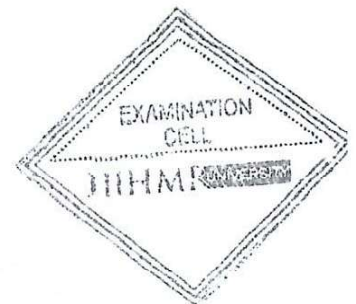


Master of Public Health (Implementation Science)
Cohort 1 (2022-24)

Principles of Epidemiology

FINAL EXAMINATION
TUESDAY, DECEMBER 20, 2022



All questions are compulsory

Time: 2:00 Hours

Max. Marks: 70

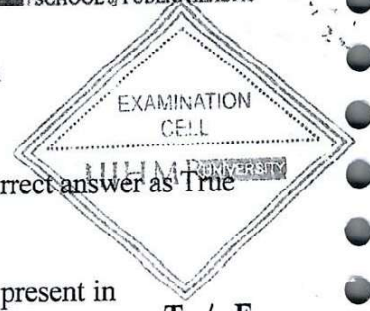
Student's Name: _____

Student ID: _____

Principles of Epidemiology - Final Examination

Section A

The questions below have only one of the two responses – **True** or **False**. Circle correct answer as **True (T)** or **False (F)**. Each question carries 1 mark.



- 1 Period Prevalence is a measure of frequency of new and old cases of a disease present in the community in period of time. T / F
- 2 In a Ratio, the Numerator is part of Denominator. T / F
- 3 In age specific rates, the denominator should be the population in that age specific group. T / F
- 4 The proportional mortality rate is percent deaths caused by a disease out of total deaths due to all causes T / F
- 5 Incidence Rate is occurrence of new cases in a given population in a defined period of time. T / F
- 6 When we use Person years of exposure as denominator to measure outcomes in Cohort Studies, the main assumption is that One year is equal to One person. T / F
- 7 A screening test should be both reliable and valid. T / F
- 8 The sensitivity of screening test is the proportion of people who have the disease classified correctly as not having the disease by the screening test. T / F
- 9 Positive Predictive Value of a Screening Test is the proportion of test positive cases out of total True positives cases. T / F
- 10 I hypothesis testing, Type II error occurs when groups are not different in reality, but the test result shows they are different. T / F
- 11 It is important to test for statistical significance for establishing causal association between risk factor and the disease T / F
- 12 Descriptive studies help us in testing the hypothesis of cause and effect relationship. T / F
- 13 Causality cannot be determined by cross-sectional studies because temporal relationship cannot be demonstrated. T / F
- 14 In a Randomized Clinical Trial, the study is composed of study subjects randomly assigned to treatment or placebo group. T / F
- 15 A Confounding factor may affect the estimates of risk. T / F
- 16 In Randomized Control Trials, comparability of the characteristics of the study and the placebo group is essential to control selection bias. T / F
- 17 In the cohort study design, the subjects are free from the disease under study at the start of the study. T / F
- 18 A relative risk equal to 1 signifies that there is no association between the risk factor and the disease. T / F
- 19 In a Cohort Study, association between cause and effect is measured by Relative Risk. T / F
- 20 Odds Ratio in case control study is equivalent of relative risk as measured in cohort studies. T / F

SECTION B

All Questions are compulsory. Each question has multiple choices listed below it. There is only one correct answer. Encircle the correct answer. You can use these sheets for rough calculations and cross them at the end of examination. Each question carries 2 mark each.

