03 - COMMUNITY MEDICINE / COMMUNITY DENTISTRY

(04) MD (Community Medicine) Part1 Examination
[now MD (Community Medicine/Community Dentistry) Part1 Examination]

01. April 1990
02. April 1991
03. April 1992
04. September 1992
05. April 1993
06. April 1994
07. June 1995
08. June 1996
09. June 1997
11. June 1999
12. November 1999
13. June 2000
15. July 2001
16. February 2002
17. July 2002
18. August 2003
19. July 2004
20. August 2005
21. August 2006
22. August 2007
1. Outline the steps involved in planning a research activity aimed at "assessing the pattern of family planning acceptance" in a province in Sri Lanka (100 marks)

2. Discuss the advantages and disadvantages of the following:
   2.1 use of a self-administered questionnaire (30 marks)
   2.2 observational techniques in service oriented research (35 marks)
   2.3 a cohort study in identifying the risk factors in hypertension (35 marks)

3. Discuss briefly the following sampling technique indicating the advantages and disadvantages of each of the approaches.
   3.1 cluster sampling (50 marks)
   3.2 probability proportional to size (50 marks)

4. Discuss the problem of confounding in epidemiological studies. (100 marks)
1. 363 male cigarette smokers aged less than 60 years who survived the first heart attack by at least 2 years were categorised by smoking habits. Patients were followed up to determine the cessation of smoking habits and subsequent mortality. The table below summarises the findings:

<table>
<thead>
<tr>
<th>Survival at 2 years</th>
<th>number</th>
<th>number</th>
</tr>
</thead>
<tbody>
<tr>
<td>dead</td>
<td>19</td>
<td>135</td>
</tr>
<tr>
<td>alive</td>
<td>15</td>
<td>194</td>
</tr>
</tbody>
</table>

"Continued" smokers 19 135
"Stopped" smokers 15 194

Calculate the epidemiological rates useful to compare the mortality experiences of those who stopped smoking with those who continued to do so. (50 marks)
What conclusions may be drawn? (50 marks)

2. What is the rationale for carrying out a 'test of statistical significance'? Give an example of one such test, demonstrating your understanding of the following:

2.1 Null hypothesis (25 marks)
2.2 Choice of the test (25 marks)
2.3 Level of significance (25 marks)
2.4 Interpretation of different possible outcomes (25 marks)

3. A study of the relationship between systolic blood pressure (SBP) and weight (W) in a sample of 40 school children gave a correlation coefficient of 0.6 which was found to be statistically significant at the 50% level. Explain what this means, illustrating your answer if necessary. (100 marks)

4. It has been shown that an association exists between blood levels of lead and the intelligence quotient (LQ) in children. What factors would you take into consideration in determining causality? (100 marks)
Answer all questions

1. You have been asked by a medical journal to referee a paper entitled "a case control study of the efficacy of BCG vaccination in an urban area of country X". Outline the points you will consider before recommending whether or not the paper should be accepted for publication.

2. Write notes on,
   i. the epidemiological implications of repeatability
   ii. the predictive value

3. A prison Medical Officer examined 280 men convicted of homicide classifying them into those with a history of habitual violence when drunk (group A and the remainder (group B). The examination included laboratory tests and the results for serum cholesterol (mmol/l) were as follows;

<table>
<thead>
<tr>
<th>Age in years</th>
<th>n</th>
<th>Gp A</th>
<th>SD</th>
<th>n</th>
<th>Gp B</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>21</td>
<td>4.13</td>
<td>0.58</td>
<td>9</td>
<td>5.6</td>
<td>(0.41)</td>
</tr>
<tr>
<td>21- 30</td>
<td>53</td>
<td>4.88</td>
<td>0.64</td>
<td>19</td>
<td>6.18</td>
<td>(0.66)</td>
</tr>
<tr>
<td>31- 40</td>
<td>47</td>
<td>5.75</td>
<td>1.19</td>
<td>30</td>
<td>6.66</td>
<td>(0.89)</td>
</tr>
<tr>
<td>41- 50</td>
<td>22</td>
<td>5.74</td>
<td>0.77</td>
<td>30</td>
<td>6.74</td>
<td>(1.09)</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>30</td>
<td>5.69</td>
<td>1.01</td>
<td>19</td>
<td>6.44</td>
<td>(0.64)</td>
</tr>
</tbody>
</table>

   In his published report, he concluded that a low serum cholesterol level is a good indicator of habitual violence". Discuss the study, the results and the conclusion extensive calculations are not necessary

4. Discuss important features to consider when designing a self-administered questionnaire.
1. What are the sources of bias in a controlled trial? How may they be dealt with?

2. A national cohort study of febrile convulsions in children gave data on the No. of convulsions before the age of 5 years according to the age at the first convulsion.

<table>
<thead>
<tr>
<th>No. of Convulsions</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at lst convulsion 0-1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>77</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>4+</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>132</td>
</tr>
<tr>
<td>Age at lst convulsion 2-4</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
</tr>
</tbody>
</table>

Calculate the value of $X^2$ (3 d.f.) for this table and comment on its interpretation. Suggest briefly any further analysis, which might be appropriate.

3. Discuss the value of matching in the design of case-control studies with examples.

4. It has been suggested that heavy work during pregnancy may increase the risk of premature delivery and perinatal mortality. Discuss how you might test this hypothesis.
Answer all four questions.

1. Describe the biases that may arise in a case-control study of risk factors for diarrhoea among children under five years of age and how they may be minimised.
   
   1.1. in a hospital setting
   1.2. in a community setting.  (100 marks)

2. Give an outline of a study to determine the association between the use of oral contraceptives and breast cancer among females.  (100 marks)

3. Describe how you could evaluate the effect of an intervention programme of health education designed to increase the use of contraception for family Planning. Assume that you have collected relevant data prior to the intervention. The intervention programme was conducted in one-half of an area of the medical officer of health with a population of 100,000, the other one-half serving as the control.  (100 marks)

4.  
   4.1. What precautions should be taken in constructing a questionnaire for a community health survey.  (25 marks)

   4.2. List the advantages and disadvantages of open and closed questions.  (25 marks)

   4.3. What training should you give a team of interviewers regarding the administration of the questionnaire.  (25 marks)

   4.4. How could you test for the validity of the information obtained.  (25 marks)
POSTGRADUATE INSTITUTE OF MEDICINE  
UNIVERSITY OF COLOMBO  

MD (COMMUNITY MEDICINE) EXAMINATION  
APRIL, 1992

Date: 28th April, 1992                Time : 2.00 p.m.- 4.00 p.m.

PAPER II

Answer all four questions.

1. List the possible sources of error you might encounter where measurements of blood pressure are taken in a study to assess the prevalence of hypertension in a community. (30 marks)  
How would you attempt to minimise such errors? (70 marks)

2. Indicate the sampling procedures you would select to carry out the following studies:
   
   2.1 a survey of parasitic disease among children attending a child welfare clinic (30 marks)
   
   2.2 a study of dental caries among children in the education district of Colombo (35 marks)
   
   2.3 a study of coverage of immunisations during infancy, in a province in Sri Lanka. (35 marks)

Discuss the advantages/disadvantages of the method of sampling selected, in each of the situations.

3. Discuss the differences between,
   
   3.1 Relative risk and odds ratio (35 marks)
   
   3.2 Direct and indirect standardisation (35 marks)
   
   3.3 Total fertility rate and net reproductive rate (30 marks)
4.1 The lecithin/sphingomyelin (L/S) ratio was determined in amniotic fluid samples taken from a group of 430 high-risk pregnant women. An L/S ratio greater than 2 was used as an index of foetal lung maturity. Following delivery, 356 infants had no respiratory problems, although an L/S ratio of less than 2 has been recorded in 29 of them. Seventy-four (74) infants developed respiratory problems, of whom 69% had had L/S ratios below 2.

What conclusions could you draw on the usefulness of this test in predicting the development of respiratory problems. 

(40 marks)

What recommendations would you make regarding the "cut off level" of L/S ratio to improve the usefulness of this test in predicting the development of respiratory symptoms. 

(20 marks)

4.2 The results obtained from a longitudinal study where risk factors for myocardial infarction were studied, are given below:

Development of myocardial infarction after 16 yrs. among men aged 35-44 yrs; by level of serum cholesterol.

<table>
<thead>
<tr>
<th>Serum cholesterol mg%</th>
<th>Developed MI</th>
<th>Did not develop MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 250</td>
<td>10</td>
<td>125</td>
</tr>
<tr>
<td>250 or less</td>
<td>21</td>
<td>449</td>
</tr>
</tbody>
</table>

What conclusions could you draw from the above? 

(40 marks)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (COMMUNITY MEDICINE/COMMUNITY DENTISTRY) EXAMINATION
SEPTEMBER, 1992

Date : 29th September, 1992          Time : 9.00 a.m. - 11.00 a.m.

PAPER I

Answer all four questions.

1. Describe the errors that may affect the reliability of data collected at a medico-social survey. How could maximum reliability be ensured? (100 marks)

2. Discuss the advantages and disadvantages of cohort and case-control methodologies in a study of risk factors for diarrhoea (enteric infection) among children age 5 years and under (100 marks)

3. Describe how a clinical trial should be conducted to test the effectiveness of drugs A and B that have been claimed to be effective for a particular disease. How could the difference observed be tested for statistical significance (100 marks)

4. Write notes on the following,
   4.1. Test of significance for an odds ratio (30 marks)
   4.2. 'Chi square' test (40 marks)
   4.3. 'Power' of a study (30 marks)
1. Describe the steps that should be followed in designing a national level study on the health status of "Elderly" (those of age 60 years and over) in Sri Lanka (100 marks)

2. Write notes on the following,
   2.1. Determination of sample size (30 marks)
   2.2. Confidence interval (35 marks)

3. Confounding variables (35 marks)
   3.1. When an enzyme-linked immunosorbent assay (ELISA) for HIV antibodies was carried out in 200 patients with AIDS, 194 of them were found to be positive. When the test was carried out in 600 healthy people, the test was positive only in 12 healthy individuals.

      3.1.1. What information could you gather regarding the validity of the ELISA test (40 marks)

      3.1.2. Comment on the usefulness of the ELISA as a screening test (30 marks)

3.2. It is assumed that the ELISA test has the same sensitivity for healthy carriers of HIV virus as for AIDS patients and is used in a screening programme in a blood bank where 2,000,000 units of blood are screened each year. The 'true' prevalence of HIV infection among the blood donors is 1/10,000. How many contaminated blood samples would escape detection each year? (30 marks).
4.1. In a clinical trial of 3 anaesthetics A, B, C (one of which A has been in use for many years), patients were randomly allocated to one of the anaesthetics. Table given below records the number of cases of 'serious nausea' reported by the patients.

<table>
<thead>
<tr>
<th>Serious nausea</th>
<th>Anaesthetic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>A</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>06</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>01</td>
</tr>
<tr>
<td>No</td>
<td>A</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200</td>
</tr>
</tbody>
</table>

It was concluded that anaesthetic C produced less of serious nausea, hence was the best of three drugs. Indicate giving reasons, whether you are in agreement with the above conclusion. (50 marks)

4.2. In a study to compare the incidence of suicide, 60,000 people living in the "inner city" area and 190,000 people living in the suburbs of the same city were followed up for 10 years to find out how many of them committed suicide. 102 persons who lived in the inner city and 101 of those who lived in the suburbs committed suicide during this period. What conclusions could you draw from the above data? (50 marks)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (COMMUNITY MEDICINE/COMMUNITY DENTISTRY) EXAMINATION
APRIL, 1993

Date: - 24th April, 1993          Time : 2.00p.m. - 4.00 p.m.

