

Please complete this quiz by recording your answers on the answer sheet provided.

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Questions for Module I: part 2 Bean: Introduction to Statistics

1. How are numerical summaries of clinical measurements affected by a frequency distribution that is skewed to the right?
 1. The mean and the median are equal
 2. The mean is larger than the median
 3. The median is larger than the mean
 4. The mode is unaffected
 - a. 1, 2, and 3 are correct
 - b. 1 and 3 are correct
 - c. 2 and 4 are correct
 - d. 4 is correct
 - e. 1, 2, 3 and 4 are correct

2. In a series of clinical measurements, the degree of spread of the values around the center can be expressed in terms of the
 1. median
 2. range
 3. mean
 4. standard deviation
 - a. 1, 2, and 3 are correct
 - b. 1 and 3 are correct
 - c. 2 and 4 are correct
 - d. 4 is correct
 - e. 1, 2, 3 and 4 are correct

3. In a study to evaluate the efficacy of a new antiviral agent in curing the common cold in young children, 100 children between the ages of 2 and 8, diagnosed with colds by participating pediatricians, were given the new drug. One week later, the investigators conducting the study observed that 90 of the 100 subjects were asymptomatic. They concluded that the antiviral drug was highly effective in curing children's colds. Which of the following statements regarding this conclusion is correct?
 - a. The conclusion is valid for the study population
 - b. The conclusion is invalid because the investigators measured prevalence rather than incidence
 - c. The conclusion is invalid because the frequency measure reported does not have an appropriate denominator
 - d. The conclusion is invalid because it is not generalizable to the target population of all children with colds
 - e. The conclusion is invalid because the study lack an appropriate control group

4. In a randomized controlled clinical trial of a new antihypertensive agent, patients with diastolic blood pressure readings greater than 90 mmHg on their most recent clinic visit are selected as subjects. A patient assigned to the experimental treatment group is normotensive at his first clinic visit after initiating drug therapy. All of the following factors represent plausible explanations for this observation EXCEPT
 - a. the Hawthorne effect
 - b. random variation in blood pressure measurements
 - c. regression to the mean

- d. efficacy of the experimental drug
 - e. measurement error
5. The principal reason why a randomized controlled clinical trial is superior to an observational study is
- a. study results are always applicable to the target population
 - b. migration bias is eliminated
 - c. subjects are assigned to comparison groups, rather than self-selecting their group status
 - d. random allocation guarantees that comparison groups are equally vulnerable to potentially confounding variables
 - e. both measurement and observer error are eliminated

QUESTIONS 6 – 8

Questions are based on the following data. (repeat for each question)

In a report summarizing the results to a study comparing serum sodium levels in normotensive patients and newly diagnosed hypertensive patients prior to dietary sodium restriction, a team of clinical researchers states that the difference in mean serum sodium levels was not statically significant at the 5% level of significance. In addition, the researchers report that, for the sample sizes employed in this study, the power of the chosen statistical test to detect a difference in mean serum sodium levels of at least 5 mEq/L between the two patient populations is .20.

6. Assume the serum sodium levels in the two populations do, in fact, differ by a least 5 mEq/L. The probability that the statistical test will fail to detect this difference could then be described by all of the following statements EXCEPT
- a. this probability is equal to .80
 - b. this probability increases as the level of significance is decreased
 - c. this probability represents the type II error rate
 - d. this probability is smaller than the probability that the test will fail to detect a difference in serum sodium levels of a least 10 mEq/L
7. All of the following statements about the power of the chosen statistical test are true EXCEPT
- a. the reported value for power suggests that the research team should not conclude that “no difference exists between the mean serum sodium levels of the two populations”
 - b. the power of the test will decrease if the probability of a type II error increases
 - c. this value represents a 20% chance that the statistical test will detect a difference in serum sodium levels between the two populations of a lease 5 mEq/L, given that such a difference actually exists
 - d. this value represents the probability of detecting a difference of at least 5 mEq/L in mean serum sodium levels when H₀ is true
 - e. given the reported value of power, a statistically significant difference in the mean serum sodium levels of the two patient populations may have been observed if the investigators had used a larger sample size
8. If the investigators repeat the study with a larger sample size, they would expect which of the following changes to occur?

- a. the probability that they will detect a difference in mean serum sodium levels between normotensive and hypertensive patients, given that no such difference actually exists, increases
- b. the probability that they will fail to detect a difference in mean serum sodium levels between the two populations, given that such a difference does exist, decreases
- c. the power of the statistical test will decrease
- d. the level of significance, α , will increase
- e. the probability that the statistical test will have a false negative outcome will increase