Using Paradata to Assess and Monitor Data Quality in the National Health Interview Survey (NHIS)

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National Health Interview Survey

- NHIS – annual survey of the civilian, non-institutionalized population of the U.S.
- In-person interview with telephone follow-up allowed
- Approximately 35,000 families interviewed annually
- 4 core modules (Household, Family, Sample Child, Sample Adult)

Sources of NHIS Paradata

- Contact History Instrument (CHI)
  - Introduced in 2004
    - Produced by the Census Bureau
    - Used on other Census surveys
  - Launches each time interviewer accesses the CAPI instrument
  - Collects data on each visit attempt
    - Responding and nonresponding (in-scope) households
    - Out-of-scope households

Sources of NHIS Paradata

- Front/Back sections of survey instrument
  - Present on NHIS since late 1990's
  - Tailored to NHIS
  - Collects information about:
    - Language of interview
    - Cooperativeness of respondent
    - Mode of interview (personal visit vs. phone)
    - Reasons for partial/break-off interviews
    - Type of noninterview case

Sources of NHIS Paradata

- Audit trails
  - Record of keystrokes
    - Field times
    - Dates
    - Interviewer notes
- Time file
  - Interview times
  - Module/Section times

Examples of NHIS Research Using Paradata

- Exploring the determinants of initial contact with sample households
- Exploring the determinants of survey participation
- Assessing the impact of high effort interviews on health estimates
- Evaluating the impact of telephone follow-up on health estimates

Examples of NHIS Research Using Paradata

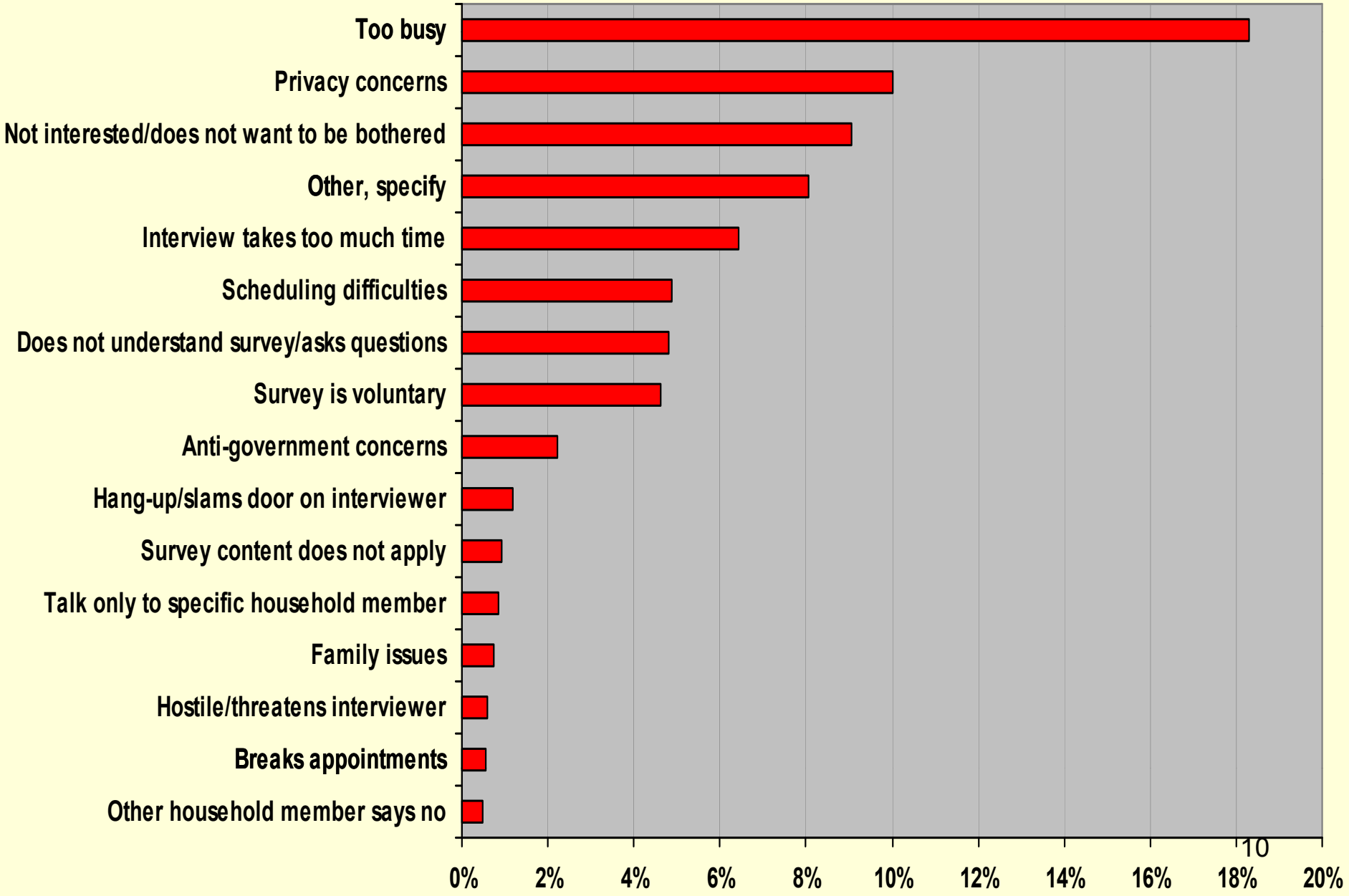
- Exploring reasons for conducting interviews by telephone
- Exploring reasons for partial interviews/breakoffs
- Evaluating the impact of participant reluctance on item nonresponse
- Monitoring interviewer performance