PAPER I

Answer all four questions,
Each question should be answered in a separate book.

1. What possible errors could occur during a large anthropometric survey of school children. Describe the action you would take to minimise them   (100 marks)

2. Write notes on,
   2.1. Negative predictive value                      (25 marks)
   2.2. Operationalizing a variable                    (25 marks)
   2.3. Focus group discussion                        (25 marks)
   2.4. Ensuring confidentiality in HIV surveillance  (25 marks)

3. 3.1. The prevalence of a rare disease in a community is thought to be around 1%. Find the sample size necessary to obtain an estimate of the prevalence rate, with a maximum possible error of 0.2%   (40 marks)

   3.2. In the above community it is suspected that differences in prevalence rate exist among different age groups and socio-economic groups. Discuss all the steps involved in drawing a sample.   (60 marks)

4. The age-weight curves for male and, female babies (upto 3 months of age) are given below,

   \[ y^* = 2.5 + 0.8x + 0.05x^2 \]  - Males
   \[ y^* = 2.4 + 0.75x + 0.07x^2 \]  - Females

   Where Y = weight (Kg) and X = age (months)
4.1. What is the difference in weights between male and female babies at birth? (10 marks)

4.2. Comment on the rate of growth for male and female babies. (15 marks)

4.3. Show whether female babies equal the male babies in weight during the first 3 months (30 marks)

4.4. Discuss the danger of using these curves to predict the weight of babies above 3 months of age. (45 marks)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (COMMUNITY MEDICINE/COMMUNITY DENTISTRY) EXAMINATION
APRIL, 1993

Date : 27th April 1993                       Time : 9.00 a.m.- 11.00 a.m.

PAPER II

Answer all four questions.
Each part should be answered in a separate book.

PART I

1. Following a "going down" dinner at the University Canteen people started reporting to the University Medical officer with diarrhoea and/or vomiting. How would you investigate this outbreak?     (100 marks)

2. Discuss the advantages and disadvantages of the following instruments for collecting data in Survey Research.
   2.1. Postal questionnaire       (20 marks)
   2.2. Structured questionnaire      (20 marks)
   2.3. Unstructured questionnaire      (20 marks)
   2.4. How may the advantages be maximised and the disadvantages be minimised?        (40 marks)

PART II

3. A survey of 2680 adult males in provincial town A revealed 678 with cough. The distribution of smoking habits of these men are given in Table 1

Table 1
Smoking habits of men surveyed in town A
non smokers 1500
ex smokers 300
smokers/cigarettes per day

| Under 10 | 200 |
| 10 - 19  | 380 |
| 20 - 29  | 280 |
| 30 over  | 20  |
| Total    | 2680 |
In a large national study of adult males of comparable age the distribution of the prevalence of cough by smoking habit was determined, the results of which are given in Table 2

<table>
<thead>
<tr>
<th>Smoking Habit</th>
<th>Percentage with cough</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-smoker</td>
<td>8</td>
</tr>
<tr>
<td>ex-smoker</td>
<td>10</td>
</tr>
</tbody>
</table>

Smokers/cigarettes per day
- under 10: 15
- 10 - 19: 20
- 20 - 29: 28
- 30 over: 60

Is there evidence to suggest that provincial town A has a factor other than smoking that may contribute to the prevalence of cough observed. (100 marks)

Perform any calculations that are necessary.

4. Define the following types of bias and explain how these can be minimised in an epidemiological study.

4.1. Participation bias (25 marks)
4.2. Recall bias (25 marks)
4.3. Interview bias (25 marks)
4.4. Digit preference (25 marks)
PAPER I

Answer all four questions.
Each question should be answered in a separate book.
Statistical tables will be supplied.

1. Describe how you would design and conduct a study on "Instrument and observer variability for measurement of height" using 5 children, 5 measuring instruments and 5 observers. What statistical test would be used for the analysis of data? (100 marks)

2. Comment on the methodology used in the following studies.

   2.1. Outstation telephone directory was used as the sampling frame in a prevalence study of diabetes among adult males of high social class. (30 marks)

   2.2. Students of a sample of Madya Maha Vidyalayas (Central Colleges) were examined to estimate the prevalence of goitre among children 5 to 18 years in Sri Lanka. (30 marks)

   2.3. In a study to determine the morbidity pattern of a community all mothers who brought pre-school children to the child welfare clinic were asked to recall the morbidity experience of their families during the past 3 months. (40 marks)

3. Write notes on,

   3.1. Use of confidence intervals for significance testing. (25 marks)

   3.2. Correlation coefficient. (25 marks)

   3.3 Information bias. (25 marks)

   3.4 Cluster sampling. (25 marks)
4. The relationship between birth weight and height of the mother was, studied by linear regression analysis, and the following table was extracted from the computer output,

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>Sum of squares (ss)</th>
<th>Degree of freedom (df)</th>
<th>Mean square (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression on height of mother</td>
<td>1.48</td>
<td>1</td>
<td>1.4800</td>
</tr>
<tr>
<td>Residual</td>
<td>20.39</td>
<td>98</td>
<td>0.2081</td>
</tr>
<tr>
<td>Total</td>
<td>21.87</td>
<td>99</td>
<td></td>
</tr>
</tbody>
</table>

The relationship can be expressed in the form of a regression equation as follows..
Birth weight (Kg) = a + b * height of mother (cm)

4.1. Is there a significant association between the two variables?

4.2. Calculate one statistic to describe the relationship between the two variables.

4.3. Explain the terms a and b in the regression equation

4.4. If the calculated values for a and b are 1.025 and 0.0155 calculate the birth weight of an infant of a mother who is 145cm tall.
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOYIBO
MD (COMMUNITY MEDICINE/COMMUNITY DENTISTRY)
PART I EXAMINATION
APRIL, 1994

Date :- 27th April, 1994                     Time :- 9.00 a.m. - 11.00 a.m.

PAPER II

Answer all four questions.

1. As regional epidemiologist of area X, outline the steps you would follow in the setting up of a surveillance system for poliomyelitis. (100 marks)

2. In a case control study of infant feeding practices and risk of disease 200 cases and 200 controls were enrolled. It was observed that 22 of the 200 cases has never been breast fed when compared to 20 among the controls. The study group was divided into two social strata; high and low using information on the socioeconomic status of each infant. There were 160 infants in the high socioeconomic group and of these 40 were cases. In this group 38 had never been breast fed, out of which 12 were cases. In the low socio economic group 80 were controls, 10 cases and 2 controls has never been breast-fed.
   Discuss the results. (100 marks)

3. Write notes on,
   3.1 Ecological fallacy. (20 marks)
   3.2 Repeatability. (20 marks)
   3.3 Regression to the mean. (20 marks)
   3.4 Advantages and disadvantages of randomisation in clinical trials. (40 marks)

4. The age specific incidence rates of Breast Cancer for three different time periods are given in Fig.1.
   The age specific incidence rates for 3 birth cohorts are given in Fig. 2.
   The findings are from the same study, The incidence has been plotted on semi log paper.
   Discuss the trends and comment. (60 marks)
Fig. 1  

Fig. 2  Age-specific incidence of breast cancer in Iceland for three birth cohorts, 1840-1879, 1880-1909, 1910-1949. Adapted from Bjarnasson et al. (1974).
4.2. The following (Fig. 3) is from a paper written by Doll on the relationship between smoking and lung cancer.

4.2.1. Comment.

4.2.2. If you were to do a similar study which relationship would you concentrate on and why. (40 marks)

Fig. 3

Age-specific mortality rates from lung cancer for smokers and non-smokers, From Doll (1971). (0---0 = cigarette smokers by duration of smoking, 0-0 = cigarette smokers by age; X-X = non-smokers by age.)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (COMMUNITY MEDICINE/COMMUNITY DENTISTRY)
PART I EXAMINATION
JUNE, 1995

Date: 13th June, 1995                   Time: 2.00 p.m. - 4.00 p.m.

PAPER I

Answer all four questions.
Each question should be answered in a separate book.
Statistical tables will be supplied.

1. Write an essay on "Use of mortality data in health management". (100 marks)

2. Comment on the hypothesis, methodology and the type of data analysis that may be used, in each of the following studies :-

   2.1. A researcher wishes to test the hypothesis that a given toothpaste reduces 'dental cavities'. A random sample of 18-year-olds are selected and all subjects were examined for the presence of cavities. A dentist then filled the cavities and all subjects were given free monthly supplies of the toothpaste for a period of 3 years. At the age of 21 years, all subjects were checked again for cavities. The researcher then, compared the number of cavities found in the initial dental checkup with the number found at the age of 21 years. (40 marks)

   2.2. An investigator wishes to establish whether there is a relationship between height at age 3 years and height at 21 years. A random sample of 3-year-olds were selected and heights measured. The researcher then patiently waited for another 18 years and measured the subjects again. (30 marks)

   2.3. A researcher wished to 'discover' whether the differences in the age at menarche was related to the climate. Two groups of young women were selected, one from a temperate climate and one from a tropical climate. The subjects were matched according to both height and weight and then age at menarche were compared. (30 marks)
3. 100,000 persons were tested for HIV, using a multistage screening procedure. ELISA test was used in the first stage and Weston Blot in the second stage.

The sensitivity and specificity of ELISA test is 99% and 90% respectively and for Weston Blot, 90% and 98% respectively.

3.1. Calculate the positive and negative predictive values for the ELISA test, if the prevalence of HIV is 1 per 1000. (30 marks)

3.2. If the prevalence increases to 2 per 1000, what would the predictive values be? (20 marks)

3.3. Calculate the overall sensitivity and specificity at the end of the second stage of the screening test (30 marks)

3.4. What are the advantages of such a two stage screening procedure? (20 marks)

4. Comment on Figures 1, 2 and 3 (100 marks)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (COMMUNITY MEDICINE/COMMUNITY DENTISTRY)
PART I EXAMINATION
JUNE, 1995

Date: 14th June, 1995                   Time: 9.00 a.m. - 11.00 a.m.

PAPER II

Answer all four questions

1. 
   1.1 Describe the sources of controls and their selection for controlled clinical trials, indicating their advantages and disadvantages.  (60 marks)
   1.2 Discuss the ethical considerations for controlled clinical trials.  (40 marks)

2. Describe the measures that should be taken to ensure maximum reliability of data collected at a field survey.  (100 marks)

3. Write notes on the following,
   3.1 Criteria that should be satisfied before a risk factor is said to approximate causality.  (30 marks)
   3.2 Misclassification biases  (40 marks)
   3.3 Advantages and disadvantages of using "open" and closed" questions in a community based descriptive study.  (30 marks)

4. The prevalence rates of roundworm infestation in two villages A and B with 250 persons in each village were found to be about the same.

On stratifying by age, there were 250 persons less than 20 years and 250 persons 20 years and more.
In, village A, there were 60 and 190 in the younger and older age groups respectively.
Of a total of 105 infested with roundworm among the younger age group in both villages, 35 were in village A while of a total of 50 infested among the older age group, 40 were in village A.

4.1 Set out a 2 x 2 table for each age group  (40 marks)
4.2 What observations could be made from this data  (20 marks)
4.3 Is there a statistically significant difference in the prevalence of infestation between the two age groups?  (40 marks)
1. The haemoglobin level of 3 groups of children, A, B and C who were given diets 1, 2 and 3 respectively were studied. The ANOVA table based on the data obtained from this study is given below.

