

# Biostatistics Study Cheat Sheet



## Summary of Data Types

	<u>Nominal</u>	<u>Ordinal</u>	<u>Continuous</u>	
			<u>Interval</u>	<u>Ratio</u>
Definition:	Data without order or indication of relative severity	Data ranked in a specific order but without a consistent magnitude	Data ranked in a specific order that includes a constant difference in magnitude of change. Zero is arbitrary	Data ranked in a specific order that includes a constant difference in magnitude of change. Zero is <b>NOT</b> arbitrary.
Examples:	Sex, mortality	Trauma score	Temperature	Blood pressure, heart rate
Eligible for parametric tests:	No	No	If normally distributed	
Typical measure of central tendency:	Not applicable	Median	Mean / average	

## EQUATIONS

	Outcome Yes	Outcome No
<b>Intervention</b>	Group A	Group B
<b>Control</b>	Group C	Group D

$$\text{Intervention event rate} = A/B$$

$$\text{Control event rate} = C/D$$

$$\text{OR} = (A/C) / (B/D) \text{ or } (AD/BC)$$

$$\text{RR} = A/(A+B) - C/(C+D)$$

$$\text{RRR} = 1 - \text{RR}$$

$$\text{ARR} = A/(A+B) - C/(C+D)$$

$$\text{NNT} = 1/\text{ARR}$$

$$\text{Power} = 1 - \beta$$

If the...	...it will...
Sample size decreases	Make the study require less resources to perform
Sample size increases	Increased the power
Power increases	Make results more reliable
Confidence interval narrows	Reduce uncertainty
P-value gets smaller	Reduce likelihood outcomes occurred by chance
Standard deviation gets smaller	Imply reduced variability in the sample
Data is not normally distributed	Not allow for parametric tests to be used
Odds ratio is < 1	Make the outcome less likely in the intervention group
Relative risk is < 1	Suggest a negative association between the intervention & outcome
ARR becomes less	Mean the intervention is less meaningful
Alpha increases	Increase the chance of a type I error
Beta increases	Increase the chance of a type II error
Study has extreme outliers	Not impact the median as much as it would impact the mean

When the...	...it means...
Data being produced by a project is intended to contribute to generalizable knowledge	It is a research project
Study poses any threat to human subjects	Institutional review board approval is required
Conclusion is that there is a difference when there actually is no difference	A type I error has occurred
Conclusion is that there is no difference when there actually is a difference	A type II error has occurred
Subject remembers an event differently from how it occurred	There is recall bias
Study subjects alter their behavior due to awareness of being in a study	The Hawthorne Effect is occurring
Study design is not consistent with standard clinical practices	The study has limited external validity
Study is observational in design	There is no intervention group
Study is a snapshot of a population at one point in time	It is a cross-sectional study
Design is a case-control study	It is a retrospective study
Use of multivariate logistical regression is employed	Independent variables can be identified

**Abbreviations:** ARR = absolute risk reduction, NNT = number needed to treat, OR = odds ratio, RR = relative risk, RRR = relative risk ratio