

Specificity

In order to evaluate the quality of a diagnostic test, it is necessary, at a minimum, to know its validity, reliability, sensitivity, and specificity.

- **Validity:** refers to whether the questions asked by the study are answered by the method. **Note:** to be really valid, a test should be highly sensitive, specific, and unbiased.
- **Reliability:** is equal to the repeatability and reproducibility of a test. **Note:** A reliable test would produce very similar results when used to measure a variable at different times.
- **Sensitivity:** is defined as the percent of persons **with** the disease who are **correctly** classified as having the disease (*those who have the disease*).
 - **True Positive (TP):** those who have the disease
 - **False negative (FN):** those who are **incorrectly** classified as not having the disease
- **Specificity:** is defined as the percent of persons **without** the disease who are **correctly** classified as not having the disease (*those who do not have the disease*).
 - **True Negative (TN):** those who **do not** have the disease
 - **False Positive (FP):** **those who do not have the disease but were erroneously identified by the test as having the disease.**

Inferential statistics: is used to make claims about the populations that give rise to the data collected. This requires that we go beyond the data available to us. Consequently, the claims we make about populations are always subject to error; hence the term "**inferential statistics**" and not deductive statistics. Inferential statistics encompasses a variety of procedures to ensure that the inferences are sound and rational, even though they may not always be correct. In short, inferential statistics enables us to make confident decisions in the face of uncertainty.



1. The **P value** is a probability. It is the final arithmetic answer that is calculated by a statistical test of a hypothesis (H_0 called the *null hypothesis*). Its magnitude informs the researcher as to the validity of the hypothesis, that is, whether to accept or reject the hypothesis as worth keeping. **Note:** If it's below .05 (5%), reject the H_0 — the results are called "**statistically significant.**" If it's above .05 (5%), accept the H_0 — the results are called "**not statistically significant.**"
2. **Correlation/correlation coefficient (r):** quantifies the relationship between variables (*x and y*).
3. **Mutliple regression:** provides a mathematical model of linear relationship between a **dependent** and two or more **independent** or predictor **variables**.
4. **Chi-square** is a statistical test commonly used to compare observed data with data we would expect to obtain according to a specific hypothesis.
5. **t-test** is used to analyze the statistical difference between two means.