<table>
<thead>
<tr>
<th>Variation</th>
<th>Sum of squares</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>32.81</td>
<td>2</td>
</tr>
<tr>
<td>Within group</td>
<td>27.76</td>
<td>3</td>
</tr>
</tbody>
</table>

What conclusions can you draw from the above? (50 marks)

1.2. A random sample of 122 delinquent boys were selected and randomly divided into 2 groups. The researcher was interested in studying whether a new programme of therapy would affect the 'level of anxiety'. Boys in group I were given the new therapy, whereas those in Group II were not. Both groups were given an 'anxiety level' test (high score indicating more anxiety). The data were as follows:

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number in the group</td>
<td>61</td>
</tr>
<tr>
<td>Mean score</td>
<td>98</td>
</tr>
<tr>
<td>Sex</td>
<td>1.98</td>
</tr>
</tbody>
</table>

Were the differences between the groups significant? (50 marks)
2. The table shows the mortality rates (per million per annum) for diabetes mellitus in a population.

2.1. Comment (60 marks)

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Time</th>
<th>45 - 54</th>
<th>55 - 64</th>
<th>65 - 74</th>
<th>75 and over</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1931 - 1940</td>
<td>144</td>
<td>603</td>
<td>1850</td>
<td>2857</td>
</tr>
<tr>
<td></td>
<td>1941 - 1950</td>
<td>139</td>
<td>570</td>
<td>1555</td>
<td>2696</td>
</tr>
<tr>
<td></td>
<td>1951 - 1960</td>
<td>49</td>
<td>250</td>
<td>817</td>
<td>1514</td>
</tr>
<tr>
<td></td>
<td>1961 - 1967</td>
<td>49</td>
<td>245</td>
<td>795</td>
<td>1527</td>
</tr>
</tbody>
</table>

2.2. Suggest appropriate interventions. (40 marks)

3. The relationship between breast cancer in mothers and daughters is to be investigated. The primary question is whether there is evidence for familial aggregation of breast cancer. Suggest ways in which this relationship could be studied, discussing the advantages and disadvantages of such studies (100 marks)

4. 4.1 Describe the advantages and disadvantages of a self administered questionnaire on a knowledge, attitudes and practices (KAP) study of Sexually Transmitted Diseases (70 marks)

4.2. Describe the methods of controlling for confounding bias (30 marks)
PAPER II

Answer all four questions.

1. Write an essay on "Risk factors in epidemiological studies". (100 marks)

2. Describe the biases that may occur in,
   2.1. Selection of study samples
   2.2. Measurement of exposure and outcome in case-control studies, indicating how these biases maybe prevented or minimized. (100 marks)

3. 3.1. Describe the planning and conduct of a hospital-based double-blind clinical trial to test the efficacy of the presently used drug (A) compared with a new drug (B) in the drug treatment of disease (X)(Exclude data processing and drawing inferences.) (60 marks)
   3.2. Discuss the ethical considerations in the conduct of such a trial. (40 marks)

4. Two hospital based case-control studies were conducted to assess whether the presence of domestic animals in the house was a risk factor for infective diarrhoea among children under 5 years of age.
   In the first study, of a total sample of 80 children under 5 years of age, 14 of them had domestic animals in the house, and in this group there were 10 cases of diarrhoea of a total of 40 cases of diarrhoea.
   In the second study the total sample was increased to 400 and the proportions of houses with animals and cases of diarrhoea remained the same.
   Test for association and comment on the results (100 marks)
1. A community based intervention trial has been planned to answer the question "Does treatment of hypertension reduce the incidence of coronary heart disease"

1.1. How would you decide on the number of subjects required for this trial indicating the information required for this purpose? (35 marks)

1.2. It is possible that some subjects may not take the treatment. What effect would this have on the results of this trial. What can be done about it? (35 marks)

1.3. In planning the study, the subjects have been randomly allocated for the study and the control groups. Table 1 lists some of the relevant initial (pre-treatment) characteristics of the two groups.

<table>
<thead>
<tr>
<th>Table I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Group</td>
</tr>
<tr>
<td>Control Group</td>
</tr>
<tr>
<td>Number</td>
</tr>
<tr>
<td>Age in years (mean and SD)</td>
</tr>
<tr>
<td>No. of Cigarette smokers</td>
</tr>
<tr>
<td>Systolic BP (mean and SD)</td>
</tr>
<tr>
<td>Diastolic BP (mean and SD)</td>
</tr>
</tbody>
</table>

Are you satisfied with the comparability of the groups? If not, what can be done to improve the usefulness of data. (30 marks)
2. A researcher plans to collect the following information during a household survey. Explain the ways in which the reliability of the data collected can be ensured.

2.1. Age of an adult (20 marks)

2.2. Blood pressure in an adult male (20 marks)

2.3. Smoking habits of an 18 year old boy (30 marks)

2.4. Satisfaction with services received as an in-patient in a government hospital (30 marks)

3.

3.1 What is a historical (reconstructed) cohort study? As a Medical Officer in charge of a large factory, describe briefly how you would conduct a historical cohort study on the health effects of exposure to manmade mineral fibres. (40 marks)

3.2. In a case control study (using hospital patients) of smoking in relation to peptic ulcer, an excess of cigarette smokers was found in the peptic ulcer group. List the main causes of bias that may arise in this comparison. (30 marks)

3.3. There may be an association between weaning of constricting garments and varicose veins. Would a prevalence study (cross sectional) be appropriate for investigating this association. List the advantages and disadvantage. (30 marks)

4. Write notes on

4.1. Focus group discussions (25 marks)

4.2. Population attributable risk (25 marks)

4.3. Predictive value (25 marks)

4.4. Non parametric tests of significances (25 marks)
Answer all four questions.

1. Write notes on,
   1.1. Human development index (HDI) (25 marks)
   1.2. Net reproductive rate (NR) (25 marks)
   1.3. Systematic sampling (25 marks)
   1.4. "Nested" case control studies (25 marks)

2. The following study was carried out during January 1st to March 31st, 1995 in a small town. All drivers applying for the renewal of their heavy vehicle license were invited to undergo HIV testing. Of the 800, 75% complied.

   Distribution of test positives according to age.

<table>
<thead>
<tr>
<th>Age</th>
<th>No. Tested</th>
<th>No. Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 45</td>
<td>400</td>
<td>40</td>
</tr>
<tr>
<td>45 or more</td>
<td>200</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>600</td>
<td>50</td>
</tr>
</tbody>
</table>

2.1 What type of epidemiological study design is this? (10 marks)
2.2 What is the overall prevalence of HIV and the 95% confidence interval? (15 marks)
2.3 Is the above prevalence estimate likely to be biased? If so in which direction and why? (25 marks)
2.4 Is there an association between age and HIV prevalence? If so is the association statistically significant? (30 marks)
2.5 Can you suggest any reason for the association between age and HIV prevalence? (20 marks)
3. An epidemiological survey was carried out to detect leprosy in a DDHS area in 1979. The survey was repeated in 1980. Following are the data collected:

<table>
<thead>
<tr>
<th></th>
<th>1979</th>
<th>1980</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Total Population</td>
<td>3400</td>
<td>3300</td>
</tr>
<tr>
<td>No. Examined lst time</td>
<td>3200</td>
<td>3100</td>
</tr>
<tr>
<td>No. of cases among those examined lst time</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td>No. Re-examined</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No. of cases among those re-examined</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No. of cases with deformity</td>
<td>04</td>
<td>03</td>
</tr>
<tr>
<td>No. of new cases among those re-examined</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No. of deformities among new cases in those re-examined</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

3.1.1 Calculate: (1) Rate of examination in,
(a) 1979
(b) 1980
(15 marks)

3.1.2. Rate of re-examination in 1980
(15 marks)

3.1.3. Prevalence of leprosy in 1980
(15 marks)

3.1.4. Incidence of leprosy in 1979
(15 marks)

3.1.5. Deformity rate in 1980
(15 marks)

3.2. Figure 1 and 2 represents the trends in Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR) from 1900 to 1990 in Sri Lanka drawn on ordinary graph paper (Fig. 1) and semi log graph paper (fig.2). Comment on the differences seen in the two figures.
(25 marks)
4. Presented below is a life table constructed for English men 1950 - 52.

<table>
<thead>
<tr>
<th>x (age)</th>
<th>ix</th>
<th>dx</th>
<th>px</th>
<th>qx</th>
<th>exo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100,000</td>
<td>3,266</td>
<td>.96734</td>
<td>.03266</td>
<td>66.42</td>
</tr>
<tr>
<td>1</td>
<td>96,734</td>
<td>233</td>
<td>.99759</td>
<td>.00241</td>
<td>67.66</td>
</tr>
<tr>
<td>2</td>
<td>96,501</td>
<td>136</td>
<td>.99859</td>
<td>.00141</td>
<td>66.82</td>
</tr>
<tr>
<td>3</td>
<td>96,365</td>
<td>98</td>
<td>.99898</td>
<td>.00081</td>
<td>65.91</td>
</tr>
<tr>
<td>4</td>
<td>96,267</td>
<td>81</td>
<td>.99916</td>
<td>.00084</td>
<td>64.98</td>
</tr>
<tr>
<td>5</td>
<td>96,186</td>
<td>78</td>
<td>.99919</td>
<td>.00081</td>
<td>64.04</td>
</tr>
<tr>
<td>6</td>
<td>96,108</td>
<td>72</td>
<td>.99925</td>
<td>.00075</td>
<td>63.09</td>
</tr>
<tr>
<td>7</td>
<td>96,036</td>
<td>61</td>
<td>.99957</td>
<td>.00063</td>
<td>62.13</td>
</tr>
<tr>
<td>8</td>
<td>95,975</td>
<td>56</td>
<td>.99942</td>
<td>.00058</td>
<td>61.17</td>
</tr>
<tr>
<td>9</td>
<td>95,919</td>
<td>53</td>
<td>.99945</td>
<td>.00055</td>
<td>60.21</td>
</tr>
<tr>
<td>10</td>
<td>95,866</td>
<td>50</td>
<td>.99946</td>
<td>.00052</td>
<td>59.24</td>
</tr>
</tbody>
</table>

4.1. What stands for x, ix, dx, px, qx and exo in this life table? (10 marks)

4.2. How are the px, qx and exo calculated? (20 marks)

4.3. Explain why e1o is greater than e0o (10 marks)

4.4. Discuss the use of life table technique in epidemiology. (60 marks)
1. The following table shows the results of a screening test applied to a population.

