesis which have been challenged include the fact that the lack of association between health and absolute levels of poverty is counter-intuitive and that some of the mortality changes, from diseases such as CHD, appear to occur very rapidly in relation to changes in income. Wilkinson and his associates suggest that social status may affect physiological risk factors, including lipoproteins and fibrinogen levels, and cite animal evidence relating stress with these variables.

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

- The method used to measure the distribution of income within a society is called the Gini coefficient.
- An aspect of the hypothesis is that there may be a threshold above which absolute improvements in material circumstances fail to lead to health improvements, suggesting that absolute poverty may still be of relevance in less developed countries.
- A small number of studies in Scandinavian countries have shown results which would tend not to support the hypothesis.
- The association between relative poverty and inequality in self reported morbidity has also been reported.
- Recent counter argument published in BMJ that the connection between ill health and income dispersion could be at least partially due to statistical artefact.

Examiners' Comments

Many candidates failed to answer the questions asked. Instead, they concentrated on the evidence relating to poverty and health.

F. Medical Sociology & Health Psychology

- 5. An increasing demand for “counselling” for mental health problems has been seen in primary care services. What might be the socially determined reasons for this increasing demand? What are the difficulties in providing such services?**

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

- The growing public health burden of the common mental health disorders.
- Profound societal changes which have occurred in recent years and their influence on mental health: unemployment with its recognised association with poor self esteem, anxiety, depression. Increasing marital and relationship breakdown, increasing numbers of single parents and people, living alone, bereaved, caring for disabled, socioeconomic disadvantage.
- Decreasing extended family and community and informal support. Growing evidence that older people prefer to seek support of public sector (GPs, social services etc) rather than from family.
- Much of the burden of caring for people in these categories falls to primary care. Most common chronic disorder seen in general practice is depression.
- Growth of ‘counselling’ in general practice a response to increasing demand - people with depression and anxiety generally very heavy consulters drug treatment not the solution in every case, secondary sector priority to treat people with severe mental illness (in keeping with national agenda) increasing recognition of value of problem solving for social and emotional difficulties.
- Difficulties with providing such services. Evidence of effectiveness of counselling unclear what outcome measures to choose, qualifications of counsellors, referral criteria, diversity of therapeutic approaches but relative efficacy, unclear expectations of patients time constraints on primary care.

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

- Recognition that primary health care infrastructure is best place to identify needs for mental health care and constitutes an appropriate focus.
- Better outcomes are achieved when specific patient groups are targeted - give examples, post natal depression.
- Problems of tackling societal issues at an individual level.

- Recognition that introduction of counselling services in UK general practice is at least partly “treating the health professionals by reducing the burden on them imposed by levels of work and patient anxiety”.

Examiners' Comments

On the whole, candidates seemed to find this a difficult question to answer. Many failed to mention current socio-economic issues such as job insecurity or family conflicts. Lack of evidence of effectiveness of counselling mentioned by only a few candidates. The question did not require any discussion of strategies for serious mental illness.

6. “Public involvement and awareness about how to improve health and well being is crucial” (CMO’s Project to Strengthen the Public Health Function in England). To what extent do you agree with this statement? What are the ways by which health services can achieve greater involvement of members of the local community?

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

- Widespread agreement that the health services should be more responsive to the views of the people they serve
- Benefits of public involvement at all levels of decision making expected to be:
 - People more likely to take responsibility for health at the individual level or as members of a community if involved as partners with organisations from the start.
 - Ensuring that services are more responsive to people’s concerns, values, needs, preferences, obstacles they face in achieving health.
 - Improved openness and accountability in the services.
- Need to define who represents the public-different local populations: ethnic, socioeconomic groups etc, service users, leaders of public opinion.
- Methods to involve the public-meetings, focus groups, rapid appraisal, surveys, community initiatives.
- Successful public involvement requires listening, informing, discussing, reporting and action.
- Constraints-individual vs population health, expectations and wants, people’s knowledge and values, perceptions of health and local services, NHS tradition and culture not one that encouraged partnership with the public.

