

**UNIVERSITY OF SWAZILAND**  
**FACULTY OF HEALTH SCIENCES**  
**DEPARTMENT OF COMMUNITY HEALTH NURSING SCIENCE**

**FINAL EXAMINATION: MAY 2017**

**COURSE TITLE: COMMUNITY HEALTH NURSING IV (EPIDEMIOLOGY)**

**COURSE CODE: NUR 521**

**TIME ALLOCATED: 2 HOURS**

**MARKS ALLOCATED: 75**

**INSTRUCTIONS:**

- 1. PLEASE ANSWER ALL QUESTIONS**
- 2. USE THE PROVIDED ANSWER BOOKLET FOR ALL YOUR ANSWERS**
- 3. START ALL QUESTIONS IN A NEW PAGE**
- 4. USE BULLETS TO EXPRESS EACH POINT IN YOUR ANSWERS (DO NOT INVENT YOUR OWN NUMBERING)**
- 5. CHECK THAT YOUR QUESTION PAPER HAS 8 PRINTED PAGES**
- 6. DO NOT OPEN THE QUESTION PAPER UNTIL PERMISSION HAS BEEN GRANTED**

**QUESTION 1: Multiple Choice Questions**

**For each of the following questions, write clearly the letter that corresponds with the most appropriate answer e.g. 1.11 D. There is only one correct answer for every question.**

- 1.1 A randomized controlled trial comparing the efficacy of two psychiatric drugs showed no difference between the two ( $p = 0.10$ ). Assume that in reality, the two drugs differ. This is an example of:
- A. Systematic error on the part of the researchers
  - B. Type I error
  - C. Correct decision
  - D. Type II error
- 1.2 In epidemiology, the main purpose of assessing the validity and reliability of screening and diagnostic tests is:
- A. To distinguish between people in the population who have the disease and those who do not have disease
  - B. To discard those tests that yield invalid and unreliable results
  - C. To determine how good the test is in separating populations with and without the disease being investigated
  - D. Both A and C
- 1.3 A statement from an article published in the *Swaziland Journal of Community Health Nursing* stated that “2,000 subjects with bipolar disorder were treated with our new medicine. Within 4 days, 94% were asymptomatic.” The statements claimed that the medicine was effective. Based on the evidence given above, the claim:
- A. is correct
  - B. May be incorrect because the conclusion is not based on a rate
  - C. May be incorrect because no control or comparison group was involved
  - D. May be incorrect because no test of statistical significance was used

- 1.4 The purpose of a double blind or double masked study is to:
- A. Achieve comparability of treated and untreated subjects
  - B. Avoid observer and subject bias
  - C. Avoid observer bias and sampling variation
  - D. Avoid subject bias and sampling variation
- 1.5 When calculating the percent agreement between two observers in a screening program for epileptic seizures among a group of mental health patients, a psychologist reported that the level of agreement was 0.73. This kappa statistic represents what level of agreement?
- A. Excellent
  - B. Intermediate to good
  - C. Poor
  - D. None of the above

**For Questions 1.6 and 1.7 use the information below:**

Population of Manzini on March 30, 2009 = 183 000

No. of new TB cases occurring between January 1 and June 30, 2009 = 26

No. of TB cases according to the town register on June 30, 2009 = 264

- 1.6 The incidence rate of active cases of TB for the 6-month period was:
- A. 7 per 100 000 population
  - B. 26 per 100 000 population
  - C. 14 per 100 000 population
  - D. 28 per 100 000 population
- 1.7 The prevalence rate of active TB as of June 30, 2009, was:
- A. 144 per 100 000 population
  - B. 14 per 100 000 population
  - C. 130 per 100 000 population
  - D. 264 per 100 000 population

- 1.8 At an initial examination among a population, bipolar disorders were found in 5 of 1 000 men aged 30 to 35 years and in 10 of 1 000 women aged 30 to 35 years. The conclusion that women have a two times greater risk of developing bipolar disorders than do men in this age group is:
- A. correct
  - B. incorrect, because a ratio has been used to compare male and female rates
  - C. incorrect, because no data for a comparison or control group are given
  - D. incorrect, because of failure to distinguish between incidence and prevalence

**Question 1.9 is based on the information in the table below:**

A survey was conducted among the non-hospitalized adult population of the United States during 1988 through 1991. The results from this survey are shown below.

Age Group	Persons with Schizophrenia (%)
18–29 years	4
30–39 years	10
40–49 years	22
50–59 years	43
60–69 years	54
70 and older	64

- 1.9 The researchers stated that there was an age-related increase in the burden of schizophrenia in this population. You conclude that the researchers' interpretation:
- A. is correct
  - B. is incorrect because it was not based on rates
  - C. is incorrect because incidence rates do not describe risk
  - D. is incorrect because prevalence is used

Question 1.10 is based on the information given in the table below:

Age	COMMUNITY X		COMMUNITY Y	
	No. of People	No. of Deaths from suicides	No. of People	No. of Deaths from suicides
Young	8,000	69	5,000	48
Old	11,000	115	3,000	60

1.10 What is the proportionate mortality from suicides for community Y?

- A. 9.6 per 1,000
- B. 13.5 per 1,000
- C. 20.0 per 1,000
- D. None of the above

[Total: 10 marks]

