

# Contents

<b>Preface</b>	<b>xi</b>
<b>1. Introduction</b>	<b>1</b>
1.1 Why Analyze Health Surveys?, 1	
1.2 Conducting a Large-scale Health Survey: The Third National Health and Nutrition Examination Survey, 3	
1.3 Common Types of Health Surveys and Their Sample Designs, 5	
1.4 Sampling Frames, 6	
1.5 The Complexity of Analyzing Survey Data: A Preview, 7	
<b>2. Basic Survey Methodology</b>	<b>8</b>
2.1 Introduction, 8	
2.2 Single-Stage Sampling Plans, 9	
2.3 Multistage Sampling, 16	
2.4 Variance Estimation of Functions of Estimators: Linearization, 23	
2.5 Replication Methods of Variance Estimation: The Jackknife, Balanced Half-Sample Replication, and the Bootstrap, 29	
2.6 Using Auxiliary Population Information to Analyze Survey Data: Poststratification, and Ratio and Regression Estimators, 35	
2.7 Nonsampling Errors: Nonresponse, Sampling Frame Undercoverage, and Measurement Error, 39	
2.8 Some Other Types of Surveys, 45	
2.9 Notes, 48	
2.10 Problems, 50	

<b>3. Statistical Analysis with Survey Data</b>	<b>61</b>
3.1 Introduction, 61	
3.2 Inference for a Single Variable: Means, Measures of Dispersion, Proportions, Totals, and Percentiles, 61	
3.3 Comparisons Between Two Means: T-Tests and Tests of Proportions, 75	
3.4 Scatterplots, 79	
3.5 Linear Regression and Analysis of Variance, 89	
3.6 Logistic Regression: Analysis of Categorical Outcomes, 100	
3.7 Survival Analysis: Analysis of Cohort Data, 117	
3.8 Predictive Margins (Direct Standardization), 126	
3.9 Analyses Restricted to Subpopulations, 140	
3.10 Other Types of Analyses, 141	
3.11 Notes, 143	
3.12 Problems, 144	
<b>4. Sample Weights and Imputation</b>	<b>159</b>
4.1 Introduction, 159	
4.2 Components of Sample Weights, 160	
4.3 Weighted Versus Unweighted Estimates of Population Parameters, 165	
4.4 The Inefficiency of Using Sample Weights, 172	
4.5 Modeling the Survey Design—An Alternative to Weighted Estimation, 177	
4.6 Summary of Recommendations for Utilizing Sample Weights, 180	
4.7 Imputation for Missing Data, 182	
4.8 Notes, 185	
4.9 Problems, 185	
<b>5. Additional Issues in Variance Estimation</b>	<b>192</b>
5.1 Introduction, 192	
5.2 Limited Degrees of Freedom for Variance Estimation, 193	
5.3 Strata with One Sampled Primary Sampling Unit, 203	
5.4 Variance Estimation for Subpopulations, 207	
5.5 Variance Estimation with Imputed Values, 211	
5.6 Generalized Variance Functions, 218	
5.7 Variance Estimation for Superpopulation Inference, 225	

5.8	Notes, 228	
5.9	Problems, 229	
<b>6.</b>	<b>Cross-Sectional Analyses</b>	<b>235</b>
6.1	Introduction, 235	
6.2	Identifying Individuals at High Risk for Snuff Use, 236	
6.3	Blood Lead Levels and Blood Pressure, 247	
6.4	Poverty Index and Height in Children, 254	
6.5	Notes, 258	
6.6	Problems, 258	
<b>7.</b>	<b>Analysis of Longitudinal Surveys</b>	<b>260</b>
7.1	Introduction, 260	
7.2	Body Iron Stores and the Risk of Developing Cancer, 262	
7.3	Estimating the Transition Probabilities of Becoming Disabled and Recovering from Disability in Old Age, 269	
7.4	Notes, 276	
7.5	Problems, 276	
<b>8.</b>	<b>Analyses Using Multiple Surveys</b>	<b>278</b>
8.1	Introduction, 278	
8.2	Revising Sample Weights from Multiple Surveys of a Population, 281	
8.3	Growth Charts, 284	
8.4	Changing Rates of Mammography Screening, 286	
8.5	COMMIT, a Community Intervention Trial of Smoking Cessation, 292	
8.6	Notes, 300	
8.7	Problems, 301	
<b>9.</b>	<b>Population-Based Case-Control Studies</b>	<b>304</b>
9.1	Introduction, 304	
9.2	Alcohol Consumption and Digestive Cancer Mortality, 308	
9.3	Skin Sun-Susceptibility and Nonmelanoma Skin Cancer, 322	
9.4	Notes, 327	
9.5	Problems, 330	

<b>Appendix A. Surveys Analyzed in This Book</b>	<b>333</b>
A.1 Current Population Survey (CPS), 333	
A.2 Hispanic Health and Nutrition Examination Survey (HHANES), 334	
A.3 Longitudinal Study of Aging (LSOA), 334	
A.4 First National Health and Nutrition Examination Survey (NHANES I), 336	
A.5 NHANES I Epidemiologic Followup Study, 337	
A.6 Second National Health and Nutrition Examination Survey (NHANES II), 337	
A.7 Third National Health and Nutrition Examination Survey (NHANES III), 338	
A.8 1990 National Hospital Discharge Survey (1990 NHDS), 338	
A.9 National Health Interview Survey (NHIS), 339	
A.10 1988 National Maternal and Infant Health Survey (1988 NMIHS), 339	
A.11 1986 National Mortality Followback Survey (1986 NMFS), 340	
<b>Appendix B. Linearization for Implicit Functions of Weighted Sums</b>	<b>341</b>
<b>Appendix C. Restricted Cubic Regression Splines</b>	<b>345</b>
<b>References</b>	<b>347</b>
<b>Author Index</b>	<b>369</b>
<b>Subject Index</b>	<b>377</b>