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## Exploring the Impact of Participant Reluctance on Data Quality in the National Health Interview Survey (NHIS)

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### Abstract<sup>2</sup>

Using survey and contact attempt history data collected with the 2005 National Health Interview Survey (NHIS), a multi-purpose health survey conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), we set out to explore the impact of participant concerns/reluctance on data quality, as measured by rates of partially complete interviews and item nonresponse. Overall, results show that respondents from households where some type of concern or reluctance (e.g., “too busy,” “not interested”) was expressed produced higher rates of partially complete interviews and item nonresponse than respondents from households where concern/reluctance was not expressed. Differences by type of concern were also identified.

KEY WORDS: data quality; item nonresponse; participant concerns/reluctance; contact attempt history data

### 1. Introduction

Federal demographic surveys in the United States have witnessed a gradual but steady decline in response rates in recent decades (U. S. Census Bureau, 2004), prompting data collectors to expend considerable resources to maximize interview completions through the conversion of reluctant respondents. While it is often presumed that such efforts will reduce nonresponse bias and other forms of survey error, refusal conversions may sometimes produce unintended, deleterious effects on data quality.

Over 40 years ago, Cannell and Fowler (1963) found that reluctant respondents provided less accurate data than their more willing counterparts, a finding they attributed to low respondent motivation. Accordingly, reluctant respondents may provide the minimum response necessary to allow the interview to proceed, a cognitive strategy known as satisficing (Krosnick, 1991). Krosnick (1991) suggests that satisficing results in increased item refusals or “don’t know” responses, the choosing of more socially desirable responses and explicitly offered no-opinion response options, more recency and primacy effects when selecting from a list of responses, and less complete responses to open-ended questions.

While many respondents may satisfice (Triplet et al., 1996), it seems reasonable to expect more satisficing by respondents who were reluctant to participate in the survey. Blair and Chun (1992) found that converted refusers were more likely than initial cooperators to refuse to answer items or to answer “don’t know,” and they produced interviews of shorter duration. Reviewing data from a survey on voting behaviors, Mason, Lesser and Traugott (2002) reported item-missing data in a quarter of converted refusal cases compared to just 11% of nonrefuser cases. And Triplet et al. (1996) identified higher rates of item nonresponse among converted refusers in a time-diary survey. On average, converted refusers produced 1.58 missing items (don’t know/refused) compared to 0.26 for initial cooperators. Furthermore, when asked to record all activities engaged in within a 24 hour period, converted refusers recorded 5.5% fewer activities than initial cooperators.

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<sup>2</sup> The findings and conclusions in this paper are those of the authors and do not necessarily represent the views of the Department of Health and Human Services, the Centers for Disease Control and Prevention, and the National Center for Health Statistics.

More recently, researchers have begun to explore the impact of specific respondent concerns and reluctance expressed during survey introductions on subsequent data quality. Couper (1997) identified significant differences in responses to survey questions (1990 National Election Study) by the two most frequently mentioned concerns: “too busy” and “not interested.” While respondents who said “too busy” or “not interested” had elevated levels of item refusals and don’t knows (compared to respondents not making these statements), the “not interested” respondents produced consistently higher rates of item nonresponse than the “too busy” respondents. In addition, respondents who said “not interested” prior to the interview had lower levels of interest in politics, lower levels of political knowledge, and lower levels of political participation than respondents not making this statement. No such associations were identified with respondents stating “too busy.” Similarly, respondents to a political tracking survey who initially said “not interested” produced a significantly higher number of “don’t know” answers than respondents not making this statement (Campanelli, Sturgis, and Moon, 1996). “Not interested” respondents were also significantly more likely to refuse detailed income questions, and significantly more likely to not provide consent to be contacted again. Again, no such associations were identified with mentions of “too busy.” Both studies concluded that statements made at the doorstep are more than polite declinations that have little meaning once a respondent has agreed to participate. Instead, these statements of concern/reluctance convey important information about a respondent’s likely level of engagement in and commitment to the interview.

