

# [Usmle biostatistics](https://assignbuster.com/usmle-biostatistics/)

BIOSTATISTICS \* Effect modification: effect of the main exposure on the outcome is affected by another variable. It is NOT a bias! \* Case-control study: also known as retrospective study. Divided into “ cases” and “ controls. ” If disease is rare, the odds ratio will approximate the relative risk (following subjects over time. ) \* Cohort study (Retrospective or prospective): divided into “ exposed” and “ non-exposed. ” Study subjects are free of the outcome at the time the study begins. \* Cross-sectional study: exposure and outcome are studied at one point in time. Think: snapshot study) \* Randomized control trial: gold standard for studying the efficacy of treatment or procedure. Subjects are randomized into experimental or control. Less bias and strong causal relationship. \* Cross-over study: group of participants are randomized to one treatment for a certain period of time and the other with the alternative for that same certain period of time. Then after period ends, the groups switched treatments for the duration of the trial. \* Parallel study: think “ drug group vs. placebo group. ” No other variables are measured \* Hazard ratio: the higher the ratio, that higher risk for hazardous events.

If ratio is 1 (or value if closer to 1), then there’s little difference between the two entities \* Factorial design studies: randomization of different interventions with additional study of 2 or more variables \* Cluster analysis: randomization of different groups, not individuals \* Lowering the cut-off will increase its sensitivity \* Confounder: an extraneous factor which has properties linking it to the exposure and outcome of interest \* Probability if test is negative, 1-negative predicative value \* Observer bias: investigator’s decision is adversely affected by knowledge of exposure status.

Example: It is known the ESRD is more common in black population \* Respondent bias: outcome obtained by patient’s response \* Recall bias: inaccurate recall of past exposure by patient \* Selection bias: manner in which subjects are selected for a study or from selective losses from follow-up \* Validity of test (accuracy of test): results must be compared to the results from the gold standard \* Reliability of test: results are similar in repeated measurements and random error is minimal \* Sensitivity and specificity of test: measures results of gold standard test.

Shows accuracy of results but not reliability \* In normal (bell-shaped) distribution: 68%- 1 standard deviation from the mean 95%- 2 standard deviations from the mean 99. 7%- 3 standard deviations from the mean \* Risk- the probability of getting a disease over a certain period time. Use sensitivity formula. \* Ideal randomization process: minimal selection bias, near equal group sizes, and low probability of confounding variables. Must have baseline characteristics \* If p value is < 0. 01, then it means it’s statistically significant \* Susceptibility bias: treatment regimen is selected based on severity of the patient’s condition. without taking into account of other confounding variables \* Lead-time bias: during the study, one of the two interventions diagnosed the disease earlier than the other without having an effect on the outcome (survival). Think of “ new screening test” for poor prognosis diseases such lung diseases or pancreatic cancer. \* Measurement bias: poor data collection from inaccurate results \* Increasing prevalence and stable incidence can be contributed to factors that prolong the duration of the disease (i. e. mproved quality of care) \* Latent period: exposure must be continuously present for a certain period of time to influence the outcome \* Matching controls confounding variables. \* False negative will increase when the cut-off value of a diagnostic test is raised. \* NNT= 1/ARR \* Correlation coefficient (r)- linear relationship between the two variables \* Null value is 0 (no association) \* Sign indicates a positive or negative association \* The closer the value is to its margin (-1 or 1), the stronger the association \* Does not necessarily imply causality P value is the probability that the result of a study is by chance alone \* Statistically significant, if p 3 means \* PPV increases with an increase in prevalence of disease in study population \* Chi-square test: compare proportions, 2×2 table may be used to compare the observed values with the expected value \* Precision is the measure of random error. The tighter the confidence interval, the more precise the result increasing the sample size increases precision