

**UNIVERSITY OF WALES COLLEGE OF MEDICINE  
MASTER OF PUBLIC HEALTH  
WEDNESDAY, 16TH MAY 2001  
10-1**

**Paper 1A**

**PUBLIC HEALTH POLICY**

You should answer **FOUR** questions: equal marks are given to each question.

**ONE** from Section A : Determinants of Health

**ONE** from Section B: Health Economics

**TWO** from Section C: Health Policy and Management

Credit will be given for evidence of critical thinking and for answers which are illustrated by reference to the literature and, where relevant, to your own experience.

**PLEASE USE A SEPARATE ANSWER BOOK FOR  
EACH QUESTION**

### ***Section A: Determinants of Health***

#### ***Answer One Question***

1. What concepts of health currently determine public health interventions (in a setting of your choice)?
2. What ethical, legal and social problems are raised by 'the new genetics'?

### ***Section B: Health Economics***

#### ***Answer One Question***

3. "Health care needs are finite and rationing is simply a euphemism for denying treatment to those who need it." How would a health economist respond to this statement?
4. By means of an example, explain when and why a cost utility analysis would be preferable to a cost effectiveness analysis.

### ***Section C: Health Policy and Management***

#### ***Answer Two Questions***

5. What are the advantages and disadvantages of the main ways that health care is funded? Why have many countries adopted "free at the point of use" health care, and to what extent should and could this approach be modified to control costs?
6. Last year WHO published a league table of international health performance. Give a critique of this approach, and explain why you would encourage, modify or abandon the approach.
7. How far should a country's health care sector be expected to promote better health rather than react to disease and illness?
8. 'Centralisation of specialist medical services is inevitable and should be encouraged'. Give the main arguments for and against this statement giving what evidence you know of for developing and developed countries.

UNIVERSITY OF WALES COLLEGE OF MEDICINE

Division of Public Health

MPH Core Course in Statistics 2000/01

Examination paper, Wednesday 9 May 2001.

You should attempt *all six* questions in this paper for which 2 hours are allowed. If you find you are spending a lot of time on one question you are advised to move on to the next one - to guide you in this the marks available for each question are indicated. We suggest you use 10 minutes to read the paper at the start, and reserve 10 minutes to check at the end - then for each question or part of a question, the number of marks allocated indicates how many minutes you should expect to spend on it. Note that a substantial proportion of marks are awarded for clear interpretation or comments. There is *no* credit for performing calculations other than those explicitly requested; for those that are required, you may use a calculator, but you should include details of your working including relevant intermediate steps. Standard statistical tables are appended, together with some useful formulae and a nomogram.

1. (a) The standardised mortality ratio for deaths due to cirrhosis of the liver among male medical practitioners in 1998 was 287, with 95% confidence interval 130 to 452. The standardised mortality ratio for deaths due to cancer of the respiratory system was 37, with 95% confidence interval 15 to 119. What do you infer?

[8 marks]

- (b) Giving reasons for your answer, could these results be due to the age of the doctors?

[3 marks]

**[11 marks]**

**total]**

2. (a) A screening test for a defined condition has sensitivity 96% and specificity 99%. Explain carefully what this means.

[4 marks]

- (b) What should be calculated to help decide whether it is worthwhile to apply this screening test to a population in which the prevalence of the condition is 1 in 500? Perform the calculation and comment on the result you obtain.

[9 marks]

**[13 marks]**

**total]**

3. In a certain area there were 1468 boys born in a year with an estimated gestational age of 40 weeks; the corresponding number of girls born was 1435. For the boys the mean weight was 3450 g with a standard deviation of 453 g while for the girls the mean was 3288 g with standard deviation 451 g. The distribution of the weights can be assumed to be Gaussian.

(a) Find a 95% confidence interval for the mean weight at birth of a baby boy at 40 weeks gestation.

[6 marks]

(b) Find a 95% reference range for the weights of such baby boys.

[3 marks]

(c) Explain carefully what these two intervals represent, and distinguish between them.

[4 marks]

(d) A 95% confidence interval for the difference of mean weights between boys and girls is (130 g, 195 g). Explain what can be inferred from this interval.

[4 marks]

**[17 marks**

**total]**

4. Osteoporosis, a condition involving weakening of bones, is common in patients with inflammatory bowel disease. A randomised controlled trial was performed to evaluate the effectiveness of a programme of exercises designed to strengthen bone. 110 patients were allocated to either a 6 month exercise programme (n=53) or a control regime (n=57). Bone mineral density (BMD) was measured at the beginning and end of the study period. In all other respects patients in both groups were managed as usual. The mean percentage increase in BMD was +1.3 units (SD 3.9 units) in the intervention group and +0.2 units (SD 3.2 units) in the control group. A 95% confidence interval for the mean change in the exercise group is from +0.3 units to +2.3 units.

(a) Without performing any further calculation, explain why it is incorrect to infer from this interval that the exercise programme is beneficial.

[3 marks]

(b) What test should be used to compare the mean change in BMD between the two groups? Specify the null and alternative hypotheses and calculate the test statistic. State whether or not the null hypothesis should be rejected, and the steps leading to this decision.