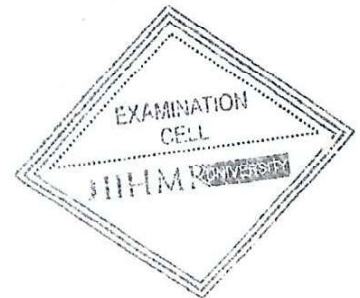
1. Incidence Rate measures:
 - a) Frequency occurrence of new cases
 - b) Magnitude of old cases
 - c) Magnitude of old and new cases
 - d) Number of cases attributed to a cause

2. As a manager, which of the following health statistics would you use to select a risk factor to target for intervention in order to have the greatest health impact in the limited resource settings?
 - (a) Incidence Rate.
 - (b) Attributable Risk
 - (c) Prevalence Rate.
 - (d) Relative risk of the disease

3. In order to assess how strongly related an exposure is to a disease, which would be the best health statistic?
 - a) Incidence of the disease
 - b) Attributable risk
 - c) Prevalence of the exposure
 - d) Relative risk

4. In a hospital, 5000 patients with various diseases were admitted in a year. During the year 1000 patients died from various causes during the year. Out of these deaths, 30 patients died of Gall bladder cancer. The proportional mortality rate for Gall bladder cancers in the hospital is:
 - a) 0.3 %
 - b) 30.0%
 - c) 40.0%
 - d) 3.0%

5. All are INCORRECT about Cross-sectional studies EXCEPT
 - a) Both exposure and disease can be measured
 - b) Temporal Association can be determined
 - c) Incidence can be measured
 - d) It is not possible to estimate prevalence



Questions 6 and 7

An outbreak of gastritis occurred on a cruise ship. The data in table below were obtained shortly after the outbreak using a questionnaire completed by everyone on board the ship.

	People who Ate Food		People who did not eat	
	Sick	Well	Sick	Well
Cheese	200	800	100	900
Chicken	650	350	100	900
Spinach	200	800	500	500
Bread	300	700	400	600
Chocolate	600	400	450	550

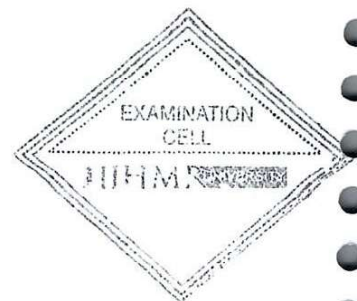
Use the above data for the following questions.

6. What is the most likely infective food on the cruise ship?
 - a) Cheese
 - b) Chicken
 - c) Spinach
 - d) Chocolate
7. What is the relative risk of developing gastritis for Cheese consumption?
 - a) 0.5
 - b) 2.0
 - c) 2.3

Questions 8, 9, and 10

A screening test for breast cancer was administered to 1000 women with biopsy-proven cervical cancer and to 1000 women without cervical cancer. The test results were positive for 900 of the proven cases and 100 of the normal women (Without cervical cancer). Use these data for the question 13, 14& 15:

8. The sensitivity of the test is:
 - a) 40%
 - b) 90%
 - c) 80%
 - d) 10%
9. The specificity of the test is:
 - a) 90%
 - b) 10%
 - c) 80%
 - d) 25%
10. The Predictive Value for positive test
 - a) 94.9%
 - b) 70%
 - c) 90%
 - d) 99%



11. Five years after the introduction of a vigorous screening program, the prevalence of diabetes mellitus was found to be greater than in the year prior to the introduction of the program. Which of the following are possible reasons?

- a) An increase in previously undetected cases
- b) A reduction in the risk factors predisposing to diabetes
- c) A decrease in case fatality rate of diabetes
- d) An increase in the proportionate mortality of diabetes
- e) None of the above

12. A cohort study of women aged 20 to 25 years in India found that the Incidence rate of cervical cancer in women who used oral contraceptives was 5/100,000 and that it was 2/100,000 in those who did not use oral contraceptives. Based on these data, the inference that taking oral contraceptives causes cervical cancer is

- a) Correct
- b) Incorrect due to failure to distinguish between incidence and prevalence
- c) Incorrect due to failure to adjust for confounding factor (age) for possible difference in age distribution of users and nonusers
- d) Incorrect because there was a selection bias

Questions 13, 14, 15 and 16 are based on the data available from as cohort study.

