UNIVERSITY OF WALES COLLEGE OF MEDICINE

MASTER OF PUBLIC HEALTH

WEDNESDAY, 14TH MAY 2003

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

The **COMPULSORY QUESTION** and **ONE OTHER** 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.

<u>PLEASE USE A SEPARATE ANSWER BOOK FOR EACH QUESTION</u>

Section A: Determinants of Health
Answer <u>one</u> question

Please use a separate answer book for EACH question

1.   In 1996, 92% of life science companies supported academic research. Quoting a 1999 study, the authors of a paper published in an American medical journal say that 68% of US and Canadian institutions held equity in companies that sponsored research done at their institutions. This was an important source of revenue.

The authors reviewed 37 studies with original data on financial relationships among industry, investigators, and academic institutions. They found that partnerships between industry and academia have grown since the 1980s. Between 23% and 28% of academic researchers received funding from industry, 43% received gifts such as biomaterials and discretionary funds, and a third had personal financial ties with industry sponsors. The financial ties included paid speaking engagements, consulting arrangements, positions on advisory boards, and equity in the sponsoring company. Industry sponsored research is likely to reach conclusions favourable to industry. In 61 industry sponsored trials of non-steroidal anti-inflammatory drugs, not a single trial found the comparison drug superior to the sponsor's drug.

Comment on the issues of conflicting interests for the integrity of health related research, and how this might affect public health.

2.   Outline what is meant by health behaviour (9 marks) and illness behaviour (9 marks). Is it useful for public health practitioners to distinguish between these two (7 marks)?

Section B: Health Economics
Answer <u>one</u> question

Please use a separate answer book for EACH question

3.   By means of an example (real or made up) explain when a cost effectiveness analysis would be preferable to a cost benefit analysis?

4.   Defend the economist's view that a health care system which prioritises services on the basis of cost per quality adjusted life year (QALY) will be both efficient and ethical.

Section C: Health Policy and Management
Answer question 5 which is <u>compulsory</u>, and <u>one</u> from the remaining questions)

Please use a separate answer book for EACH question

5 (**compulsory**).   On the outskirts of a large industrial city is an area of housing of about 4 square kilometres. Nearly 35,000 people live there, mainly poorly paid manual workers and their families. Currently, unemployment in the area is running at 15%, average family size is 4 children, there are many single-parent families, and morbidity figures are consistently much worse than for the adjacent city. There are community tensions and most people have migrated into the area from distant parts of the country, some from abroad.

The European Commission has offered a grant of 5 million pounds for each of the next 5 years to raise the standards of health in this area, and local politicians have given you 1 month to prepare a proposal to present to a visiting EC team about how the money should be used. The team at your disposal includes 1 nurse, 1 doctor and 1 social worker plus some clerical and support staff.

Outline how you will go about assessing and prioritising the needs of the population; what information you will want your team to collect; any particular methods or technologies you would want them to employ; and the sorts of problems you anticipate in developing a technically sound assessment which will satisfy the expectations of the people, the politicians who have given you the task, and the EC visiting team.

Please use a separate answer book for EACH question

6.   *Caveat emptor:* "Let the buyer beware" is an ancient maxim. However, a consumer of health care services faces many difficulties if trying to ensure she or he is receiving good quality health care. Describe a range of those difficulties. Explain what practical attempts are being made, or should be made, to ensure higher quality services, and the sorts of problems faced by those implementing them.

7.   It has been suggested that a certain country (make your own choice) should spend an extra 2% of GDP on health care in the coming financial year. Prepare a short briefing note for the Cabinet describing the relative effects of raising this money using direct or indirect taxes, user fees or some sort of insurance system, giving a brief assessment of those options in terms of likely effect on equity and efficiency.

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 both developing and developed countries.

UNIVERSITY OF WALES COLLEGE OF MEDICINE

MASTER OF PUBLIC HEALTH/MSc PHCA

WEDNESDAY, 7 MAY 2003

Paper 1B

STATISTICS

You should answer **ALL FIVE** questions in this paper for which 2½ 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. 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 calculations that are required, you may use a calculator, but you should include details of your working, including relevant intermediate steps. Some useful formulae together with standard statistical tables are appended.

Question 1

Suppose that a new national surveillance system for a particular condition started up in 1984. A total of 16,173 new cases were recorded in the period up to 2001 as detailed below.

Year	Number of cases in the surveillance system's files	Year	Number of cases in the surveillance system's files
1984	198	1993	531
1985	253	1994	593
1986	348	1995	601
1987	352	1996	752
1988	377	1997	913
1989	386	1998	1128
1990	388	1999	1584
1991	397	2000	2495
1992	452	2001	4425

(a) Calculate the mean of these data. How useful is this as a summary of the picture during this time period?

4 marks

(b) Describe the pattern of these data. Do not produce one, but state what sort of chart might be useful in displaying them.

4 marks

(c) What factors might explain this pattern?

6 marks

Total 14 marks

Question 2

In 2001, the death rate for the entire male population of England and Wales was 10.0 per 1000. A total of 281,200 males lived in a particular area of Wales of whom 3100 died during the year.

Age group	England & Wales 2001 death rate per 1000 males	Total number of males resident in area	Expected deaths
Under 1	5.90	1800	10.6
1 - 4	0.25	8390	2.1
5 - 9	0.11	11290	1.2
10 - 14	0.16	12900	
15 - 19	0.53	17470	9.3
20 - 24	0.81	19410	15.7
25 - 34	1.00	43960	44.0
35 - 44	1.58	42200	
45 - 54	3.90	38020	148.3
55 - 64	10.00	35240	
65 - 74	28.10	30450	
75 - 84	74.20	16500	
85 +	186.60	3570	666.2
Total	- - -	281200	

(a)   Complete the table by inserting the missing figures for expected deaths.

