



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF HEALTH SCIENCES**

**UNIVERSITY EXAMINATION FOR THE MASTERS IN
PUBLIC HEALTH & EPIDEMIOLOGY
1st YEAR SEMESTER ONE 2015/2017**

KISUMU LEARNING CENTRE

COURSE CODE: HMP 5112

COURSE TITLE: PRINCIPLES OF EPIDEMIOLOGY

EXAM VENUE: STREAM MSC/MPH

DATE: xxxxx EXAM SESSION:

TIME:

Instructions:

- 1. Answer 4 questions**
- 2. Question ONE is COMPULSORY**
- 3. Candidates are advised not to write on the question paper**
- 4. Candidates must hand in their answer booklets to the invigilator while in the examination room**

Question 1

1. Using the key elements in the WHO definition of epidemiology, complete the following statements. (3Mks)

- i. _____ Compare food histories between persons with Staphylococcus food poisoning and those without
 - ii. _____ Compare frequency of brain cancer among anatomists with frequency in general population
 - iii. _____ Mark on a map the residences of all children born with birth defects within 2 miles of a hazardous waste site
 - iv. _____ Graph the number of cases of congenital syphilis by year for the country
 - v. _____ Recommend that close contacts of a child recently reported with meningococcal meningitis receive Rifampin
 - vi. _____ tabulate the frequency of clinical signs, symptoms, and laboratory findings among children with chicken in Cincinnati, Ohio
- a. Epidemiology is usually termed as the “**basic science**” of public health, discuss using appropriate examples (5 Mrks)
 - b. The Cancer and Steroid Hormone (CASH) study, in which women with breast cancer and a comparable group of women without breast cancer were asked about their prior use of oral contraceptives, is an example of which type(s) of study? (2 Mrks)
 - c. A researcher follows 200 women who exercise regularly and 300 women who do not exercise regularly. After 30 years of follow-up, 20 of the women in the exercise group are diagnosed with osteoporosis while 30 women in the non-exercise group are diagnosed with osteoporosis.
 - i. Draw the 2X2 contingency. (2 Mks)
 - ii. Calculate the relative risk of developing osteoporosis between the two groups. (Show your work.) (2Mks)

- d. Some of the risk factors for heart disease are smoking, hypertension, obesity, diabetes, high cholesterol, inactivity, stress, and type A personality. Are these risk factors necessary causes, sufficient causes, or component causes? **(1 Mk)**

Question 2

2.

- a. Use the Agent-Host-Environment model to describe the role of the human immunodeficiency virus (HIV) in AIDS. **(3 Mks)**
- b. Classify each of the following studies epidemiologically. **(2Mks)**
- i. Vietnam Experience Study: Subjects were several thousand soldiers stationed in Vietnam from 1969-1971 and several thousand soldiers stationed in Europe from 1969-1971. In the mid-1980's, investigators determined and compared the death rate and prevalence of illness in both groups.
 - ii. Subjects were 59 patients with end-stage cancer. All were given a new treatment. The monthly survival was charted over 2 years.
 - iii. Subjects were persons with laboratory-confirmed trichinosis, and one healthy friend of each. All subjects were asked about their consumption of pork and other meat products.
 - iv. Subjects were children enrolled in a health maintenance organization. At 18 months, each child was randomly given one of two types of vaccine against *Haemophilus influenzae*. Parents were asked to record any side effects on a card, and mail it back after 2 weeks.
- c. State any two methods of indirect transmission? **(1Mk)**
- d. Define the following terms as used in medical screening **(3 Mks)**
- i. Validity
 - ii. Reliability
 - iii. Sensitivity
 - iv. Specificity
 - v. Negative predictive value
 - vi. Positive predictive value
- e. Questionnaires were mailed to every 10th person listed in the city telephone directory. Each person was asked to list age, sex, smoking habits, and respiratory symptoms during the preceding seven days. About

20% of the questionnaires were completed and returned. About 10% of respondents reported having upper respiratory symptoms. (3 Mks)