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

- Recognition of the need for sensitivity
- Long time scales - not a quick or easy process
- Advantages and disadvantages of various methods of public involvement
- Clarity regarding purpose of public involvement at the outset
- Advantages of the new culture of collaboration between NHS and local authorities in meeting/changing public expectations.

Examiners' Comments

Most candidates answered this question to an acceptable standard. Given that the Government White Paper and Green Paper have only recently been published, it was surprising that the role of local authorities was mentioned by some but not all candidates.

H. Organisation & Management of Health Care

7. Discuss the public health physician’s role managing an attempt to concentrate services for the treatment of major accident and emergency cases in any one three acute hospitals currently providing these services to a population of 900,000 people.

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

- Understanding that the question is about whether and how health service research findings underpin the rationale for the measure proposed and how they can be used in managing any change.

- Recognising the groups, agencies and interests involved and/or affected by the decision - accessibility to *the public* and impact of delay - changes to the *response and retrieval* services - knock-on effects on case-mix of *hospitals* concerned, with resulting need for technological investment (ITU beds, etc); loss of training capacity in some hospitals versus enhancement of A&E service in main hospital - implications for *primary care services*, referral patterns.
- Recognising need for intelligence on cost-effectiveness of alternative arrangements and associated developments, and supplying it (regionalising care of major trauma; alternative arrangements for meeting demand, eg minor injury units, telephone advice services), displaying awareness of the evidence base.
- Use of the analysis in preparing for conflict management - identifying any superordinate issues (greater amelioration of major illness end effects of trauma, or no change in impact of treatment but reduction in costs).

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

- Showing an awareness of the nature and direction of likely resistance to the change, and an understanding of the public health physician's specific role in managing it vis a vis the roles of others.

Examiners' Comments

This topic was familiar to most of the candidates who attempted it. Many candidates produced a rather generic 'management of change' type answer rather than specifically addressing the question. The best answers applied knowledge of recent research findings, initial data collection and analysis, the importance of national authoritative reports and theoretical framework to the management of change in the clinical setting. As in the past, some candidates spent too much time displaying knowledge of management theory and too little to the public health physician's role in this clinical service setting.

8. From the standpoint of public health and welfare, discuss the merits of a switch from *direct employment to contracting out* for professional clinical services by health care providers. Quote examples to illustrate your points.

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

- Some examples of contracting out, such as the use of private laboratories for pathology investigations, subcontracting elective surgery to independent hospitals, use of covering agencies such as GP deputising services.
- Awareness of equal need for:
 - maintenance of standards
 - safety
 - efficiency
- Hence comparable systems of quality control, including assurance of evidence-based practice, inspection and audit.
- Awareness of findings of studies of comparative costs and health effects of services delivered by the two methods.
- Discussion of effects on workforce.

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

- Deeper discussion of coping with the organisational "costs" of change - role conflict, wastage issues, deskilling and redundancy.
- Awareness of methodological complexity of comparing the health and welfare effects of the two systems of delivery.

Examiners' Comments

Surprisingly, attempted by only a small minority. The key points indicate the scope of what was expected. Misinterpreted by some candidates as issues of the purchaser/provider split and the internal market. Examiners were surprised that more candidates did not attempt this straightforward question.

PAPER IIIA - UK

1. **The Clinical Director of Paediatric Surgery approached your health authority for resources to set up an ultrasound imaging service to diagnose infantile pyloric stenosis. The director cites the paper “Ultrasound compared with clinical examination in infantile hypertrophic pyloric stenosis” by Godbole P, Sprigg A, Dickson**

JAA, Lin PC. Arch Dis Childhood 1996;75:335-337.

- Write a critical appraisal of the paper.
- Draft a letter of reply to the Clinical Director of Paediatric Surgery

(Each part of the question carries equal marks).