Participant Reluctance and Item Nonresponse

Participant Reluctance and Item Nonresponse

- Explore item nonresponse by whether or not reluctance expressed at first contact
  - Comparisons of refusal and don't know rates for 139 items (two-tailed t-tests)
  - Logistic regressions
- Utilizes NHIS data covering March 2005 through December 2007

Percent of Eligible Cases Where Household Members Expressed Concerns/Reluctance at First Contact (n=98,799): NHIS, 2005 (quarters 2-4) - 2007



Item Nonresponse Rates for Select Items by Concerns						
	Total Family Income		Weight		Usual Source of Care	
	R (%)	DK (%)	R (%)	DK (%)	R (%)	DK (%)
Too busy						
No	19.3**	12.4	2.7**	1.5	0.6**	0.0**
Yes	30.8**	11.1	5.5**	1.6	1.7**	0.2**
Privacy concerns						
No	18.7**	12.4**	2.7**	1.5	0.6**	0.1
Yes	45.1**	9.8**	6.7**	1.9	2.1**	0.1
Not interested						
No	19.4**	12.3**	2.7**	1.4**	0.6**	0.0*
Yes	49.1**	10.4**	9.8**	2.7**	3.9**	0.4*

R = refused; DK = don't know

* .01 ≤ p < .05; ** p < .01 (two-tailed t-test)

Item Nonresponse: Summary of Bivariate Results (two-tailed t-tests)		
	Comparisons of Refusal Rates (139 items)	**Comparisons of Don't know Rates (139 items)**
	Total Number of Sig. Differences (p < .05)	**Total Number of Sig. Differences (p < .05)**
Too busy		
Yes (vs. No)	137	60 (1 lower)
Privacy concerns		
Yes (vs. No)	138	21 (1 lower)
Not interested		
Yes (vs. No)	138	113 (1 lower)

NOTE: In parentheses is the number of items where mentions of the concern produced a significantly lower rate.

Summary

- Participant reluctance at first contact appears to have negative implications for data quality
  - Higher levels of item refusals in particular
    - Consistent effects observed in multivariate analyses
  - Magnitude of effects is larger for mentions of “not interested”
  - Multiple concerns foretell more problems

Interviewer Performance

- Response rate has been a primary tool by which we evaluate interviewers
- Continued pressure to maintain high response rates has led to interviewer shortcuts / violations of procedures
  - Not reading questions in their entirety
  - Interviewing an available (but wrong) respondent
  - Collecting partial information at the doorstep and entering the data later

Example:
Line Switching

Line Switching

- What is line switching?
  - The act of switching names on the household roster, after instrument selection of respondents, so that an available (but incorrect) person can be interviewed

Line Switching

- Household Roster:
  - 1. Jane Doe (60 yrs. White, Non-Hispanic)
  - 2. John Doe (66 yrs. Asian)
- Speaking to Jane Doe (line 1):
  - John Doe (line 2) selected as Sample Adult, not available
- After sample selection screen, immediate backup to household roster and names switched so that John Doe is line 1, Jane Doe is line 2
- Instrument still recognizes line 2 (but name is now Jane Doe) as Sample Adult

Line Switching

- What is line switching?
  - The act of switching names on the household roster, after instrument selection of respondents, so that an available (but incorrect) person can be interviewed
- Added an instrument flag in Q3, 2007, to capture changes to the name entries
- Household roster “locked down” starting Q3, 2008

Number of Cases Where the Entire Interview or Portion of the Interview Was Discarded because the Wrong Person Was Interviewed: NHIS, 2007 (Q3) – 2008 (Q1)

Regional Office	Number of Cases Where Entire Interview or Portion of Interview Was Discarded
Boston	12
New York	20 (13 from 1 interviewer)
Philadelphia	1
Detroit	7
Chicago	9
Kansas City	2
Seattle	12
Charlotte	18 (all from 1 interviewer)
Atlanta	7
Dallas	3
Denver	29 (18 from 1 interviewer)
Los Angeles	17
TOTAL	137 (43 different interviewers)

