

國立臺灣師範大學 104 學年度碩士班招生考試試題

科目：流行病學與衛生統計學

適用系所：健康促進與衛生教育學系

注意：1.本試題共 4 頁，請依序在答案卷上作答，並標明題號，不必抄題。2.答案必須寫在指定作答區內，否則依規定扣分。

壹、流行病學 (50 分)

一、請依據下列論文的內容，回答關於此研究的下列問題：(1) 研究目的；(2) 研究對象；(3) 研究設計；(4) 資料分析方法；(5) 研究結果。(15 分)

Many older adults are physically inactive and inactivity increases with age. This knowledge comes from cross-sectional studies. Cross-sectional studies may miss important trajectories within the older adults as a result of retirements, and poor health impact of promotional efforts. The aim of this study was to analyses, longitudinally, the annual effects of age group and birth cohort on self-reported regular exercise in the Swedish population aged 53-84 years during a 16-year period, for each sex separately. A random sample of non-institutionalized persons was interviewed three times from 1988 to 2004 by professional interviewers. In addition to three time-related variables - year of interview, age at the time of the interview, and year of birth - we included the following explanatory variables in the analyses: educational level, body mass index, smoking, and self-reported health status. The data were analyzed by a mixed model with a random intercept. The total prevalence of self-reported regular exercise increased between 1988/89 and 2004/05 among both men and women, from 27.1 to 43.1% and from 21.1 to 41.1%, respectively. There was a mean annual change in all age-groups in exercise of between 0.76 and 1.24% among men and between 0.86 and 1.38% among women. Low prevalence of self-reported regular exercise was associated with low educational level, obesity, smoking, and poor self-reported health, although those with poor self-reported health the greatest increase of physical activity. There was a steady, albeit inadequate, increase in self-reported regular exercise in older adults between 1988 and 2004. Physical activity promotion in older adults should be of high priority for both primary and secondary prevention of diseases, especially among groups with known risk factors for low levels of exercise.

二、請解釋下列配對的名詞，並說明兩者的差異為何 (24 分)

1. 累積發生率 VS. 期盛行率 2. 共同感染 VS. 連鎖感染 3. 加成交互作用 VS. 累乘交互作用

三、請依據下列某地區四十歲以上居民的資料計算高血壓，邊界高血壓對中風之相對危險性 (relative risk)、可歸因危險性 (attributable risk)，以及族群可歸因危險分率 (population attribution fraction) (11 分)

	中風發生率	人口分布百分比
正常血壓	0.0006	45%
邊界高血壓	0.0024	40%
高血壓	0.0036	15%

國立臺灣師範大學 104 學年度碩士班招生考試試題

貳、衛生統計學 (50 分)

一、選擇題：(每題 2 分，共 20 分)

1. The standard error of the mean is the same thing as
 - a. the standard deviation of a sample
 - b. the standard deviation of a population
 - c. the variance of a sample
 - d. the standard deviation of a sampling distribution
2. Which assumption about level of measurement is made for the Chi square test?
 - a. all variables are at least ordinal in level of measurement
 - b. all variables are nominal in level of measurement
 - c. all variables are at least interval-ratio in level of measurement
 - d. at least one variable must be ordinal in level of measurement
3. Tests of significance tell us if our results are non-random. To investigate the strength and direction of relationships, we must use
 - a. percentages
 - b. Chi square tests
 - c. ANOVA
 - d. measures of association
4. What would be the most appropriate test of significance for research situations in which we have an interval-ratio dependent variable and an independent variable with three or more categories?
 - a. the t test
 - b. the IQV
 - c. ANOVA
 - d. Chi square
5. To prove that one variable causes another, we use
 - a. tests of significance
 - b. measures of association
 - c. ANOVA
 - d. none of the above: neither measures of association or tests of significance can prove causal relationships
6. With two independent variables, the least-squares multiple regression equation would be
 - a. $Y = a + bX^2$
 - b. $Y = a + b + X_1 + X^2$
 - c. $Y = a + b_1X_1 + b_2X_2$
 - d. $Y = b_1X_1 + b_2X_2$

國立臺灣師範大學 104 學年度碩士班招生考試試題

7. The coefficient of multiple determination (R^2), with two independent variables (X_1, X_2), is
 - a. the amount of variation explained by X_1 minus the amount of variation unexplained by X_2 .
 - b. the amount of variation explained by X_1 plus the amount of variation explained by X_2 , after controlling for the effect of X_1 .
 - c. the total variation in Y minus the amount unexplained by X_1 after controlling for X_2 .
 - d. the sum of all explained and unexplained variation in X_1 and X_2 .
8. In an ANOVA test, when the null hypothesis is rejected, we know that at least one of the means is significantly different from the others. In order to find out which mean(s) are significantly different, we must conduct a
 - a. t test
 - b. chi square test
 - c. post hoc test
 - d. post mortem test
9. One study has reported that the sensitivity of the mammogram as a screening test for detecting breast cancer is 0.85, while its specificity is 0.8. In a population in which the probability that she has cancer is 0.0025, what is the probability that she has cancer given that her mammogram is positive?
 - a. 0.15
 - b. 0.20
 - c. 0.01
 - d. 0.06
10. The ANOVA test uses means and standard deviations to compare the amount of variation _____ with the amount of variation _____.
 - a. within sample means ... between sample means
 - b. above categories ... below categories
 - c. within categories ... between categories
 - d. within sample standard deviations ... between sample standard deviations

二、簡答題及計算題：(30 分)

1. Define and distinguish between the sample distribution, the sampling distribution, and the population distribution. How are these three distributions related to each other in inferential statistics? (8 分)
2. A study was conducted to evaluate the relative efficacy of supplementation with calcium versus calcitriol in the treatment of postmenopausal osteoporosis. Calcitriol is an agent that has the ability to increase gastrointestinal absorption of calcium. A number of patients withdrew from this study prematurely due to the adverse effects of treatment. The data is shown below.

國立臺灣師範大學 104 學年度碩士班招生考試試題

Treatment	Withdrawal		Total
	Yes	No	
Calcium	20	288	308
Calcitriol	27	287	314
Total	47	575	622

Please answer the following questions:

- a. Compute the sample proportion of subjects who withdrew from the study in each treatment group. (3 分)
 - b. Test the null hypothesis that there is no association between treatment group and withdrawal from the study at the 0.05 level of significance. What do you conclude? (8 分)
3. In a study investigating maternal risk factors for congenital syphilis, syphilis is treated as a dichotomous response variable, where 1 represents the presence of disease in a newborn and 0 otherwise. The estimated coefficient from a logistic regression model containing the explanatory variables such as cocaine use, alcohol use, marital status, level of education, and number of prenatal visits to a doctor are listed below. The estimated intercept is not given.

Variable	Coefficient
Cocaine Use	1.354
Alcohol Use	0.723
Marital Status	0.779
Level of Education	0.298
Number of Prenatal Visits	-0.098

Please answer the following questions.

- a. As an expectant mother's number of prenatal visits to the doctor increases, what happens to the probability that her child will be born with congenital syphilis? (3 分)
- b. Marital status is a dichotomous random variable, where the value 1 indicates that a woman is unmarried and 0 that she is married. What are the relative odds that a newborn will suffer from syphilis for unmarried versus married mothers? (8 分)