

**Epidemiology-Biostatistics Exam
Final, 2004**

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Instructions: This exam is 25% of your course grade. The maximum number of points for the course is 1,000; hence, this exam is worth 250 points. There are 20 questions on this exam. Each question is worth 12.5 points to yield the maximum of 250 points for this exam. For questions 1-10, record the best answer in pencil on the answer sheet provided. For questions 11-20, write your answers in the spaces provided. Submit your exam and your answer sheet as directed after you have completed the exam.

1. Researchers conduct a study on the weight difference of 95 subjects at baseline and after being on a new diet for two months. These subjects were randomly selected from a nutrition class for overweight patients. They report that the mean weight loss was 5 pounds with a 95% confidence limit from 0.5 pounds to 9.5 pounds. Alpha was set at 0.05. Select the correct answer:
 - a. The researchers should reject the null hypothesis.
 - b. 95% of the subjects had a weight loss between 0.5 pounds and 9.5 pounds.
 - c. 5% of the subjects had no weight loss.
 - d. The internal validity is limited given the study only lasted two months.
 - e. A Type II error could have occurred.

2. Select the best statement concerning a scatterplot:
 - a. It plots the distribution of potential confidence intervals in a data set.
 - b. It is a method to convert skewed data to normally distributed data in a data set.
 - c. It provides a visual description of the distribution of potential sample means drawn from a given population.
 - d. It plots the standard errors of randomly selected data from a given population.
 - e. It plots the values of two continuous variables in a data set.

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3. Select the correct statement concerning correlation and regression:
 - a. The regression coefficient is independent of the units of measurement.
 - b. The correlation of X on Y is not the same as the correlation of Y on X.
 - c. A researcher should reject the null hypothesis if the Pearson's Correlation Coefficient is 0.
 - d. The regression line in simple linear regression is a positive slope.
 - e. Linear regression estimates the equation that best fits the data.

4. Select the correct statement concerning relative risk and odds ratio:
 - a. A relative risk of 20 has the same strength of association as a relative risk of 0.05.
 - b. As a general statement, there is less confounding when calculating a relative risk vs. an odds ratio.
 - c. Coefficients from logistic regression analysis yield relative risks.
 - d. One should not calculate a relative risk when the data are from a retrospective cohort study.
 - e. Underlying data should be normally distributed to calculate a relative risk.

5. The appropriate statistical test to use to determine if there is a statistically significant difference between two survival curves is:
 - a. Kaplan-Meier Test
 - b. Actuarial Test
 - c. Log-Rank Test
 - d. Paired T-test
 - e. Two-Sample T-test

6. Dilution bias occurs when:
 - a. patients in a RCT not offered a screening test receive it anyway.
 - b. trials on screening methods done in an experimental setting do not reflect results in actual practice.
 - c. there is random misclassification in RCTs assessing screening methods.
 - d. patients in a RCT offered a screening test don't receive it.
 - e. study results are not reproducible.

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7. Attempts to predict future health events by systematically comparing groups of human subjects differentially exposed to agents of interest is called:
- clinical experience
 - the scientific model
 - practice variability
 - clinical guidelines
 - outcomes research
8. A surrogate end point is:
- A method of calculating the probability that the primary outcome(s) occurred in subjects lost to follow-up such that their results can be included in an intention-to-treat analysis.
 - A process used to classify secondary outcomes that might be clinically important in clinical studies where multiple outcomes can be assessed.
 - A laboratory measurement or a physical sign used as a substitute for a clinically meaningful end point.
 - A surrogate measurement used in a case control or retrospective cohort study when either the exposure or outcome of interest is difficult to objectively define.
 - A measurement to extrapolate the results from clinical trials into clinical practice.
9. In an alcoholic hepatitis screening program, researchers are discussing the appropriate cut-off level for an abnormal test. One researcher argues for a cut-off value of 50 IU/ml while another argues for a cut-off value of 80 IU/ml. A higher value in IU/ml indicates more severe disease. Select the correct answer:
- The sensitivity and specificity are the same for both cut-off values.
 - The number of false negatives is higher with a cut-off of 50 IU/ml vs. 80 IU/ml.
 - The number of false positives is lower with a cut-off of 50 IU/ml vs. 80 IU/ml.
 - The specificity with a cut-off at 50 IU/ml is greater than the specificity with a cut-off of 80 IU/ml.
 - The sensitivity with a cut-off of 50 IU/ml is greater than the sensitivity with a cut-off of 80 IU/ml.

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10. You are doing a study examining the association between alcohol intake and risk factors for diabetes. You decide to perform a linear regression analysis where glucose tolerance is the outcome variable and alcohol is the exposure variable. Because you are not certain whether the relation between alcohol and glucose tolerance is linear, you should:
- a. Enter alcohol intake as a continuous variable
 - b. Adjust for plasma insulin in the analysis
 - c. Test whether diabetes is an effect modifier
 - d. Enter alcohol intake as a categorical variable
 - e. Transform the data to a normal distribution

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QUESTIONS 11-20 ARE SHORT ANSWER QUESTIONS. PLEASE WRITE YOUR RESPONSES NEATLY.

11. What type of regression should be used to control for confounding or examine possible effect modification in a survival analysis?

12. The sensitivity of a new test to diagnose hepatitis C is 50% and the specificity is 75%. Calculate the predictive value negative of the new test for hepatitis C in a group of IV drug users with a known prevalence of hepatitis C of 20%. Show your work.

13. A researcher wants to know if individuals who exercise daily are less likely to have an MI compared to individuals who do not exercise daily. There are 10,000 subjects in the trial. What statistical test should the researcher use?

14. A group of pediatricians follows a group of babies who are breastfed for six months following birth compared to another group of babies who are not breastfed for six months following birth. The pediatricians want to determine if there is a difference in the incidence of croup between the two groups over this six-month period. Of 100 breastfed babies, 2 babies develop the croup and of 50 babies who are not breastfed, 5 develop the croup. Calculate and interpret the correct measure of association of breastfed babies developing croup over the six-months compared to babies who are not breastfed.

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20. Define the p value.

END OF EXAM
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