Part a)

Most of all of the Following Points will be Required for a Pass:

- This is a prospective study of patients referred to a surgical team with a possible diagnosis of infantile pyloric stenosis. Its purpose was to assess the value of ultrasound scans in such cases.
- Patients referred with a possible diagnosis of pyloric stenosis who had both a clinical examination and an ultrasound scan were entered into the study. The results of these investigations were compared with findings at surgery (if performed). Reduction of symptoms was used to define a negative case.
- Data on the costs of scans, and the time intervals between various parts of the process were collected prospectively. The methods were appropriate for the purpose of the study.
- A positive clinical examination or ultrasound was highly predictive of pyloric stenosis (PPV of 98 and 100% respectively); but negative findings were less predictive of the absence of pyloric stenosis (NPV of 61% and 82% respectively).
- The research was undertaken in ‘ordinary’ circumstances. The subjects were managed in just the same way, by the same staff that they would have been managed by outside of a research setting. This improves the generalisability of the results.
- Generalisability is a problem because the research was undertaken in a ‘regional’ centre, presumably by tertiary clinicians, not by paediatricians in a DGH setting.
- Ranges are often given. Standards deviations or confidence intervals would be more helpful. No tests of significance were performed on the data.
- The authors do not present simple 2 by 2 tables to help describe the results. These would be:

Table 1 - Analysis of Clinical Examination

	True Positive	True Negative
Test Positive	60	1
Test Negative	15	40

Sensitivity = $\frac{60}{75} = 80\%$ The authors’ claims for the key measures are: 72%
Specificity = $\frac{40}{41} = 97.6\%$ 97%
PPV = $\frac{60}{61} = 98.4\%$ 98%
NPV = $\frac{40}{55} = 72.7\%$ 61%

Table 2 - Analysis of Ultrasound Examination

	True Positive	True Negative
Test Positive	74	0
Test Negative	14	41

Sensitivity = $\frac{74}{85} = 98.7\%$ The authors’ claims for the key measures are: 97%
Specificity = $\frac{41}{41} = 100\%$ 100%
PPV = $\frac{74}{74} = 100\%$ 100%
NPV = $\frac{41}{42} = 97.6\%$ 98%

(population 500,000) might have 15 cases per year.

- b) the study is in a 'regional' centre and the authors only advocate scanning possible cases who are negative on clinical examination. Over 21 months, 55 such cases were reported (though there may be more who weren't included in the study).

At £13.90 per scan, the cost is very low whichever data are used.

Examiners' Comments

Most candidates answered this question. This was answered well by some candidates, but poorly by others.

A central requirement to the answering of this question was a detailed examination of the figures presented. Several candidates failed to do this, merely accepting at face value the quoted values for sensitivity, specificity and predictive value quoted by the authors of the paper. It is surely clear, for example, that a detection rate by clinical examination of 60 or 75 cases later confirmed at operation does not equate to a sensitivity for clinical examination of 72%, but rather one of 80%. Some candidates did not connect the ability of a test to detect positive cases with its sensitivity.

Another feature of this paper that was missed by many candidates was the misclassification bias brought about by including in the figures for diagnostic ultrasound cases who were only detected on repeat examination, after continuance of symptoms had increased clinical suspicion. These cases should not have been included, and they artificially raised the apparent sensitivity of the ultrasound examination.

Several candidates commented that the discussion section of the paper was good. It is a shame that fewer commented on the fact that it bore little relation to the results obtained.

The second half of the paper, likewise, showed much variation in answers. Candidates should remember that the two halves of the paper are separate, and figures separately in a marking scheme. The fact that a candidate has commented on poor research methods in the critical appraisal section of this paper does not mean that they should leave them out of the 'letter to clinical director', if it is appropriate to include them. Many of the letters presented could have been written by a competent secretary with no training in public health.

2. There has been a sharp increase over the last three years in the prescribing of selective serotonin re-uptake inhibitors (SSRIs) for the treatment of depression by general practitioners serving your catchment population.

There is clear disagreement on the issue between local psychiatrists, who support the use of SSRIs on clinical grounds, and your Health Commission's pharmaceutical advisor, who cites the attached paper (Song et al, BMJ 1993; 306:638-687).

Write a critical appraisal of the paper and, based upon your review, prepare not more than ten overheads for a forthcoming meeting between your pharmaceutical adviser and general practitioner representatives in your local medical committee to discuss the way forward for your district.

