

# Choosing a Statistical Test

The most common tests in health care research

<https://www.youtube.com/watch?v=UaptUhOushw>

# Many possibilities

- Estimate Population Proportion
- Estimate Population Mean
- One Sample Proportion
- Two Sample Proportions
- One Sample t (Mean)
- Two Sample t (Mean)
- Paired t
- Correlation/Regression Analysis
- One-Way ANOVA
- Two-Way ANOVA
- Chi Square Test
- One Sample Variance
- Two Sample Variances
- Wilcoxon rank-sum test
- Kruskal-Wallis test

## Most common

- One-Way ANOVA
- One Sample Proportion
- Two Sample Proportions
- One Sample  $t$  (Mean)
- Two Sample  $t$  (Mean)
- Paired  $t$
- Correlation/Regression Analysis

# The Common Tests Arranged

	1 sample proportion	1 sample t	
	2 sample proportions	2 sample t	
		2 sample t Paired t	Correlation/ Regression
		One-Way ANOVA	

# Q1: What type of data do you have?

## Categorical (often called rates)

- Mortality Rates (death/survival)
- Patient Falls Rates (fall/not fall)
- Compliance with Discharge Instructions (yes/no)

## Quantitative

- Measurements
  - Temperatures
  - Blood Pressures
  - Pain Scale 1 to 10
- Counts
  - Number of Complications
  - Number of Hospital Visits
- Pre-established Scales

# Q1: What type of data do you have?

## Categorical (often called rates)

- Mortality Rates (death/survival)
- Patient Falls Rates (fall/not fall)
- Compliance with Discharge Instructions (yes/no)

## Quantitative

- Measurements
  - Temperatures
  - Blood Pressures
  - Pain Scale 1 to 10
- Counts
  - Number of Complications
  - Number of Hospital Visits
- Pre-established Scales

## Q2: How many samples do you have?

- One Sample
  - Usually means I am making a comparison against a historic or global value
- Two Samples
  - Traditional control group vs. test group in an experiment
  - Comparing the one group to the other group
- Two Samples Special (or Two-ish Samples)
  - One sample of people, but two different measurements made
  - Two samples of people, but for each person in one sample, there is a natural pairing with one person in the other sample
- Three or More Samples
  - Comparing the three groups to each other

# A bit more on the Two Samples Special

- One Sample with Two Measurements
  - Before and after weights with a diet
  - Temperature under right armpit and under left armpit
  - BMI and Systolic Blood Pressure
  - Could be comparing the two measurements
  - Could be looking for a relationship between the two measurements
- Two Samples with natural pairing
  - Mothers and their babies
  - Identical Twins
  - Wives and their husbands
  - Almost always looking for a relationship between the two measurements
  - Occasionally comparing the two measurements



	Separated by Type of Data and Number of Samples		
	Categorical Data	Quantitative Data	
One Sample	1 sample proportion	1 sample t	
Two Samples	2 sample proportions	2 sample t	
Two Samples Special		2 sample t Paired t	Correlation/ Regression
Three or more samples		One-Way ANOVA	

## Q3: What is the test supposed to do?

### Compare the data

- Does my one sample match or differ from a global or historic value?
- Are my two samples the same or different from each other?
- Are my three or more samples the same or different from each other?

### Seek a relationship

- Note: This is only for the two samples – special
- Does one measurement predict the other?
- Does one measurement depend on the other?
- Is there a trend between the two sets of measurements?

## 2-sample t vs. paired t

- We have two samples – special (usually one sample from which two measurements have been made)
- We want to compare the two sets of data
- 2-sample t just compares the two sets of data, ignoring the connection between the two samples
- Paired t asks, if I subtracted the one measurement from the other, what could I determine about the difference between them
  - Most often used for before and after data