## QUESTION 2

2.1 Explain the main difference between mortality rate and case fatality? [2]

2.2 Explain three (3) limitations of using data from death certificates when conducting epidemiological research? [3]

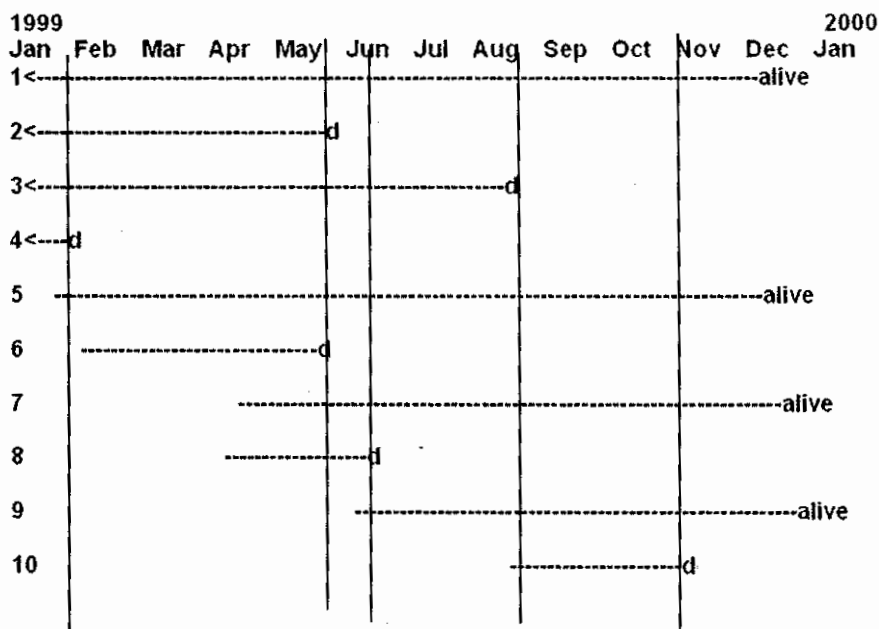
2.3 Is there any difference between random sampling and randomization? Justify [3]

2.4 Explain how you would prevent unplanned cross-over in a randomized controlled trial? [2]

[Total: 10 marks]

**QUESTION 3**

In a population of 1 000 individuals with a life expectancy of 57 years, an epidemiologic investigation begun on January 1, 1999 found 4 cases of Rubella on this date. During the year of the study, 6 new cases were found. In the same year, of all the cases of Rubella present, 4 died at age 33 years due to Rubella, while 2 died at age 25 years due to other causes. The diagram below illustrates the time of case recognition, periods of observation during the study, and vital status at the time of the termination of observation. An arrow at the start of the diagram indicates that the start of disease had occurred before the study began. For those that died during the study, “d” is written at the end of the month of death, while for those who survived, ‘alive’ is written to mean they were alive by 31 December 1999.



Assume that the 990 remaining individuals in the study did not become ill or die during the year of observation.

From the information and diagram given on the previous page, calculate the following:

- 3.1 Prevalence of Rubella on December 31, 1999 [3]
- 3.2 Cumulative incidence of Rubella during 1999 [4]
- 3.3 Proportionate mortality from Rubella during 1999 [3]
- 3.4 The total months of follow-up during the study period [3]
- 3.5 The incidence density of Rubella during the study period [3]
- 3.6 The years of potential life lost due to Rubella and other causes in this population [3]
- 3.7 Case-fatality from Rubella during 1999 [3]
  
- 3.8 Which of the measures you calculated above would be the best indicator for each of the following purposes:
  - 3.8.1 Determining the effectiveness of a new treatment [1]
  - 3.8.2 Evaluating the effectiveness of a program that tries to prevent the disease [1]
  - 3.8.3 Estimating the needs for medical facilities in treating the disease [1]
  
- 3.9 Explain how the answer in 3.5 differs from the one in 3.2 above [2]
  
- 3.10 Explain what happens to the prevalence of a disease in each of the following situations:
  - 3.10.1 When the number of deaths from the disease equals the number of new cases from that disease [1]
  - 3.10.2 When the incidence of the disease increases [1]
  - 3.10.3 When the number of deaths from the disease exceeds the number of new cases from that disease [1]

**[Total: 30 marks]**

#### QUESTION 4

To evaluate the performance of a new diagnostic test for depression, Psychologists checked it out on 100 known cases of the disease for which the test was designed, and on 200 controls known to be free of the disease. Ninety of the cases yielded positive results, as did 30 of the controls. Based on these data:

- 4.1 Express the data described in the paragraph above in a 2x2 table [4]
- 4.2 What is the sensitivity of the new diagnostic test? [3]
- 4.3 What is the specificity of the new diagnostic test? [3]
- 4.4 What is the positive predictive value of the diagnostic test? [3]
- 4.5 What is the negative predictive value of the diagnostic test? [3]
- 4.6 Based on your answers for 4.2 and 4.3 above, is this test more likely to correctly classify those with disease or those without disease? Justify your answer [3]
- 4.7 When doing disease screening, would you rather have a screening test that is higher in sensitivity than specificity or a test that is higher in specificity than sensitivity? Justify your answer [3]
- 4.8 Explain the impact of having a high number of false positives in a population [3]

**[Total: 25 marks]**