



“Investing in Africa’s future”

COLLEGE OF HEALTH AGRICULTURE & NATURAL SCIENCE (CHANS)

DEPARTMENT OF PUBLIC HEALTH AND NURSING (DPHN)

NSPH 540: ADVANCED EPIDEMIOLOGY (MPH)

FIRST SEMESTER FINAL EXAMINATIONS

AUG-DEC 2023

LECTURER: DR N. CHIKONZO

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

Credit will be given for logical, systematic and neat presentations.

SECTION A

Question 1a.

Elaborate on the following:

- i.** Types and examples of Study designs [5 marks]
- ii.** Hierarchy of evidence [5 marks]
- iii.** Causality [5 marks]
- iv.** Ecological Fallacy [5 marks]

Question 1b.

The association between heavy alcohol consumption and the risk of oral cancer was investigated in a case–control study with 475 cases and 400 controls. Of the cases 350 had heavy alcohol consumption and 200 of the controls had heavy alcohol consumption.

- i.** Calculate and interpret the crude odds ratio based on these data [5marks]
- ii.** Sex was considered a potential confounder and/or effect measure modifier in this study. The data were stratified into males and females to assess these issues. Calculate the stratum-specific odds ratios among males and females using the following data [5 marks]

	Males		Females	
Heavy alcohol consumption	Cases	Controls	Cases	Controls
Yes	300	150	50	50
No	50	50	75	150

- iii.** Is sex a confounder in this study and what will you do? [2 marks]
- iv.** Is sex an effect measure modifier in this study and what will you do [3 marks]
- v.** Briefly justify your answers to parts C and D [5 marks]

SECTION B

Question 2

A study is conducted to investigate the association between air pollution and mortality. The study uses data from a large city over a period of 10 years. The researchers measured air pollution levels at different locations in the city and then linked the data to death records.

- a. What is the study design and why? (5 marks)
- b. Identify and explain at least 3 potential biases that could affect the study? (10 marks)
- c. How can these biases be minimized? (5 marks)

Question 3

- a. Explain the concept of a causal inference in epidemiology (5 marks).
- b. Describe the Bradford Hill criteria for causation (10 marks)
- c. Give an example of how these criteria can be applied to establish a causal relationship between an exposure and an outcome (5 marks).

Question 4

- ai) Define 'effect modification' and explain how these can influence the results of epidemiologic studies (4 marks)
- ii) Describe methods to identify and control for effect modification in study design and analysis (6 marks)
- bi) Define 'confounding' and explain how these can influence the results of epidemiologic studies (4 marks)
- ii) Describe methods to identify and control for confounding in study design and analysis (6 marks)

Question 5

- a) Explain the steps involved in planning and implementing a cohort study (10 marks)
- b) Discuss sources of bias in cohort studies and strategies to minimize them (10 marks)

Question 6

- a.)
- b.)
- c.) Describe statistical considerations and methods for analyzing cohort study data (10 marks)
- d.) Provide an example of a longitudinal cohort study that has advanced understanding of chronic disease epidemiology (10 marks)

End of Paper