Statistical Measurements in Medical Ultrasound

Appendix A Worksheet Answer Key | Educator Resource

Standard Statistical Metrics

Correct matching letters are shown in green.

Key Terms

C	1. mean
D	2. median
B	3. range
E	4. standard deviation
F	5. variance
A	6. coefficient of variation

A. standard deviation divided by the mean

B. spread from the smallest to the largest value

C. average value of a set of measurements

D. middle value

E. how much values typically vary around the mean

F. average squared distance of values from the mean

Fill in the Blanks

Name: Date:

1. Because sonographic findings influence clinical decisions, test performance should be described using **objective statistical measures** rather than **subjective impressions** .
2. Statistical evaluation in medical testing is used to quantify how **trustworthy** a test is.
3. It also measures how often a test is **correct** and how much **confidence** should be placed in a positive or negative result.

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Fill in the Blanks continued

Answers appear in worksheet order and are shown in green.

List three benefits to the patient.

4. **Fewer missed diagnoses**
5. **Fewer unnecessary procedures and anxiety**
6. **More appropriate triage and care**

List three benefits to the practitioner.

7. **Clearer clinical confidence in results**
8. **Improved quality assurance and performance monitoring**
9. **Smarter selection of the right test**
10. Sensitivity and specificity summarize test behavior under known truth conditions: how effectively disease is **detected** and how reliably non-disease is **excluded** .
11. PPV and NPV translate test results into practical clinical meaning by estimating how trustworthy a **positive or negative** result is in the population being tested.
12. Sensitivity describes how often a test **identifies** disease when disease is truly present.
13. Specificity describes how well a test **excludes** disease when disease is truly absent.
14. PPV is the probability that disease is truly **present** when the test result is positive.

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Fill in the Blanks continued

Answers appear in worksheet order and are shown in green.

15. NPV is the probability that disease is truly **absent** when the test result is negative.

16. The **2 x 2 contingency table** is the basic framework used to evaluate any diagnostic test, including ultrasound.

17. TP (True Positive): the test is positive, and disease is truly **present** .

18. FP (False Positive): the test is positive, but disease is truly **absent** .

19. FN (False Negative): the test is negative, but disease is truly **present** .

20. TN (True Negative): the test is negative, and disease is truly **absent** .

21. **SnNout** : A highly SeNsitive test, when Negative, helps rule OUT disease.

22. **SpPin** : A highly SPecific test, when Positive, helps rule IN disease.

23. PPV and NPV depend on prevalence: how **common** the disease is in the tested population.

24. **Chi-square** is a statistical test used to determine whether there is a real association between two categorical variables, or whether an observed difference in counts is likely due to random variation.