In this paper, we use survey and contact attempt history data from the 2005 NHIS to address the following research questions: Do respondents from households where concern/reluctance was expressed (“reluctant respondents”) contribute as much data as respondents from households where concern/reluctance was not expressed (“willing respondents”)? More specifically, are reluctant respondents more likely to produce partially complete interviews (deemed to contain sufficient key data to count favorably toward the response rate) than willing respondents? Do reluctant respondents provide more don’t know and/or refusal responses to questions than willing respondents? If so, can these differences be explained by respondent, household, and geographic characteristics? And do the results vary by type of concern/reluctance expressed (e.g., “too busy,” “not interested”)?

## 2. Background

### 2.1 Descriptions of the NHIS and the Contact History Instrument (CHI)

The analyses presented here rely on survey and contact attempt history data covering 43 weeks (four weeks of quarter one and all of quarters two through four) of the 2005 NHIS. The NHIS is an annual survey of the health of the civilian, noninstitutionalized household population of the United States conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC). Utilizing a multistage, clustered sample design, the NHIS produces national estimates on health insurance coverage, health care access and utilization, health status, and health behaviors.<sup>3</sup>

Data are collected by trained interviewers with the U. S. Census Bureau using computer assisted personal interviewing (CAPI). The survey contains four main modules: Household, Family, Sample Child, and Sample Adult. For the household composition module, a household respondent provides basic sociodemographic information on all members of the household. Within each family, the family module is completed by a family respondent who provides health information on each member of the family. Additional health information is collected from one randomly selected adult (sample adult) aged 18 years or older, and from the parent or guardian of one randomly selected child under age 18 (sample child).

Contact attempt data are collected via the automated Contact History Instrument (CHI). Interviewers use CHI to record information on each contact attempt with a household,<sup>4</sup> including the outcome of each attempt and any contact or cooperation-based strategies employed. Of particular importance is a screen that interviewers complete for attempts resulting in contact with sample unit members. Utilizing a mark-all-that-apply format, the screen

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<sup>3</sup> Like other federal surveys, the NHIS has witnessed a gradual but steady decline in household response rates in recent years (from 95.5% in 1990 to 87.1% in 2005).

<sup>4</sup> Sample adult and CHI data are collected at the “case” or family level. However, we use the term household throughout this paper since just over 98% of all eligible households contain one family.

includes 21 categories<sup>5</sup> of respondent concerns, behaviors, questions, and reasons for reluctance--“concerns/reluctance”--that may be expressed or exhibited during interviewer-respondent interactions. A “no concerns” and an “other-specify” category are also included. Some categories were included specifically to capture privacy and burden concerns: “privacy concerns,” “too busy,” and “interview takes too much time.” Additional categories have emerged from systematic analyses of interviewer case notes and a series of interviewer focus groups (see Figure 1 for the list of 16 categories included in this analysis).

For this analysis of data quality, we use data collected at this screen to compare households (and respondents within these households) expressing concerns/reluctance with those not expressing concerns/reluctance. More specifically, comparisons are made between mentions of any concerns/reluctance and no mentions of concern/reluctance, and by mention or non-mention of specific concerns/reluctance.

## **2.2 Data Used in Analysis of Partially Complete Interviews and Item Nonresponse**

All interviewed cases with contact attempt history data (n=33,762) were included in the analysis of partially complete and fully complete interview rates by mentions of concern/reluctance, while bivariate and multivariate analysis of item nonresponse by mentions of concern/reluctance was restricted to sample adult records with contact attempt history data (n=29,796). To account for the clustered sample design and produce appropriate standard errors, the analysis was performed in SUDAAN (version 9.0, Research Triangle Institute, Inc., Research Triangle Park, NC). Since no attempt is made to generalize findings beyond the NHIS, the analysis was unweighted.

## **2.3 Limitations of the Data and Analysis**

There are some important limitations of the data and analysis presented here. First, it is not possible to attribute statements of concern/reluctance to individual respondents, though statements recorded for a case may reflect contact with one or more of multiple household members. It is unclear how the inability of CHI to link statements to specific individuals (e.g., the sample adult) may affect our results.<sup>6</sup> Second, there is likely variability in the completeness of contact attempt history records and coding of concerns and reluctance across interviewers. And finally, contact attempt history data are subject to recall error. For contacts resulting in interviews, CHI is completed at the end of the interview; considerable time may elapse between the mention and recording of concerns. Furthermore, the interview exchange may influence the interviewer’s recollection of respondent concerns.

