

UNIVERSITY OF SWAZILAND
FACULTY OF HEALTH SCIENCES
(SECOND SEMESTER)

MAIN EXAMINATION PAPER

MAY, 2014

COURSE CODE : **NUR 521**
COURSE TITLE : **COMMUNITY HEALTH NURSING IV**
(EPIDEMIOLOGY)
TIME ALLOWED : **2 HOURS**
MARKS ALLOCATED : **75**

INSTRUCTIONS:

- 1. THERE ARE TWO SECTIONS IN THIS PAPER.**
- 2. SECTION ONE (1) COMPRISES OF MULTIPLE CHOICE QUESTIONS.**
- 3. SECTION TWO (2) COMPRISES OF CALCULATION AND SHORT ESSAY QUESTIONS.**
- 4. ANSWER ALL QUESTIONS.**

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SECTION A: MULTIPLE CHOICE

For the following multiple choice questions, write one most appropriate answer. Write the question number and the letter representing the answer. E.g.: 3. D. Each correct response carries one (1) mark.

1. When deciding whether or not there is an epidemic, the population not assumed to be at risk, is usually the population of the.....
 - A. area from which the cases are reported.
 - B. age, gender, and place specific group at highest risk.
 - C. geographical area peripheral where the cases were reported.
 - D. None of the above. (1)

2. Some of the risk factors for heart disease are smoking, hypertension, obesity, diabetes mellitus, high cholesterol, inactivity, stress, and type A personality. Are these risk factors:
 - A. Necessary cause?
 - B. Sufficient causes?
 - C. Component causes?
 - D. Neither necessary nor sufficient causes? (1)

3. A survey was conducted among UNISWA staff members during 2009-2013. The results from the survey are shown below:

Table 1. Distribution of hypertension among UNISWA staff members according to age

Age group	Persons with hypertension (%)
18-29	4
30-39	10
40-49	22
50-59	43
60-69	54
70 and older	64

The researcher stated that findings from Table 1 suggested an age-related increase in the risk of hypertension among UNISWA staff members. You conclude that researcher's interpretation is:

- A. Incorrect because incidence rates do not describe risk
- B. Incorrect because it was not based on rates
- C. Is correct
- D. Incorrect because prevalence is used (1)

4. Fluoridation of water would be an example of

- A. Primordial prevention strategy
- B. Primary prevention strategy
- C. A secondary prevention strategy
- D. Tertiary prevention strategy (1)

5. You are employed by the Emergency Preparedness Response (EPR) in the Telenursing centre and you observe that at some point during the month of June a number of individuals from health facilities in Mbabane report common colds. Which of the following measures of morbidity would be most appropriate in answering this question?

- A. Incidence density
- B. Point prevalence
- C. Period prevalence
- D. Cumulative incidence (1)

Refer to the following hypothetical scenario for question 6-7. The population of Mbabane was 183 000 in March, 2013. The number of tuberculosis (TB) diagnosed between January 1 and June 30, 2013 was 26. The number of active TB cases according to the city register on June, 30 2013 was 264.

6. The incidence rate of active TB cases in the city of Mbabane for the 6-month period was:
- A. 7 per 100 000 population
 - B. 14 per 100 000 population
 - C. 26 per 100 000 population
 - D. 28 per 100 000 population
- (1)
7. The prevalence of active TB as of June 30, 2013 was:
- A. 130 per 100 000 population
 - B. 144 per 100 000 population
 - C. 264 per 100 000 population
 - D. 14 0er 100 000 population
- (1)
8. The phrase “population at highest risk of infection is often used to describe groups of people who have:
- A. A low level of resistance, whether it results from existing disease, a naturally or artificially depressed immune response system, or some other cause
 - B. Never had the disease
 - C. Particular behaviour patterns
 - D. Greatest susceptibility and greater likelihood of contact with the source of infection.

(1)

9. According to the attack rate table below, the most reasonable hypothesis as to the vehicle of infection would name which of the following foods as being responsible?

