



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

SCHOOL OF HEALTH SCIENCES

**UNIVERSITY EXAMINATION FOR MASTERS DEGREE IN
EPIDEMIOLOGY AND DISEASE CONTROL/EPIDEMIOLOGY AND
BIOSTATISTICS**

1ST YEAR 2ND SEMESTER 2017/2018 ACADEMIC YEAR

KISII L. C.

COURSE CODE: HMP 5126

COURSE TITLE: EPIDEMIOLOGICAL METHODS

STREAM: MSc. PH

TIME: 3HRS

Instructions

- 1. Answer question 1 (compulsory) and any other 3 questions**
- 2. Candidates are advised not to write on the question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

Question 1: (15 marks)

- a) Distinguish between mortality rate and case fatality rate (3mks)
- b) For validity of a diagnostic method define the following (sensitivity, specificity, predictive value) _ 3mks
- d) Distinguish between surveillance and screening (3mks)
- e) Discuss the strengths and limitations of case control studies (3mks)
- f) In a mass screening of 5000 women, 25 of these were found to have breast cancer. During the next 5 years, 10 of the women developed breast cancer. Determine which measures of disease occurrence can be calculated and calculate them (3mks)

Question 2: (15 marks)

- a) Compare and contrast design features of prospective and retrospective cohort studies (4mks)
- b) Describe tools for managing threats to internal validity in clinical trials (4mks)
- c) Define confidence interval, null and alternative hypothesis (3mks)
- d) In sub-county A (population of 150,000) 300 notifications of a certain disease were recorded, while in sub-county B (population 100,000) 250 notifications of the same disease were recorded during the same period of time. Determine which sub-county had higher incidence of disease (4mks)

Question 3: (15 marks)

Using an example discuss the use of odds ratio and relative risk in observational and experimental designs

Question 4: (15 marks)

a) A population of 1000 people is monitored for a year for the development of measles. None of them has measles at the start of the investigation. Thirty people develop measles by 30th June and 20 people develop measles by September 30th. Eight people were lost to follow up on November 30th, none of those lost to follow up had developed measles. Assuming that one can only get measles once:

- i) What is the cumulative incidence of measles in this population (4mks)

- ii) What is the prevalence of measles on July 1st (2mks)
- b) Discuss effect modification on confounding factors (5mks)
- c) Discuss the relationship between ecological factors and how they affect human beings (4mks)

Question 5: (15 marks)

Hg Suppose that in 1998 researchers hypothesized that communication ability and skill in young adulthood was related to Alzheimer’s Disease. To test this they evaluated hand written essays completed by a group of 350 nuns joining a single religious sect in 1930. By careful review of these writing samples, the researchers categorized all 350 as either having a high error profile (N=150) or a low error profile (N=200). Using surveillance of death certificates and other methods the researchers verified vital status of each nun through 1998. An accounting of all deaths produced the table below.

Cause of Death and Year by Handwriting Profile Status

	High error profile			Low error profile	
Cause of Death	# of Deaths	Year of Death	Cause of Death	# of Deaths	Year of Death
Alzheimer’s Disease	5	1985	Alzheimer’s Disease	1	1985
Alzheimer’s Disease	6	1990	Alzheimer’s Disease	3	1990
Alzheimer’s Disease	5	1995	Alzheimer’s Disease	4	1995
Heart Disease	10	1980	Heart Disease	8	1980
Heart Disease	15	1995	Heart Disease	10	1990
Other	25	1960	Other	20	1960
Other	30	1970	Other	10	1970

- a. Describe the type of study design used in this example. (2 mks)

- b. Compute the incidence density rate of Alzheimer's disease death for those with a high error profile and for those with a low error profile. (4mks) Show your work.
- c. Compute the incidence density ratio for the risk of Alzheimer's disease death associated with a high error communication profile. Explain, in two sentences or less, what this value means. (3 mks)
- d. Using data from this study compute an odds ratio for the association of a high error communication profile with death from Alzheimer's disease. Show a clearly labeled 2x2 table. (3 mks)
- e. Compare the odds ratio with the incidence density ratio computed in part c and explain why they are similar or different. (3mks)

Question 6: 15 marks

- a) Discuss with relevant examples the following descriptive study designs
 - i) Case report (3mks)
 - ii) Case series report (2mks)
 - ii) Cross-sectional studies (4mks)
- b) Explain with examples what it means by a confounding factor, Explain 3 essential characteristics of confounding (6mks)