

PHP 2500 Introduction to Biostatistics

Problem Set Five

Due: Tuesday November 27th

Please show all your work.

1. Pagano #5, (Chapter 9, p227)
2. Pagano #8, (Chapter 9, p228)
3. Pagano #9, (Chapter 9, p228)
4. Pagano #10, (Chapter 9, p229)
5. Pagano #11, (Chapter 9, p229)
6. Pagano #8, (Chapter 14, p339)
7. Pagano #10, (Chapter 14, p339)
 - a. skip (c)
8. Pagano #11, (Chapter 14, p340)
 - a. replace (b) with a 90, 95, and 99% confidence interval
9. Pagano #11, (Chapter 11, p279)
 - a. compute a 95% CI
10. Pagano #12, (Chapter 11, p279)
 - a. compute a 95% CI – does it contain zero? Interpret.
11. Pagano #10, (Chapter 11, p280)
 - a. skip figure in question (a) and question (b)
 - b. question (c): are your conclusions the same as in (a)
 - c. question (d): construct a 95% CI on the difference, state your conclusions.
12. How large a sample size is required to construct a 90 and 95% CI for the proportions 0.55, 0.9 with length of 0.1 and 0.05. (You should have 8 sample sizes here; Stata will not do this for you.)

13. The data set `icu.dta` contains data collected on 200 participants who were part of a larger study investigating in-hospital survival of patients admitted to an ICU. A description of the study and variables is included on the next page and the data is available on the class website. Examine these data using descriptive statistics, graphs, confidence intervals, and hypothesis tests.
- a. Is there a gender difference in systolic blood pressure at admission or heart rate at admission? Answer yes or no and in both cases provide a 95% CI for the estimate of the difference.
 - b. Does a history of chronic renal failure indicate that a patient is more or less likely to survive? If so, estimate the survival advantage.
 - c. Does the service at ICU admission indicate is a patient is more or less likely to survive? If so, estimate the survival advantage.
 - d. Does the answer to part (B) or (C) depend on the type of test you performed (ttest or prtest)? If so, please explain the difference. If not, then explain why not. Which test is to be preferred?

Potentially useful Stata commands

Sample size calculations for hypothesis tests: `sampsi` (Optional)
Confidence intervals: `ci` and `cii`, `ttest` `testi`, `prtest` and `prtesti`

icu.dta: 200 observations, 21 variables

Description:

The ICU data set consists of a sample of 200 subjects who were part of a much larger study on survival of patients following admission to an adult intensive care unit (ICU). The major goal of this study was to develop a logistic regression model to predict the probability of survival to hospital discharge of these patients and to study predictors associated with ICU mortality.

Description	Codes/Values	Variable name
Identification Code	ID number sta	id_Vital Status0 = Lived, 1 = Died
Age	Age in years	age
Gender	0 = Male, 1 = Female	sex
Ethnicity	1 = White 2 = Black 3 = Other	race
Service at admission	0 = Medical 1 = Surgical	ser
Cancer part of problem	0 = No, 1 = Yes	can
History of chronic renal failure	0 = No 1 = Yes	crn
Infection at admission	0 = No 1 = Yes	inf
CPR prior to admission	0 = No, 1 = Yes	cpr
Syst. blood pressure	mm Hg	sys
Heart rate	beats/min	hra
Previous admission to ICU within 6 months	0 = No 1 = Yes	pre
Type of admission	0 = Elective 1 = Emergency	typ
Major bone fracture at admission	0 = No 1 = Yes	fra
PO2 from initial blood gases	0 \geq 60 1 < 60	po2
PH from initial blood gases	0 > 7.25 1 \leq 7.25	ph
PCO2 from initial blood gases	0 > 45 1 \leq 45	pco
Bicarbonate from initial blood gases	0 > 18 1 \leq 18	bic
Creatinine from initial blood gases	0 < 2.0 1 \geq 2.0	cre
Level of consciousness	0 = No coma/stupor 1 = Deep stupor 2 = Coma	loc

REFERENCES

Hosmer and Lemeshow, *Applied Logistic Regression*, Wiley, (1989)
Lemeshow, S., Teres, D., Avrunin, J. S., Pastides, H. (1988). Predicting the Outcome of Intensive Care Unit Patients. *Journal of the American Statistical Association*, **83**, 348-356.