UNIVERSITY OF SWAZILAND

FACULTY OF HEALTH SCIENCES

MAIN EXAMINATION PAPER- DECEMBER 2014

TITLE OF PAPER   : FUNDAMENTALS OF EPIDEMIOLOGY

COURSE CODE   : EHM 203

TIME   : 2 HOURS

MARKS   : 100

INSTRUCTIONS   : ANSWER **QUESTION 1** AND ANY FOUR QUESTIONS

: EACH QUESTION IS 20 MARKS

: NO FORM OF PAPER SHOULD BE BROUGHT INTO NOR TAKEN OUT OF THE EXAMINATION ROOM

: BEGIN THE ANSWER TO EACH QUESTION ON A SEPARATE SHEET OF PAPER

: CALCULATORS MAY BE USED BUT THEY MUST BE OF THE SILENT TYPE

: SUBMIT ALL CALCULATIONS/ WORK- OUT DETAILS WITH THE ANSWER SHEET

QUESTION 1

I. In the definition of epidemiology, the terms "distribution" and "determinants" take together refer to:

    A. Frequency, pattern, and causes of health events

    B. Dissemination of information to those who need to know

    C. Knowledge, attitudes, and practices related to health

    D. Public health services and resources

II. Descriptive epidemiologyincludes all EXCEPT:

    A. Who

    B. When

    C. Where

    D. Why

III. The London cholera epidemic of 1848 was traced to the Broad Street pump by whom?

    A. Graunt

    B. Farr

    C. Snow

    D. Doll

IV. The time course of a disease outbreak is usually displayed as a/an:

    A. Secular trend

    B. Seasonal trend

    C. Epidemic curve

    D. Endemic curve

V. The Framingham study, in which a group of residents have been followed since the 1950's to identify occurrence and risk factors for heart disease, is an example of which type of study?

    A. Experimental and observational

    B. Cohort and observational

    C. Case-control

    D. Clinical trial

VI. An epidemic curve which follows the classic log-normal pattern of sharp rise and more gradual decline is most consistent with which manner of spread?

    A. Continuous source

    B. Intermittent source

    C. Point source

    D. Propagated

VII. The primary difference between an experimental and observational study is:

    A. The investigator is "blinded" (prevented from knowing the subjects' true exposure status until the end of the study) in an experimental study but not in an observational study

    B. The investigator controls the subject's exposure in an experimental study but not in an observational study

    C. The investigator controls the subject's outcome in an experimental study but not in an observational study

    D. Experimental studies are conducted with animals; observational studies are conducted with humans

VIII. Number women in the U.S. who died from heart disease in 1991

Number of women in the U.S. who died in 1991

The fraction shown above is a:

    A. Rate

    B. Proportion and ratio

    C. Attack rate

    D. Mortality rate

IX. Number of women in the U.S. who died from heart disease in 1991

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Number of women in the U.S. population, midyear in 1991

The fraction shown above is a:

        A. Death rate

        B. Proportion

        C. Attack rate and ratio

        D. Mortality rate

X. Both point prevalence and period prevalence can be represented by the formula $(x/y)10^n$ for a specified time period. The primary difference between point prevalence and periodprevalence is in:

        A. x

        B. y

        C. 10^n

        D. The time period of reference

[20 marks]

QUESTION 2

a) Define epidemiology [3]

b) State the differences between public health and clinical science in terms of what is studied and the research goal [4]

c) State three properties of laboratory studies & three properties of community studies [6]

d) Give three objectives of epidemiology [3]

e) During 2005, a total of 273 cases of Ebola were reported in country X having a total population of 12 630.

    i) What was the incidence rate of Ebola per 100 000 population in country X during 2005? [2]

ii)   It was reported that during that year, 2005, 65 cases of the disease were male doctors working in the referral hospital. These doctors were between the age group 25-30. In the hospital, the total number of doctors in this age group was 372. What was the age-specific incidence rate of Ebola during 2005 among doctors in the hospital? [2]