<table>
<thead>
<tr>
<th></th>
<th>Disease Present</th>
<th>Disease Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Positive</td>
<td>30</td>
<td>300</td>
<td>330</td>
</tr>
<tr>
<td>Test Negative</td>
<td>10</td>
<td>2200</td>
<td>2210</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>2500</td>
<td>2540</td>
</tr>
</tbody>
</table>

Calculate and discuss the implications of the following:

(a) sensitivity (25 marks)
(b) specificity (25 marks)
(c) positive predictive value (25 marks)
(d) yield (25 marks)

2. Write notes on the following:

(a) The randomisation process in a clinical trial (30 marks)
(b) How is randomisation achieved? (30 marks)
(c) Discuss the ethical issues in randomised clinical trials (40 marks)

3. Twenty five elderly insulin dependent patients with diabetes mellitus were studied to see if good control of diabetes is associated with a lower rate of complications. Among the 15 patients with good diabetic control, 20% were found to have diabetic complications compared to 70% with diabetic complications among those with poor diabetic control.
A statistical test of significance done on the difference between the two complication rates gave a one-tailed probability of 0.02. On the basis of these results, the investigators concluded that "good diabetes control can significantly reduce diabetic complications".

a. Summarize the results of the study in a 2 X 2 contingency table. (25 marks)

b. Which test of significance was probably used to test for the difference between the two complication rates? Give reasons. (25 marks)

c. What is meant by "a one-tailed probability of 0.02"? - (25 marks)

d. Comment on the statement that "good diabetic control can significantly reduce diabetic complications", in the context of this study. (25 marks)

4. Discuss the difference between parametric and non-parametric statistical methods. (40 marks)

Give one example to demonstrate the use of the following:

Wilcoxon's Rank Sum Test (20 marks)

x2 test for goodness of fit (20 marks)

ANOVA (20 marks)
1. Write notes on,
   1.1 Incidence density (30 marks)
   1.2 Ecological bias (30 marks)
   1.3 Migrant studies (40 marks)

2. A researcher tested a procedure for removing house dust mites from the bedding of adult asthematics in an attempt to improve subject's lung function, which was measured by PEFR. The trial was a two period cross over design, the control or placebo treatment being dust removal from the living room. The means and standard error for PEFR in 32 subjects are given below:

<table>
<thead>
<tr>
<th>Study groups</th>
<th>Mean PEFR litres/minute</th>
<th>Standard Error litres/minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active treatment</td>
<td>335</td>
<td>19.6</td>
</tr>
<tr>
<td>Placebo treatment</td>
<td>329</td>
<td>20.8</td>
</tr>
</tbody>
</table>

   Difference within subjects (treatment - placebo) 6.45 5.05

   2.1 Carry out an appropriate statistical procedure. (40 marks)
   2.2 Comment on the results. (60 marks)

3. Outline the methods of dealing with confounding in epidemiological studies. (100 marks)
4. The following data are from a study of the mortality experience of men who participated in the UK atmospheric nuclear weapons tests. Their mortality rates are compared with UK national rates and also with rates of matched controls. The controls were men who had been employed by the same institutions as the exposed men and had served in the same areas where the tests were carried out but had not participated in the weapons testing programme.

<table>
<thead>
<tr>
<th></th>
<th>Test Participants</th>
<th>Controls</th>
<th>Relative rate* (95% C.L.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SMR**  Observed</td>
<td>SMR**  Observed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deaths</td>
<td>deaths</td>
<td></td>
</tr>
<tr>
<td>All causes</td>
<td>80  1591</td>
<td>79  1607</td>
<td>1.01 (0.95-1.07)</td>
</tr>
<tr>
<td>All neoplasms</td>
<td>80  406</td>
<td>83  434</td>
<td>0.96 (0.86-1.08)</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>65  119</td>
<td>81  156</td>
<td>0.82 (0.67-1.02)</td>
</tr>
<tr>
<td>Leukaemia</td>
<td>113  22</td>
<td>32  6</td>
<td>3.45 (1.56-8.37)</td>
</tr>
</tbody>
</table>

* Mortality in test participants relative to controls
** Age standardised SMR using UK national rates as standard

4.1. Comment on the findings (50 marks)

4.1. What further information would you require for interpretation of the findings? (50 marks)
1. A study was undertaken to compare the blood pressure of 2 communities A and B. Of those over 30 years of age, 500 persons from each community were selected by sampling. The names of all persons over 30 years of age were arranged in alphabetical order and every 5th person were selected for the study. The study was carried out by 8 field workers using their own sphygmomanometers. 100 persons in Community A and 50, in community B were non responders. 20% in community A and 15% in community B were hypertensive.

1.1. What was the method of sampling used in this study? (10 marks)

1.2. What are the errors that could occur in the study and how will you overcome them? (60 marks)

1.3. What conclusions can you draw from the study? (30 marks)

2. It has been hypothesised that exposure to toxic gases, following an industrial accident that occurred 2 years ago, could have an effect on fertility among women, living in that area. Describe in detail how you would carry out a study to test this hypothesis. (100 marks)

3. Of a total of 7336 deliveries that took place during the period 1992 - 1993 in a Maternity Hospital, 554 pregnancies were identified as high risk pregnancies and "monitoring of foetal heart rate" was carried out. In the same hospital, 692 high risk pregnancies were identified out of a total 3186 deliveries that occurred in 1991. (Foetal heart rate monitoring was introduced in 1992).
(Birth Weight (gmm))

<table>
<thead>
<tr>
<th></th>
<th>&lt; 2500</th>
<th>&gt;*2500</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992 - 1993</td>
<td>47</td>
<td>507</td>
<td>554</td>
</tr>
<tr>
<td>1991</td>
<td>111</td>
<td>581</td>
<td>692</td>
</tr>
</tbody>
</table>

Apgar score at 1 minute

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1 - 6</th>
<th>7 - 10</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992 - 1993</td>
<td>0</td>
<td>40</td>
<td>505</td>
<td>545</td>
</tr>
<tr>
<td>1991</td>
<td>3</td>
<td>65</td>
<td>608</td>
<td>673</td>
</tr>
</tbody>
</table>

Perinatal Mortality

<table>
<thead>
<tr>
<th></th>
<th>Deaths</th>
<th>Survivors</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992 - 1993</td>
<td>2</td>
<td>552</td>
<td>554</td>
</tr>
<tr>
<td>1991</td>
<td>12</td>
<td>680</td>
<td>692</td>
</tr>
</tbody>
</table>

3.1. What can you conclude about the relationship between monitoring and perinatal mortality? Do any statistical tests which seems necessary (70 marks).

3.2. What additional information would you like to have to help you in interpreting these data? (30 marks)

4. Write notes on -

4.2. Nested case control studies (30 marks)

4.2. Ecological bias (30 marks)

4.3. Migrant studies (40 marks)
1. A doctor hypothesizes that men who abuse drugs are more likely to commit rape than men who are not drug abusers. He conducts a case-control study to test this hypothesis selecting cases from a random sample of men serving sentence for rape in state prison

(a) Are the cases representative of the population of all rapist? Give reasons for your answer. - (20 marks)
(b) Suggest a suitable control group for this study. - (20 marks)
(c) List potentially confounding variables and suggest method to control them. - (20 marks)
(d) What are the advantages and disadvantages of using a case - control study design to examine the relationship between rape and drug abuse. - (20 marks)
(e) What is the outcome variable in this study? What difficulties might the investigator encounter in measuring this variable. - (20 marks)

2. Two neurologist hypothesize that patients who receive physical therapy after cerebro-vascular accidents soon after the condition is stabilized experience a lesser degree of permanent impairment than those for whom physical therapy is delayed. Outline a randomized controlled clinical trial to test this hypothesis? (100 marks)

3. Write notes on,

(a) Standardized mortality ratio. (30 marks)
(b) Sentinel Surveillance (30 marks)
(c) Fertility Indicators (40 marks)
4. To study the possible association between oral contraceptive use and the occurrence of rhumatoïd arthritis (RA) an investigator selected 100 women confirmed diagnosis of RA and 200 women without RA. Results are given below.

<table>
<thead>
<tr>
<th>Oral contraceptive use</th>
<th>RA+</th>
<th>RA-</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>User</td>
<td>40</td>
<td>120</td>
<td>160</td>
</tr>
<tr>
<td>Non-user</td>
<td>60</td>
<td>80</td>
<td>140</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>200</td>
<td>300</td>
</tr>
</tbody>
</table>

(a) calculate and interpret the odds ratio.  
(b) can relative risk be directly calculated from the result of this study? give reasons to your answer.  
(c) calculate 95% confidence interval for the Odds ratio.  
(d) is there a statistically significant association between oral contraceptive use and occurrence of RA?
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (COMMUNITY MEDICINE) PART I EXAMINATION
NOVEMBER, 1999

Date: 15th November, 1999      Time: 2.00p.m.-4.00p.m.

PAPER I

Answer all four questions.

1. Discuss the usefulness and the limitations of routinely collected morbidity data in Sri Lanka for health planning. (70 marks)
   Outline a plan for improvement of such data in a province. (30 marks)

2. Write notes on,
   2.1 McNemar's test (40 marks)
   2.2 Sampling using probability proportionate size technique (30 marks)
   2.3 Total Fertility Rate (TFR) (30 marks)

3. 50,000 persons were screened for diabetes mellitus in a community. Initially, the presence of glycosuria was tested using a dipstick method. The sensitivity and the specificity for the urine test were 90% and 80% respectively.
   3.1 Calculate the predictive values positive and negative for the urine test if the prevalence of diabetes mellitus in that community was 6 per 1000. (30 marks)
   3.2 If the prevalence of diabetes mellitus was 10 per 1000, what would be the predictive values be? (20 marks)
   3.3 Comment on the results obtained from 3.1 and 3.2 (25 marks)
   3.4 Discuss briefly the factors that affect the yield of a screening programme (25 marks)

4. A researcher wishes to test the hypothesis that low birth weight is associated with poor cognitive performance at school entry.
   4.1 Outline a study to test the above hypothesis. (50 marks)
   4.2 Give reasons for choosing the particular study design. (20 marks)
   4.3 What are the biases that may arise and how would you overcome them? (30 marks)
Answer all four questions.

1.

1.1 Define randomization. (10 marks)

1.2 Describe 3 situations in which clinical trial could be considered unethical. (30 marks)

1.3 Describe 3 differences between randomized clinical trials, and community trials. (30 marks)

1.4 List 3 situation in which it is preferred to conduct community trial rather than randomized clinical trial. (30 marks)

2.

2.1 Describe how you would assess validity of information obtained by interviewing? (30 marks)

2.2 Describe 3 situations where qualitative data complement quantitative data (30 marks)

2.3 Describe 2 methods of analyzing qualitative date and the limitations of these methods. (40 marks)

3. You have been asked to implement in your DDHS area a health education intervention program for adolescent girls on HIV/AIDS and reproductive tract infection.
3.1 Give details of the intervention study you would carry-out. (30 marks)

3.2 How would you monitor the process of the intervention? (30 marks)

3.3 How would you evaluate the effect of the intervention program at end of 2 years? (Describe the sample size, indicators and how you would measure the indicators) (40 marks)

4. As the medical officer of a DDHS (MOH) area it has been brought to your notice that there has been an outbreak of gastroenteritis following a wedding reception.

4.1 Give details how you will investigate the epidemic (40 marks)

At the end of the investigation the following data is given to you

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Ate</th>
<th>Did not eat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>ill</td>
</tr>
<tr>
<td>Beef Rolls</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>Patty</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>Fish Sandwiches</td>
<td>150</td>
<td>120</td>
</tr>
<tr>
<td>Cutlet</td>
<td>140</td>
<td>60</td>
</tr>
<tr>
<td>Ice cream</td>
<td>160</td>
<td>120</td>
</tr>
</tbody>
</table>

4.2 What is the likely cause of the outbreak. Give reasons for your assumption. (25 marks)

4.3 What further investigations will you carry out at this stage? (20 marks)

4.4 What steps will you take to prevent similar outbreaks in the future? (15 marks)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO
MD(COMMUNITYMEDICINE/COMMUNITY DENTISTRY)
PART I EXAMINATION
JUNE, 2000

Date : 20th June, 2000      Time: 2.30p.m.-4.30.p.m.

PAPER 1

Answer all four questions.

1. Explain giving examples when you would use the following statistical procedures.

   1.1. analysis of variance       (30 marks)
   1.2. multiple linear regression      (40 marks)
   1.3. paired 't' test       (30 marks)

2. There has been an outbreak of measles in children under 5 years of age in area A. The measles immunisation coverage in the area is 72%.

