



SOLOMON ISLANDS NATIONAL UNIVERSITY
School of Nursing and Allied Health Sciences
Diploma of Public Health (Health Promotion)

HP 681 – BASIC APPLIED EPIDEMIOLOGY

FINAL EXAMINATION

SEMESTER 1, 2017



SOLOMON ISLANDS NATIONAL UNIVERSITY
SCHOOL OF NURSING & ALLIED HEALTH SCIENCES
DIPLOMA OF PUBLIC HEALTH (HEALTH PROMOTION)

HP 681 BASIC APPLIED EPIDEMIOLOGY
Final Examination, Semester 1 2017

TIME ALLOWED : 3 Hours
DATE : 09th June 2017
STARTING TIME : 09:00am

STUDENT NAME : _____

STUDENT ID : _____

INSTRUCTIONS:

1. All questions are compulsory, and therefore you must attempt to answer them all.
2. For Short & Long Answer Questions, write your answers on the space provided.
3. Make sure to write clearly in pen or biro and not in pencil.
4. Write your full name & student ID in the spaces provided above.
5. This examination paper should contain a total of 15 pages
6. This Examination is worth **40%** of your total assessment.

SECTIONS	MARKS GIVEN
Section A: Multiple Choice Questions	/ 15 Marks
Section C: True or False Questions	/ 15 Marks
Section B: Short /Long Answer Questions	/ 70 Marks
Total Marks	/ 100 Marks

~ Best of luck ~

SECTION A: MULTIPLE CHOICE QUESTIONS**/15 MARKS**

Each question/statement below contains five suggested answers. Circle the single best answer corresponding to each statement. Each question is worth one (1) mark.

- | | |
|--|--|
| <p>1. In a prospective study of a disease, the cohort originally selected consisted of:</p> <ul style="list-style-type: none">a) Persons who are found to have the disease.b) Persons without the disease.c) Persons with the factor under investigation.d) Persons with a family history of the disease.e) Persons without the factor under investigation. <p>2. A retrospective study is characterized by all EXCEPT.</p> <ul style="list-style-type: none">a) Relative risk may be estimated from the resultsb) It is relatively inexpensivec) Incidence rates may be computedd) One selects controls without the diseasee) Assessment of past exposure may be biased. <p>3. To study possible impact of occupational hazards on the health workers, the following epidemiological study design are suitable, EXCEPT:</p> <ul style="list-style-type: none">a) Case-control studyb) Randomized control Trialsc) Prospective cohort studyd) Retrospective cohort studye) Ecological study <p>4. In a study of 150 cases of a disease and 150 controls, it is determined that the difference found with respect to a possible etiologic factor is not statistically significant. One may conclude from this finding that:</p> <ul style="list-style-type: none">a) There is no association of the factor with the diseaseb) The difference may be clinically significantc) The comparability of cases and controls has been confirmed.d) Observer or interviewer bias has been eliminated.e) The difference may be the result of sampling variation | <p>5. We do “<i>matching</i>” in a case-control study to ensure:</p> <ul style="list-style-type: none">a) Clear establishment of the cases in the study that will be compared.b) That bias or systematic error is ruled out in order to have VALID results.c) Comparability & eliminate possible confounders in the study.d) Proper calculation of the odds ratio among the cases and the controls.e) Equal distribution in the groups to be compared. <p>6. To calculate Confidence Limits, the followings are needed, EXCEPT:</p> <ul style="list-style-type: none">a) Sample sizeb) Estimated meanc) P Valued) Standard deviatione) Confidence interval level (i.e. 95% or 99%) <p>7. Which of the following is NOT a method for controlling the effects of confounding in epidemiologic studies?</p> <ul style="list-style-type: none">a) Matching.b) Stratification.c) Randomizationd) Blinding.e) Hawthorne effects <p>8. Sensitivity and specificity of a screening test refer to its:</p> <ul style="list-style-type: none">a) Repeatabilityb) Validityc) Yieldd) Reliabilitye) Severity |
|--|--|

