

---

# TABLE OF CONTENTS

---

About the Editors xi

About the Authors xiii

Preface xxi

---

## **PART ONE: BACKGROUND 1**

- 1 Introduction: Advancing Methods in Social Epidemiology 3  
J. Michael Oakes and Jay S. Kaufman
- 2 The History of Methods of Social Epidemiology to 1965 21  
Christopher S. Hamlin

---

## **PART TWO: MEASURES AND MEASUREMENT 45**

- 3 Indicators of Socioeconomic Position 47  
Bruna Galobardes, Mary Shaw, Debbie A. Lawlor, George Davey Smith,  
and John Lynch

- 4 Measuring and Analyzing “Race,” Racism, and Racial Discrimination 86  
Saffron Karlsen and James Yzet Nazroo
- 5 Measuring Poverty 112  
David M. Betson and Jennifer L. Warlick
- 6 Measuring Health Inequalities 134  
Sam Harper and John Lynch
- 7 A Conceptual Framework for Measuring Segregation and Its Association with Population Outcomes 169  
Sean F. Reardon
- 8 Measures of Residential Community Contexts 193  
Patricia O’Campo and Margaret O’Brien Caughy
- 9 Using Census Data to Approximate Neighborhood Effects 209  
Lynne C. Messer and Jay S. Kaufman

---

**PART THREE: DESIGN AND ANALYSIS 237**

- 10 Community-Based Participatory Research: Rationale and Relevance for Social Epidemiology 239  
Paula M. Lantz, Barbara A. Israel, Amy J. Schulz, and Angela Reyes
- 11 Network Methods in Social Epidemiology 267  
Peter V. Marsden
- 12 Identifying Social Interactions: A Review 287  
Lawrence E. Blume and Steven N. Durlauf
- 13 Multilevel Studies 316  
Tony A. Blakely and S. V. Subramanian
- 14 Experimental Social Epidemiology—Controlled Community Trials 341  
Peter J. Hannan
- 15 Propensity Score Matching for Social Epidemiology 370  
J. Michael Oakes and Pamela Jo Johnson

16 Using Causal Diagrams to Understand Common Problems  
in Social Epidemiology 393

M. Maria Glymour

17 Natural Experiments and Instrumental Variable Analyses in  
Social Epidemiology 429

M. Maria Glymour

Name Index 461

Subject Index 469



---

## TABLES & FIGURES

---

### Tables

- 3.1. Occupational Groups Defined With the Registrar General Social Classes 51
- 3.2. Occupational Groups Defined With the Erikson and Goldthorpe Schema 52
- 3.3. Occupational Groups Defined With the NS-SEC Scheme 53
- 3.4. Occupational Groups Defined With Wright's Scheme 54
- 3.5. Occupational Groups Defined With the U.S. Census Occupational Scale 55
- 5.1. Impact of Alternative Resource Measures on Poverty Rates 125
- 5.2. Distribution of the Poor by the Amount of Their Unmet Needs (1994) 126
- 5.A.1. Official and Recommended Poverty Threshold for the Reference Family of Four (Two Adults and Two Children) 132
- 6.1. Commonly Used Disproportionality Functions 156
- 6.2. Educational Inequality in Current Smoking Among Females, 1965 and 2003 160
- 7.1. Properties of Segregation Measures 185
- 9.1. Maternal Characteristics in the  $\geq$  Twenty-Year-Old Non-Hispanic White and Non-Hispanic Black Vital Records Cohort by Area 218

- 9.2. Site-Specific and All-Site First Principal Component Score Loadings for Each MODE-PTD Site 220
- 9.3. Mean (SD) of Sociodemographic Data of Each MODE-PTD Site, Year 2000 U.S. Census Data 221
- 9.4. Percentage of White Non-Hispanic Low Birth Weight (LBW; Total Number of Births) and Q4–Q1, Q3–Q1 Risk Differences (RD; 95% Confidence Intervals [CI]) in the  $\geq$  Twenty-Year-Old Cohort in Each Quartile (Q) of Deprivation by MODE-PTD Geographic Area 224
- 9.5. Percentage of Black Non-Hispanic Low Birth Weight (LBW; Total Number of Births) and Q4–Q1, Q3–Q1 Risk Differences (RD; 95% Confidence Intervals [CI]) in the  $\geq$  Twenty-Year-Old Cohort in Each Quartile (Q) of Deprivation by MODE-PTD Geographic Area 226
- 10.1. Principles of Community-Based Participatory Research 242
- 13.1. A Classification of Ecological Variables 319
- 13.2. Three Types of Ecological Effect 321
- 13.3. Confounding as a Source of Error for Estimated Ecological Effects 323
- 14.1. ANOVA Partition of the Sums of Squares in a Single Cross-Section Group Randomized Trial Having Unit as a Random Effect 349
- 14.2. ANOVA Table for the Repeated Measures Analysis in a Nested Cohort Design, or the Pre/Post-Test Analysis in a Nested Cross-Section Design 358
- 14.3. Impact on the Factor ( $t_{1-\alpha/2} + t_{\text{Power}}$ ) in Power Calculations as a Function of *df* Available 361
- 15.1. Covariate Imbalance Across Exposure Groups Prior to Matching 384
- 15.2. Reduction in Covariate Imbalance After Matching on the Propensity Score 386