   2.1 Design a study to test the efficacy of measles vaccination in this area.     (60 marks)
   2.2 What confounders would you take into consideration in designing the study and how would you reduce the effects of these confounders.       (40 marks)

3. Discuss sampling procedures you would use in following studies.

   3.1 assessing KAP on HIV/AIDS among commercial sex workers.          (35 marks)
   3.2 determing prevalence of visual defects in the elderly living in a province. (35 marks)
   3.3 assessing mental health status in pre-school children in a district. (30 marks)

4. A screening programme for breast cancer was carried out in a population of 100,000 women in which the prevalence of breast cancer was known to be 0.5% from an earlier estimate. The sensitivity of the screening test was 80% and the screening yielded 1395 women as having breast cancer.

   4.1 Do the necessary calculations and discuss the properties of the screening test including ethical issues. (60 marks)
   4.2 Explain: the steps you would take to increase the predictive value positive (PV+) of this screening programme.  (40 marks)
Answer all four questions.

1. What is random error? How can it be reduced? (20 marks)

2. Discuss the common sources of systematic error in epidemiological studies and how they may be reduced. (80 marks)

2. Table 1 shows the relationship of exposure to asbestos and smoking, with lung cancer.

2.1 Calculate all possible measures of effect (40 marks)

2.2 Discuss the results (60 marks)

Table 1: Age standardized lung cancer death rate per 100,000 population in relation to cigarette smoking and exposure to asbestos dust.

<table>
<thead>
<tr>
<th>Exposure to Asbestos</th>
<th>History of Cigarette Smoking</th>
<th>Lung Cancer Death Rate per 100,000 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>71</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>58</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>123</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>602</td>
</tr>
</tbody>
</table>
3. A clinician notes that the local application of drug 'A' results in faster healing of diabetic foot ulcers compared to the usual practice of hypertonic saline dressings.

3.1 Outline a study to test the above observation (60 marks)
Discuss the biases that may arise and the steps you would take to overcome them. (40 marks)

4. Figures 1 and 2 refer to prostate cancer data from the USA.

4.1 Comment on the data (20 marks)
4.1.2 Discuss possible explanations for what is observed (30 marks)

![Graph showing age-specific incidence and mortality for prostate cancer in the USA in 1995.](image)

**Fig. 1**  
- Age - race specific incidence and mortality for prostate cancer USA 1995.

- Solid square - Black American
- Open square - White American
Fig. 2 - Time trends in the incidence and mortality for prostate cancer by race USA 1973 - 1995

Solid square - Black American
Open square - White American

4.2 Figure 3 and Table 2 examine the relationship between alcohol consumption and CHD mortality

Figure 3 - Relationship between per capita alcohol consumption and CHD death rates of different countries.
Table 2 - Dose response relationship of alcohol intake with CHD mortality from the Chicago Western Electric Company Study.

<table>
<thead>
<tr>
<th>Average daily consumption of alcohol</th>
<th>Age-adjusted CHD mortality rate/1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of drinks</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>80</td>
</tr>
<tr>
<td>1</td>
<td>77</td>
</tr>
<tr>
<td>2 - 3</td>
<td>73</td>
</tr>
<tr>
<td>4 - 5</td>
<td>55</td>
</tr>
<tr>
<td>6</td>
<td>155</td>
</tr>
</tbody>
</table>

4.2.1 Comment on the data in figure 3 & Table 2. (20 marks)

4.2.2 Discuss the observations (30 marks)
1. In a case control study of risk factors of Myocardial Infarction (MI). 100 cases and 100 controls were asked for their smoking habits and alcohol consumption. The information obtained is given below.

<table>
<thead>
<tr>
<th>Alcohol consumption +</th>
<th>Smoking +</th>
</tr>
</thead>
<tbody>
<tr>
<td>With MI</td>
<td>71</td>
</tr>
<tr>
<td>Without MI</td>
<td>52</td>
</tr>
</tbody>
</table>

1.1 Calculate the relevant estimate of risk of MI with consumption of Alcohol. Write your conclusions. (40 marks)

1.2 Show how the estimate you obtained in 1.1 for those with consumption with alcohol is affected by smoking status, if

---among 30 non-smoking patients with MI, 8 consumed alcohol as opposed to, 16 of 60 non-smoking controls and
- among 70 smokers with MI, 63 consumed alcohol supposed to 36 of 40 Control Who were smokers.

Write your conclusions. (40 marks)

1.3 List the methods you would use to overcome the above problem in case control studies. (20 marks)

2. The Ministry of Health has decided to introduce a new vaccine, Measles & Rubella (MR) at 3 years of age to the immunization schedule from 1.4.2001.

2.1 What information would you look at to justify the above decision? (60 marks)

2.2 Discuss the information you would use to monitor the effectiveness of the vaccine introduced. (40 marks)
3. Indoor morbidity data for peptic ulcers for two periods of time are given below:

The annual admission rates per 100,000 population
Aged 15 years and over for peptic ulceration.

<table>
<thead>
<tr>
<th>Year</th>
<th>Non perforated ulcer</th>
<th>Perforated ulcer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Duodenal ulcer</td>
<td>Gastric ulcer</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>1978-80</td>
<td>153.0</td>
<td>41.9</td>
</tr>
<tr>
<td>1990-92</td>
<td>131.0</td>
<td>34.1</td>
</tr>
</tbody>
</table>

3.1 Comment on the data (30 marks)

3.2 What factors may have been responsible for the change observed? (50 marks)

3.3 What are the limitations of these data as a guide to change in incidence rates of peptic ulcer.? (20 marks)

4. Discuss the usefulness and limitations of the following,

4.1 Perinatal Mortality Rate (30 marks)

4.2 Proportional Mortality Ratio (30 marks)

4.3 Key informant interviews (40 marks)
Answer all four questions.

1. Comment on the following

1.1 The strongest international correlates of mean blood pressure is salt intake. A study of 3568 randomly selected persons from several countries and ethnic groups reported a very low correlation between salt intake and blood pressure

(20 marks)

1.2 A cross sectional population survey of varicose veins yielded the following results.

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Percentage prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>10 *</td>
<td>0.5</td>
</tr>
<tr>
<td>20 *</td>
<td>3</td>
</tr>
<tr>
<td>30 *</td>
<td>12</td>
</tr>
<tr>
<td>40 *</td>
<td>26</td>
</tr>
<tr>
<td>50 *</td>
<td>30</td>
</tr>
<tr>
<td>60 *</td>
<td>18</td>
</tr>
<tr>
<td>70 +</td>
<td>10</td>
</tr>
</tbody>
</table>

(40 marks)

1.3 Figure 1.3 - Distribution of systolic blood pressure in a population of Kenya nomads and British Civil Servants. Men aged 40-59 yrs.

(40 marks)
2. Outline a study to test the hypothesis that waist circumference is a better predictor of hypertension than BMI in adult females paying special attention to issues in study design & data analysis. (100 marks)

3. In a clinical trial to assess the effects of a new treatment for cancer of the oesophagus, 100 patients were given the standard treatment, 12 were alive at the end of 3 years and 11 were alive at the end of 5 years. Of 47 patient who were given the new treatment, 12 and 2 patients were surviving at the end of 3 years and 5 years respectively.

3.1 Is there statistical evidence that the new treatment is better than the standard treatment? (40 marks)

3.2 How would you critically evaluate the above statistical findings to draw conclusions regarding management of patients with oesophageal carcinoma? (60 marks)

4. Write notes on:

4.1 Standardization (30 marks)

4.2 Kappa Coefficient (30 marks)

4.3 Selection bias (40 marks)
1. The renal-hypertensives clinic in a hospital has been requested to cut down the cost of laboratory investigations and the urine test – N - acetyl B – D - glucosaminidase (NAG) is used for this purpose. This test is claimed to be cheap, convenient, and a simple guide to the need for further investigations in hypertensives.

In 137 hypertensive subjects of whom 53 had renal disease 44 had increased levels of NAG in urine. Among the total subjects 67 showed a similar result.

The consultant refers the data given above to you as the Epidemiologist.

1. What advice would you give regarding the utility of this test? (60 marks)
2. What further data would you require to give a complete answer? (40 marks)

2. What are the errors that can arise in using a questionnaire as a study instrument? What are the things you would do to minimize variation in data collected?

1. During construction of the questionnaire. (50 marks)
2. During administration of the questionnaire. (50 marks)

3. Write notes on:

1. ANOVA (20 marks)
2. Limitations of cross over trials (40 marks)
3. Mantel Haenszel odds ratio (40 marks)
4. There is concern that the incidence of cancer is increasing in our country. The only morbidity data available are those published by the Cancer Control Programme, Maharagama which are given below.

Comment on the above statement (100 marks).

Table 1: New cases of cancer by age, reported by the Cancer Control Programme, Maharagama and the population for the years 1985 and 1995.

<table>
<thead>
<tr>
<th>Age group in years</th>
<th>1985</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population ('000)</td>
<td>New cases of cancer</td>
</tr>
<tr>
<td>&lt;5</td>
<td>1951</td>
<td>75</td>
</tr>
<tr>
<td>5 - 9</td>
<td>1775</td>
<td>69</td>
</tr>
<tr>
<td>10 - 14</td>
<td>1775</td>
<td>67</td>
</tr>
<tr>
<td>15 - 19</td>
<td>1688</td>
<td>72</td>
</tr>
<tr>
<td>20 - 24</td>
<td>1586</td>
<td>104</td>
</tr>
<tr>
<td>25 - 29</td>
<td>1338</td>
<td>116</td>
</tr>
<tr>
<td>30 - 34</td>
<td>1180</td>
<td>165</td>
</tr>
<tr>
<td>35 - 39</td>
<td>882</td>
<td>264</td>
</tr>
<tr>
<td>40 - 44</td>
<td>734</td>
<td>364</td>
</tr>
<tr>
<td>45 - 49</td>
<td>640</td>
<td>485</td>
</tr>
<tr>
<td>50 - 54</td>
<td>570</td>
<td>627</td>
</tr>
<tr>
<td>55 - 59</td>
<td>444</td>
<td>711</td>
</tr>
<tr>
<td>60 - 64</td>
<td>359</td>
<td>608</td>
</tr>
<tr>
<td>65 - 69</td>
<td>269</td>
<td>551</td>
</tr>
<tr>
<td>70 - 74</td>
<td>190</td>
<td>383</td>
</tr>
<tr>
<td>&gt;=75</td>
<td>218</td>
<td>351</td>
</tr>
<tr>
<td>Total</td>
<td>15599</td>
<td>5012</td>
</tr>
</tbody>
</table>
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD(COMMUNITY MEDICINE/COMMUNITY DENTISTRY)
PART 1 EXAMINATION
JULY, 2001

Date: 6th July, 2001
Time: 9.30 a.m. to 11.30 a.m.

PAPER II

Answer all four questions.

1. As the Director of Health Services of a Province, plan an intervention to improve the quality of mortality and morbidity data in your area (100 marks).

2. The following data were obtained during a cross sectional population survey of a district

Table 1: Distribution of diabetics and non diabetics by level of physical activity.

<table>
<thead>
<tr>
<th>Level of activity</th>
<th>Diabetics</th>
<th>Normal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary</td>
<td>51</td>
<td>530</td>
<td>581</td>
</tr>
<tr>
<td>Moderately active</td>
<td>150</td>
<td>1553</td>
<td>1703</td>
</tr>
<tr>
<td>Active</td>
<td>112</td>
<td>785</td>
<td>897</td>
</tr>
<tr>
<td>Total</td>
<td>313</td>
<td>2868</td>
<td>3181</td>
</tr>
</tbody>
</table>

Comment on the findings (100 marks).

