

**UNIVERSITY OF WALES COLLEGE OF MEDICINE
MASTER OF PUBLIC HEALTH
WEDNESDAY, 17TH MAY 2000**

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. Is primary health care the solution to the health problems of the poor?

OR

2. Why did the World Development Report 1993 identify tobacco as a public health problem. What factors have affected policy towards smoking?

Section B: Health Economics

Answer One Question

3. How would an economist counter the argument that prioritising on the basis of costs per Quality Adjusted Life Year is unethical?

OR

4. What are the advantages and disadvantages of Cost Benefit Analysis over other techniques of economic appraisal?

Section C: Health Policy and Management

Answer Two Questions

5. Discuss the advantages and disadvantages of community-based care in contrast to hospital-based care. Use examples from any two countries with which you are familiar.
6. Nye Bevan said 'There will never be enough money for the NHS'. Explain why this should be so and outline the pressures causing the NHS and other health services to cost more year on year.
7. What are the basic modes of funding health care and indicate the strengths and weaknesses of the different options using examples from at least two different countries (UK counts as one country).
8. "Health Reform is endemic". What are the main elements within health services to justify thinking that continuing reform is inevitable? Why might health reform be considered a "political" rather than a "technical" undertaking?

UNIVERSITY OF WALES COLLEGE OF MEDICINE

Division of Public Health

MPH Core Course in Statistics 1999/2000

Examination paper, Wednesday 10 May 2000.

You should attempt *all five* 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. Appropriate standard statistical tables are appended, together with some useful formulae.

1. Use of oral vitamin D3 has been suggested to help to prevent fractures in elderly people who fall. A randomised controlled trial was set up to test the effectiveness of vitamin D3 supplementation for elderly people in residential and nursing homes. Of 4917 subjects receiving active treatment, 912 sustained a fall-related fracture during the follow-up period, compared to 1021 out of 4952 in the placebo group.

(a) Identify and perform a suitable hypothesis test to compare the outcomes in the two groups, and briefly interpret the findings.

[15 marks]

(b) The relative risk in the active group compared to the placebo group was 0.900, with 95% confidence interval from 0.830 to 0.975. Explain carefully what the relative risk and its confidence interval represent here, and how they should be interpreted.

[7 marks]

[22 marks

total]

2. In a study in Ireland 299 women attending antenatal clinic for the first time were interviewed. The following results were obtained.

		Were you advised to take folic acid before conception?		Total
		Yes	No	
Was your pregnancy planned?	Yes	48	69	117
	No	14	168	182
Total		62	237	299

The odds ratio was calculated as 8.3, with 95% confidence interval from 4.2 to 17.4.

(a) What proportion of women with planned pregnancies reported that they were advised to take folic acid? Calculate a 95% confidence interval for this proportion, and comment.

[6 marks]

(b) Show how the odds ratio is calculated, and explain what it signifies and how its confidence interval should be interpreted. What reservations do you have in interpreting these results?

[10 marks]

[16 marks]

total]

3. There is public concern about the effects on respiratory health of chemical pollutant emissions from a factory in a heavily populated area. The following results were obtained for deaths from respiratory diseases during a period of 16 years in people living less than 2 km from the factory and those living between 2 and 7.5 km from it.

Distance	Resident population	Respiratory deaths		SMR	95% confidence interval
		Observed	Expected		
Under 2 km	71495	1196	1121	107	101 to 113
2 - 7.5 km	783943	13970	12766	109	108 to 111

(a) Explain what is meant by the standardised mortality ratio (SMR). Explain briefly the principles behind its calculation. Explain why it is used here.

[11 marks]

(b) What would you infer from these results, and why?

[7 marks]

[18 marks]

total]

4. The SF-36 is a widely used general health rating scale. 210 people attending hospital as out-patients took part in a study to determine whether similar results are obtained by interview and by self-completion postal questionnaire. The randomisation allocated 95 subjects to be interviewed in the clinic and complete a postal questionnaire 10 days later. The other 115 completed the postal questionnaire 10 days before being interviewed in the clinic. The table gives results for the component of the score that refers to pain.

Group	n	Mean score		Difference (interview - postal)		
		Interview	Postal	Mean	SD	95% confidence interval
Interview first	95	56.0	54.8	+1.2	22.8	-2.0 to +4.2
Postal first	115	51.6	50.6	+1.0		
All subjects	210	53.6	52.5	+1.1		

(a) Show how the 95% confidence interval for the mean difference for all subjects is calculated.

[7 marks]

(b) Perform the corresponding hypothesis test, and interpret the findings.

[10 marks]

(c) Explain briefly why a crossover design was used here.

[4 marks]

(d) From the results obtained in the two groups separately, would you draw the same inferences as in part (b), and why?

[4 marks]

[25 marks]

total]

5. In France, women between the ages of 50 and 69 are invited for mammographic breast cancer screening every 3 years. The following results were obtained in a certain region, for women who had been negative for cancer when screened 3 years earlier.