[20 marks]

QUESTION 3

a) State and explain 2 modes of prevention used in epidemiology [4]

b) What is the epidemiologic triad of disease? [2]

c) Give an illustration of an epidemiologic triad of a disease of your choice stating the factors affecting each element of the triad [6]

d) What is an epidemic curve? [2]

e) For each of the following outbreak settings, choose the most likely epidemic pattern and explain your choice of answer.

i. Outbreak of salmonellosis traced to turkey cooked and held at an improper temperature and served at a pot-luck supper.   [2]

ii. Outbreak of influenza among nursing home residents, new cases occurring over a 3-week period (Hint: incubation period for influenza is less than 5 days.) [2]

iii. Episodic cases of Legionnaires' disease in hospitalized patients traced to showers and the hospital's water supply.   [2]

[20 marks]

QUESTION 4

The following episode will help you answer the question below:

50 students attend a summer camp in Maguga dam. They arrive at 5pm, went for a tour around the place. At 7pm they had their dinner which was prepared by their matron. The dinner

consisted of spaghetti and meat balls. At 10pm, the matron was woken up by a group of students complaining about a stomach bug and 20% of the students had diarrhoea already which they all reported it started just about 30 minutes back. An ambulance was called which arrived 30 minutes after. By the time it arrived, 15 more students had diarrhoea. The ambulance took all sick students to the hospital. An hour after the ambulance had left, 10 more students were vomiting and having diarrhoea. Just in the early hours of morning, 5 more students were vomiting and having diarrhoea. They were all rushed to the hospital as well. Parents were called to collect their kids as the situation was beyond the matron's ability. In the morning around 8am, parents arrived both for those who were in hospital and the remaining. Later on the same day around 2 pm, the principal got a call from 1 parent stating that her child (who was well in the morning) was now vomiting too.

a) Describe this outbreak using the characteristics of descriptive epidemiology [3]

b) What do you think is the type of outbreak? [1]

c) Draw an epidemic curve to illustrate the choice of your answer in (b) and explain [6]

d) What are the possible explanations for the case reported at 2pm the following day? [4]

e) What was the incubation time for the epidemic and why? [2]

f) What are the characteristics of an outbreak than can be obtained from an epidemic curve? [4]

[20 marks]

QUESTION 5

The following schematic diagram represents a study of 6 people who are at risk for disease Z. each line from A to F represent the monitoring period for the subjects. X represent subjects who acquired the disease during the monitoring period.

