Table of Contents

List of Figures.
List of Tables.
Preface.
Acknowledgments.
1. Introduction.
1.1 Diagnostic Test Accuracy Studies.
1.2 Case Studies.
1.3 Software.
1.4 Topics Not Covered in This Book.
2. Measures of Diagnostic Accuracy.
2.1 Sensitivity and Specificity.
2.2 Combined Measures of Sensitivity and Specificity.
2.3 Receiver Operating Characteristic (ROC) Curve.
2.4 Area Under the ROC Curves.
2.5 Sensitivity at Fixed FPR.
2.6 Partial Area Under the ROC Curve.
2.7 Likelihood Ratios.
2.8 ROC Analysis When the True Diagnosis is Not Binary.
2.9 C-Statistic and Other Measures to Compare Prediction Models.
2.10 Localization and Detection of Multiple Lesions.
2.11 Positive and Negative Predictive Values, Bayes Theorem, and Case Study #2.
2.12 Optimal Decision Threshold on the ROC Curve.
2.13 Interpreting the Results of Multiple Tests.
3. Design of Diagnostic Accuracy Studies.
3.1 Establish the Objective of the Study.
3.2 Identify the Target Patient Population.
3.3 Select a Sampling Plan for Patients.
3.4 Select the Gold Standard.
3.5 Choose a Measure of Accuracy.
3.6 Identify Target Reader Population.
3.7 Select Sampling Plan for Readers.
3.8 Plan Data Collection.
3.9 Plan Data Analyses.
3.10 Determine Sample Size.

4. Estimation and hypothesis testing in a single sample.
4.1 Binary Data.
4.2 Original Data.
4.3 Continuous Data.
4.4 Testing the hypothesis that the ROC area or partial area is a specific hypothesized value.

5. Comparing the Accuracy of Two Diagnostic Tests.
5.1 Binary-Scale Data.
5.2 Original- and Continuous-Scale Data.
5.3 Tests of Equivalence.

6.1 Studies Estimating the Accuracy of a Single Test.
6.2 Sample Size for Detecting a Difference in Accuracies of Two Tests.
6.3 Sample Size for Assessing Non-Inferiority or Equivalency of Two Tests.
6.4 Sample Size for Determining a Suitable Cuto? Value.
6.5 Sample Size Determining for Multi-Reader Studies.
6.6 Alternative to Sample Size Formulae.

7. Issues in Meta-analysis for Diagnostic Accuracy Studies.
7.1 Objectives.
7.2 Retrieval of the Literature.
7.3 Inclusion/exclusion criteria.
7.4 Extracting information from the literature.
7.5 Statistical analysis.
7.6 Public presentation.

Part II. Advanced Methods.
8. Regression Analysis for Independent ROC Data.
8.1 Four Clinical Studies.
8.2 Regression Models for Continuous-Scale Tests.
8.3 Regression Models for Ordinal-Scale.

9. Analysis of Multiple Reader and/or Multiple Test Studies.
9.1 Studies Comparing Multiple Tests with Important Patient Covariates.
9.2 Studies with Multiple Reader and Multiple Tests.
9.3 Analysis of Multiple Tests Designed to Locate and Diagnose Lesions.

10. Methods for Correcting Verification Bias.

10.1 Examples.

10.2 Impact of Verification Bias.

10.3 A Single Binary Scale Test.

10.4 Correlated Binary Scale Tests.

10.5 A Single Ordinal Scale Test.

10.6 Correlated Ordinal Scale Tests.

10.7 Continuous-Scale Tests.


11.1 Examples.

11.2 Impact of Imperfect Gold Standard Bias.

11.3 One Single Binary Test in a Single Population.

11.4 One Single Binary Test in G Populations.

11.5 Multiple Binary Tests in One Single Population.

11.6 Multiple Binary Tests in G Populations.

11.7 Multiple Ordinal-Scale Tests in One Single Population.

11.8 Multiple Continuous-Scale Tests in One Single Population.


12.1 Binary Data.

12.2 Ordinal or Continuous Data.

12.3 ROC Curve Area.