

*NATIONAL UNIVERSITY OF IRELAND, GALWAY
OLLSCOIL na hÉIREANN, GAILLIMH*

SPRING EXAMINATIONS 2000/2001

Department of Medical Informatics and Medical Education

Fourth Medical Year Examination March 8th 2001-02-20

0930-1130

You must answer all parts of all five questions

Each question has several stems indicated by a letter (e.g. a), b) etc.) Some questions are also divided into sections. Please indicate clearly in your answer book which section and or stem of the question you are answering. (e.g. Qu.4, section 2 (b) means you are answering the second stem in section 2 of the 4th question.)

Dr Peter Cantillon
Dr. David Bullimore
Gloria Avalos

***This is a two-hour examination, which means that you
have approximately 24 minutes per question.***

Question 1. Collecting and interpreting information

Section 1. Audit

8 Marks

- Define the term audit
- Describe in general terms the purpose of audit
- Describe in a few sentences how audit differs from research
- Draw a typical audit cycle indicating the key features of the cycle

Section 2. Designing an audit

12 Marks

Read the following case study. Design an audit to answer the audit questions listed at the end of the case study.

Five GPs in a group practice in Dublin have read the National Cardiovascular Disease Strategy document and want to audit the quality of cardiovascular disease prevention provided by their practice. They decide to look first at the highest risk group (i.e. patients with existing cardiovascular disease.) They know that both antiplatelet agents and cholesterol lowering drugs have been shown to reduce further cardiovascular events in these high-risk patients. They are also aware that many of the patients are not taking preventative medication. They decide to carry out an audit of the use of antiplatelet agents (aspirin etc.) by patients with established cardiovascular disease. They hope to use the results to plan a strategy for increasing the use of aspirin (or alternative antiplatelet agent) by patients with pre-existing cardiovascular disease.

Your task is to design an audit cycle (using the steps that you learned about in your lecture on audit) to answer the audit question above. Explain your reasoning for each step in the audit cycle.

Question 2. Finding information using the Internet

20 Marks

- Define the term "Internet"
- What is an Internet Service Provider?
- What is an Internet Web Browser?
- What is a Search Engine?
- Write short notes on the operation and use of three different types of search engine available for use on the Internet
- Explain both the meaning and the use of Boolean Logic in Internet searches. Illustrate your answer with examples
- Explain the difference between Bibliographic and Value-Added medical databases. Write short notes on the role of each type of database in providing information for evidence based practice. Name one example of each type of database

Question 3. Screening

20 Marks

Write short notes on the following:

- a) What is the purpose of screening?
- b) List five of the Wilson and Jungner screening criteria
- c) Explain the relevance of each of the criteria that you have listed
- d) Apply the five criteria that you have listed to the cervical cancer screening programme. Comment on why cervical cancer screening meets or does not meet the Wilson Jungner criteria that you have selected
- e) Explain the terms sensitivity and specificity.
- f) Explain the terms positive and negative predictive value

Question 4

Section 1: Data types

5 Marks

State the level of measurement (nominal, ordinal, interval) used in the following questions taken from a study questionnaire. NB. Do not attempt to answer the questionnaire!! You are being asked to state what kind of data (nominal, ordinal, interval) that each question will produce

a) *How often do you eat fried food?*

Daily
4-6 times a week
1-3 times a week
Less than once a week

b) *Do you read food labels?*

Yes
No

c) *What is your weight in kilograms?*

d) *What is your marital status?*

Married
Widowed
Divorced
Separated
Never married

e.) *Please indicate your agreement or otherwise with the following statements*

"I think that beef on the bone should be banned"

Strongly disagree
Disagree
No Opinion
Agree
Strongly agree

Section 2: Please write brief answers to the following questions: 10 Marks

- a) Explain your understanding of when parametric tests should be used?
- b) How do you define the terms mean, mode and median and standard deviation?
- c) The Mann Whitney U is a non-parametric alternative to which parametric tests?
- d) What is the name of the statistical method for comparing three or more means?
- e) What is the meaning of the following correlation coefficients?
 - a) $r = +1$
 - b) $r = -1$
 - c) $r = 0$

Section 3: Skewed distributions

5 Marks

- a) Draw by hand a distribution, which indicates positive skew.
- b) Indicate where you think the mean, median and mode might lie on your positively skewed graph

Question 5

Section 1: Odds ratio

8 Marks

The following are the results of a case control study looking at the association between Coronary Heart Disease (CHD) and cigarette smoking.

The results of the Odds Ratio are presented as follows:

Table A

	CHD	No CHD
Smokers	112	176
Non-Smokers	88	224

Odds ratio = 1.62

Confidence Interval = (1.13 <OR< 2.31)

p-value = 0.0055

- Write an interpretation of Table A above
- Write a null hypothesis concerning the above variables.
- Provide an interpretation for each of the three results listed above (i.e. for the odds ratio, the confidence interval and the p-value)
- Explain what is signified by a 95% confidence interval?

Section 2: Parametric tests

6 Marks

Data was collected from women who suffer from hot flushes. The age of the women in the study was recorded. Look at the two output tables and answer the questions on the next page.

Table 1

Hot Flushes	Number of women	Mean age (yrs)	Standard Deviation (yrs)
Yes	7	56.6	5.5
No	43	58.3	3.77

Table 2

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AGE	Equal variances assumed	1.585	.214	-1.070	48	.290	-1.75	1.64	-5.05	1.54

- a) Why is the equality of variances calculated?
- b) Do you think that equal variances can be assumed in table 2? Explain your answer with reference to the results.
- c) Write an interpretation of these results

Section 3:

6 Marks

A study looking at whether men or women were more likely to have medical cards produced the following results:

Medical Card		Gender		Total
		Male	Female	
Yes	Count %	42 26%	91 30%	133
No	Count %	119 74%	217 70%	336
Total		161	308	469
	%	100%	100%	

- a) What type of table is this?
- b) What type of data is being presented in this table?
- c) What test would you use to demonstrate whether the difference in medical card ownership between the sexes is significant or not?
- d) What is the null hypothesis for this test?
- e) If the p-value of this test were = 0.06, what would you conclude about the null hypothesis.