Screening result		Cancer present	No cancer present	Total
		Positive	203	
Negative		27	46843	46870
Total		230	48045	48275

(a) What is meant by the following terms?

- (i) prevalence
- (ii) sensitivity
- (iii) specificity
- (iv) positive predictive value
- (v) negative predictive value

Calculate these quantities for the above data.

[15 marks]

(b) How would you expect these figures to differ if women were screened yearly, and why?

[4 marks]

total]

[19 marks

Some useful formulae.

Standard error of \bar{X} s / \sqrt{n}

Standard error of p $\sqrt{p(1-p) / n}$

Standard error of $\bar{X}_1 - \bar{X}_2$ $\sqrt{s_1^2 / n_1 + s_2^2 / n_2}$

Standard error of $p_1 - p_2$ $\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$

Standard error of $\log_e(OR)$ $\sqrt{1/a + 1/b + 1/c + 1/d}$

t (paired) $\bar{d} / SE(\bar{d})$

t (independent samples) $\frac{\bar{X}_1 - \bar{X}_2}{SE(\bar{X}_1 - \bar{X}_2)}$

1- α confidence intervals:

For \bar{X} $\bar{X} \pm t_\alpha \times SE(\bar{X})$

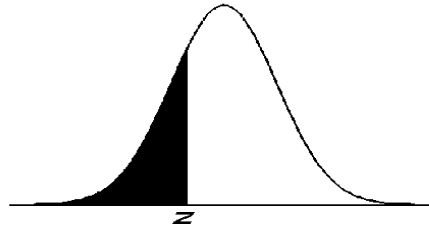
For $\bar{X}_1 - \bar{X}_2$ $\bar{X}_1 - \bar{X}_2 \pm t_\alpha \times SE(\bar{X}_1 - \bar{X}_2)$

For p (simple method) $p \pm z_\alpha \times SE(p)$

For $p_1 - p_2$ $p_1 - p_2 \pm z_\alpha \times SE(p_1 - p_2)$

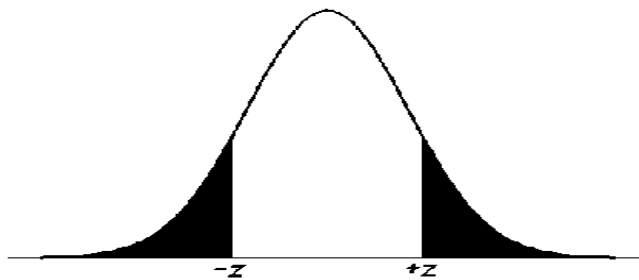
Some useful values from Normal, t and χ^2 distributions

Normal Distribution - one-tailed areas.
 Proportion $P(z)$ of the Normal distribution that lies below z where z is the standard Normal deviate



z	$P(z)$	z	$P(z)$	z	$P(z)$
-3.0	0.001	-1.0	0.159	1.0	0.841
-2.9	0.002	-0.9	0.184	1.1	0.864
-2.8	0.003	-0.8	0.212	1.2	0.885
-2.7	0.003	-0.7	0.242	1.3	0.903
-2.6	0.005	-0.6	0.274	1.4	0.919
-2.5	0.006	-0.5	0.309	1.5	0.933
-2.4	0.008	-0.4	0.345	1.6	0.945
-2.3	0.011	-0.3	0.384	1.7	0.955
-2.2	0.014	-0.2	0.421	1.8	0.964
-2.1	0.018	-0.1	0.460	1.9	0.971
-2.0	0.023	0.0	0.500	2.0	0.977
-1.9	0.029	0.1	0.540	2.1	0.982
-1.8	0.036	0.2	0.579	2.2	0.986
-1.7	0.045	0.3	0.616	2.3	0.989
-1.6	0.055	0.4	0.655	2.4	0.992
-1.5	0.067	0.5	0.691	2.5	0.994
-1.4	0.081	0.6	0.726	2.6	0.995
-1.3	0.097	0.7	0.758	2.7	0.997
-1.2	0.115	0.8	0.788	2.8	0.997
-1.1	0.136	0.9	0.816	2.9	0.998
-1.0	0.159	1.0	0.841	3.0	0.999

Some selected two-tailed percentage points of the Normal distribution



$P(z)$	0.5	0.2	0.1	0.06	0.05	0.02	0.01	0.001
z	0.674	1.282	1.645	1.881	1.960	2.326	2.576	3.291