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

Critical appraisal

- This is a meta-analysis of 64 randomised controlled clinical trials comparing selective serotonin uptake inhibitors with tricyclic and related antidepressants.
- In general, the search strategy used is reasonable: Medline and Index Medicus were used in conjunction with discussion with experts. Trials were judged on the basis of their quality before inclusion, and one trial was rejected because it was not double blind. Care was also taken to avoid including the same results more than once. However, the authors use repeatedly the term "major depression", but do not state how they judged the depressive status of participants in the trials reviewed.
- The meta-analysis compares efficacy of treatment, as measured in some trials by the Hamilton Rating Scale, and acceptability of treatment, as measured by drop out rate. Candidates should be able to comment on the meanings of the two "blobograms" forming Figures 1 and 2.
- The authors point out, rightly, that there is no difference in clinical efficacy of SSRIs and tricyclic antidepressants. This might be misleading, however: it is not claimed that SSRIs have a greater efficacy than tricyclics, only that they have fewer side effects.

- Drop-out rate is a crude proxy for acceptability. The reasons for dropping out of RCTs are complex and many do not relate to the treatment. In Table II the drop out rate due to side effects is shown to be less for SSRIs than for tricyclics, although this difference does not reach significance, whereas the overall drop-out rate is similar in both groups. Also, patients might tolerate side effects over the relatively short time span of a clinical trial (reported here as “median six weeks”), whereas they would not do so over a longer treatment period.
- Side effects of treatment vary with dose. The dosage regimens reported vary widely, but any confounding effect this might have on results is not considered.
- Criticism can be levelled at the paper because of the inclusion of “related antidepressants” as well as tricyclics. These compounds have fewer side effects than tricyclics but are not used as commonly in clinical practice. Their inclusion could therefore diminish any apparent advantage of SSRIs.
- Little consideration is given to the potential for tricyclic antidepressants to be used for the purposes of deliberate overdose leading to suicide. In the context of the “Health of the Nation” target on reduction of suicide this is surprising.

Overheads

- Need to be concise for meeting of pharmaceutical adviser, psychiatrists and general practitioners.
- This is a topical and sensitive issue, which is not resolved. In general, candidates should be judged by their approach to the problem, rather than by the presentation of a specific solution.

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

- The overheads should contain facts from which it is intended that guidelines for the treatment of depression in primary care should be developed. It should be recognised by the candidate that to be effective these guidelines would have to be “ground up” and that they should not try to be prescriptive to any group involved, least of all to general practitioners. The production of specific guidelines in the overheads are inappropriate, unless these are in the form of suggestions for further discussion and development by the groups concerned.
- Issues to be considered in the construction of guidelines range from diagnosis of depression and assessment of suicidal risk by general practitioners to selection of appropriate treatments, which need not be restricted to those involving the use of drugs. A narrow approach, looking only at the issue addressed in the paper, might lead to a very non-specific “solution” to the management of depression in primary care.
- In terms of the choice between SSRIs and tricyclic antidepressants as first line treatment for depression in primary care, guidelines should consider the identification of specific groups of patients for whom particular therapies would be advocated. One possible strategy would involve an initial trial of a tricyclic or related drug to assess tolerance, with specific agreed criteria for conversion to the more expensive alternative.

Examiners' Comments

This question was answered by fewer candidates and fewer failed this question badly.

Several of those who answered this question spent a considerable amount of time on the statistical aspects of the paper. Whilst important, these are not the only things to be taken into consideration in this paper. As will be evident from the key points for this question, the examiners also attached importance to the lack of definition of the term “major depression”, to the variation in reported dosage regimens, and the effects this might have on side effects, to the lack of consideration of the potential for tricyclic antidepressants to be used for deliberate overdose, leading to suicide, and by the inclusion of ‘related anti-depressants’, with different profiles of side effects, as well as tricyclics.

The style of overheads presented was generally good, with no candidates falling into the trap of too much material on one slide. Rather, the opposite was the case: some candidates presented few facts, and little evidence for the production of guidelines.