Food items	Attack rates/100	
	Exposed persons	Unexposed persons
Cheese cake	89%	92%
Apple crumble	88%	21%
Waffle	53%	59%
Fruit salad	76%	68%

- A. Cheese cake
- B. Apple crumble
- C. Waffle
- D. Fruit salad (1)

10. Which of the following statements best fits the definition of epidemiology?

- A. The science dealing with aetiology, distribution and treatment of communicable and non-communicable diseases in a population
- B. The study of the distribution and determinants of disease in human populations
- C. The study of the measure to prevent or control epidemics
- D. The science that deals with the physiology and psychological effects ascribed to disease/condition in a population (1)

11. Which is the most common way that Emergency Preparedness and Response (EPR) uncover outbreaks?

- A. Performing descriptive analysis of surveillance data each week
- B. Receiving call from health care providers
- C. Reviewing all case reports each week to detect common features
- D. Performing time series analysis to detect deviations from expected values based on the previous few weeks and comparable periods (1)

12. A screening test is used in the same way in two similar populations, but the proportion of false positive results among those who test positive in population A is lower than that among those who test positive in population B. What is the likely explanation for this finding?
- A. The prevalence of disease is higher in population A
 - B. The specificity of the test is lower in population A
 - C. The specificity of the test is higher in population A
 - D. The prevalence of disease is lower in population A
- (1)
13. Which of the following DOES NOT increase susceptibility to infection?
- A. Malnutrition
 - B. Pre-existing ill-health
 - C. Artificially depressed immunologic response mechanism
 - D. Immunization
- (1)
14. Which of the following is a good index of the severity of a short-term, acute disease?
- A. Cause-specific death rate
 - B. 5-year survival
 - C. Case-fatality rate
 - D. Standardized mortality ratio
- (1)
15. The following are steps of an outbreak investigation:
1. Analyse data by time, place and person
 2. Conduct a case control study
 3. Generate hypotheses
 4. Conduct active surveillance for additional cases
 5. Verify diagnosis
 6. Confirm that the number of cases exceed the expected number
 7. Talk with laboratory experts about specimen collection

What is the logical conceptual order of the steps listed above?

- A. 1-2-3-4-5-6-7
- B. 5-6-4-1-2-3-7
- C. 6-5-3-1-2-7-4
- D. 6-5-7-4-1-3-2

(1)

16. A randomized trial comparing the efficacy of two drugs showed a difference between the two (with p-value <0.05). Assume that in reality; however, the two drugs do not differ.

This is therefore an example of:

- A. Type I error (α error)
- B. Type II error (β error)
- C. $1-\alpha$
- D. $1-\beta$

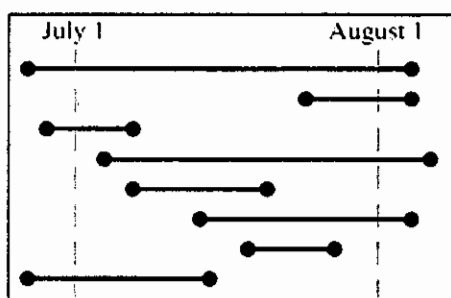
(1)

17. Given that you are investigating an outbreak, you have to compare numbers and rates of illnesses in a community. Often times, you may prefer to use rates instead of numbers because.....

- A. Conducting surveillance for communicable diseases
- B. Deciding how many doses of immune globulin are needed
- C. Estimating subgroups at highest risk
- D. Telling physicians which strain of influenza is most prevalent

(1)

Use the following diagram for Questions 18 and 19. Assume that the horizontal lines in the diagram represent duration of illness in 8 different people, out of a community of 700.



18. What is the prevalence of disease during July?

- A. 3/700
- B. 4/700
- C. 5/700
- D. 8/700

(1)

19. What is the incidence of disease during July?

- A. 3/700
- B. 4/700
- C. 5/700
- D. 8/700

(1)

20. To study the causes of an outbreak of aflatoxin poisoning in Africa, investigators conducted a case-control study with 40 case-patients and 80 controls. Among the 40 poisoning victims, 32 reported storing their maize inside rather than outside. Among the 80 controls, 20 stored their maize inside. The resulting odds ratio for the association between inside storage of maize and illness is:

- A. 3.2
- B. 5.2
- C. 12.0
- D. 33.3

(1)

Use the following choices for questions 21, 22 and 23:

- A. Cluster
- B. Epidemic
- C. Outbreak

21. 200 cases of HINI infection in several constituencies of the Hhohho region over several months.

(1)

22. 40 cases of Salmonella enteritis in a week traced after a single meal served at the Faculty of Health Sciences cafeteria. (1)

23. 10 cases of cancer diagnosed over two years among residents of a single neighborhood (previous data is not available). (1)

Use the information in the following paragraph and data in the table below to answer questions 24 and 25. An outbreak of gastrointestinal disease occurred 24-36 hours after people had attended a wedding. Out of the 203 attendees (including the bride and the groom), 200 completed questionnaires and 50 reported illnesses compatible with the case definition. Tabulated food consumption histories are presented in the table below:

Food item	Ate specified food			Did not eat specified food		
	Ill	Well	Total	Ill	Well	Total
Punch	46 (25%)	138	184	4 (25%)	12	16
Wedding cake	45 (45%)	55	100	5 (5%)	95	100
Sushi	10 (91%)	1	11	40 (21%)	149	189