<p>9. Sensitivity of a screening test refers to:</p> <ul style="list-style-type: none"> a) The ability of the test to correctly identify disease-free people b) The ability of the test to correctly identify diseased people c) The proportion of false positives d) The proportion of false negatives e) None of the above <p>10. Positive predictive value of a screening test refers to:</p> <ul style="list-style-type: none"> a) The ability of the test to correctly identify the people with the disease b) The proportion of false positives c) The proportion of true positives d) The probability of the person having the disease when the test is positive e) The proportion of “true positives” among all those who have the negative test results. <p>11. Seventy-five (75) % of the people with disease X who were tested with the screening test were having positive results. The remaining 25% were having false negative results. This 75% refers to:</p> <ul style="list-style-type: none"> a) Specificity of the screening test b) Sensitivity of the screening test c) Positive predictive value of the screening test d) Negative predictive value of the screening test e) None of the above. <p>12. Ninety (90)% of the people without disease X who were tested with the screening test were having negative results. The remaining 10% were having false positive results. This 90% refers to:</p> <ul style="list-style-type: none"> a) Positive predictive value of the test b) Negative predictive value of the screening test c) Specificity of the screening test d) Sensitivity of the screening test e) None of the above. 	<p>13. Endemic refers to:</p> <ul style="list-style-type: none"> a) A disease that has a low rate of occurrence but that is constantly present in a community or region. b) An attack rate in excess of 10 per 1000 population c) The occurrence of illnesses of similar nature clearly in excess of the normal expectation for that population at that time. d) Disease of the respiratory system that occur seasonally e) The disease rate per 100 000population. <p>14. Regarding the epidemic curve that is instrumental in outbreak investigation, all of the following statements are incorrect, EXCEPT:</p> <ul style="list-style-type: none"> a) It provides demographic information of the cases. b) It is a line graph of number of cases by their geographical location c) The probable time period of exposure cannot be estimated d) It is impossible to construct an epidemic curve if only the number of cases by their date/time of onset is known. e) It gives clues on whether it is a “common source” outbreak or a “propagated” outbreak. <p>15. A person with an in apparent infection...</p> <ul style="list-style-type: none"> a) Is of no epidemiologic importance b) Is a danger to family members but not to others in the community c) Never develops antibodies. d) Can transmit the infection to others e) Develops immunity to the infection.
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SECTION B: TRUE OR FALSE**/15 MARKS**

Tick (✓) on the appropriate column of your choice for each statement: Each statement is worth one (1) mark.

STATEMENTS	TRUE	FALSE
1. One of the advantages of case-control studies is that the incidence of disease can be calculated.		
2. Measures of prevalence rate are helpful in assessing the need for health care and the planning of health services.		
3. Randomization, restriction, matching etc. are among the methods commonly used to control confounding in the design of an epidemiological study.		
4. When the prevalence of a disease is very low (i.e. rare disease), there is a big difference between the Odds Ratio (OR) and the Relative Risk (RR).		
5. To determine the shape of the distribution curve, only information on central tendency is needed.		
6. Standard deviation is the most commonly used and rigidly defined measure of dispersion.		
7. Confidence Interval (CI) gives the difference between the upper and the lower confidence limits.		
8. It is incorrect to put forward the null hypothesis as " <i>there is no difference between Drug A and Drug B</i> " when a research hypothesis is " <i>Drug A is better than Drug B.</i> "		
9. The mean, median and mode are measures of the variability of a distribution		
10. Causal inference refers to the process of determining whether an observed association is likely to be causal.		
11. Micro-organisms (i.e. bacteria, viruses, parasites, etc.) are necessary causes of infections.		
12. A dose-response relationship occurs when changes in the level of a possible cause produce no changes in the prevalence or incidence of the effect.		
13. While primordial prevention and primary prevention have the most contribution to the health and well-being of the whole population, secondary prevention and tertiary prevention are targeted in clinical practice.		
14. Touching, kissing, blood transfusions, injection of drugs, breastfeeding are some of indirect transmission of infectious agents.		
15. Attack rate is usually calculated during an outbreak to understand the incidence of disease for the week or month, and normally expressed as %.		

SECTION B: SHORT/LONG ANSWER QUESTIONS

/70 MARKS

Question 1:

/10 Marks

Epidemiology has been defined as “the study of the distribution and determinants of health-related states or events.....”

a. Explain what “distribution” and “determinants” of health-related state or disease refer to? (2 Marks)

b. Describe the three (3) broad phases of epidemiology and provide examples. (3 Marks)

i.

ii.

iii.

c. John Snow was called the Father of Field Epidemiology; why? (5 Marks)

Question 2:**/8 Marks**

For question a; b; c; and d, assign the studies described to one of the types listed below:

- A. Cross-sectional or prevalence study
- B. Experimental
- C. Prospective study
- D. Retrospective or case-control study

a. "One thousand two hundred males working for "somewhere" manufactory were initially examined in 1961 and were classified by diagnosis criteria for coronary artery disease. Every three years they have been examined for new cases of this disease; attack rates in different sub-groups have been computed annually."

Answer: _____ **(2 Marks)**

b. "A random sample of middle-age sedentary males was selected from four census tracts, and each man was examined for coronary artery disease. All those having the disease were excluded from the study. All others were randomly assigned to either an exercise group, which followed a two-year program of systematic exercise, or to a control group, which had no exercise program. Both groups were observed semi-annually for any difference in incidence of coronary artery disease."

Answer: _____ **(2 Marks)**

c. "One hundred persons with infectious hepatitis and 100 matched neighborhood well controls were questioned regarding a history of eating raw clams or oysters within the preceding three months."

Answer: _____ **(2 Marks)**

d. "Questionnaires were mailed to every 15th person listed in the City Telephone Directory. Each person was asked to provide information regarding age, sex, smoking habits, and respiratory systems during the preceding seven days. Over 90% of the questionnaires were completed and returned. Prevalence rates of upper respiratory symptoms were determined from the response."

