

國立成功大學

112學年度碩士班招生考試試題

編 號：308

系 所：公共衛生研究所

科 目：生物統計學與流行病學

日 期：0207

節 次：第 2 節

備 註：可使用計算機

※ 考生請注意：本試題可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

Multiple choice questions, indicate the most appropriate response. (5 points each)

1. Epidemiology is based upon two fundamental assumptions, one of which is that disease and illness do not occur at random in the population:
 - A. True
 - B. False

2. Proportion tells us how fast the disease is occurring in a population:
 - A. True
 - B. False

3. A simple random sample is defined as a sample in which each individual has an equal chance of being selected.
 - A. True
 - B. False

4. Under which circumstance is the odds ratio a poor estimate of the risk ratio?
 - A. Disease is rare and effect size is small
 - B. Disease is common and effect size is large
 - C. Disease is rare and effect size is large
 - D. Disease is common and effect size is small

5. Which of the following is most likely to occur when there is substantial loss to follow-up in a prospective cohort study?
 - A. Bias toward the null
 - B. Higher proportion of outcomes than expected
 - C. Invalid study result
 - D. Inaccurate classification of exposure among subjects who complete the study

6. Which of the following is characteristic of selecting control subjects in a case-control study?
 - A. They typically undergo medical examination to rule out presence of the disease of interest
 - B. They should originate from an alternate source population than the cases originated from
 - C. The prevalence of exposure should reflect the prevalence of exposure in the population from which the cases originated
 - D. None of the above

7. If I would like to examine whether there is a relationship between headache and hypertension, I randomly selected study participants and 50 participants with hypertension and 30 of them with headache as well, in addition, 60 participants did not have hypertension and 20 of them with headache. Which statistical method that can be used to examine the association between headache and hypertension?

- A. Chi-square test
- B. T test
- C. Z test
- D. ANOVA

8. If I would like to examine whether there is a difference for the scores from the 20 students came from three different departments, below are the statistical outputs, and which one is correct:

	Sum of squares	df	Mean square	F	p
Between group	3308.811		C		
Within group	A		201.082	D	0.003
Total	B				

- A. A=3619.476
- B. B=6928.287
- C. C=1102.937
- D. D=8.228

9. Which of the below information that can be obtained from the box and whisker plot?

- A. median
- B. 95th percentile
- C. coefficient of variation
- D. variance

Short Answer Questions. (Partial credit will be given for answers if the concepts of the question are presented appropriately.)

Questions 10 and 11 use the information below:

- Population of the city of Atlantis on March 30, 2003=183,000
 - No. of new active cases of TB occurring between January 1 and June 30, 2003=26
 - No. active TB cases according to the city register on June 30, 2003=264
10. What was the incidence rate of active cases of TB for the 6-month period? (5 points each)

11. What was the prevalence rate of active TB as of June 30, 2003? (5 points each)

Questions 12-14 are based on the information contained in the table below regarding lung cancer and CHD mortality for a cohort study of male physicians: (5 points each)

LUNG CANCER AND CHD MORTALITY IN MALE BRITISH PHYSICIANS: SMOKERS VERSUS NON-SMOKER		
	Age-adjusted Death Rates Per 100,000	
	Smokers	Non-smokers
Lung cancer	140	10
Coronary heart disease (CHD)	669	413

12. What is the attributable risk (AR) per 100,000 of coronary heart disease mortality among smokers compared to non-smokers?
13. What is the attributable risk percent (AR%) of lung cancer mortality among smokers compared to non-smokers?
14. If a successful smoking cessation program was initiated in this group of British physicians, for which disease would there be a greater reduction in the number of deaths? Why?

15. Suppose that you wanted to test a new method for diagnosing legionella. You decide to test the new method with 500 urine samples. Based on the gold standard test, you know that, out of the 500 urine samples you tested, 125 truly have disease. Upon testing the samples with the new test, 85 samples test positive for legionella. Furthermore, only 65 of the 85 that tested positive truly have disease. Please fill in the **2x2 table** below and calculate the **sensitivity** and **specificity of the new legionella test**. (10 points)

True Characteristics in the Population

Results from
Screening

	Disease	No Disease	Total
Positive			
Negative			
Total			

請於答案卷上作答

16. I would like to test whether the amount of sugar contained in A, B, and C brand of milk are different, what is the **null (H₀) and alternative (H_a) hypothesis**? (10 points)

	A	B	C
1	17	19	20
2	18	18	23
3	15	16	21
4	14	15	20

Questions 17 and 18. (5 points each)

17. If I know the regression model: $y=4.0+0.8(X)$, where y is head circumference and x is gestational week. Could you please estimate if the gestational week (X) is 26 weeks, what is the expected value of head circumference (y)?

18. Based on the same statement of question 17, when gestational week increased by 10 weeks, what will be the mean increase of head circumference (y)?