Section B - UK

- 3. The National Screening Committee recently issued advice that screening for prostatic cancer should not be introduced.**

A local pressure group has written the attached letter to the Chief Executive of your Health Authority, taking issue with this advice and requesting that you fund a screening programme.

Write:

- a) a briefing paper for your Chief Executive and**
- b) a draft response to the letter from the local pressure group (see attached).**

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

- Explain the difference between screening, case finding and clinical presentation.
- Differences between screening tests and screening programmes
- Wilson & Junger criteria and any developments of them
- Quality Assurance within any programme
- The evidence for and against prostatic cancer screening
- An appropriate letter explaining the position to a member of the public with a particular interest in the subject.

LETTER

Prostate Cancer Support Group
Any Street
Any Town

Chief Executive
Anywhere District Health Authority

Dear Doctor

I am writing on behalf of the Prostate Cancer Support Group. We represent patients and ex-patients who have had this disease and we try in particular to help those newly diagnosed. We are concerned that the general public and authoritative perception of prostate cancer and its extent is sadly lacking. New patients are bewildered by the great unknown - a devastating "bolt from the blue". There appears to be much debate about "women's diseases", but there are no equivalent programmes to cervical cancer or breast cancer screening programmes for men, despite the large numbers of men with prostate cancer.

There are no early symptoms of this disease because the gland is deep inside the body. It appears to be a matter of luck as to whether you have a doctor who is aware of the possibility and carries out a simple blood test and rectal examination early enough to pick up the disease at its earlier stages. The Department of Health appears to treat the subject as "out of sight, out of mind". Early diagnosis would save lives and misery and the higher cost of treatment of more advanced disease.

Early diagnosis gives a good chance of cure, whilst some can be relieved of symptoms through radiotherapy. Later diagnosis brings the risk of already existing spread to the pelvis, spine, ribs and lungs; even if the cancer has not spread widely, prostate removal is a major operation, which requires very skillful teams. There is risk of not only death, but also impotence and incontinence. This can also lead to major changes in lifestyle and loss of gainful employment. For the most unfortunate the spread of the disease is such that there is no cure. Other treatments such as castration or very expensive drug treatment may only delay the spread for a very limited period. Please note that there is only 1 death in every 8 men diagnosed with this disease in the USA, compared with 1 in every 2 here. The position of the Department of Health and its National Screening Committee are untenable.

I hope you can take on board our pleas and use whatever influence you have to promote awareness of the disease and direct more resources to early diagnosis/screening and treatment by highly skilled teams.

I look forward to receiving your reply.

Your sincerely

Examiners' Comments

Range of marks was 3-7, most clustered around 4 & 5.

All candidates knew of NSC advice but few gave clear description of evidence; none mentioned QA (despite Kent and Canterbury); some muddle over the evidence for/against screening, UK cf USA, natural history of disease. Very poor drafting skills - some making no attempt but resorting to bullet points they thought should be included.

Candidates tended to concentrate on prostate cancer rather than the principals of screening and relating prostate cancer to these. This meant they wasted some time and didn't emphasise or include all the issues relating to screening. Many candidates had difficulty organising their thoughts and some had difficulty with style and layout. These are particularly important for Paper IIIB.

4. There has been much debate about who contributes to the Public Health Function. You have been asked by your Health Authority Board to write a paper within the context of your own locality.

Discuss the skills, disciplines and personnel you would want:

- a) Within your own team in your own organisation.**
- b) In order to develop closer working relationships with outside organisations.**
- c) To consult from time to time.**

a) Own team in your own organisation

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

- Critical appraisal (EBM & EBP), epidemiology, statistics, wide range of clinical and non-clinical skills/experience, good communication skills, facilitation/negotiation skills and networking.
- DHA
Public Health Physicians, Research & Information Officers and Epidemiologists, Trainees in Public Health Medicine,
Nurses, Pharmaceutical & Medical Advisers, Consultants of Dental Public Health.
Explicit mention of CCDC and library staff

b) Closer Working Relationships with outside organisations

- Local authorities - Environmental health, Directors of Public Protection, social services, housing officers, local Education Authorities.
- Primary Care teams - GPs, primary health care purchasing groups, community services workers.
- Others - Chemical analysts, water authorities, housing corporations and health promotion experts.

c) Consult from Time to Time

- Business Interests, Trade Unions, General Public, Medical Schools, Further and Higher Education Establishments, Police, Churches, Voluntary Organisations.

