"Investing in Africa's Future"

FACULTY OF HEALTH SCIENCES

2015 FIRST SEMESTER EXAMINATIONS

COURSE CODE: SPH540

COURSE TITLE: ADVANCED EPIDEMIOLOGY

DATE: November-December 2015

TIME: 3 hours

INSTRUCTIONS

Answer **ALL** Questions in **Section A** and **ANY 3** questions from **Section B**

The mark allocation for each question is indicated at the end of the question

SECTION A

QUESTION 1

1. Define the following epidemiological terms:

   a. Chance

   b. Bias

   c. Confounder

   d. Effect Modification

   e. Validity

2. Briefly outline factors associated with disease causation.

3. Giving clear examples, explain the differences between probability and non-probability sampling methods.

4. Explain how bias can be introduced in a study. Outline methods used to reduce bias in a study.

5. Explain the effects of confounding in epidemiology.

1. A case-control study was conducted to evaluate the interrelationships between several risk factors for Myocardial Infarction. Information on smoking status was collected from, defined as smoking within the past three months, and was reported by 157 of the 366 cases and 110 of the 423 controls.
   a. Set up the appropriate two-by-two table and calculate measure of association between current smoking and myocardial infraction.
   b. Calculate a measure of the excess risk of myocardial infraction in cigarette smokers that is attributable to their own smoking

   c. State any assumptions that you make in performing these calculations and give interpreters for your results

2. You conduct a case-control study examining the relationship between drinking soda and colon cancer and find that among 1500 who have colon cancer, 400 drink soda, while among the 3000 controls who don't have colon cancer, 450 drink soda.

   a. Draw a 2x2 table and calculate the crude OR [6 marks]

   b. interpret the OR [2 marks]

   c. Now you stratify by gender and find the following: Among women, 200 of 1000 who have colon cancer drink soda, while among the 2000 who don't have colon cancer, 300 drink soda. Among men, 200 of the 500 who have colon cancer drink soda, but only150 of the 1000 who don't have colon cancer drink soda. Draw out the stratified 2x2 tables and calculate their respective ORs. [12 marks]

d. Interpret the ORs   [4 marks]

e. Is this an example of effect modification or confounding? [2marks]

f. Explain in lay terms what this conclusion means. [2 marks]

g. What do you do now? [2 marks

5. The following table shows numbers of lung cancer deaths by daily number of cigarettes smoked at the time of the 1951 questionnaire (for male physicians who were non-smokers and current smokers only). Person-years of observation ("person-years at risk") are given for each smoking category. The number of cigarettes smoked was available for 136 of the persons who died from lung cancer.

Number and rate (per 1,000 person-years) of lung cancer deaths by number of cigarettes smoked per day, Doll and Hill physician cohort study, Great Britain, 1951-1961.					
Daily number of cigarettes	Deaths from Lung Cancer	Person-years at risk	- Mortality rate per 1000 person-years	Rate Ratio	Rate difference per 1000 Person years
0	3	42800	0.07	Ref	Ref
1-14	22	38600			
15-24	54	38900			
25+	57	25100			
All Smokers	133	102600			
Total	136	145400			

a. Compute lung cancer mortality rates, rate ratios, and rate differences for each smoking category. What do each of these measures mean?

b. What proportion of lung cancer deaths among all smokers can be attributed to smoking? What is this proportion called?

c. If no one had smoked, how many deaths from lung cancer would have been averted?

6. An outbreak of anthrax was detected among residents of Mutasa District of Manicaland. In a case-control study, investigators found that 21 of the 30 case-patients and four of the 60 controls had eaten infected meat.

    a. Draw a 2x2 table to summarise the data

    b. Calculate the measure of association. Is it statistically significant?

    c. Interpret the results

7. Briefly outline factors associated with disease causation.

8. Giving clear examples, explain the differences between probability and non-probability sampling methods.

9. List and give a detailed account of each of the epidemiologic study designs.

10.