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Choice of Collection Method: The Telephone Survey

- Depends on
 - Target population
 - Concepts of interest
 - Available resources: time and \$
- Linked to:
 - Sampling strategy
 - Design of measures
 - Survey Management

Telephone Sample Selection

- List Samples : Coverage error?
 - Telephone Directories
 - Other directories
 - Other lists with respondents phone numbers—
land lines and cell phones
- Random Digit Dial

Waksburg-Mitofsky Two Stage Method—Random Digit Dial

area code

central office code

four -digit number

First Stage: Clusters of area code/central office code-primary
sampling unit

Second Stage: Numbers within clusters

First Stage RDD

- Secure list of all area codes and prefix or central office numbers Bellcore's computerized data base
- Determine how many clusters will be used - typically 50-100
- Using random selection- create primary sampling units of clusters- area code and central office codes
- Randomly assigned 4 digits to create ten digit numbers- identify phones with working numbers

Second Stage- RDD

- Clusters that have working numbers retained for next stage 410-971-3072 is within cluster 410-971-3000 to 3099
- Clusters with working numbers- last three digits are added and numbers randomly sampled for interviews
- Calls made until desired sample size is reached

Benefits of RDD strategy?

- Multi-level sampling strategy reduces calls to non-working numbers and non residential numbers?
- Includes unlisted households
- What kinds of error do these examples above describe?
- Other benefits: \$, quality control, etc

Disadvantages

- Cannot be used for cell phone calls—24.9% cell only households 2009
 - What kind of error results from this?
 - Potential for bias?
- Response rates to telephone surveys rapidly declining
 - Answering machines
 - Proliferation of sales calls—do not call lists
 - Caller id
- Breakoffs more common
- What about multiple lines per household?

Adding Cell Phones

- Can use modification of Waksburg-Mitofsky approach (need more cases to exclude dual households)
- Need to hand dial
- Cost burden for the respondent
- Lower response rate
- Context of call may not be in a residence
- SMS texting options

BRFSS

Table 1. Rates of Response to the Behavioral Risk Factor Surveillance System Survey, by State and Survey Mode, 2008

State	Cell Phone Only		Landline	
	No. of Respondents	Response Rate, % ^a	No. of Respondents	Response Rate, % ^a
California	286	14.21	11,598	36.83
Connecticut	236	24.27	6,155	39.17
Georgia	285	32.98	5,716	54.43
Hawaii	337	31.52	6,446	47.42
Iowa	250	55.86	6,012	59.30
Louisiana	304	36.02	6,182	47.82
Massachusetts	271	28.82	20,581	47.38
Michigan	260	38.75	9,453	54.09
Minnesota	437	44.31	4,287	60.46

Hu, S. S., et al. (2011) Improving public health surveillance using a dual-frame survey of landline and cell phone numbers. *American Journal of Epidemiology* 173:703-11

Table 3. Prevalence Estimates for Various Health Conditions and Behavioral Risk Factors in the Behavioral Risk Factor Surveillance System, by Survey Mode, and Adjusted Odds Ratios for Comparison of Survey Modes, 2008

Health Condition or Risk Factor	Prevalence Estimate ^a						χ^2 P Value ^b	Adjusted Odds Ratio ^c	95% CI	Relative Bias, %
	Landline and Cell Phone (n = 171,033)		Landline (n = 165,672)		Cell Phone Only (n = 5,361)					
	%	95% CI	%	95% CI	%	95% CI				
Self-rated health status of "feeling good or better"	82.7	82.3, 83.1	82.0	81.6, 82.4	86.6	85.1, 88.0	<0.01	0.932	0.804, 1.080	
Any kind of health-care coverage	83.7	83.2, 84.2	86.2	85.8, 86.6	70.4	68.4, 72.4	<0.01	0.550*	0.490, 0.617	2.90
Not receiving health care due to cost	15.0	14.6, 15.5	13.8	13.4, 14.1	21.8	20.0, 23.5	<0.01	1.392*	1.236, 1.567	-9.17
Ever having angina or coronary heart disease	4.2	4.0, 4.4	4.6	4.4, 4.8	1.9	1.3, 2.5	<0.01	0.991	0.717, 1.370	
Ever having asthma	14.3	13.9, 14.7	14.0	13.7, 14.4	15.6	14.0, 17.1	<0.05	1.003	0.884, 1.137	
Obese (body mass index ^d ≥ 30)	26.4	25.9, 26.9	26.7	26.3, 27.2	24.5	22.6, 26.4	<0.05	0.955	0.857, 1.064	
Current cigarette smoker	20.6	20.2, 21.1	18.7	18.3, 19.1	30.8	28.8, 32.7	<0.01	1.448*	1.274, 1.647	-10.25
Binge drinker	17.0	16.5, 17.4	14.8	14.4, 15.2	28.6	26.7, 30.6	<0.01	1.390*	1.245, 1.552	-14.81

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Improving telephone response rates

- BFRSS
 - Prenotification letters and messages on answering machines (raises response rate 6%)
 - Mail followup survey– increases under-represented groups (reverse directories yield 50-70% address matches)– being tested
 - Advantages– adding cell phone only adults shifts health indicators

Telephone: Constructing Interviews

- Needs of respondents
 - pronunciation of words
 - pace of interview
 - interview interruptions
 - response categories must match R's cognitive ability
- Needs of interviewers
 - transcripts and transitions
 - simple words
 - format-layout that flows
- Needs of coder/researcher
 - Complexity of programming interview

Strategies

- Emphasis on 1st few questions- early respondent engagement can reduce termination
- Conversational introduction example (Houtkoop-Steenstra, et al)

Multi-mode Strategies

- Can produce a study that maximizes advantages and minimizes disadvantages
- The National Survey of America's Families
Example— see www.urban.org
-- purpose to monitor well-being of America's families, especially low income families

NSAF

- RDD survey of households with children-with oversample of low-income families—(*why the oversample?*)
 - Telephone screening is the most efficient approach to identifying eligible families
 - Samples needed of families in 13 states so that analyses could be conducted separately by state as well a sample of US families
 - Therefore large sample sizes required
- What are major disadvantages of this approach?

- To complement the telephone survey— and in-person survey of non-telephone households was added to the study
 - Challenges—identifying non-telephone households
 - Combining two samples— increased survey error —why?

Controlling for Mode Effects

- Used in-person screening of households
- Followed by cell-phone interview
 - Advantages: R experienced same interview as RDD sample; Same level of quality control
 - Disadvantages: Practical problems with cell phone coverage—especially in the mountains

Addressing Response Rate Problems

- Advance Letter and Brochure
- Building on Family's interest in the topic
- Federal Express advance letter
- Incentives
- Second short survey of non-responders