CONCEPT

Biostatistics and Medical Statistics: Clinical Effect Measures, Survival and Diagnostic Accuracy

20 – 24 December 2026
Dammam - Eastern Province five-star



Biostatistics and Medical Statistics: Clinical Effect Measures, Survival and Diagnostic Accuracy

Ref: 834_20424 **Date:** 20 – 24 December 2026 **Location:** Dammam - Eastern Province five-star **Fees:** 19500 SAR

Introduction:

Biostatistics and medical statistics sit behind every clinical audit, research protocol and journal club, yet many health teams still quote a relative risk without its confidence interval, confuse prevalence with incidence or accept a diagnostic test on sensitivity alone. This Core Concept course trains clinical, quality and research staff to summarise patient data, calculate rates and association measures, choose and read the right significance test, interpret survival curves and diagnostic accuracy figures and appraise published trials. Participants produce a Clinical Data Analysis and Study Appraisal Report on a case dataset and a published paper.

Course Objectives:

- Summarise clinical and laboratory data with the correct descriptive measures and probability distribution for each variable type
- Calculate incidence, prevalence and age-standardised rates to compare disease frequency between patient groups and time periods
- Compute and interpret relative risk, odds ratio, number needed to treat and hazard ratio with confidence intervals and p-values
- Select and read the appropriate t, chi-square or rank-based test, correlation or regression output for a clinical question
- Estimate sample size and power for a study and interpret Kaplan-Meier survival and diagnostic accuracy results including ROC analysis
- Appraise a published clinical study for bias and statistical errors and present health statistics clearly to clinical and management audiences

Target Audience:

- Clinical staff who read published trials and apply their findings to patient care protocols and pathways
- Quality and patient safety staff who analyse clinical audit, indicator and incident data
- Clinical research coordinators and study staff who prepare protocols, sample size justifications and results tables
- Infection prevention staff who calculate device-associated infection rates and compare wards over time
- Health information staff who produce statistical reports for clinical departments and committees
- Pharmacy and laboratory staff who weigh drug evidence and diagnostic test performance

Course Outline:

Day 1: Health Data Types, Descriptive Summaries and Disease Frequency

- Clinical Variable Types: Nominal, Ordinal, Discrete and Continuous Patient Measurements
- Mean, Median, Standard Deviation and Interquartile Range for Skewed Laboratory Values
- Normal, Binomial and Poisson Distributions in Clinical Measurements and Event Counts
- Incidence Proportion, Incidence Density per Person-Years and Point Prevalence
- Direct and Indirect Age Standardisation with the Standardised Mortality Ratio

Day 2: Estimation, Inference and Measures of Association

- Standard Error and 95 Percent Confidence Intervals for Proportions and Means
- P-Values, Type I and Type II Errors and Clinical Versus Statistical Significance
- Two-by-Two Table Build: Risk Difference, Relative Risk and Number Needed to Treat
- Odds Ratio, Log Odds Ratio Confidence Interval and the Rare Disease Assumption
- Hazard Ratio Interpretation in Time-to-Event Trial Reports

Day 3: Choosing and Reading Significance Tests, Correlation and Regression

- Test Selection Flowchart by Outcome Type, Number of Groups and Pairing
- Unpaired and Paired t-Tests for Blood Pressure and Biomarker Comparisons
- Chi-Square and Fisher Exact Tests for Treatment Response Proportions
- Rank-Based Alternatives for Skewed Outcomes: Wilcoxon and Kruskal-Wallis Tests
- Correlation Coefficients, Simple Linear Regression and Logistic Regression Odds Output

Day 4: Sample Size, Survival Analysis and Diagnostic Test Accuracy

- Sample Size and Power Calculation from Effect Size, Alpha and Dropout Allowance
- Kaplan-Meier Survival Curves, Right-Censoring and the Log-Rank Test
- Cox Proportional Hazards Model Output for Covariate-Adjusted Survival
- Sensitivity, Specificity, Predictive Values and Likelihood Ratios from a Diagnostic Table
- ROC Curve Construction, Area Under the Curve and Cut-Off Selection

Day 5: Case Work: Clinical Data Analysis and Study Appraisal Report

- Randomised Trial Review with the Cochrane Risk of Bias Tool
- CASP Checklist Appraisal of a Cohort or Diagnostic Accuracy Paper
- Confounding, Multiple Comparisons and Bonferroni Adjustment Checks in Published Results
- Health Statistics Presentation: Forest Plots, Survival Charts and Plain-Language Summaries
- Clinical Data Analysis and Study Appraisal Report Build and Peer Defence

Skills You Will Gain:

- Clinical Data Summarisation
- Disease Rate Standardisation
- Effect Measure Interpretation
- Significance Test Selection
- Sample Size Estimation
- Survival Curve Interpretation
- Diagnostic Accuracy Assessment
- Clinical Study Appraisal

Why Attend This Course:

- Leave with a Clinical Data Analysis and Study Appraisal Report built on a case dataset and a published paper
- Challenge study claims in journal clubs and committees by checking confidence intervals, bias and power rather than headline p-values
- Judge whether a new diagnostic or screening test suits your patient population using predictive values at local prevalence
- Compare statistical practice with clinicians, quality staff and researchers from hospitals, primary care, laboratories and research units

Conclusion:

Sound clinical and quality decisions depend on reading health numbers correctly: knowing which rate, which effect measure and which test fits the question, and how much uncertainty surrounds each estimate. The course moves from data types, descriptive summaries and disease frequency, through confidence intervals, p-values and association measures, to significance tests, regression, sample size, survival analysis and diagnostic accuracy. The final day applies these methods to a case dataset and a published paper and produces a Clinical Data Analysis and Study Appraisal Report.