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

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National Center for Health Statistics

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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
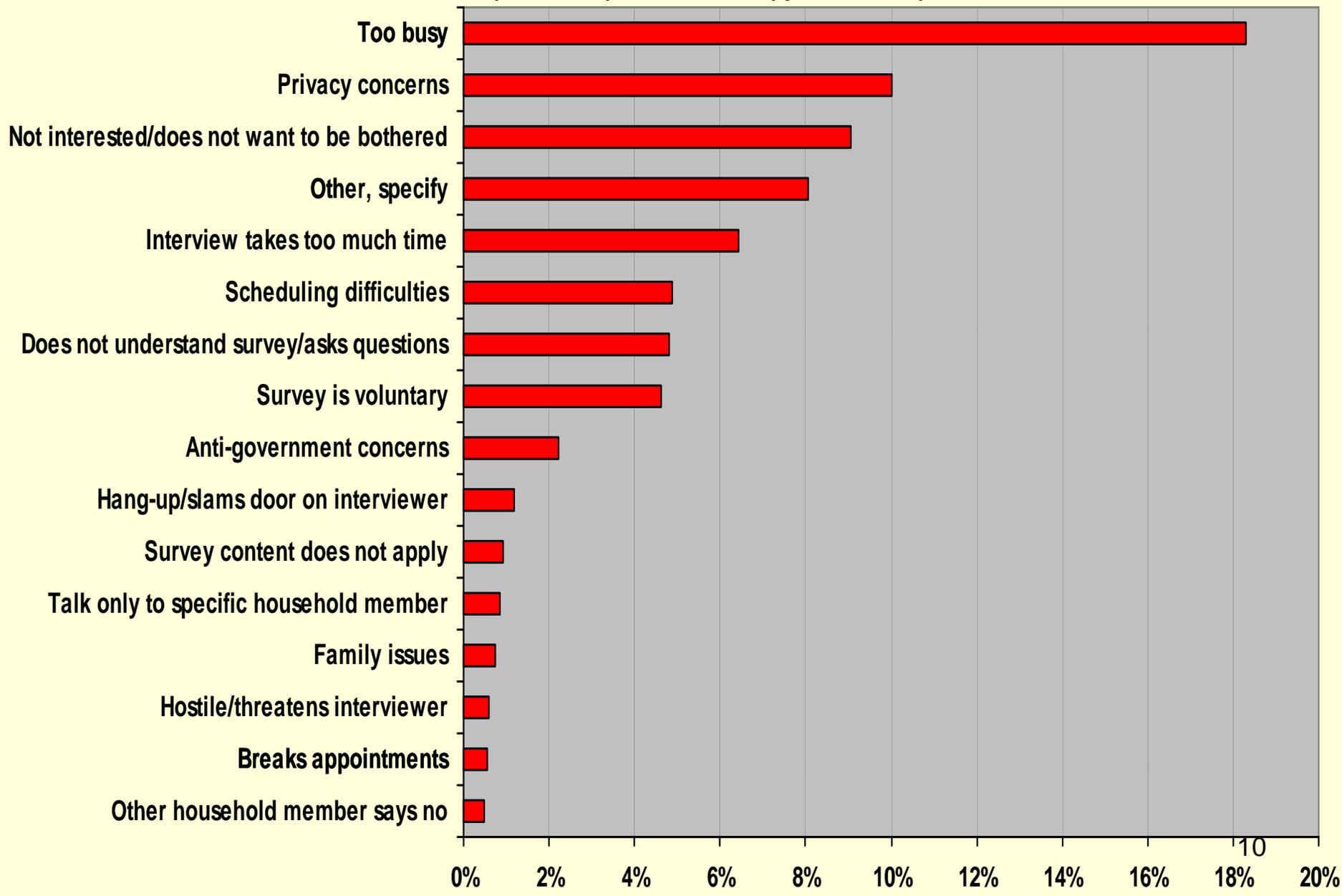
Examples of NHIS Research
Using Paradata

