

PathMD™: Board Review Letter

Author: Philip Ferguson, M.D.

Statistics - Part 2

Volume 1, Number 41

Case #1 The image shown for this question is a Gaussian distribution. The variable X and the variable Y correspond to what percentage of the data represented under the curve?

- A. 64% and 95%
- B. 68% and 95.5%
- C. 64% and 95.5%
- D. 72% and 96.5%
- E. 72.5% and 96.5%

Case #2 The image shown for this question is a skewed distribution. The point along the horizontal axis represented by the variable X is best descriptive of which of the following statistical terms?

- A. Mean
- B. Median
- C. Mode
- D. Standard deviation
- E. Percentile rank

Questions

1. When evaluating a relative operating characteristic (ROC) curve to compare different tests, which of the following will have the greatest efficiency (correctly classify the largest percentage of patients)?
Note: sensitivity is plotted from 0 to 100 on the y-axis, and specificity is plotted from 100 to 0 on the x-axis.
 - A. The test with the steepest initial plot line
 - B. The test with the line closest to a diagonal ($y=1x + 0$)
 - C. The test with the greatest area under the curve
 - D. The test with the greatest sensitivity
 - E. The test with the greatest specificity
2. A test has 95% sensitivity and specificity for a disease with a prevalence of 1 in 500. What is the positive predictive value (PPV) of this test?
 - A. 95%
 - B. 5%
 - C. 4%
 - D. 2%
 - E. None of the above
3. A company is introducing a new test for detecting a “test choking” gene. 92 people known to be “test chokers” are tested, and 87 are positive. 610 people who are not “test chokers” are tested, and 576 are negative. Based on this information, calculate the sensitivity and specificity of the new test to detect “test chokers.”
 - A. Sensitivity – 72%; Specificity – 94%
 - B. Sensitivity – 72%; Specificity – 99%
 - C. Sensitivity – 95%; Specificity – 94%
 - D. Sensitivity – 95%; Specificity – 99%
 - E. None of the above

PathMD™: Board Review Letter

Author: Philip Ferguson, M.D.

Statistics - Part 2

Volume 1, Number 41

4. If the prevalence of the “test chokers” is 1 in 750, what is the positive predictive value of the test described in the previous question?
 - A. 95%
 - B. 94%
 - C. 6%
 - D. 5%
 - E. 2%

5. Levy-Jennings plots are useful for evaluating which of the following types of analytical changes within a testing system in sequential plotting of quality control test results?
 - A. Trends
 - B. Random error
 - C. Shifts
 - D. A and C are correct
 - E. All of the above are correct

6. When evaluating a Levy-Jennings plot for random error, shifts, and trends, if present, which would indicate an unstable system?
 - A. Trends
 - B. Random error
 - C. Shifts
 - D. Both A and C are correct
 - E. All indicate an unstable system

7. Positive and negative predictive values are dependent in part of all of the following EXCEPT:
 - A. Test sensitivity
 - B. Test specificity
 - C. Prevalence in the population
 - D. Number of people tested
 - E. All of the above are true

8. If 10 tests were performed on a “healthy” individual, what is the likelihood all of the results will be within the reference range?
 - A. 95%
 - B. 60%
 - C. 46%
 - D. 36%
 - E. None of the above

Notes for question set:¹

¹ PathMD strives for the highest quality and accuracy. However, the *PathMD: Board Review Letter* is for review purposes and not meant for clinical decision making. It should not be used in place of review of primary reference texts and the current medical literature. If inaccuracies are identified, please notify us so that a correction may be published. (info@PathMD.com)