- i. Is this study experimental or observational? (circle) experimental
observational
 - a. Justify the choice you made in i.
 - ii. Is this study an ecological study? (circle) yes or no
 - a. Justify the choice you made in ii.
 - iii. Is this study longitudinal or cross-sectional? (circle) longitudinal
cross-sectional
- f. The table below shows the relation between the results of a test, a liver scan, and the correct diagnosis based on necropsy, biopsy, or surgical inspection. How good is the liver scan at diagnosis of abnormal pathology? (3 Mks)

	Pathology		Total
	Abnormal (+)	Normal (-)	
Liver scan			
Abnormal (+)	231	32	263
Normal (-)	27	54	81
Total	258	86	344

Question 3

- a. In December 2013, epidemiologists learned of a case of Ebola outbreak caused by Ebola virus (EBOV) infection among residents of Guinea. Pathogens of the disease are the five ebolaviruses recognized by International Committee on Taxonomy of Viruses, had never before been identified in Guinea. In response to the outbreak, US Center for Disease Control and other partners sent a team of epidemiologists to Guinea.

Describe how this information might be used for each of the following

- i. Assessing the community's health (2Mks)
 - ii. Making decisions about individual patients (2Mks)
 - iii. Documenting the clinical picture of the illness (2Mks)
 - iv. Searching for causes to prevent future outbreak (2Mks)
- b. Differentiate the following terms as used to define the spectrum of a disease (1Mks)
- i. Infectivity

- ii. Pathogenicity
- c. Discuss the natural history of a disease, giving correct chronology of events (2Mk)
- d. Illustrate Rothman's Causal pie model, stating relevant factors involved (4Mks)

Question 4

- a. Illustrate two scenarios explaining endemic and hyperendemic (2 Mks)
- b. Briefly mention and explain five theories of disease causation (5Mks)
- c. In the table below, what is the fraction of cases with the disease among the exposed that is attributable to the exposure? (1Mks)

	Unexposed	Exposed
Disease	9	17
No disease	7	5

- d. Briefly explain 4 factors in disease causation (2Mks)
- e. Why John Snow's investigation of cholera is considered a model for epidemiologic field investigations? (1Mk)
- f. After receiving a call from two university students, health department investigators learn that many more students are sick with vomiting and diarrhea.
 - a. Work through this case study and help health department investigators find the answers to these questions and more (4Mks)

Question 5

- a. Differentiate the concept of the population as used in demography and in epidemiology **(2Mks)**
- b. The epidemiologic triad of disease causation refers to **(1Mk)**
- c. Discuss any four types of causal relations? **(2Mks)**
- d. Briefly discuss the epidemiologic evolution, mention the contribution of each key figures **(2Mks)**

- e. Discuss the primary purposes of descriptive and analytic epidemiologic studies **(3Mks)**

- f. Describe the role of primary evaluation in public health practice **(2Mks)**

- g. How might epidemiology help to establish programs based on the established priorities **(3Mks)**

Questions 6

- a. Briefly discuss two reasons why a case-control study is (or is not) well suited to examine risk factors for brain cancer. **(3Mks)**
- b. The authors state that their cases come from a defined population. List **four** features of the population or the study design that support this statement or helped the authors to achieve it? **(2Mks)**

- c. Investigators examine data from police records to identify crash factors associated with a driver fatality vs. a driver non-fatality. The crash factors they consider are driver blood alcohol level, driver age and driver use of the seat belt. Which study design was this?: **(1Mk)**

- d. Several previous studies of exposure to breastmilk and risk of breast cancer in adulthood reported little association in crude analyses (unadjusted). The absence of an

association could have resulted from a failure to adjust for age. Explains why failure to adjust for age could have obscured an underlying true association (2Mks)

- e. Table below shows a case-control study in which the association was examined between smoking and risk of Parkinson's disease. Calculate the appropriate Odds ratio (2Mks)

	Controls	Cases
Smokers	55	30
Non smokers	45	70

- f. Briefly discuss the differences between a cohort and a case-control study in terms of disease-exposure (2Mks)
- g. What does it mean when an epidemiologist says there is "interdependence" between factors? (1Mks)
- h. What does the word spectrum of a disease mean? (1Mks)