Years
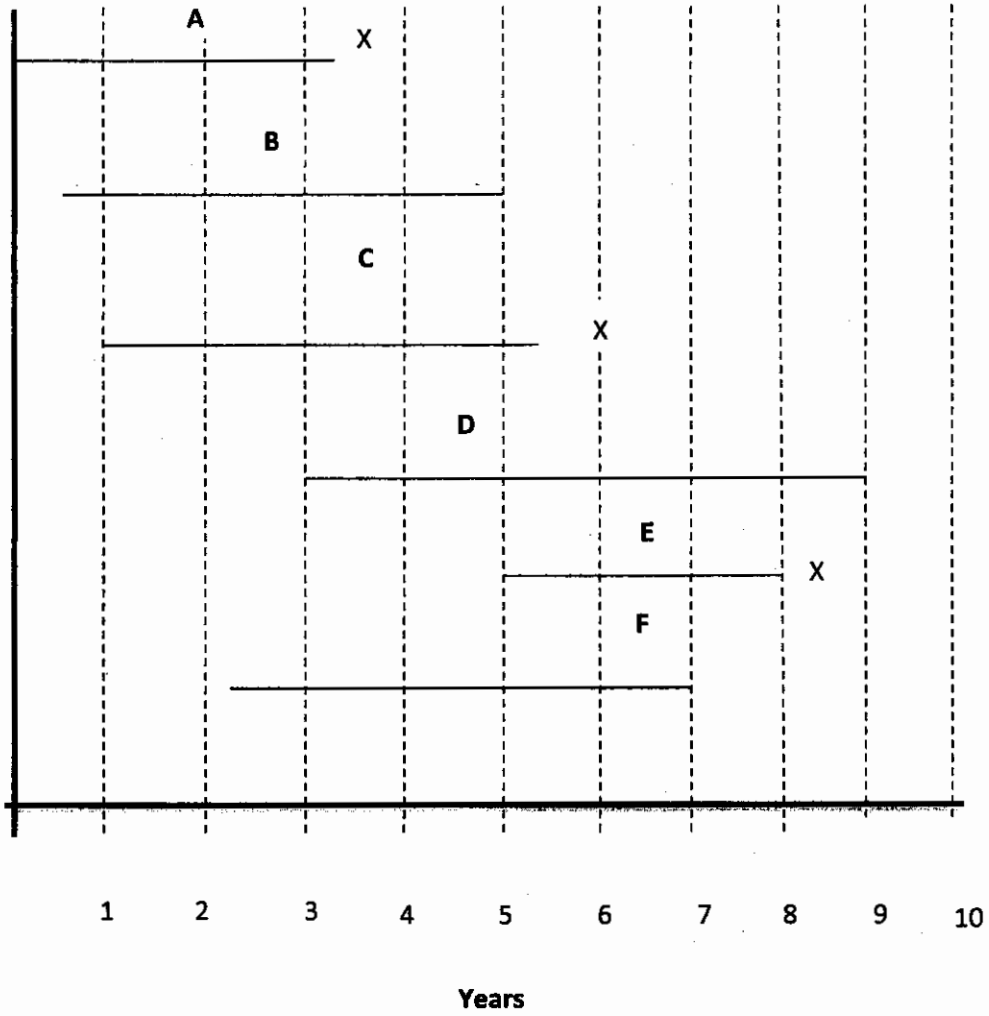
i.   What study design is illustrated in this diagram and give an explanation for your answer? [2]

ii. Give two advantages and two disadvantages of the study design illustrated in the diagram above [4]

iii. What would you say about patient A, B and F? [3]

iv. What is the incidence rate of the disease in the 10 year study period? [2]

v. What would have possible happened to patient D? [3]

vi. What is the total number of person-years contributed by the subjects in the study period? [2]

vii. What is the prevalence rate of the disease in the 10-year, using period person-years? [2]

viii. What is the prevalence rate of the disease on the 5th year? [2]

[20 marks]

QUESTION 6

a) You are employed as an Environmental Health Officer in Lavumisa. During the past few weeks, the Republic of South Africa has issued press statements notifying the public about an outbreak of Cholera in the country (RSA). As the officer in charge in Swaziland, you are expected to implement a control and surveillance plan of the Cholera in your area of jurisdiction.

i. What is the rationale for disease surveillance? [4]

ii. What are the steps you are going to follow in ensuring a viable surveillance and control plan? Explain them in full [10]

iii. Should the disease hit the country, how are you going to verify that it is really an outbreak? [2]

b) Table 1 below shows the number of Polio cases diagnosed by a country between 1990 and 1999. Study the table and answer the questions that follow.

Table 1: Incidence & prevalence of polio

Year	Incidence	Prevalence
1990	24.5	41.8
1991	24.9	41.2
1992	23.8	40.9
1993	24.6	40.1
1994	24.1	38.4
1995	24.7	37.9
1996	24.2	35.3
1997	23.9	33.2
1998	25.1	29.8
1999	24.5	27.2

i.   How would you explain the changes in prevalence of polio in cases between the year 1990 & 1999 as displayed in the table above? [2]

ii. How would you explain the changes incidence of polio in cases between the year 1990 & 1999 as displayed in the table above? [2]

[20 marks]