

# Biostatistics Rx Course Outline



## Biostatistics Rx

A practical guide to study design and evaluation for healthcare providers

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### Course Learning Objectives

1. Classify types of data and outline appropriate descriptive statistics to summarize these data.
2. Explain hypothesis testing in inferential statistics and interpret the results of these tests.
3. Describe the most appropriate inferential statistical test based on the type of data being analyzed.
4. Interpret the results of correlation and regression testing.
5. Discuss the types of study designs and identify each design's threats to validity, biases, confounding, and other limitations.

### Course Modules

#### Module 1 - Introduction and Course Overview

1. Introduction and Course Overview

#### Module 2 – Visualizing and Describing Data with Descriptive Statistics

1. Types of Data
2. Histograms and Normal Distribution
3. Module 2, Quiz 1
4. Descriptive Statistics
5. Boxplots and Outliers
6. Module 2, Quiz 2
7. Confidence Intervals
8. Expressing Risk
9. Diagnostic Test Performance Statistics
10. Module 2 – Exam

#### Module 3 – Core Concepts of Inferential Statistics

1. Inferential Statistics

2. P-Values
3. Module 3, Quiz 1
4. Statistical Power
5. Type I and II Errors
6. Module 3, Quiz 2
7. Hypothesis Testing (for Nerds)
8. Module 3 – Exam

#### **Module 4 – Basic Hypothesis Testing**

1. Statistical Test Selection
2. Comparing Means of Two Groups
3. Comparing Means of Three or More Groups
4. Module 4, Quiz 1
5. Comparing Medians
6. Comparing Frequencies with Chi Square
7. Comparing Frequencies with Chi Square Variants
8. Module 4, Quiz 2
9. Time-Dependent Analysis
10. Statistical Test Review
11. Module 4 – Exam

#### **Module 5 – Measuring Relationships Between Data**

1. Correlation
2. Linear Regression
3. Module 5, Quiz 1
4. Logistic Regression
5. Module 5 – Exam

#### **Module 6 – Clinical Trial Design and Evaluation**

1. Observational Studies
2. Experimental Studies
3. Meta-Analysis
4. Module 6, Quiz 1
5. Hypothesis and Endpoints
6. Interim Analysis and DSMB
7. Superiority and Non-Inferiority
8. Module 6, Quiz 2
9. Randomization, Blinding, Run-In
10. Study Results
11. Study Validity, Biases, Confounders
12. Module 6, Quiz 3

13. Meta-analysis Appraisal

14. Module 6 - Exam

Module 7 – Final Exam and Course Wrap-Up

1. Biostatistics Rx - Final Exam

2. Congrats and Next Steps

3. End-of-Course Survey