Example:
Knowledge of Heart Attack Symptoms

Knowledge of Heart Attack Symptoms

- Questions on knowledge of heart attack symptoms were administered to sample adults in 2001 (baseline) and 2008
  - Pain or discomfort in the jaw, neck or back
  - Feeling weak, lightheaded or faint
  - Chest pain or discomfort
  - Pain or discomfort in the arms or shoulder
  - Shortness of breath
- Comparisons of 2008 to 2001 estimates revealed unexpected declines in the percentage of adults who answered “yes” to each of these as symptoms of a heart attack

Heart Attack Symptoms: Time Estimates

- Estimate 20 seconds to read 5 items quickly in their entirety
- Estimate 13 seconds to read shortcut version of 5 items
- Reviewed audit trails for these items (Q1-Q3, 2008)
  - 27.9% of interviews took less than 20 seconds
  - 18.8% of interviews took less than 13 seconds

Audit Trail Examples

"3/17/2008 2:05:30 PM","Enter Field:ADULT.ACN.JAWP","Status:Normal","Value:"
"3/17/2008 2:05:30 PM","Leave Field:ADULT.ACN.JAWP","Cause:Next Field","Status:Normal","Value:2"
"3/17/2008 2:05:30 PM","Enter Field:ADULT.ACN.WEA","Status:Normal","Value:"
"3/17/2008 2:05:31 PM","Leave Field:ADULT.ACN.WEA","Cause:Next Field","Status:Normal","Value:2"
"3/17/2008 2:05:31 PM","Enter Field:ADULT.ACN.CHE","Status:Normal","Value:"
"3/17/2008 2:05:31 PM","Leave Field:ADULT.ACN.CHE","Cause:Next Field","Status:Normal","Value:2"
"3/17/2008 2:05:31 PM","Enter Field:ADULT.ACN.ARM","Status:Normal","Value:"
"3/17/2008 2:05:32 PM","Leave Field:ADULT.ACN.ARM","Cause:Next Field","Status:Normal","Value:2"
"3/17/2008 2:05:32 PM","Enter Field:ADULT.ACN.BRTH","Status:Normal","Value:"
"3/17/2008 2:05:33 PM","Leave Field:ADULT.ACN.BRTH","Cause:Next Field","Status:Normal","Value:2"

Audit Trail Examples

"3/19/2008 8:49:05 AM","Enter Field:ADULT.ACN.JAWP","Status:Normal","Value:"
"3/19/2008 8:49:06 AM","Leave Field:ADULT.ACN.JAWP","Cause:Next Field","Status:Normal","Value:1"
"3/19/2008 8:49:06 AM","Enter Field:ADULT.ACN.WEA","Status:Normal","Value:"
"3/19/2008 8:49:07 AM","Leave Field:ADULT.ACN.WEA","Cause:Next Field","Status:Normal","Value:1"
"3/19/2008 8:49:07 AM","Enter Field:ADULT.ACN.CHE","Status:Normal","Value:"
"3/19/2008 8:49:07 AM","Leave Field:ADULT.ACN.CHE","Cause:Next Field","Status:Normal","Value:1"
"3/19/2008 8:49:07 AM","Enter Field:ADULT.ACN.ARM","Status:Normal","Value:"
"3/19/2008 8:49:08 AM","Leave Field:ADULT.ACN.ARM","Cause:Next Field","Status:Normal","Value:1"
"3/19/2008 8:49:08 AM","Enter Field:ADULT.ACN.BRTH","Status:Normal","Value:"
"3/19/2008 8:49:08 AM","Leave Field:ADULT.ACN.BRTH","Cause:Next Field","Status:Normal","Value:1"

Example:
Knowledge of Heart Attack Symptoms
(refer to handout)

Knowledge of Heart Attack Symptoms

- For 14.7% (n=2,849) of sample adult interviews, the response to all five questions was “no”
  - The response set of “no” was observed for
    - 42.5% of interviews that took less than 13 seconds to complete the items
    - 5.6% of interviews that took 20 or more seconds to complete the items

Knowledge of Heart Attack Symptoms

- 395 interviewers worked at least one interview where all five items were completed in less than 13 seconds
  - 49 interviewers worked 20 or more interviews where all five items were completed in less than 13 seconds
  - 33 interviewers had 20 or more interviews where all five items were completed in less than 10 seconds