3. 3.1 It is suggested that blood donors be given the option of requesting for their HIV status. Would you agree with this recommendation? Explain your reasons (50 marks).

3.2 "Stigma" is a public health problem. Taking any disease as an example discuss measures that you would advocate to reduce stigma (50 marks).

4. Treated bed nets are advocated in the control of malaria. Plan a study to determine the effectiveness/impact of this measure (100 marks).
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD(COMMUNITY MEDICINE) PART 1 EXAMINATION
FEBRUARY, 2002

Date:- 5th February, 2002     Time :- 2.00 p.m. - 4.00 p.m.

PAPER I

Answer all four questions.

1. A case-control study to evaluate the risk factors for hip fractures among patients aged 65 years or older was conducted. The use of psychotropic drugs and presence of mental confusion as possible risk factors were examined. 139 cases and 234 controls were included. The following results were obtained:

<table>
<thead>
<tr>
<th>Psychotropic drug</th>
<th>Mental Confusion</th>
<th>Cases</th>
<th>Controls</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
<td>40</td>
<td>135</td>
<td>1.0</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>42</td>
<td>64</td>
<td>2.23</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>21</td>
<td>21</td>
<td>3.38</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>36</td>
<td>14</td>
<td>8.68</td>
</tr>
</tbody>
</table>

1.1. Outline the advantages of a case-control design to examine the risk factors for hip fractures

1.2. Interpret the results of the table presented above.

2. You wish to determine the ethnic differences in the prevalence of myopia in a population of 2000 school children aged 7 years, and having the following distribution: 80% sinhala, 12% tamil and 8% others.

2.1. How would you select a sample of 900 subjects to determine the prevalence of myopia in each ethnic group?

2.2. How would you summarise the overall prevalence of myopia?
3. Table 1 shows the age specific fertility rates reported from four different studies.

Table 1: Age specific fertility rates (Births per 1000 women)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>15 – 19</td>
<td>31</td>
<td>38</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>20 – 24</td>
<td>146</td>
<td>147</td>
<td>110</td>
<td>72</td>
</tr>
<tr>
<td>25 – 29</td>
<td>161</td>
<td>161</td>
<td>134</td>
<td>123</td>
</tr>
<tr>
<td>30 – 34</td>
<td>158</td>
<td>122</td>
<td>104</td>
<td>105</td>
</tr>
<tr>
<td>35 – 39</td>
<td>126</td>
<td>71</td>
<td>54</td>
<td>58</td>
</tr>
<tr>
<td>40 – 44</td>
<td>43</td>
<td>23</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>45 – 49</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>TFR</td>
<td>3.4</td>
<td>2.8</td>
<td>2.3</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Source:

1974 – 75 - World Fertility Survey
1982 – 87 - Demographic and Health Survey 1987
1988 – 93 - Demographic and Health Survey 1993
1995 – 00 - Demographic and Health Survey 2000

3.1. Comment on the fertility decline seen in the above table (50 marks)

3.2. Briefly discuss other information that would be needed to examine probable causes of the decline observed. (50 marks)

4. It is reported that low birth weight is a risk factor for the development of gestational diabetes. Outline the design of a study to test the above hypothesis. Discuss the reasons for your choice of the design and the probable biases that may occur. (100 marks)

(It is known that 20 - 25% of all births in Sri Lanka take place at De Soysa Maternity Hospital and Castle Street Hospital for Women and records of deliveries are available from 1956 onwards).
Answer all four questions.

1.  
   1.1. Discuss the criteria of suitability of a disease for screening. (50 marks)
   1.2. Discuss the various issues that must be considered in the implementation of a screening programme (50 marks)

2.  
   2.1 In stratified analysis compare and contrast the evaluation of confounding and effect modification. (50 marks)
   2.2 What are the chief strengths and limitations of multivariate analysis (50 marks)

3. Outline the epidemiological approaches that may be used to test the hypothesis that Hepatitis C infection may be a cause of liver cancer (100 marks)

4.  
   4.1 The following mortality data was recorded for two occupational groups A and B during a given year.

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed deaths</td>
<td>100</td>
<td>1050</td>
</tr>
<tr>
<td>Expected deaths (when national rates were applied)</td>
<td>125</td>
<td>1000</td>
</tr>
</tbody>
</table>

   Compare the mortality in the two occupational groups (50 marks)

   4.2 The mean diastolic blood pressure in a random sample of 64 adult males drawn from a population of 1000 adult males was 80 mmHg with a standard deviation of 12 mmHg. Calculate the 95% confidence interval for the mean diastolic blood pressure for the adult population. (50 marks)
PAPER I

Answer all four questions.

1. You have been asked to evaluate a new "technique" for assessment of blood sugar concentration.
   1.1. Design a study to investigate the influence of subjects, techniques and observers. (60 marks)
   1.2. State the form of analysis you would use. (40 marks)

2. Discuss the usefulness of the following approaches in epidemiological research.
   2.1 Migrant studies (50 marks)
   2.2 Birth cohort analysis (50 marks)

3. In a hospital based case control study to assess the relationship between rheumatoid arthritis and oral contraceptives use, the cases were random sample of 100 women with rheumatoid arthritis undergoing treatment at one of the five rheumatology clinics in the Out Patient Department.
   3.1 Suggest an appropriate control group for the study. Give reasons for your choice. (30 marks)
   3.2 Describe the potential sources of bias that may compromise the conclusions of the study. (30 marks)
   3.3 How would you minimize three of the identified biases. (40 marks)

4. Write notes on the following:
   4.1 Usefulness of Receiver Operator Characteristic (ROC) curve (35 marks)
   4.2 Standardized Mortality Ratio (SMR) (35 marks)
   4.3 B error of 0.02 (30 marks)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD(COMMUNITY MEDICINE/COMMUNITY DENTISTRY)
PART 1 EXAMINATION
JULY, 2002

Date: 9th July, 2002

PAPER II

Answer all four questions.

1. Write short notes on:
   1.1 Blocked randomization (30 marks)
   1.2 Volunteers in research (35 marks)
   1.3 Non-compliance in clinical trials (35 marks)

2. Explain the situations in which the following statistical tests could be applied. Give an example for each situation.
   2.1 Correlation coefficient (30 marks)
   2.2 Mental - Haenzel odds ratio (OR) (35 marks)
   2.3 Analysis of variance (35 marks)

3. Describe the situations in which the following data collection procedures are used, giving reasons.
   3.1 Focus group discussions (35 marks)
   3.2 Life histories (35 marks)
   3.3 Key informant interviews (30 marks)

4. You have been requested to carry out a research project to find out the prevalence of obesity in urban children between 10-19 years of age in Sri Lanka.
   4.1 Describe the sampling procedure you would use giving reasons. (60 marks)
   4.2 How would the sampling affect the estimates (40 marks)
Q1. Doctors practising in village X, attribute asthma in their area to air pollution due to emissions from a sugar manufacturing plant. Outline the design of a study to examine this association (100 marks)

Q2. A study reported in the Journal of Public Health Medicine (vol. 25, no.1 pp 59-61) investigated the relative effectiveness of four strategies in detecting and preventing tuberculosis in a given community. The four methods examined were, contact tracing of smear positive pulmonary disease, smear negative pulmonary disease, non pulmonary tuberculosis and population screening of new immigrants from high incidence countries. The findings of the study are given in table 2

Table 2 : Results of contact tracing according to category of the incidence case and result of screening new immigrants.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Index cases</th>
<th>Number of Contacts traced</th>
<th>Number of Active cases of TB</th>
<th>Total no. of Cases detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contacts of Smear positive pulmonary TB</td>
<td>66</td>
<td>263</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>Smear negative pulmonary TB</td>
<td>78</td>
<td>156</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Non pulmonary TB</td>
<td>83</td>
<td>227</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>New immigrants</td>
<td>-</td>
<td>322</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

2.1 Comment on the effectiveness of the different strategies in control of tuberculosis in this community. (100 marks)
PART B

Q3  Discuss briefly

3.1  Behavioural surveillance in relation to HIV/AIDS.  (50 marks)
3.2  Analysis and reporting of qualitative data.  (50 marks)

Q4  Write notes on

4.1  Interim (sequential) analysis  (25 marks)
4.2  P value in multiple comparison  (25 marks)
4.3  Ecological bias  (25 marks)
4.4  Disability Adjusted Life Years (DALY)  (25 marks)
PART A

Q1. Discuss the usefulness and limitation of using routinely available information in the assessment of morbidity and mortality due to neoplasms in Sri Lanka.

(100 marks)

Q2. The Wright Peak Flow Meter and the Mini Flow Meter are two instruments used to measure Peak Expiratory Flow Rate in patients. A physician was interested in finding out how well the Mini Peak Flow Meter performs in comparison to the Wright Peak Flow Meter in measuring the peak flow rates in patients. Table 1 gives the findings of an experiment conducted for this purpose.

Table 1: Comparison of Peak Expiratory Flow Rate (PEFR) (litres/min) measured by Wright meter and mini meter in 12 female subjects

<table>
<thead>
<tr>
<th>Subject no.</th>
<th>Wright PEFR litres/min</th>
<th>Mini PEFR litres/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>490</td>
<td>525</td>
</tr>
<tr>
<td>2</td>
<td>397</td>
<td>415</td>
</tr>
<tr>
<td>3</td>
<td>512</td>
<td>508</td>
</tr>
<tr>
<td>4</td>
<td>401</td>
<td>444</td>
</tr>
<tr>
<td>5</td>
<td>470</td>
<td>500</td>
</tr>
<tr>
<td>6</td>
<td>415</td>
<td>460</td>
</tr>
<tr>
<td>7</td>
<td>431</td>
<td>390</td>
</tr>
<tr>
<td>8</td>
<td>429</td>
<td>432</td>
</tr>
<tr>
<td>9</td>
<td>420</td>
<td>420</td>
</tr>
<tr>
<td>10</td>
<td>275</td>
<td>227</td>
</tr>
<tr>
<td>11</td>
<td>165</td>
<td>268</td>
</tr>
<tr>
<td>12</td>
<td>421</td>
<td>443</td>
</tr>
</tbody>
</table>
2.1 Carry out any calculations necessary and **comment on the performance** of the Mini Peak Flow Meter in comparison to the Wright Peak Flow Meter. (The steps in calculations have to be clear) (60 marks)

2.2 Discuss what measures you would take to ensure quality of data in the above experiment. (40 marks)

**PART B**

**Q3** The true incidence rates of Coronary Heart Disease (CHD) among persons who consume alcohol is 50.0 per 100,000 person years and who do not consume alcohol is 10 per 100,000 person years.

3.1 Calculate the true rate ratio (20 marks)

Suppose a study was conducted over a 1 year period to determine the association between alcohol consumption and CHD using a self administered questionnaire among 1,500,000 persons of whom 1,000,000 actually consumed alcohol and the remainder were teetotalers. Also, suppose that in the study one half of the alcohol consumers were classed as teetotalers and that one third of the teetotalers were classed as alcohol consumers.

3.2 Calculate the ratio for the study (40 marks)

3.3 What is the reason for the discrepancy of estimates in parts (a) and (b). (10 marks)

3.4 Briefly describe the steps you would take to minimize this discrepancy. (30 marks)

**Q4** Discuss giving examples:

4: 1. Selection of controls in case control studies. (50 marks)

4.2 Ethical considerations in a survey of adolescent reproductive health. (50 marks)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD(COMMUNITY MEDICINE/COMMUNITY DENTISTRY)
PART 1 EXAMINATION
JULY, 2004

Date:- 27th July, 2004
Time- 1.30 p.m. - 3.30 p.m.