# **3. Results**

## **3.1 Prevalence of Concerns/Reluctance**

Prior to exploring the impacts of participant concerns/reluctance on partially complete interviews and item nonresponse, we assessed the prevalence of concerns/reluctance across households. Figure 1 presents the percentage of eligible (in-scope) households where members expressed concerns/reluctance at one or more contacts. By far, “too busy” was the most prevalent concern. It was mentioned at least once in 24.7% of eligible households. “Privacy concerns” and “not interested/does not want to be bothered”<sup>7</sup> followed at 14.7% and 13.6% respectively. “Interview takes too much time” was mentioned by members in 11.9% of households, while “scheduling difficulties,” “survey is voluntary,” and “does not understand survey/asks questions” were mentioned in between 5% and 10% of households. The remaining concerns were mentioned in less than five percent of eligible households.

As stated previously, we were interested in exploring differences in data quality by type of concern/reluctance. From this point on, we present results by mentions of any concern/reluctance (at one or more contacts) and by

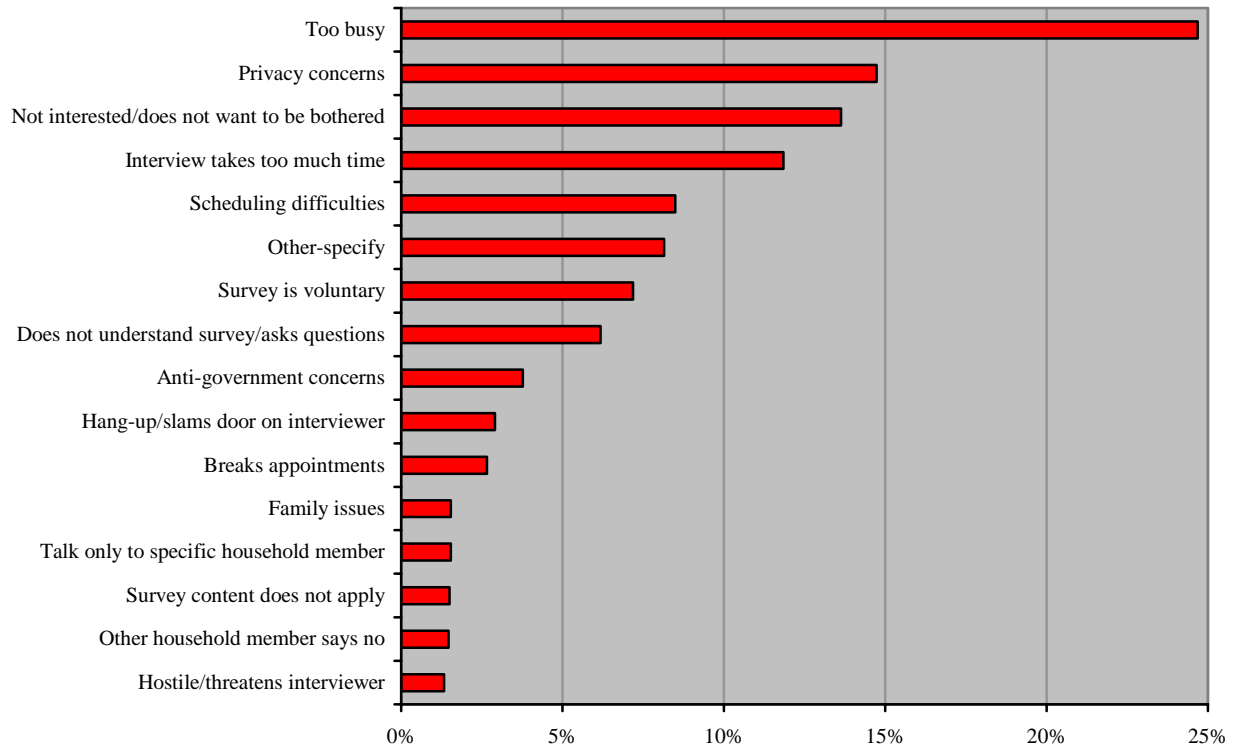
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<sup>5</sup> Since the CHI instrument was designed for use with multiple surveys administered by the U. S. Census Bureau, six categories are specific to panel or longitudinal surveys and are excluded from the analyses presented here.