Interviewer Performance Indicators

- Need to move away from reliance on the response rate as an evaluation tool

- Developing indicators, using paradata, to track interviewer performance

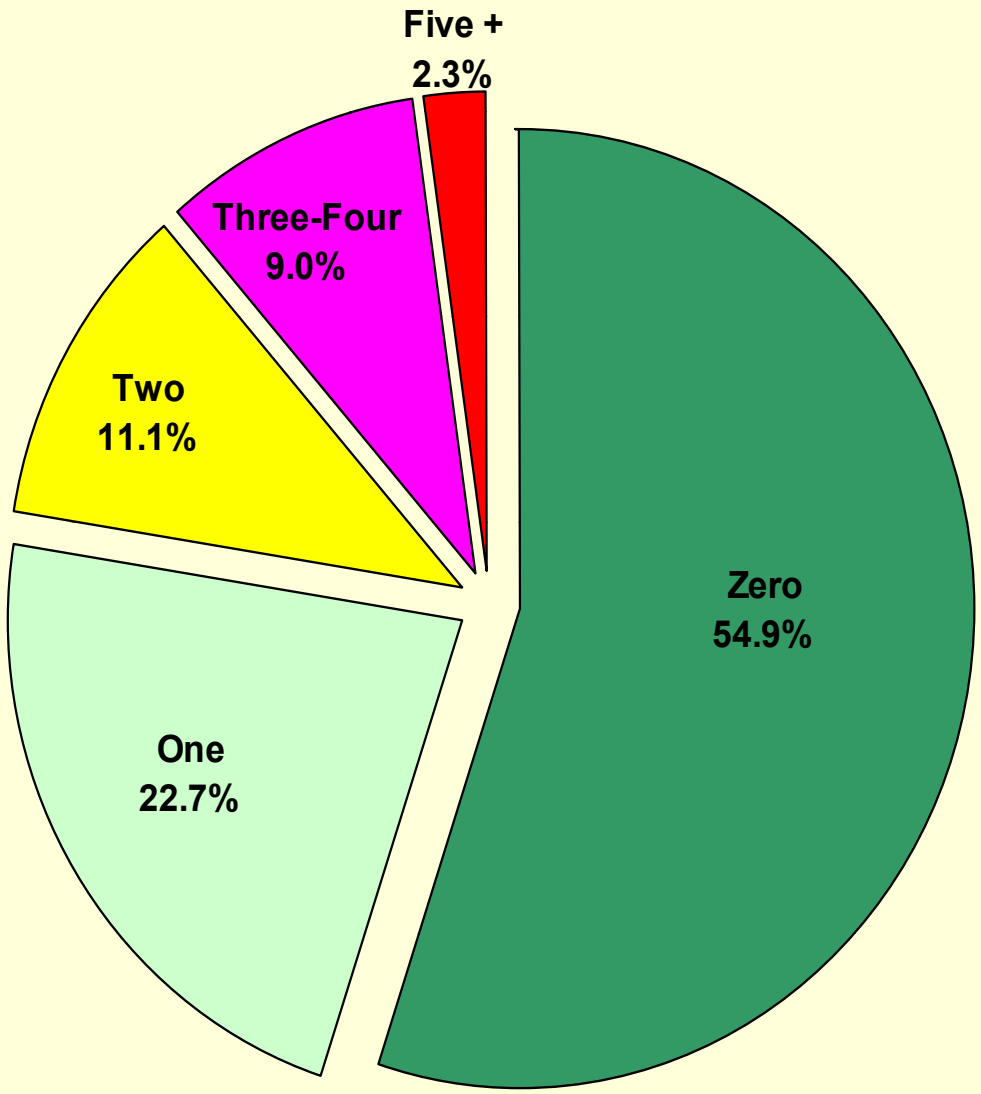
  – Time (interview, sub-unit)
  – Nonresponse (partial interviews, item nonresponse)
  – Mode
  – Miscellaneous

Interviewer Performance Indicators: Methodology

- Example: median sample adult time
  - Produce a median sample adult time for each interviewer
  - Obtain weighted distribution of interviewer sample adult times (weight by complete interviews)
  - Flag interviewers who fall in bottom 10%, 5%, and 1% of distribution and have worked 20 or more complete interviews
- Reporting mechanism (PANDA) with feedback loop

Percentage of Interviewers (n=731) Flagged on Zero, One, Two, Three to Four or Five or More of 16 Performance Indicators: NHIS, 2008 (Q1-Q3)

NOTE: Interviewers with 5 or more flags worked 4.3% of all interviews



Interviewer Performance

- Developed training modules with an emphasis on data quality and appropriate interviewing procedures
  - Computer-based training (CBT) covering 16 performance/procedure themes
  - 30-minute video using scenarios reinforces much of what is covered in the CBT
- Revised reinterview instrument for 2009

Summary

- NHIS paradata have been invaluable for ongoing research and monitoring activities focused on data quality
- Among others, future uses of paradata will include
  - continued tracking of interviewer performance and data quality
  - continued explorations of contact and cooperation propensities, and the development of new approaches for nonresponse adjustment
  - guiding and improving on-going data collection activities, including explorations of “responsive design” approaches