PAPER I

Answer all four questions
Answer each question in a separate book.

Q1.
1.1 What are the possible disadvantages of using structured response questions when the researcher is unsure as to what answers respondents may want to (30 marks)
1.2 When are structured questions best used? (10 marks)
1.3 Describe how a researcher can avoid bias in designing a questionnaire (60 marks)

Q2.
In study of aetiology of carcinoma of the lung investigators found 1350 persons who out of 1357 who had lung cancer, and 1296 smoked out of 1357 who did not cancer sampled from the community.
2.1 What is the risk of lung cancer? (40 marks)
2.2 What proportion of lung cancer can be prevented by eliminating smoking from population? (40 marks)
2.3 Discuss whether Odds Ratio is a valid estimate of Relative Risk. (20 marks)

Q3.
3.1 Describe how you would evaluate an ongoing cervical cancer screening program. (50 marks)
3.2 Describe a study design to assess the effectiveness of this programme in reducing mortality due to carcinoma cervix (50 marks)
Q4. This question is based on a survey published in an Australian newspaper. Such survey is not represent research published in scientific journals. The survey questioned a sample adults concerning their smoking habits.

### Survey characteristics

<table>
<thead>
<tr>
<th>Sample</th>
<th>1000 voters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage</td>
<td>Australia wide</td>
</tr>
<tr>
<td>Method</td>
<td>Telephone</td>
</tr>
<tr>
<td>Question</td>
<td>Do you smoke? Yes or No</td>
</tr>
</tbody>
</table>

### Results

<table>
<thead>
<tr>
<th>Smoking</th>
<th>Percentage of replies to the questions in the two cities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Melbourne</td>
</tr>
<tr>
<td>Yes</td>
<td>24</td>
</tr>
<tr>
<td>No</td>
<td>76</td>
</tr>
</tbody>
</table>

4.1 If we assume that cigarette smoking is a 'stigmatised' behaviour, do you think the telephone survey produced valid answers? (15 marks)

4.2 180 people were interviewed in Melbourne and 220 in Sydney. If the population of Australia is 17 million and the populations of Melbourne and Sydney are 2.5 and 3.2 million respectively. Comment on the proportions. (25 marks)

4.3 Which categories of smokers may not have been reached by this survey and what implications might this have for external validity of the survey? (20 marks)

4.4 A journalist commented on the results saying 'This difference is ironic given that anti-smoking lobbyist have applauded Melbourne as a pacesetter for smoking law reform, such as tobacco tax-funded health promotion' Explain why this comment is inappropriate given the design of the survey? (15 marks)

4.5 Which statistical test should be used to analyse the significance of the results concerning the difference in smoking between the two cities? Justify your selection. (25 marks)
HIV serology was carried out among transport workers coming for their annual renewal of license using a single Elisa test. Informed consent was not obtained. The testing was done in an unlinked anonymous fashion. Information was gathered from January 1st 2002 to December 31st 2002. The table below shows the frequency among workers who used four wheelers (group 1) and two wheelers (group 2).

<table>
<thead>
<tr>
<th>Group</th>
<th>No. tested</th>
<th>No.+ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2400</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>600</td>
<td>24</td>
</tr>
</tbody>
</table>

1.1. Name the study design. (10 marks)
1.2. Is the study ethically correct? (20 marks)
1.3. What parameter was being measured, incidence or prevalence? (10 marks)
1.4. Is there a statistically significant difference between the two groups? (30 marks)
1.5. The ELISA test has a sensitivity of 99% and specificity of 98%. How does this fact affect the study results? (30 marks)

2. Write notes on
2.1. Usefulness of proportional mortality ratio (30 marks)
2.2. Methods of studying vaccine efficacy (35 marks)
2.3. Usefulness and limitations of International Classification of Diseases (35 marks)
3 Outline the methodology of a study you would design to test the hypothesis that middle aged Middle East returnees have an increased risk of developing diabetes. (100 marks)

4. In a trial of BCG vaccination of children against Leprosy in a district, the child contacts of cases of Leprosy who were Tuberculin negative were randomly allocated to i.) BCG vaccinated group and ii) unvaccinated group. At the first follow up 2 years later, the number of cases of Leprosy discovered in the study groups is given in the Table.

<table>
<thead>
<tr>
<th>Age in years at intake</th>
<th>Unvaccinated group</th>
<th>Vaccinated group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total children</td>
<td>Cases No.</td>
</tr>
<tr>
<td>0-</td>
<td>1366</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1588</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>1623</td>
<td>19</td>
</tr>
<tr>
<td>6</td>
<td>1251</td>
<td>17</td>
</tr>
<tr>
<td>8</td>
<td>870</td>
<td>20</td>
</tr>
<tr>
<td>10-12</td>
<td>561</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>7259</td>
<td>74</td>
</tr>
</tbody>
</table>

4.1 Why were children who were 'case contacts' only, included in the study? (25 marks)

4.2 What precautions would you want to incorporate in the initial examination and allocation to vaccinated and unvaccinated groups? (25 marks)

4.3 What precautions would be necessary at the time of follow up? (25 marks)

4.4 What conclusions can you draw on the efficacy of BCG vaccination against leprosy? (25 marks)
1. A sample of new born babies chosen using a simple random sampling technique from an entire district provided the following information.
   Sample size 100
   Mean birth weight 3 kg
   Standard deviation 500 gm

   1.1. What is the coefficient of variation? (20 marks)

   1.2. Had the sample size been 400 what would have happened to SD
        (a) larger
        (b) smaller
        (c) same (10 marks)

   1.3. Is there anything in the above data that suggests that the distribution of birth weight is unlikely to be normal? (10 marks)

   1.4. Assuming that the distribution of birth weight is normal.
        What proportion of newborns would have weights,
        1.4.1. > 3kg
        1.4.2. less than 2.5 kg
        1.4.3. less than 2kg

        (10 marks) (10 marks) (10 marks)

   1.5. Calculate 95% confidence interval (sample size 100). (15 marks)

   1.6. Answer in one sentence, what the above interval means. (15 marks)
2. Discuss the biases that may occur in the evaluation of a screening test. (100 marks)

3. Describe briefly the steps you would follow in planning and conducting a study to assess the prevalence of hypertension in a district of Sri Lanka. (100 marks)

4. Discuss the usefulness and limitations of:
   - Ecologic studies (40 marks)
   - Non parametric tests (30 marks)
   - Nested case control studies (30 marks)
1. The figure shows the number of cases of leprosy registered (prevalence) and new cases detected from 1985 to 2005.

Figure....Number of cases of Leprosy - Global in thousands by year

1.1. Describe the graph. (10 marks)

1.2. What are the reasons for the dramatic fall in registered cases? (25 marks)

1.3. Why have the new case detection not shown a similar fall? (15 marks)
Based on this decrease, WHO aims to eliminate leprosy globally by 2005 and changed the national programme from a "vertical" programme to an "integrated" programme.

1.4. List the advantages and disadvantages of an "integrated" national programme compared to a "vertical" programme? (25 marks)

1.5. What steps would you take to ensure that there is no resurgence of Leprosy in the future? (25 marks)

2. A traffic accident that occurred in a town in the Kurunegala District involving a tanker lorry containing chemical waste led to the spillage of a large quantity of noxious gases. A plume of gas was observed for several hours.

Since the accident, the local haematologist has reported an apparent increase in bleeding disorders among local residents. Assuming that baseline data on bleeding disorders are available outline a study to investigate the relationship between the event and reported health problems. (100 marks)

3. A randomized double blind placebo controlled trial was conducted to determine the efficacy of atorvastatin and omega-3 fatty acids in reducing serum cholesterol against a placebo. 180 subjects were randomly assigned equally to the 3 treatment arms (60 subjects in each). Data were analysed using ANOV A. The summary table is given below.

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Degrees of freedom</th>
<th>Sums of squares</th>
<th>Mean squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>a</td>
<td>d</td>
<td>e</td>
</tr>
<tr>
<td>Within</td>
<td>b</td>
<td>9800</td>
<td>f</td>
</tr>
<tr>
<td>Total</td>
<td>c</td>
<td>10800</td>
<td></td>
</tr>
</tbody>
</table>

3.1. Calculate the values of a, b, c, d, e and f in the above table. (30 marks)
3.2. Describe briefly any further analyses that may be required. (10 marks)

Suppose the investigator wanted to determine the effect of the treatment controlling for two age groups (<60 years and ≥ 60 years)

3.3. Write the sources of variation and degrees of freedom for each source of variation. (30 marks)
3.4. How would you determine if there is an age effect? Discuss giving formula (no calculations needed). (10 marks)

3.5. State reasons why ANOVA was used for this analysis. (20 marks)

4. Write notes on the following
   4.1. Principles of choosing a sample size (50 marks)
   4.2. Controlling confounding (30 marks)
   4.3. Informed consent (20 marks)
Answer all four questions.
Answer each question in a separate book.

1. A team of health care planners wishes to estimate the prevalence of Sexually Transmitted Infections in a particular community.

   1.1. Name the research design most appropriate to achieving this objective. (10 marks)
   1.2. Define the study population. (15 marks)
   1.3. What sampling method will you use and give reasons. (20 marks)
   1.4 Outline the methods that may be used to collect data and their problems. (30 marks)
   1.5. List the ethical issues. (25 marks)

2. A regimen of drugs including injectable preparations named ECF improves survival among patients with gastric adenocarcinoma. A study needs to be done to assess whether the addition of a peri-operative regimen of ECF to surgery improves survival.

   250 patients are required in each group of patients (with and without peri-operative ECF) to detect an improvement in median survival of 12 months with a one-sided p-value of 0.05 and power of 90%.

   2.1. Explain the following:

   2.1.1 Improvement of median survival of 12 months. (10 marks)
   2.1.2 One-sided p-value of 0.05. (10 marks)
   2.1.3 A power of 90%. (10 marks)

   2.2. Explain the difference between clinical and statistical significance. (10 marks)
2.3. Can this study be conducted as a double bind study?  
Give reasons for your answer. (10 marks)

2.4. Design a suitable study to achieve the stated objectives. (50 marks)

3.

3.1. List the qualities of a good screening test. (20 marks)

3.2. How will you test the reliability of a screening test. (10 marks)

3.3. What is the Receiver Operative Characteristics (ROC) curve and its use. (20 marks)

3.4. A multistage screening was carried out in a population of 5000 industrial workers to determine those with HIV.

The first screening test (test A) has a sensitivity of 98% and specificity of 80%.

The second stage screening test (Test B) has a sensitivity of 90% and specificity of 96%.

3.4.1 What is the sensitivity and specificity of the combined test, if the prevalence of HIV is 2%. (25 marks)

3.4.2 Has the combined test made a difference in the yield of the cases? -If so how? (25 marks)

4. Write notes on the usefulness of the following to a health manager.

4.1. Cost effectiveness of an intervention. (30 marks)

4.2. Burden of disease estimates. (35 marks)

4.3 Focus group discussions. (35 marks)
POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD(COMMUNITY MEDICINE/COMMUNITY DENTISTRY)
PART 1 EXAMINATION
AUGUST, 2006

Date :- 15th August, 2006
Time :- 9.00 a.m. – 11.00 a.m.

PAPER II

Answer all four questions.
Answer each question in a separate book.

1. According to the data from a regional Cancer Registry, 80 of the 120 cases of oropharyngeal cancer were betel chewers. A random sample of 200 subjects selected from that region showed that 40/0 were betel chewers.