<sup>6</sup> Based on the principle of homophily (higher rates of contact occur between similar people than among dissimilar people; see, for example, McPherson, Smith-Lovin, and Cook, 2001), we suspect that members of the same household are relatively likely to share similar attitudes regarding survey participation.

<sup>7</sup> Due to space constraints, we truncate this category to “not interested” in Figure 2 and both tables.

**Figure 1. Percentage of Eligible Households Where Concern/Reluctance Was Expressed at One or More Contacts: NHIS, 2005**

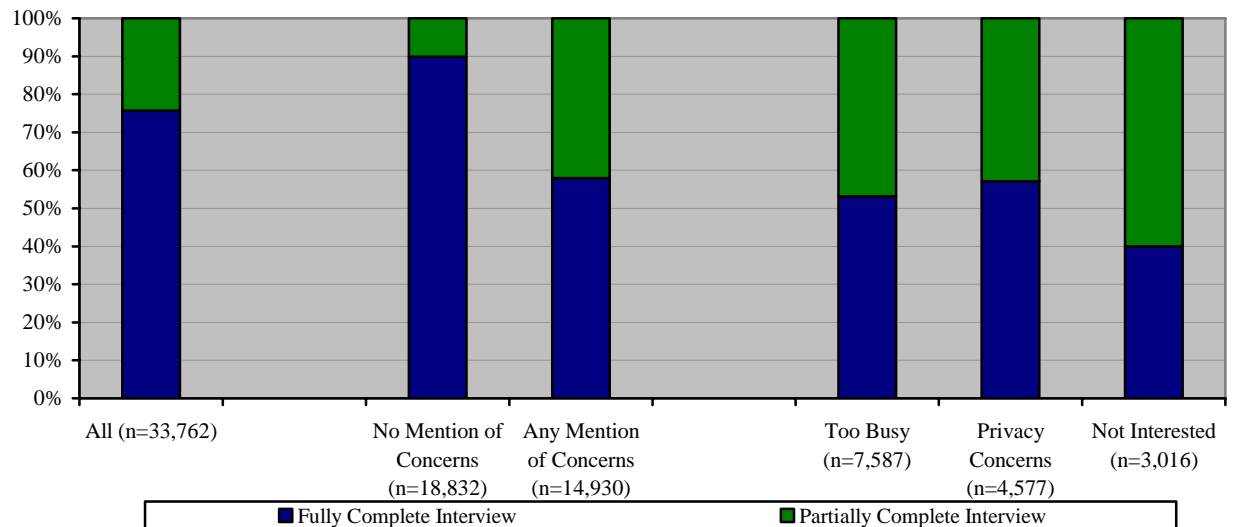


mention of “too busy,” “privacy concerns,” and “not interested/does not want to be bothered” (at one or more contacts). We selected these three concerns for two reasons. First, they were the most common concerns mentioned by household members. And second, they are consistent with categories explored in previous research (Campanelli, Sturgis, and Moon, 1996; Couper, 1997).

### 3.2 Concerns/Reluctance and Partially Complete Interviews

Figure 2 presents partially complete and fully complete interview rates for all interviewed households, interviewed households where no concern/reluctance was expressed, and interviewed households where concern/reluctance was

**Figure 2. Fully Complete and Partially Complete Interview Rates for All Interviewed Households, Interviewed Households Where No Concern/Reluctance Was Expressed, and Interviewed Households Where Concern/Reluctance Was Expressed at One or More Contacts: NHIS, 2005**



expressed at one or more contacts. Focusing on the first stacked bar, the partially complete interview rate for all households was 24.3%, and the fully complete interview rate was 75.7%. The next stacked bar presents the same rates for no mention of concerns/reluctance. Not surprisingly, more willing participants produced a partially complete interview rate of just over 10%. This contrasts sharply with the partially complete interview rate for households where any type of concern/reluctance was expressed (42.1%), and with specific mentions of “too busy” (46.9%), “privacy concerns” (43.0%), and “not interested/does not want to be bothered” (60.1%).