- 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

Category	
Too busy	
Privacy concerns	
Not interested/does not want to be bothered	
Other, specify	
Interview takes too much time	
Scheduling difficulties	
Does not understand survey/asks questions	
Survey is voluntary	
Anti-government concerns	
Hang-up/slams door on interviewer	
Survey content does not apply	
Talk only to specific household member	
Family issues	
Hostile/threatens interviewer	
Breaks appointments	
Other household member says no	

0% 2% 4% 6% 8% 10% 12% 14% 16% 18% 20%

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 $\leq$ 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

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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:"
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"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
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"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
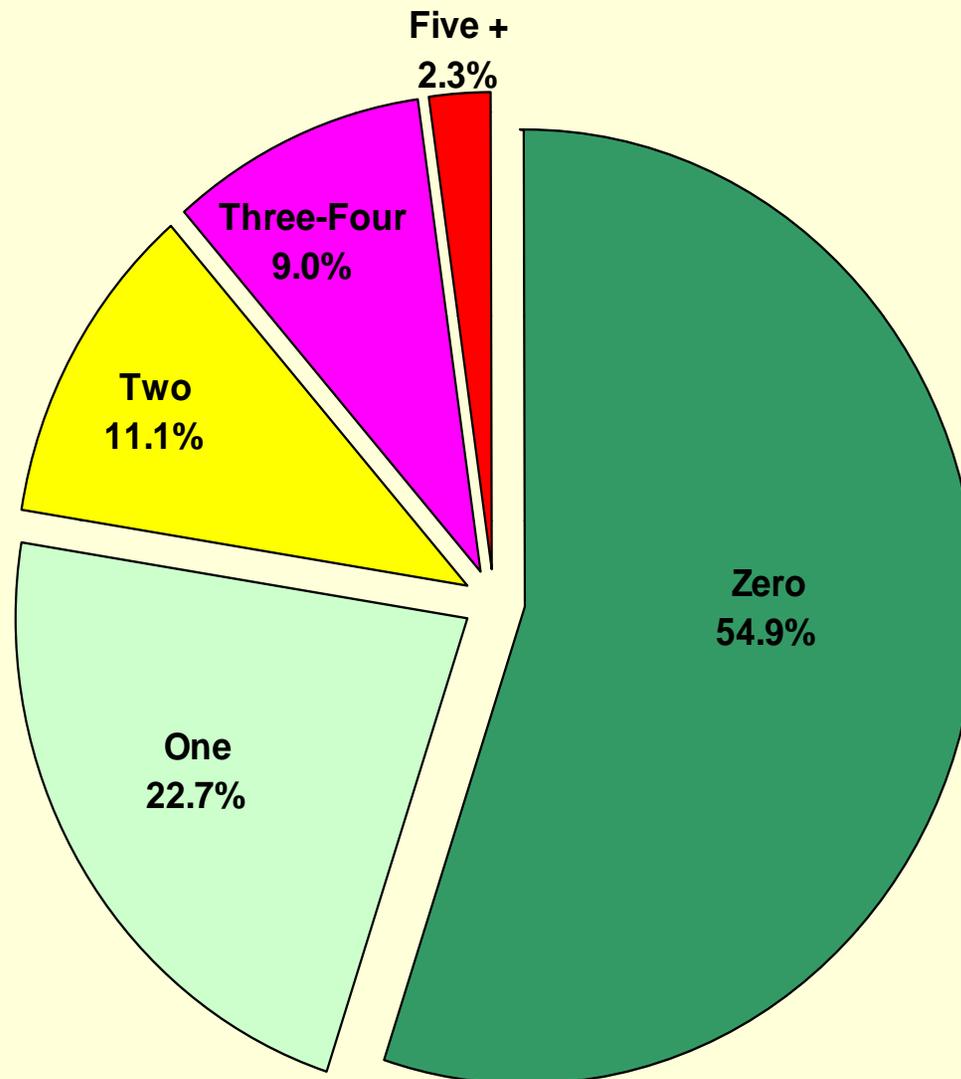
Interviewer Performance Indicators

- 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

Five +
2.3%

Three-Four
9.0%

Two
11.1%

Zero
54.9%

One
22.7%

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

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