[14 marks]

(c) A further study is planned involving a fresh set of participants, in which it is hoped to have a 90% power to detect a difference in BMD increase of 1 unit

between the exercise and control groups. Assuming a SD of 4 units, how many subjects would need to be recruited to the study?

[3 marks]

**[20 marks**

**total]**

5. The following results show proportions of gastrointestinal infections in a town that were due to cryptosporidium, for six successive years.

Year	Total reports of gastrointestinal infection	Number due to cryptosporidium	Percentage of total gastrointestinal infections
1991	128	14	10.9%
1992	133	25	18.8%
1993	133	16	12.0%
1994	256	32	12.5%
1995	274	15	5.5%
1996	210	30	14.3%
Total	1134	132	11.6%

- (a) Produce a rough sketch of a bar chart to display these results.  
[4 marks]
- (b) Calculate a 95% confidence interval for the overall proportion of 11.6%.  
[6 marks]
- (c) A chi-square test applied to the above data yielded  $\chi^2 = 18.44$ . Show briefly how this value is calculated. Specify the null and alternative hypotheses, and state whether or not the null hypothesis should be rejected, explaining the steps leading to this decision. What should be concluded?  
[14 marks]
- [24 marks total]**

6. In a cross-sectional study to determine risk factors for chronic fatigue syndrome (CFS), 1451 out of 9708 subjects were identified as having CFS. 3517 of the 9708 were judged to have moderate or severe perceived lack of social support (PLSS). Of these 3517 subjects, 628 had CFS.

- (a) Present the results in a suitable table.  
[3 marks]
- (b) Calculate the odds ratio for the association between CFS and PLSS. A 95% confidence interval for the OR is calculated to be 1.27 to 1.59. What should be inferred from these results?  
[5 marks]
- (c) Suggest, but do not attempt to perform, other analyses that could be appropriately applied to the results.  
[3 marks]
- (d) Describe briefly the limitations attaching to the conclusions drawn.  
[4 marks]
- [15 marks total]**

**UNIVERSITY OF WALES COLLEGE OF MEDICINE  
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10-1**

**Paper 1C**

**EPIDEMIOLOGY**

**(including demography and social research methods)**

You should answer **FOUR** questions: equal marks are given to each question.

**TWO** from Section A: Epidemiology

**ONE** from Section B: Social Research Methods

**ONE** from Section C: Demography

Credit will be given for evidence of critical thinking and for answers which are illustrated by reference to the literature and, where relevant, to your own experience.

**PLEASE USE A SEPARATE ANSWER BOOK FOR  
EACH QUESTION**

## **SECTION A (Epidemiology)**

### **Answer TWO questions**

1. A study of 200 patients admitted to hospital with myocardial infarction (heart attack) finds higher levels of C reactive protein, a marker of chronic infection, than in a sample of blood donors, matched for sex and age. Describe the study design and the hypothesis under test and interpret the findings.
2. Cancer of the prostate is common in older men. There is currently some debate over introduction of a national screening programme for this cancer. Discuss the principles, potential benefits and possible limitations of such a screening programme.
3. A meta analysis of trials of a dietary intervention shows a statistically significant reduction in an important risk factor and a meta analysis of cohort studies shows a J shaped relationship between the risk factor and total mortality. What do you understand by meta analysis and what advantages does meta analysis have over a well designed trial or study? Do these findings demonstrate that the dietary intervention reduces mortality? Are there potential disadvantages? What additional studies would you recommend?
4. Describe the uses and key attributes of a public health surveillance system. How would you evaluate a surveillance system to ensure it is meeting its objectives? Give an example of your choice.

## **Section B (Social Research Methods)**

### **Answer ONE question**

5. Write a methods section of a paper reporting research undertaken to ascertain the attitudes of pregnant women towards Down syndrome screening.
6. List the key characteristics of 'rapid appraisal' and 'critical appraisal'. Evaluate the contribution each makes to research in public health.



**Section C (Demography)**  
**Answer ONE question**

7. The table below shows the mid year population for 2000 and population projections for 2025 and 2050 for the whole world and for selected countries (representing the present cohort of students in the MPH programme). The percentage increases in population from 2000 to 2025 and from 2025 to 2050 are also shown.

Describe the trends you perceive, and comment on their implications for public health in 2050.

	Population mid 2000 (millions)	Projected population 2025 (millions)	<i>Percentage % increase from 2000 to 2025</i>	Projected % population 2050 (millions)	<i>Percentage increase from 2025 to 2050</i>
World	6067	7810	28.7	9039	15.7
Azerbaijan	7.7	9.8	27.3	11.5	17.3
Ghana	19.5	26.4	35.4	32	21.2
India	1002	1363	36.0	1628	19.4
Nigeria	123	204	65.9	304	49.0
Pakistan	151	227	50.3	285	25.6
Philippines	80.3	117	45.7	140	19.7
Tanzania	35.3	59.8	69.4	88.3	47.7
United Kingdom	59.8	64.1	7.2	64.2	0.2
United States	275	338	22.9	404	19.5

Source: 2000 Population Reference Bureau

8. What are the causes of 'demographic entrapment'? What solutions exist?