A cohort study, with 3000 smokers and 5000 non-smokers was conducted to assess the risk of CHD. The data is given in the following table:

	Develop CHD	Did not develop CHD	Total
Smokers	90	2910	3000
Non-Smokers	45	4955	5000

13. Incidence rate of CHD among Smokers is

- a) 30 per 1000
- b) 10 per 1000
- c) 28 per 1000
- d) 18 per 1000

14. The Relative Risk is:

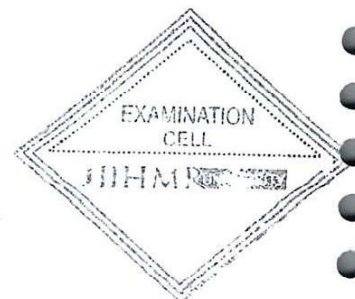
- a) 1.6
- b) 1.2
- c) 3.3
- d) 1.0

15. Odds Ratio is

- a) 1.6
- b) 2.0
- c) 3.4
- d) 1.0



16. Attributable Risk is
- 37.9
 - 17.4
 - 23.0
 - 42.9
17. Which of the following statements describes the major advantage of a randomized clinical trial?
- It avoids observer bias.
 - It lends itself to ethical justification.
 - It yields results replicable in other patients.
 - Selection bias is reduced or eliminated
 - It enrolls representative patients required to support the inference
18. A "double blind" randomized study of a vaccine is one in which:
- The study group receives the vaccine and the control group receives a placebo.
 - Neither observer nor subjects know the nature of the placebo
 - Neither observer nor subjects know which subject receives the vaccine and which receives a placebo.
 - Neither the study group nor the control group knows the identity of the observers.
19. In vaccine trial 2,000 randomly selected children two years of age were given polio vaccine against a poliomyelitis. The vaccinated children were followed for 10 years for occurrence of the poliomyelitis. Of these, 80% were never afflicted with the disease. Which is the MOST CORRECT conclusion regarding the efficacy of the vaccine?
- The vaccine is an excellent one because of the high rate of immunization.
 - No conclusion is possible since there was no comparison group of non-vaccinated children.
 - The vaccine is not very effective because it should have produced a higher immunization rate.
 - No conclusion is possible since no test of statistical significance was performed.
20. A Randomized double-blind placebo-controlled field trial was conducted to test the vaccine efficacy of new HiB vaccine (Influenza Vaccine) among children up to five years of age. 1000 children each were randomly allocated to Vaccine Group and Placebo group. At the end of one year of follow up, the incidence of Influenza was 10 per 1000 in the vaccine group, and 60 per 1000 in the placebo group. The TRUE ESTIMATE of the vaccine efficacy is:
- 80%
 - 65%
 - 40%
 - 90%
21. A Case Control study is characterized by all EXCEPT the following:
- It is relatively inexpensive
 - Relative risk may be estimated from the results.
 - Incidence rates may be computed.
 - One may select controls without the disease



22. Risk of Myocardial Infarction among women who recently used Oral Contraceptives was assessed using a Case Control Study. The data is given in the following table:

Exposure Status	MI Cases	Controls
Used OC	35	129
Did not Use OC	199	1613

Odds Ratio is:

- a) 2.19
b) 36.00
c) 0.59
d) 0.027
23. Crude and age-adjusted mortality rates (per 1000,000 people) from Coronary Heart Disease are shown for India and the United States for 2000 in the following table:

	Crude Rates	Age-Adjusted Rates
India	67.4	58.2
United States	316.3	131.4
Ratio, United States, India	4.7	2.3

Which of the following measures, is preferable for comparing the mortality rate from heart disease in the two countries

- a) Age adjusted rates
b) Crude rates
c) Age specific rates
d) Ratio of crude rates
24. Community A and community B, each have crude mortality rates for coronary heart disease (CHD) of 4 per 1,000. The age-adjusted CHD mortality rate is 5 per 1,000 for community A and 3 per 1,000 for community B. One may conclude that
- a) Community A has a younger population than community B.
b) Community A has an older population than community B.
c) The two communities have identical age distribution.
d) Diagnosis is more accurate in community A than in community B.

25. When a new treatment is developed that presents death but does not produce recovery from a disease, the following will occur:

- (a) Prevalence of the disease will decrease.
(b) Incidence of the disease will increase.
(c) Prevalence of the disease will increase.
(d) Incidence of the disease will decrease.