Examiners' Comments

Marks ranged 2-8.

Most candidates attempting this question managed to include the majority of the key points; although, few did attempt it. The most commonly forgotten skills/topics were research analysis and clinical effectiveness. Some candidates seem confused about who we should work with regularly and who just occasionally.

Again, if candidates could organise their thoughts more, this would make marking a lot easier for examiners. It would have been better if candidates had mentioned, and even better read, “The New NHS”, “Our Healthier Nation” and the CMO’s report on Public Health. Very few did.

PH function was clearly a ‘no go’ area for some candidates; fairly good basic understanding by majority but too restrictive view overall.

HONG KONG - IIIA

- 1. The Director of Health has set up a Task Force to investigate how breast-feeding can be encouraged in the local community. It has been questioned whether breast-feeding is still of benefit in developed countries.**

Write a critical appraisal of the paper “Wilson AC, Forsyth JS, Greene SA et al “Relation of infant diet to childhood health: seven year follow up of cohort of children in Dundee infant feeding study”. Br Med J 1998; 316:21-25.

Summarise, in one page, the results of the study for lay members of the task force. How relevant is this paper to Hong Kong and how might it be used in the development of policy?

Part i)

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

- Clear research question
- Cohort design appropriate
- Sample size adequate
- Study validity - breast feeding groups and outcomes measured in a valid manner
- Statistical methods - correct and relevant
- Ascertainment (75%) quite complete.

Part ii)

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

- Describe study design and results in lay terms
- Study results are relevant to Hong Kong
- Results are useful for Hong Kong - obesity and respiratory illness are major health problem in children in Hong Kong,
so is hypertension in adults. The results can be applied for advocacy on breast feeding or programmes to evaluate changes in breast feeding practices in the future

Examiners' Comments

This question was not approached in a very systematic format for critical appraisal. However, findings were summarised and presented well.

- 2. You are the Hong Kong SAR Government member on a working group on elderly health. One of the targets for the working group is to formulate policies to prevent falls in the elderly.**
 - i) Write a critical appraisal of the paper Campbell AJ, Robertson MC, Gardner M et al. “Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women”. Br Med J 1997; 315:1065-9.**
 - ii) Summarise, in one page, the findings of the study for lay members of the working group; and propose a brief action plan for the working group.**

Part i)

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

- Clear research aims
- The choice of RCT design is appropriate and will give definite answers
- Study population well defined
- Study sample unbiased
- Intervention clearly defined and relevant

- Outcome measurements clearly defined. However, self-report of falls by the elderly may not be highly accurate
- Statistical methods - correct sample size - adequate.

Part ii)

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

- Describe study design and results in lay terms, plan of action
- Review other evidence for falls prevention
- Consider if such intervention is feasible in Hong Kong
- Identify resources for intervention
- Define at risk groups and the components of the intervention programme
- Intervention
- Evaluation.

Examiners' Comments

None.

Section B

- 3. A legislator has asked the Hong Kong SAR Government about the adverse health effects of air pollutants. The legislator is particularly concerned about the numbers of deaths which are caused by air borne particulates. The Director of Health has asked you, as a public health consultant, to prepare a briefing paper for the legislator about the evidence linking air pollution and ill health and suggestions for a possible way forward.**

