



**THE UNIVERSITY OF THE WEST INDIES  
FIVE ISLANDS CAMPUS**

Semester II

**Examinations of April/May 2022**

**Course Code:** NURS1113  
**Course Title:** Epidemiology  
**Date of Assessment:** 29<sup>th</sup> April, 2022  
**Time:** 1PM  
**Duration:** 2 hours

---

**INSTRUCTIONS TO CANDIDATES:**

This paper has 5 pages and 5 questions.

**YOU ARE REQUIRED TO ANSWER ALL QUESTIONS.**

**THIS ASSESSMENT IS WORTH 60 % OF YOUR FINAL GRADE.**

**ASSIGNMENT DETAILS FROM INSTRUCTORS:**

**Complete all questions in this paper. Details of all calculations must be shown.**

1. Outline the chain of infection for Tuberculosis by identifying the reservoir(s), portal(s) of exit, mode(s) of transmission, the portal(s) of entry, and factors in host susceptibility. (10 marks)

Reservoirs:

Portals of exit:

Modes of transmission:

Portals of entry:

Factors in host susceptibility:

2. The city of Redonda with a population of 183,000 recorded 26 new active cases of TB occurring between January 1 and June 30, 2021. The total number of active TB cases is 264 according to the city's register. Within this period there were also 43 documented deaths from TB. (10 marks)

**Show all calculations**

- a. Calculate the incidence rate (per 100,000) of active cases of TB for the 6-month period. (3 marks)
- b. Calculate the prevalence rate (per 100,000) of active TB as of June 30, 2012. (3 marks)
- c. Calculate the case fatality rate for the total TB cases in Redonda. (4 marks)
3. A new screening test was introduced to Redonda for the early identification of active TB cases. The following table was constructed to show the number of cases that have been detected by the new test based on the gold standard. (10 marks)

**Gold standard screening test**

		<b>Disease</b>	<b>No disease</b>	<b>Total</b>
<b>New screening test</b>	<b>Positive</b>	325	450	
	<b>Negative</b>	25	4800	
<b>Total</b>				

- a. Complete the table and assess the validity (sensitivity and specificity) of this newly introduced screening test. (8 marks)
- b. Would you recommend this test to the health professionals in Redonda? Give one reason for your answer. (2 marks)

5. Identify the study design used. (10 marks)

a. In a study, a group of people are exposed to an environmental toxin but are not treated. Instead, they are observed over time on a standard set of measures to ascertain the potential effects of the toxin. This type of study design is called \_\_\_\_\_ (2 marks)

b. A new drug with in vitro activity against HIV is tested on a population of patients with Western-blot confirmed HIV infections. Out of the 200 individuals in the patient population, 100 are chosen by lottery to receive the drug. The drug, which is tasteless, is administered in a cup of orange juice; the other patients receive pure orange juice. Neither the nurses, doctors, nor the patients know which patients receive the drug. At the end of the study period, the number of CD4+ T cells is determined for all of the subjects. This is an example of a \_\_\_\_\_ (2 marks)

c. At a specific hospital, patients between the ages of 65 to 85 years old, diagnosed with pancreatic carcinoma are asked about their smoking habits over the course of their lives. At the same hospital, patients without pancreatic carcinoma are matched to the pancreatic carcinoma cases and are also asked about their smoking habits. This type of study design is called a \_\_\_\_\_ (2 marks)

d. Identify the study design below and list 2 characteristics of the identified design. (4 marks)



**END OF QUESTION PAPER**

## Epidemiology Formula Sheet

$$P = \frac{\text{Number of people with the disease or condition at a specified time}}{\text{Number of people in the population at risk at the specified time}} (\times 10^n)$$

$$I = \frac{\text{Number of new events in a specified period}}{\text{Number of persons exposed to risk during this period}} (\times 10^n)$$

$$\text{Crude mortality rate} = \frac{\text{Number of deaths during a specified period}}{\text{Number of persons at risk of dying during the same period}} (\times 10^n)$$

$$\text{Case fatality (\%)} = \frac{\text{Number of deaths from diagnosed cases in a given period}}{\text{Number of diagnosed cases of the disease in the same period}} \times 100$$

$$\text{Infant mortality rate} = \frac{\text{Number of deaths in a year of children less than 1 year of age}}{\text{Number of live births in the same year}} \times 1000$$

$$\text{Maternal mortality rate} = \frac{\text{Number of maternal deaths from puerperal causes in a given geographic area in a given year}}{\text{Number of live births that occurred}} (\times 10^n)$$

Sensitivity =  $TP / (TP + FN)$  and Specificity =  $TN / (TN + FP)$ .

Abbreviations:

TP, true positive

TN, true negative

FP, false positive

FN, false negative.

$$\text{Positive predictive value, } PPV = \frac{\text{True Positives}}{\text{True Positives} + \text{False Positives}}$$

$$\text{Negative predictive value, } NPV = \frac{\text{True Negatives}}{\text{True Negatives} + \text{False Negatives}}$$