



UNIVERSITY OF SWAZILAND
Faculty of Health Sciences
Department of Environmental Health Science

BSc. ENVIRONMENTAL HEALTH
MAIN EXAMINATION PAPER 2017

TITLE OF PAPER : FUNDAMENTALS OF EPIDEMIOLOGY
COURSE CODE : EHS207
DURATION : 2 HOURS
MARKS : 100

INSTRUCTIONS :

- : READ THE QUESTIONS & INSTRUCTIONS CAREFULLY
- : ANSWER FOUR QUESTIONS
- : **QUESTION ONE IS COMPULSORY THEN CHOOSE ANY THREE QUESTIONS**
- : EACH QUESTION **CARRIES 25** MARKS
- : INDICATE YOUR PROGRAM IN THE ANSWER SHEET
- : WRITE NEATLY & CLEARLY
- : NO PAPER SHOULD BE BROUGHT INTO THE EXAMINATION ROOM.
- : BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.

QUESTION 1

The 21st century epidemiology has been embedded on a number of landmarks that took place long time ago. It is believed that epidemiology emerged in the 460 BC during the Hippocrates days and flourished as a discipline in the 1940s.

- a) Discuss in depth the following 4 historic landmarks of epidemiology:
- i. Hippocrates (460 BC) [5]
 - ii. John Snow and cholera [5]
 - iii. Ignaz Philipp Semmelweis and childbed fever [5]
 - iv. Edward Jenner and smallpox [5]
- b) Explain the significance of epidemiology in public health. [5]

[25 MARKS]

QUESTION 2

In studying the occurrence of diseases, the following terms are very important: endemic, epidemic and pandemic.

- a) Define the three terms mentioned above stating how they are related to one another. [9]
- b) There are different types of outbreak, one of them being single exposure, common vehicle outbreak.
- i. Discuss the characteristic of this type of outbreak [6]
 - ii. Discuss the two factors which determine an outbreak (susceptibility and immunity) and explain the concept of herd immunity detailing on the conditions necessary for herd immunity. [10]

[25 MARKS]

QUESTION 3

In country C, it has been noted that depression is the leading cause of outpatient hospital visits of late. This has prompted a group of researchers to study the factors predisposing one

to depression. Records from the outpatient department (OPD) at the national hospital of country C were used to derive the study population. An inclusion criterion to the study was patients who have visited the hospital more than three times in the past 12 months. A total of 1 360 patients were identified. Patients were interviewed on history of depression in the past 12 months. Out of these patients, 939 reported to have had depression related conditions. However, epidemiologists have challenged this study stating that this study is biased and very erroneous.

- a) Discuss 5 possible sources of bias in this study? [10]
- b) The subjects were stratified by socio economic status (SES) whereby they were categorised into 2 categories; high and low SES. Out of the 1360, 972 were classified as low SES and of these 632 reported to have been depressed in the past 12 months.
- i) Represent the information above in a 2x2 contingency table. [4]
- ii) What type of study is this study? Explain your answer. [2]
- iii) Is history of depression in past 12 months associated with SES? Show your calculations. [6]
- iv) List three possible confounders in the association above. [3]

[25 MARKS]

QUESTION 4

According to WHO EMRO (2017), in the update on Cholera outbreaks, on the 27th of July 2017, the Ministry of Health in Somalia reported 1068 cholera cases and 3 deaths for week 28 of the outbreak of which 286 cases were from the Middle Shebelle region of the country. It was further reported that from January to July, there were 58 524 cases and 812 deaths in the 15 regions of the country. The total population of the country which stands at 12.3 million is in urgent need of humanitarian assistance while 5.5 million of the people are at risk of contracting water borne diseases. Nonetheless, the week 28 report shows a decline in the number of new cases and case fatality rate of the disease as compared to previous weeks. For instance, during week 24, there were 1979 cases and 13 deaths which was a 19% increase from week 23.

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- a) Is the severity of the disease decreasing? Explain your answer using the appropriate measures of severity. [5]
- b) How many cases and deaths were reported in week 23? [4]
- c) What is the crude fatality rate in the country between January and July? [3]
- d) What is the meaning of risks? [2]
- e) What is the risk of developing cholera in Somalia? [3]
- f) The reports are based on surveillance systems in place in the country. What are the possible surveillance sources in this country? [3]
- g) State 5 reasons why surveillance is important in the control of epidemics. [5]

[25 MARKS]

QUESTION 5

Epidemiology has been used as a vital tool in the evaluation of screening programs. This is useful in determining the benefits of early detection of a disease. This though works hand in hand with understating the natural history of a disease.

- a) Using the natural history of a disease, discuss the benefits of early screening detailing the different prevention modes at each stage of the disease process. [10]
- b) Even though early screening is beneficial to human health, there are methodology issues that are associated with evaluation of screening. One of these methodology issues is selection bias, i.e. referral bias or volunteer bias.
- i. Discuss selection bias in relation to evaluation of benefits of disease screening. [5]
- ii. How is selection bias different from over-diagnosis bias? [5]
- c) It is also important to note that the screening test should be reliable too so that the programs can be useful in protecting human health.
- i. What is meant by reliability? [2]
- h) How is reliability related to validity? [3]

[25 MARKS]