



"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

SPH 540 ADVANCED EPIDEMIOLOGY

SUPPLEMENTARY EXAMINATION

LECTURER: E. CHIKAKA

DURATION: (3 HRS)

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

A case-control study of oral cancer in females employed in the textile industry was carried out. The investigators found out that 22 of the 57 cases and nine of the 57 controls had ten years or more in the textile industry and the rest had other work histories.

- a. Draw a 2x2 table to summarise the data [4]
- b. Calculate the measure of association. Interpret the result.
Is it statistically significant? [4]
- c. What is the measure of impact? [2]
- d. Calculate the 95% Confidence Interval around the measure of association. [8]

QUESTION 2

A pediatrician designed a study to test his hypothesis that children who consume large amounts of red food coloring are more likely to be hyperactive than those who do not. He interviewed the parents of 200 hyperactive children (identified from the medical records of six psychiatrists) and compared their diets to those of 200 children undergoing treatment by one of the same six psychiatrists for other behavioral problems to determine the dietary habits of their children over the preceding two year period.

- i) What is the research design used in this study?
- ii) Of the 200 children diagnosed as being hyperactive, 82 were assessed as consuming high levels of red food coloring, as compared to 42 children being seen for other behavioral problems. What is the risk of hyperactivity associated with red food coloring?
- iii) What is the population attributable risk (aetiologic fraction)?
- iv) What biases may be operating in this study? [10]

QUESTION 3

Suppose a large cohort study follows 100 000 persons who smoke and 200 000 who do not smoke for the incidence of bladder cancer, yielding the data in the table below.

Smoking Status	Bladder Cancer		Total
	Cases	Controls	
Smokers	250	99 750	100 000
Non-Smokers	125	199 875	200 000
Total	375	299 625	300 000

- Estimate (i) Excess Risk and interpret
- (ii) Attributable Risk Percent and interpret
- (iii) 95% Confidence Interval for the Relative Risk [12]

SECTION B

QUESTION 4

The introduction of mobile phones in Zimbabwe has seen an increase in the number of users. As a Public Health Officer, you are approached by a medical aid society concerned about the possible health effects of the use of cellular phones. One such health effect is purported to be an increase in the risk of head, ear and brain tumours. The medical aid society is worried about the possible impact on their claims.

- Describe how you might undertake to assess the potential effects of cellular phones on the health of users. [10]
- Discuss any potential confounders in this study and how you might overcome/control them [10]

QUESTION 5

Explain how biases can be introduced in a study. [10]

Outline methods used to reduce biases in a study. [10]

QUESTION 6

- Explain the effects of confounding and effect modification in epidemiology. [10]
- Briefly explain how you control for confounding and effect modification at different stages of the study for different designs. [10]

QUESTION 7

The following data are from an observational study in which 150 children with mild asthma were sampled. At the beginning of the study it was recorded whether or not the child was taking medication for asthma. Children were followed for one year for improvement in asthma condition.

	Improvement	No improvement
Medication	60	40
No medication	10	40

Estimate the risk ratio for improvement given medication, the risk difference and the odds ratio. [5]

Now consider the second cohort study in which 300 children with severe asthma were sampled:

	Improvement	No improvement
Medication	100	100
No medication	10	90

- (i) For the second cohort, estimate the risk ratio for improvement given medication, risk difference and odds ratio. [5]

Next consider data from the 2 cohorts combined:

	Improvement	No improvement
Medication	160	140
No medication	20	130

- (ii) For the combined cohort, estimate the risk ratio for improvement given medication, risk difference and odds ratio. [5]

The Mantel-Haensel adjusted relative risk was calculated as 4.00. Give a possible reason for the differences between the stratified, adjusted and crude relative risks. Explain why this could have happened. [5]

QUESTION 8

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 measure of association [4]
- b. Interpret the measure calculated above [2]
- 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 only 150 of the 1000 who don't have colon cancer drink soda. Draw out the stratified 2x2 tables and calculate their respective measures of association [6]
- d. Interpret the measures of association. [2]
- e. Is this an example of effect modification or confounding? [2]
- f. Explain in lay terms what this conclusion means. [2]
- g. What do you do now? [2]