Answer: _____ **(2 Marks)**

Question 3:**/12 Marks**

A nutritional survey was conducted among second year Diploma of Public Health students as part of their Nutrition and food safety unit. Below is a set of Body Mass Index (BMI) result for 16 students that were collected in 2015;

19, 39, 26, 30, 33, 28, 24, 36, 26, 25, 27, 28, 44, 20, 31, 22

Calculate the following measures of central tendency and dispersion.

i) Mean (2 Marks)

ii) Median (2 Marks)

iii) Mode (1 Mark)

iv) Range (2 Marks)

v) Variance (3 Marks)

vi) Standard deviation (2 Marks)

Question 4:

/8 Marks

Surveillance is an important component of a health care system, it enables case finding for intervention, gives us the flat part of the epidemic curve – to find Incidence /Prevalence, helps us to identify epidemics and document their termination, monitor disease trends and establishing surveillance – response triggering;

a) Define the term Surveillance

(2 Marks)

b) Describe the 3 types of Surveillance?

(3 Marks)

i.

ii.

iii.

c) State at least three (3) principles of surveillance?

(3 Marks)

a.

b.

c.

Question 5:

(8 Marks)

There has been an outbreak of Conjunctivitis (Red Eye) reported from the national eye clinic at the National referral Hospital in Honiara towards the end of April 2016. This was confirmed by surveillance data and laboratory results based on the first few cases.

- a. Define the term 'outbreak' **(2 Marks)**

- b. What is a 'case definition' and why is it important to establish this when investigating an outbreak? **(2 Marks)**

- c. What is an 'epidemic curve'? State two important information that this 'curve' can tell you? **(4 Marks)**

Epidemic curve:

State two (2) important information:

1. _____
2. _____

Question 6:**(14 Marks)**

The following data table contains information obtained in the outbreak of Gastroenteritis after a church feasting.

Food items served	Number of persons who ATE specified food				Number of persons who did NOT eat specified food				Attack Rate Ratio
	Ill	Not Ill	Total	Percent Ill (Attack rate)	Ill	Not Ill	Total	Percent Ill (Attack rate)	
Baked ham	29	17	46	63%	17	12	29	59%	1.1
Mashed potatoes	23	14	37		23	14	37		
Cabbage salad	18	10	28	64%	28	19	47	60%	1.1
Milk	2	2	4	50%	44	27	71	62%	0.8
Water	13	11	24		33	18	51		
Cakes	27	13	40		19	16	35		
Ice cream, vanilla	43	11	54		3	18	21		
Ice cream, chocolate	25	22	47		20	7	27		
Fruit salad	4	2	6		42	27	69		

a. Calculate the Attack rates for the remaining food items and their Attack rate ratios in the table provided above. **(5 Marks)**

b. Which food item had the highest attack rate among consumers? **(1 Mark)**

Food item: _____

c. Which food item had the lowest attack rate among non-consumers? **(1 Mark)**

Food item: _____

d. What does this suggest? **(2 Marks)**

e. Which food item had the highest Attack Rate Ratio? **(2 Marks)**

Food item: _____

- f. What measure of association does the calculation of Attack Rate Ratio resemble? Therefore, how do you interpret this? **(3 Marks)**

Name of association: _____

Interpretation:

Question 7:

/10 Marks

7a. During the investigation of an outbreak of food poisoning at a summer camp, food histories were obtained from all campers as indicated in the table below.

Food	Illness Rate (percent)	
	Campers who ate specified food	Campers who did not eat specified food
Hamburger	72	84
Potatoes	70	65
Ice cream	40	50
Milk	90	30
Lemonade	20	15

i. Which of the food items was probably responsible for the outbreak? Explain your answer.

(3 Marks)

Food item: _____

Explanations:

ii. Calculate the relative risk for that specific food item. How is it interpreted?

(3 Marks)

Relative risk:

Interpretation:

7b. Regarding infectious agents and modes of transmission in infectious or communicable diseases, complete the table below with relevant information. **(4 Marks)**

(Note: a disease may have more than 1 mode of transmission; a group of diseases may be caused by different infectious agents)

Disease	Infectious agent			Mode of transmission			
	Bacteria	Virus	Protozoa/ Mycoses/ Helminthes	Direct <i>(person-to-person; air-born close distance)</i>	Vehicle-born <i>(food-born; water-born; air-born with distance)</i>	Vector-born	Formites
Example... Measles		✓		✓			
Tuberculosis							
Dengue Fever							
Malaria							
Gonorrhea							

~END OF EXAMINATION~

FORMULA SHEET

$$\mathbf{OR} = \frac{a \times d}{b \times c}$$

$$\mathbf{RR} = \frac{a/a+b}{c/c+d}$$

$$s^2 = \frac{\sum x^2 - \left[\frac{(\sum x)^2}{n} \right]}{n-1}$$

$$s = \sqrt{\frac{\sum x^2 - \left[\frac{(\sum x)^2}{n} \right]}{n-1}}$$