24. This study is an example of
A. Prospective cohort study
B. Cross-sectional study
C. Cases and control
D. Retrospective cohort study (1)

25. The most appropriate measure of association for these data is the.....
A. Attributable risk percent
B. Chi-square
C. Odds ratio
D. Risk ratio (1)

SECTION B: STRUCTURED QUESTIONS

QUESTION 1

A. You have been employed on foreign mission to the Republic of The Gambia by the World Health Organization (WHO) as an Epidemiology consultant. In 2012, a total of 1 176 453 deaths were reported and the mid-year population in 2012 was estimated to be 198 812 000. HIV-related deaths and mid-year population by age group are given in the table below:

HIV-related deaths and estimated population by age groups in the Republic of The Gambia

Age group (years)	HIV-related deaths	Mid-year population	Age-specific HIV related death rate per 100 000 population
0-4	110	11 217 000	1)
5-14	30	28 146 000	2)
15-24	423	31 698 000	3)
25-34	4 238	37 315 000	4)
35-44	4 096	29 305 000	5)
45-54	1 522	19 276 000	6)
55 ⁺	897	41 855 000	7)
Total	11 406	1982 000	

- i) Explain why the population of the Republic of The Gambia is given as a mid-year population (2)
- ii) Calculate the crude death rate in The Gambia in 2012 (2)

- iii) Calculate the crude HIV-related death rate in The Gambia in 2012 (3)
- iv) Calculate the age-specific HIV related death rate by writing your answers against the numbers 1-7 shown in the last column of the table: (7)

B. In an outbreak of flu in Mbabane 2011, *H. influenza* was diagnosed in 18 of 152 vaccinated children compared with 3 of 7 unvaccinated children. Tabulate this information on a 2 by 2 table and calculate the risk ratio. Interpret your answer.

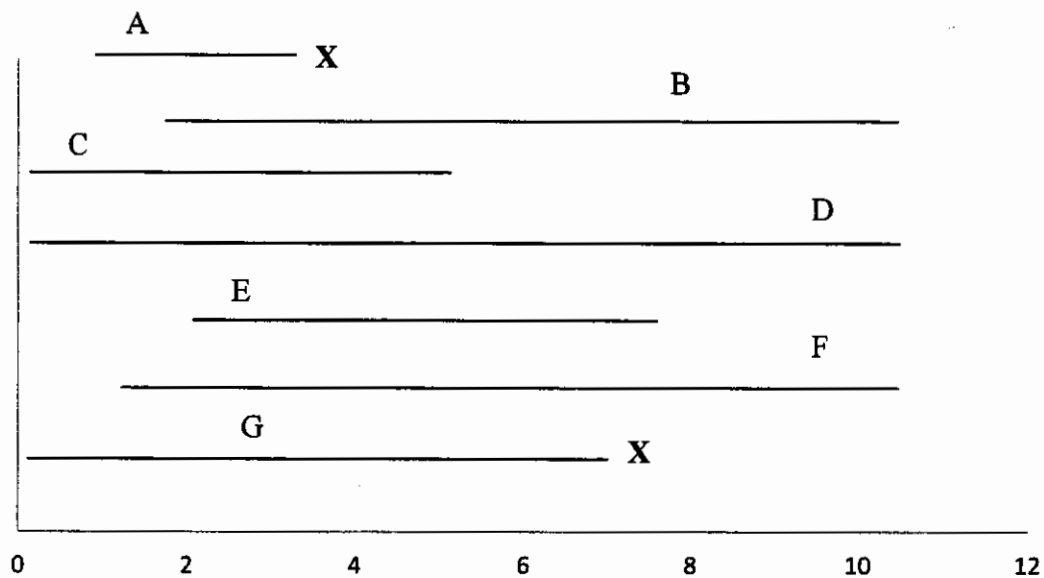
(11)

[Total marks = 25]

QUESTION 2

- A. Given that in a population of 1 000 people, 100 have a certain disease and 900 do not have the disease. Draw a 2 by 2 table and calculate the following: (5)
- i. Sensitivity of the screening test (2)
 - ii. Specificity of the screening test (2)
 - iii. Positive predictive value (2)
 - iv. Negative predictive value (2)

- B. Study the figure below showing 7 participants and answer the questions that follow. Note that X is the point of diagnosis.



- i. Describe the subjects A, C, and F (3)
- ii. Calculate the person-years contributed by the participants in this study (2)
- iii. Discuss how potential biases in the study design shown in the figure above can be addressed (7)

[Total marks = 25]