   1.1 Calculate the relevant measure of association between betel chewing and oropharyngeal cancer. (20 marks)

   1.2 Explain in one sentence what the above measure means. (10 marks)

   1.3 Calculate the 95/0 Confidence Interval. (20 marks)

   1.4 What does the above interval mean ? (10 marks)

   1.5 Calculate the population attributable risk. (25 marks)

   1.6 Explain the meaning of the value calculated under 1.5. (15 marks)

2. You are asked to review an article written on a community based trial to study the protective effect of HiB vaccine on meningitis in children under 2 years of age.

   What are the methodological issues you would focus on when reviewing the above article ? (100 marks)

3. Write notes on

   3.1 Block randomization. (25 marks)
   3.2 In-depth interviews. (25 marks)
   3.3 Single blinding. (25 marks)
   3.4 Verbal autopsy. (25 marks)
4. A psychiatrist hypothesizes that men who abuse drugs are more likely to commit rape than men who are not drug abusers. She conducts a case control study to test this hypothesis, selecting as cases a random sample of men serving sentences for rape in the state prisons.

4.1. Comment on the choice of cases.  

4.2. Suggest a suitable control group for this study.  

4.3. List potentially confounding variables and suggest methods to control them.  

4.4. What are the advantages and disadvantages of using this study design to examine the above relationship.
1. The following table is from a study of age at menarche in our country using recall. The subjects were selected using simple random sampling.

Table 1.1: Frequency distribution of age at menarche by current age group

<table>
<thead>
<tr>
<th>Age of menarche</th>
<th>Current age of women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>31-40 years</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>14</td>
<td>27</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>Total number</td>
<td>66</td>
</tr>
<tr>
<td>Mean</td>
<td>13.88</td>
</tr>
<tr>
<td>SD</td>
<td>1.387</td>
</tr>
</tbody>
</table>

Carry out necessary calculations and comment on the findings. (50 marks)

Please note Part II (1.2) of question 1 on page 2.
The table below shows the relationship between age of onset of asthma in children and maternal age at birth of the child. The children were all born in a given week.

Table 1.2: Age of onset of asthma by mother's age at birth of child

<table>
<thead>
<tr>
<th>Asthma reported</th>
<th>Mother's age at birth of child</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15-19 years</td>
</tr>
<tr>
<td>Never</td>
<td>261</td>
</tr>
<tr>
<td>Asthma +</td>
<td>150</td>
</tr>
</tbody>
</table>

Comment on the findings (carry out necessary calculations) (30 marks)

What other possible explanations are there for the findings (20 marks)
2.1 The table below is from a study on induced abortion. Some women attended abortion services provided by a non-governmental organisation while others obtained services from a practitioner in the community. Of particular interest is a comparison of the incidence of complications among the two groups of women.

<table>
<thead>
<tr>
<th>Abortion provider</th>
<th>Cases &amp; complications</th>
<th>Period of gestation at abortion</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGO</td>
<td>Number of abortions</td>
<td>&lt;9 weeks</td>
<td>889</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9-12 weeks</td>
<td>2851</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;12 weeks</td>
<td>682</td>
</tr>
<tr>
<td></td>
<td>Complications</td>
<td></td>
<td>4422</td>
</tr>
<tr>
<td>Practitioner in community</td>
<td>Number of abortions</td>
<td>&lt;9 weeks</td>
<td>608</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9-12 weeks</td>
<td>868</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt;12 weeks</td>
<td>207</td>
</tr>
<tr>
<td></td>
<td>Complications</td>
<td></td>
<td>1683</td>
</tr>
</tbody>
</table>

2.1.1 Briefly describe the findings of the study

2.1.2 Calculate a summary index for the comparison of the incidence of complications between the two groups of abortion providers and comment on the findings

2.1.3 Give the reasons for your choice of method in calculating summary index.

2.2 A population based screening programme was introduced in area X in 1996. All women aged 35-54 years were invited for cervical smear every 3 years. Over the period 1st January 1996 - 31st December 2005, 68149 women had one cervical smear taken, 36002 had two smears and 7542 women had three smears. The table below shows the results relating to severe epithelial abnormalities (consistent with severe displasia, carcinoma in situ or invasive cervical cancer) diagnosed during the first, second and third cytological examinations.

<table>
<thead>
<tr>
<th>Rank of cytological examination</th>
<th>Number of women</th>
<th>Number with severe abnormalities</th>
<th>Rate per 1000 women screened</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>68149</td>
<td>219</td>
<td>3.2</td>
</tr>
<tr>
<td>Second</td>
<td>36022</td>
<td>42</td>
<td>1.2</td>
</tr>
<tr>
<td>Third</td>
<td>7542</td>
<td>7</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Based on these findings it was concluded that "the population screening program has been successful"

Comment on this statement.
3. The following data are from a hospital based case control study of ovarian cancer. One of the exposures examined was oral contraceptive use. Cases and controls were not matched, although it was ensured that the age distribution of cases and controls were similar.

235 cases and 451 controls were selected for study. There were 35 women who had ever used oral contraceptives among the cases and 114 among the controls. The women were divided into 3 social class groups based on the husband's occupation. The distribution of cases and controls stratified by social class groups and oral contraceptive use is given below.

**Table 3: Cases and controls stratified by social class groups**

<table>
<thead>
<tr>
<th>Highest social class group</th>
<th>OC ever use</th>
<th>OC never use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>19</td>
<td>77</td>
<td>96</td>
</tr>
<tr>
<td>Controls</td>
<td>40</td>
<td>101</td>
<td>141</td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>178</td>
<td>237</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intermediate social class group</th>
<th>OC ever use</th>
<th>OC never use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>14</td>
<td>98</td>
<td>112</td>
</tr>
<tr>
<td>Controls</td>
<td>59</td>
<td>158</td>
<td>217</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td>256</td>
<td>329</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lowest social class group</th>
<th>OC ever use</th>
<th>OC never use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>2</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Controls</td>
<td>15</td>
<td>78</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>103</td>
<td>120</td>
</tr>
</tbody>
</table>

3.1 What is confounding          (10 marks)

3.2 What are the conditions that have to be fulfilled to label a variable as a confounder  (20 marks)

3.3 What is the relationship between ever use of oral contraceptives and ovarian cancer ignoring social class.  (20 marks)

3.4 Is there evidence to suggest that social class is a confounder.  (20 marks)

3.5 Make corrections for social class and comment on the relationship between ovarian cancer and ever use of oral contraceptives.  (30 marks)
4. **4.1** A blood bank uses two different types of ELISA to screen for HIV infection.

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELISA I</td>
<td>95%</td>
<td>99%</td>
</tr>
<tr>
<td>ELISA II</td>
<td>97%</td>
<td>98%</td>
</tr>
</tbody>
</table>

The hospital is situated in an area where the prevalence of HIV is about 1%.

Using the above tests how would you maximize the safety of blood transfusion with respect to HIV transmission. Show numerical example and calculate probability that a unit of blood transfused could be infected under the system suggested by you. (25 marks)

Can the same system be used in screening individuals in a clinical situation?
Comment. (25 marks)

**4.2** Discuss the usefulness of qualitative methodology in epidemiological studies. (25 marks)

**4.3** Discuss selection bias in case control studies. (25 marks)
A Case Control study was conducted to determine risk factors for childhood asthma. In the univariate analysis an odds Ratio (OR) of 2.85 (95% Confidence interval 1.57 to 5.16) was observed for presence of child when cleaning the house. The table below shows the results when the variable 'cigarette smoking inside the house' was added into the logistic regression model.

<table>
<thead>
<tr>
<th>Variable in the model</th>
<th>Coefficient β</th>
<th>Standard Error</th>
<th>Wald Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence of child when cleaning the house</td>
<td>0.93</td>
<td>0.32</td>
<td>8.25</td>
</tr>
<tr>
<td>Cigarette smoking</td>
<td>1.51</td>
<td>0.32</td>
<td>22.14</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.239</td>
<td>0.23</td>
<td>16.82</td>
</tr>
</tbody>
</table>

1.1 What factors would you consider in the selection of controls for this study? (30 marks)

1.2 Calculate the adjusted odds ratios and its 95% confidence intervals for the association between childhood asthma and
   a). Presence of child when cleaning the house
   b). Cigarette smoking (30 marks)

1.3 What are your conclusions? (40 marks)

2. Ministry of Health is planning to collect information to improve postnatal services provided in the Medical Officer of Health (MOR) areas.

2.1 Discuss the routine data available for evaluation of postnatal services and comment on its limitations. (30 marks)

2.2 Suggest methods to improve the quality of routine data. (30 marks)

2.3 Describe briefly a study to assess the quality of postnatal services. (40 marks)
3. Given below is a table showing the prevalence, perinatal mortality and crude odds ratios for selected risk markers of perinatal death among 910 births in rural Kenya in 1996-97.

<table>
<thead>
<tr>
<th>Risk markers</th>
<th>Prevalence (%)</th>
<th>Perinatal Death Rate /1000 Births</th>
<th>Crude Odds Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal haemoglobin (g/dl)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;7</td>
<td>13.8</td>
<td>192.0</td>
<td>2.2 (1.14 - 4.26)</td>
</tr>
<tr>
<td>7-10.9</td>
<td>65.8</td>
<td>110.7</td>
<td>1.2 (0.67 - 2.00)</td>
</tr>
<tr>
<td>&gt;11</td>
<td></td>
<td>-</td>
<td>1.00</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assisted</td>
<td>3.4</td>
<td>225.8</td>
<td>2.3 (0.94 - 5.35)</td>
</tr>
<tr>
<td>Caesarian section</td>
<td>13.7</td>
<td>352.9</td>
<td>4.4 (2.13 - 9.24)</td>
</tr>
<tr>
<td>Normal vaginal delivery</td>
<td></td>
<td>-</td>
<td>1.00</td>
</tr>
<tr>
<td>Maternal infection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV Positive</td>
<td>8.6</td>
<td>115.4</td>
<td>0.96 (0.47 - 1.99)</td>
</tr>
<tr>
<td>Placental malaria</td>
<td>47.1</td>
<td>96.5</td>
<td>0.68 (0.45 - 1.04)</td>
</tr>
<tr>
<td>Normal</td>
<td></td>
<td>-</td>
<td>1.00</td>
</tr>
<tr>
<td>Body Mass Index (kg/m²)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;25th Centile</td>
<td>25.0</td>
<td>192.0</td>
<td>3.1 (1.67 - 5.64)</td>
</tr>
<tr>
<td>26th - 50th Centile</td>
<td>25.0</td>
<td>102.7</td>
<td>1.5 (0.76 - 2.88)</td>
</tr>
<tr>
<td>&gt;75th Centile</td>
<td>25.1</td>
<td>88.9</td>
<td>1.3 (0.64 - 2.50)</td>
</tr>
<tr>
<td>5151 - 75th Centile</td>
<td></td>
<td>-</td>
<td>1.00</td>
</tr>
</tbody>
</table>

3.1 What is understood by the term 95% confidence interval? (10 marks)

3.2 What are the risk markers that are significantly associated with perinatal death? Give reasons. (20 marks)

3.3 Assuming that odds ratios remain the same after multivariate analysis, which risk factor would you address to ensure an early impact? (20 marks)

3.4 Describe the interventions you would adopt to address the selected risk marker. (50 marks)

4. Writes notes on

4.1 Factors affecting sample size calculations. (20 marks)

4.2 Receiver operating characteristic (ROC) curve. (20 marks)

4.3 Difference between relative risk and attributable risk and their interpretation. (20 marks)

4.3 List the main characteristics of the healthcare market in Sri Lanka, and state their impacts on market demand, supply, and price. (40 marks)