

RAPID EPIDEMIOLOGICAL SURVEYS IN DEVELOPING COUNTRIES

This applied course will be taught like a workshop with a general outline (shown here), but no daily beginning or ending times. A hard copy of the Powerpoint slides will be available for enrolled students on the course website following each lecture (<http://www.ph.ucla.edu/epi/epi41804.html>).

I. Overview of Research Methods and Issues

A. Introduction

1. Instructors
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 - (2) frerichs@ucla.edu
 - (3) (310) 825-3286
2. Opening remarks
3. Introduction of faculty and students
 - a. Education and current position
 - b. Experience with research and services
 - c. Expectations of course
4. Objectives of course
5. Guide to course outline and readings
6. Approach to...
 - a. Policy issues
 - (1) Cost-benefit analysis and cost-effectiveness analysis
 - (2) Efficacy, effectiveness and efficiency
 - (3) Forms of evaluation
 - b. Applied research
 - (1) Morbidity and mortality outcomes
 - (2) Disability-adjusted life years (DALY's)
7. Rapid microcomputer-assisted surveys
 - a. Components
 - b. Hardware and software

B. Questions

1. Who is to be surveyed?
 - a. Target population
 - b. Study population
 - c. Potential bias
2. What unit is to be sampled?
 - a. Households
 - b. Individuals

- c. Episodes, events or beliefs
3. How much error is acceptable?
 - a. Truth
 - b. Systematic bias
 - c. Accuracy
4. How valuable is the information?

C. Planning a survey

1. Frequency of surveys
2. Required information and cost
3. Standardized measurements
4. Instruments for obtaining measurements
5. Plausible values for measurements (range check)
6. Determine sampling strategy and design
 - a. Simple random sampling
 - b. Systematic sampling
 - c. Stratified random sampling
 - d. Simple cluster sampling
 - e. Two stage cluster sampling

D. Interview surveys

1. General comments
2. Standardization
3. Recognition of reproductive conditions
 - a. Health professional
 - b. Respondent
4. Recognition of events
5. Sources of bias
 - a. Misclassification bias
 - b. Selection bias
 - c. Recall bias
 - d. Observation period bias

E. Hardware and Software

1. Portable computers
2. Portable printers
3. Software
 - a. Wordprocessing
 - b. Form-making
 - c. Sample management
 - d. Spreadsheet
 - e. Statistical software
 - (1) For frequencies, univariate and bivariate analyses of cluster surveys
 - (a) *Epi Info*
 - (2) For multivariate analyses of cluster surveys

(a) *Stata, Sudaan*

F. Rapid survey

1. Planning
 - a. Formulate the study objectives
 - b. State the aims
 - c. Identify the variables
 - d. Feasibility study
 - e. Conduct a small pilot study
2. Organizing and conducting
 - a. Approval
 - b. Involvement of local officials
 - c. Language problems
 - d. Introduction to subjects
 - e. Supervision
 - f. Preliminary analysis in field
 - g. Presentation of selected findings to local officials and guests
 - h. Final analysis
 - i. Write final report
3. Example (Myanmar)

G. Interview training

1. Types of interviews
 - a. Confidential
 - b. Non-confidential
2. Approach to interviews
3. Use of role playing
 - a. Example
 - b. Discussion

II. Statistical Methods and Issues For Rapid Surveys

A. General Notions

1. Data
 - a. Types of data
 - (1) Binomial
 - (2) Equal Interval
 - b. Average value of data
 - c. Analysis of data
 - (1) Equal interval
 - (2) Binomial
 - (3) Ratio estimator
 - d. Data and action
2. Variability and bias
 - a. Accuracy and precision

- b. Bias
- c. Standard error
- d. Confidence interval

B. Simple Random Sampling

- 1. Introduction
- 2. With or without replacement
- 3. Average value and standard error
- 4. Samples and elements
- 5. Survey of smoking behavior (example)

C. Equal Probability of Selection

- 1. Introduction
- 2. EPSEM sampling
- 3. PPS Sampling
- 4. Elementary units

D. Cluster Sampling

- 1. Introduction
- 2. Sampling of persons
- 3. Sampling of households
- 4. Sampling of persons/households

E. Variance of Cluster Sampling

- 1. Sampling of persons
 - a. Sampling unit same as elementary unit
 - b. Mean
 - (1) Binomial
 - (2) Equal interval
 - (3) Ratio estimator
 - c. Variance
 - (1) Binomial
 - (2) Equal interval
 - (3) Ratio estimator
- 2. Sampling of households
 - a. Sampling unit different from elementary unit
 - b. Unique variance formula
 - (1) Ratio estimator
- 3. Analysis of subgroups
 - a. Complications
 - (1) Incorrect analysis
 - (2) Correct analysis

F. Cluster Sampling for Common Events

1. Introduction
2. Steps for doing a EPI/WHO style two-stage cluster survey
3. Sample size determination
4. Design effect
5. Intraclass correlation coefficient

G. Other Uses of Cluster Sampling

1. Evaluation of WHO-style surveys
2. Other uses for cluster sampling
 - a. Measuring changes in level of an attribute over time
 - (1) Hypothesis testing versus interval estimation
 - (2) Type I and II errors
 - (3) Power of the test
 - b. Assessing the incidence of uncommon events
 - (1) Poor use of rapid surveys
 - (2) Exception is controls for case-control study
 - c. Applications

H. Cluster Sampling for Rare Events

1. Sample size determination
2. Approach favored by R. R. Frerichs
3. Sample size program (*C Survey*)
 - a. Interval estimation
 - b. Hypothesis testing

I. Improving Precision of Rapid Surveys

1. Theory
 - a. Reduction of design effect and intraclass correlation coefficient
2. Actual field experience
 - a. Rural Indonesia (Bali)
 - b. Urban Indonesia (Jakarta)

J. Improving the Accuracy of Cluster Surveys

1. Difference between accuracy and precision
2. Sources of potential bias
3. Non-response errors with two-stage cluster surveys
4. Modifications to improve accuracy

K. Example of Rapid Survey in an Urban Area

1. Los Angeles, California
2. Enumeration and interview phases
3. Use of volunteers
4. Modifications to address bias concerns

5. Details and analysis

L. Presentation of analysis findings

1. Objectives
2. Methods
3. Results
4. Discussion and recommendations

M. Final group project

1. Presented in-class on June 17, 2004 from 3:00 to 6:00 pm
 - a. Group A
 - b. Group B

III. Closing comments

GRADING

Classroom participation (sharing thoughts and ideas)	20%
Individual problem (due beginning of class, Thursday, May 13, 2004)	30%
Group problem (contribution to class survey, 3:00 to 6:00 pm, June 17, 2004)	50%

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4. Frerichs RR: Simple analytic procedures for rapid microcomputer-assisted surveys in developing countries. *Public Health Reports* 104 (1), 24-35, 1989b.
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8. Frerichs, RR: Cluster sampling, *Chapter Five*, in Rapid Surveys (in preparation).
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10. Bennett S, Woods T, Liyanage WM, Smith DL: A simplified general method for cluster-sample surveys of health in developing countries. *World Health Statistics Quarterly*, 44 (3), 98-106, 1991.
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- coverage in rural Burma. *Journal of Tropical Pediatrics* 34, 125-130, 1988b.
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