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

- Major air pollutants (sulphur dioxide, nitrous oxide and ozone, lead, hydrocarbons, particulates and others), their main sources and adverse health effects.
- Special reference to airborne particulates, PM₁₀ and finer particulates.
- Evidence linking mortality to level of air pollutants from studies in the USA and in Europe.
- Review of local data — mortality data, pollution data available but no published studies on the relationship between mortality and pollutants.
- Published studies on respiratory ill health in children showing increased risks due to residing in a more polluted district and benefits of legislation restricting sulphur content in fuel.
- Review of what have been (or are being) done and the sectors involved e.g. legislation, taxation, government departments (Environmental Protection Department, Transport, Labour in addition to Department of Health), various environmental committees, non-governmental organisations.
- Comments on the existing problems:
 - Increasing traffic, diesel-powered vehicles.
 - Pollutants from mainland China.
 - Exceeding Air Quality Objectives, problems in using the Air Pollution Index.
 - Opposition to government proposals (e.g. phasing out of diesel-powered vehicles, increase in tax for diesel) from interested sectors, and backed by some legislators.
- Ways forward:
 - Need better studies on the adverse health effects of air pollutants in Hong Kong (e.g. on pollutant and mortality, hospital admissions) and disseminations of study results.
 - Better education of the public to solicit support for stronger control measures.
 - Wider consultation on government proposals, with legislators, and sectors affected.
 - Review of Air Quality Objectives and Air Pollution Index.

The following are points that might improve the answer to 'good' or 'excellent':

- Awareness of local data and studies, and the controversies (e.g. recent rejection of the Financial Secretary's budget proposal to increase tax on diesel).
- Specific references to major reviews on the effects of particulates (and other pollutants), hypotheses (e.g. Seaton's), the methodological issues (e.g. harvesting effects of air pollutants).
- The role of a public health consultant in the issue. The professional input to the Environmental Protection Department and other sectors.
- The conflicts of interests, the cost and benefits in relation to air pollution control.
- The need for continuing monitoring, epidemiological studies and evaluation.

Examiners' Comments

Very few candidates answered this question. Candidates provided a general answer on air pollution and control measures which did not address the concern of the legislator about deaths. No specific comments on the problems in Hong Kong and how the problems should be tackled were given.

- 4. Recent outbreaks of avian influenza have prompted some legislators to call for the establishment of a "centre for disease control" in Hong Kong. There is a debate about whether this centre should be established within the Department of Health or outside the Department. As an independent public health consultant, write a discussion paper, for release to the public, about this issue and suggest a plan for the development of the new centre.**

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

- Review of the recent outbreaks of the avian flu, the problems and the achievements.
- Discussion of other outbreaks, such as cholera, Sydney flu, etc. and the criticisms of legislators and the mass media.
- Clarification of what is meant by a CDC in Hong Kong? The legislators, the medical professions, the other sectors and the public may have different ideas and expectations. Awareness of the strong feelings of the public that the current system may not be adequate to cope and their expectations to review and improve the system.
- An understanding of the CDC in the USA. Its role in the Hong Kong Avian flu. The role of the WHO. How the Hong Kong Government, especially the Department of Health worked with these organisations?
- Reasons for a CDC outside the Department of Health with better co-ordination among government departments; stronger power; higher profile in disease control; a sign of strong government commitment to improve and strengthen the system if more resources are devoted to the new CDC.
- Reasons against a CDC outside Department of Health (DH): DH is still and should continue to take a leading role and there should not be another organisation outside or above DH; Government is not likely to change the system radically in the near future as this may affect the whole government structure; strong objections are expected from DII or other departments; the political will and public support is not strong enough (and not ready yet) for such a radical change.

Plan of action:

- To meet with legislators and others concern to solicit views and ideas and to discuss the pros and cons above.
- To identify the needs and the existing gaps and weaknesses. To work out some feasible proposals.

The following are points that might improve the answer to 'good' or 'excellent':

- Disease control include not just infectious diseases but also chronic diseases and prevention of accidents.
- Discussion of the role of WHO, the system in other countries such as the UK and other models to widen the perspective (US CDC model is not the only model to be considered).
- Sensitivity to the political situation with the legislators' agenda, the mass media and the public's expectation, the other government departments involved.
- An understanding that the suggestion for a CDC may represent a demand for changes and/or improvements of the system and is a good sign that strong public health input has strong support from the public. It is a good opportunity for public health.