6 marks

(b)   What is the crude mortality rate in the population under question?

3 marks

(c)   How does the crude mortality rate in the population under question compare with that of the reference population?

2 marks

(d)   Calculate the standardised mortality ratio for the population under question.

5 marks

(e)   What may be inferred from the crude mortality rates and the SMR in terms of the health of the population in question?

6 marks
Total 22 marks

Question 3

A new measure of the risk of a certain condition occurring has been measured in a sample of 81 people. The measurement is expressed as an index whose values can lie between 0 (no risk) and 18 (the highest risk). The mean index value in the sample was 8.1 and the standard deviation was 1.63.

(a) Calculate a 95% reference range. Comment on the appropriateness of this and of any underlying assumptions that you are making.

5 marks

(b) Calculate the 95% confidence interval for the mean of this distribution. Explain what can be inferred from this confidence interval and in particular what is meant by specifying 95%.

5 marks

(c) Compare and contrast the usefulness of a 95% reference range and a 95% confidence interval.

8 marks

Total 18 marks

Question 4

A test was performed on 250 subjects who were known to be affected with a particular disease and on 250 unaffected subjects. The test was performed blind to the subject's true status. The total number of individuals who were positive for the test was 237, the rest being negative for the test. Of those who were positive for the test 92% actually had the condition.

(a) Lay out a table of these figures.

3 marks

(b) Calculate the sensitivity, specificity, positive predictive value and negative predictive value for the test. Explain carefully what these terms mean and how they are obtained.

8 marks

(c) Suppose that a patient comes from a population group in which the prevalence of this disease is 1%. For this patient the test is positive, what then is the probability that this patient has the disease?

5 marks

(d) A different patient from the same population as in (c) is test negative. What is the probability that this second patient has the disease?

3 marks

(e) Without doing further calculations, do you think that this test would be useful for screening a population with an estimated incidence of the disease of 1%? Outline your arguments for and against this possibly and state clearly what measure or measures you would use in assessing whether or not this test was useful in this screening situation.

5 marks

Total 24 marks

Question 5

In a randomised controlled trial designed to reduce the incidence of falls in elderly women, 241 subjects were studied. The intervention group ($n_1 = 120$) had individually tailored programmes of home physical therapy, the control group ($n_2 = 121$) had an equal number of social visits. One outcome variable was the change in a measure of physical activity (higher values of the score indicate more physical activity). The table below shows the mean and standard deviation of this change in the two groups during the time period of the study.

Change in physical activity score	Exercise group	Control group
Mean	-4.6	-10.3
Standard deviation	22.9	22.3

(a) How would you assess whether or not this study was well conducted?

4 marks

(b) Perform a suitable hypothesis test to compare the changes in the average level of the change in physical activity score between the two groups.

10 marks

(c) How would you explain the meaning of the statistical findings to those who commissioned the study?

8 marks

Total 22 marks

UNIVERSITY OF WALES COLLEGE OF MEDICINE

MASTER OF PUBLIC HEALTH/ MSc (PHCA)

WEDNESDAY, 21 MAY 2003

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
Use separate answer books for each question

1.   Describe some important sources of bias in case control studies. Describe how these can be minimised in design and/or in analysis.

2.   The table summarises the findings of a prospective study with 20 years follow up of the relationship between radiographic breast density patterns and breast cancer incidence.

| | Radiographic breast density pattern | | | |
| | A | | D | |
Age	Woman years at risk	Incident cancers	Woman years at risk	Incident cancers
- 49	13,916	20	5,611	19
50-69	4,022	21	4,124	33
70 -	731	14	118	6

Explain what is meant by relative risk and use these results to estimate the relative risk of cancer in each age group according to radiographic breast density pattern. (17 marks) How could this information be used in breast screening. (8 marks)

3.   You are alerted by your local clinicians to an excess of cases of a particular type of pneumonia. Describe the steps that you would take to develop a hypothesis about the cause.

4.   Describe the features of a good screening test. What other conditions should be met before it can be used as part of an effective screening programme?

SECTION B: Social Research Methods
Answer <u>one</u> question
Use separate answer books for <u>each</u> question

5.	In 2002 Donovan and colleagues suggested that randomised controlled trials could be embedded in qualitative research studies. Comment on the ways in which RCTs and qualitative methods complement each other.

6.	In what research situations are open and closed questions best suited? (15 marks) Give three examples for each type of question.(10 marks)

SECTION C: Demography
Answer *one* question
Use separate answer books for each question

7.   What factors affect the shape of a population pyramid? (15 marks) What is demographic transition? (10 marks)

8.   Why does a government want to know the size of its country's population and how does it find out? (16 marks)   Comment on the table of the mid year population projections for 2025 and 2050. (9 marks)

Mid year population 2000 CE and population projections for 2025 and 2050 for selected countries			
	Population mid 2000 (millions)	Projected population 2025 (millions)	Projected population 2050 (millions)
World	6067	7810	9039
India	1,002.14	1,363.00	1,628.00
United States	275.00	337.82	403.69
Russia	145.23	136.95	127.70
Bangladesh	128.13	177.34	210.81
Nigeria	123.34	204.45	303.59
United Kingdom	59.75	64.09	64.16
Italy	57.82	52.44	41.95
Southern Africa	49.92	42.66	43.37
Spain	39.47	36.72	30.77
Venezuela	24.17	34.78	42.15
Saudi Arabia	21.61	39.97	54.46
Ireland	3.80	4.52	4.53
Oman	2.35	5.25	8.96
Belize	0.254	0.405	0.517

Source: 2000 Population Reference Bureau