---

## Figures

- 1.1. Conceptual Framework for Multilevel Thinking 11
- 3.1. Examples of Indicators Measuring Life Course Socioeconomic Position 72
- 5.1. Census Poverty Rate by Age: 1966 to 2003 118
- 6.1. Mean and 10th–90th Percentiles of Body Mass Index By Education, 1997 U.S. National Health Interview Survey 137
- 6.2. Absolute and Relative Racial Inequality in Infant Mortality (Three-Year Moving Averages), U.S. 1900–2000 138

- 6.3. Relative Risk (RR) of Incident Cervical Cancer (1996–2000) Among Hispanics According to Varying Reference Groups 139
- 6.4. Age-Adjusted Incidence of Kidney/Renal Pelvis Cancer and Myeloma by Race and Ethnicity, 1996–2000 141
- 6.5. Proportion of Men Reporting Recent Use of Screening Fecal Occult Blood Tests (FOBT), by Race and Ethnicity, 1987–98 143
- 6.6. Percent Change in Population Size by Race and Hispanic Origin: 1980–2000 144
- 6.7. Income-Based Slope Index of Inequality in Current Smoking, NHIS 2002 149
- 6.8. Age-Adjusted Lung Cancer Mortality by US Division, 1968–1998 153
- 6.9. Graphical Example of the “Disproportionality” of Deaths and Population, by Gender and Education, 2000 156
- 6.10. Graphical Representation of the Gini Coefficient of Health Inequality 159
- 6.11. Relative and Absolute Health Concentration Curves for Current Smoking Among Female Education Groups, 1965 and 2003 161
- 7.1. The Checkerboard Problem 173
- 7.2. The Modifiable Areal Unit Problem 174
- 8.1. Cluster Map from Concept Mapping of Urban Neighborhood Factors and Intimate Partner Violence 203
- 8.2. Neighborhood Stabilization Factors and IPV Cessation 204
- 8.3. Neighborhood Monitoring Cluster and IPV 205
- 9.1. Hierarchy of Census Geographic Entities 211
- 9.2. Box Plot of All-Site Deprivation Index by MODE-PTD Site 222
- 9.3. Block Group Preterm Birth Proportions 227
- 9.4. Census Tract Preterm Birth Proportions 227
- 9.5. MSA Preterm Birth Proportions 228
- 9.6. Zip Code Preterm Birth Proportions 228
- 11.1. An 11-Element Network 270
- 13.1. Multilevel Structure of Repeated Measurements of Individuals Over Time Across Neighborhoods With Individuals Having Multiple Membership to Different Neighborhoods Across the Time Span 328
- 14.1. Variance of a Unit Mean as a Fraction of Within-Unit Variance,  $\sigma^2$ , Plotted Against the Number of Members Per Unit, at Different Levels of the Cluster Effect, VCR 351
- 14.2. Relationship Between the Detectable Difference ( $\Delta$ ) and Power 356
- 15.1. Conceptual Diagram of Target Values and Causal Contrast 372
- 15.2. Fictitious Graph of Overlap in Propensity Scores 379

15.3.	Overlap in Propensity Scores by Neighborhood Exposure Group	385
15.4.	Effect Estimates as a Function of Caliper Width	387
16.1.	An Example Causal DAG	399
16.2.	A DAG Depicting Confounding	402
16.3.	A DAG Under Which Conventional Confounding Rules Fail	403
16.4.	A DAG for Selection Bias	408
16.5.	A Simple Numerical Example of Survivor Bias	411
16.6.	Conditioning on a Missing Variable Indicator	413
16.7.	Tests for Direct Versus Mediated Effects	415
16.8.	Identifying a Valid Natural Experiment	417
16.9.	Conditioning on the Dependent Variable	419
16.10.	An Example When Baseline Adjustment Biases Analyses of Change	422
17.1a and b	Causal Diagrams Depicting a Valid Instrument	433
17.2a, b, and c	Causal Diagrams Depicting Invalid Instruments	434
17.3a, b, and c	Example Contrasting ITT, IV, and Population Average Causal Effect in Two Populations	441