Two-tailed percentage points of the t distribution

Degrees of freedom	Multiplier for confidence interval at level				
	90%	95%	98%	99%	99.9%
	Probability of obtaining a t-value which, when its sign is ignored, exceeds the tabulated value				
	10%	5%	2%	1%	0.1%
5	2.02	2.57	3.37	4.03	6.87
6	1.94	2.45	3.14	3.71	5.96
7	1.90	2.37	3.00	3.50	5.41
8	1.86	2.31	2.90	3.36	5.04
9	1.83	2.26	2.82	3.25	4.78
10	1.81	2.23	2.76	3.17	4.59
11	1.80	2.20	2.72	3.11	4.44
12	1.78	2.18	2.68	3.06	4.32
13	1.77	2.16	2.65	3.01	4.22
14	1.76	2.15	2.62	3.00	4.14
15	1.75	2.13	2.60	2.95	4.07
16	1.75	2.12	2.58	2.92	4.02
17	1.74	2.11	2.57	2.90	3.97
18	1.73	2.10	2.55	2.88	3.92
19	1.73	2.09	2.54	2.86	3.88
21	1.72	2.08	2.52	2.83	3.82
23	1.71	2.07	2.50	2.81	3.77
25	1.71	2.06	2.49	2.79	3.73
27	1.70	2.05	2.47	2.77	3.69
31	1.70	2.04	2.45	2.74	3.63
35	1.69	2.03	2.44	2.72	3.59
41	1.68	2.02	2.42	2.70	3.54
49	1.68	2.01	2.41	2.68	3.50
60	1.67	2.00	2.39	2.66	3.46
80	1.66	1.99	2.37	2.64	3.42
120	1.66	1.98	2.36	2.62	3.37
240	1.65	1.97	2.34	2.60	3.33
Infinity (Normal distribution)	1.64	1.96	2.33	2.58	3.29

Percentage points of the χ^2 (chi-square) distribution

Degrees of freedom	Probability that the tabulated value is exceeded				
	10%	5%	2%	1%	0.1%
1	2.71	3.84	5.41	6.63	10.83
2	4.61	5.99	7.82	9.21	13.82
3	6.25	7.81	9.84	11.34	16.27
4	7.78	9.49	11.67	13.28	18.47
5	9.24	11.07	13.39	15.09	20.52
6	10.64	12.59	15.03	16.81	22.46

**UNIVERSITY OF WALES COLLEGE OF MEDICINE
MASTER OF PUBLIC HEALTH
WEDNESDAY, 24TH MAY 2000**

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

ONE from Section B

ONE from Section C

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. Describe the design, execution and analysis of a cohort study.
2. Define the following and give an illustration of how each term is used:
 - epidemic
 - endemic
 - rate
 - ratio
 - Perinatal mortality rate
 - SMR
3. An excess of cases of an infectious disease are reported to a local public health Department. Describe the steps that should be taken 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 ONE question

5. Data about maternity care are needed to monitor the health of women and their babies and the services provided. How would you design a study to investigate an allegation of poor quality reporting.

OR

6. What is action research? Describe its usefulness for public health.

Section C (Demography)

Answer ONE question

7. Verbal autopsies have been used to assess the causes of maternal deaths. What is a verbal autopsy? Why are they used? What is known about their validity?

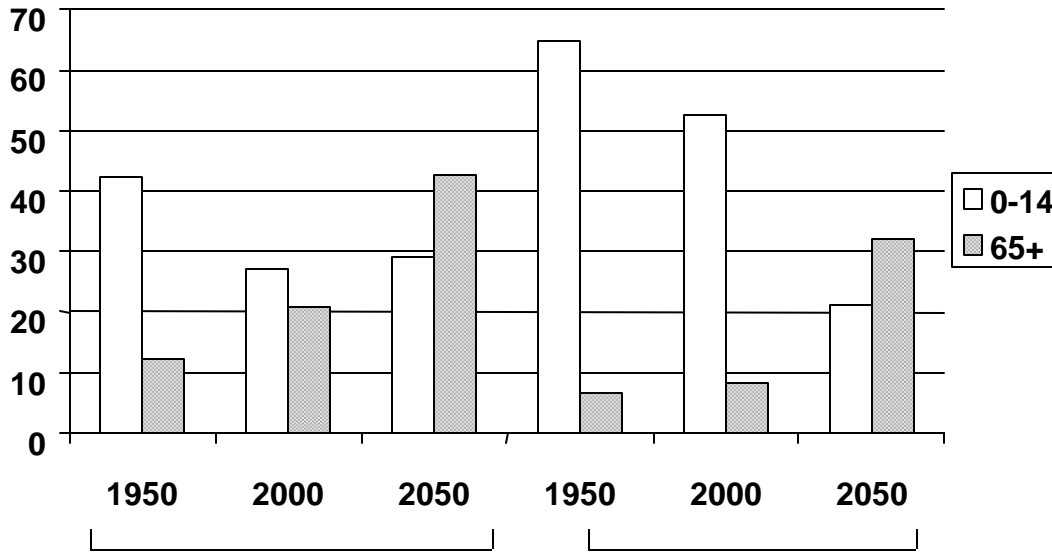
OR

8. Comment on this figure: what is a dependency ratio? What trends are apparent? Identify any limitations to the projections, and suggest implications there may be for health and social policy.

Dependency Ratios

More developed regions : Less developed regions

Dependency Ratio (per 100 people aged 16-64)



*More developed regions (North
America, Europe, Japan,
Australia, New Zealand)*

*Less developed regions
(Africa, Latin America, Asia
(excluding Japan))*