Similar to results of previous research (Couper, 1997; Campanelli, Sturgis, and Moon, 1996), statements of “not interested/does not want to be bothered” were related to a partially complete interview rate considerably higher than the rates for mentions of “too busy” and “privacy concerns,” triple the rate for all interviewed households, and six times the rate for households where no concern/reluctance was expressed.

### 3.3 Concerns/Reluctance and Item Nonresponse

At the item level, do respondents in households where concern/reluctance is expressed provide more don’t know and/or refusal responses to questions? For answers, we analyzed several items from the sample adult component of the NHIS. We chose the sample adult component because the majority of NHIS health indicators deemed critical from a health policy perspective are based on questions asked of the sample adult respondent.

Table 1 presents item refusal and don’t know rates for a set of sample adult questions on health behaviors, categorized by mention of any concerns/reluctance and by the top three concerns. We use these items as an example since the results for these items were indicative of results for all the items explored. To identify significant differences in rates by mentions of concern/reluctance (“yes” compared to “no”), two-tailed z-tests were performed.

**Table 1. Item Nonresponse Rates for Sample Adult Health Behavior Measures by Mentions of Concern/Reluctance**

Health Behavior Item	Any Mention of Concerns		Too Busy		Privacy Concerns		Not Interested	
	Yes	No	Yes	No	Yes	No	Yes	No
<b>Obesity</b>								
Height								
Refused (%)	2.56**	0.40**	3.26**	0.73**	3.28**	0.89**	7.67**	0.81**
Don’t know (%)	0.90*	0.51*	0.89	0.59	0.80	0.62	1.98**	0.57**
Weight								
Refused (%)	4.26**	1.70**	4.92**	2.12**	6.15**	2.16**	9.56**	2.22**
Don’t know (%)	1.80	1.34	1.78	1.44	1.95	1.44	2.72*	1.44*
<b>Leisure-Time Physical Activity</b>								
Vigorous								
Refused (%)	2.60**	0.33**	3.14**	0.72**	3.09**	0.87**	7.08**	0.80**
Don’t know (%)	0.74*	0.38*	0.87*	0.44*	0.53	0.50	1.81**	0.44**
Moderate								
Refused (%)	2.61**	0.32**	3.16**	0.71**	3.17**	0.86**	7.17**	0.80**
Don’t know (%)	1.26*	0.76*	1.36	0.85	1.22	0.90	2.39**	0.86**
<b>Current Smoking</b>								
Refused (%)	2.29**	0.37**	2.89**	0.67**	2.86**	0.81**	7.08**	0.72**
Don’t know (%)	0.40*	0.13*	0.52*	0.17*	0.23	0.22	1.32**	0.17**
<b>Five or More Drinks in One Day in Past Year</b>								
Refused (%)	3.84**	0.71**	4.66**	1.22**	4.70**	1.45**	10.30**	1.35**
Don’t know (%)	1.83*	1.25*	1.90	1.36	1.55	1.44	3.24**	1.36**

\* .01 ≤ p < .05; \*\* p < .01

One consistent pattern that emerges in Table 1 is the significantly higher item refusal rates for sample adults in households where any concern/reluctance was expressed, and for sample adults in households where “too busy,” “privacy concerns,” or “not interested/does not want to be bothered” were mentioned. Significant differences were identified for each of the health behavior items analyzed. However, and consistent with earlier research, the highest rates of refusal responses were elicited from sample adults in households where “not interested/does not want to be bothered” was mentioned.

A different pattern emerges from the item “don’t know” results. There were significant differences in don’t know rates on five of six items for sample adults in households where any concern/reluctance was expressed compared to sample adults in households where no concern/reluctance was mentioned. For mentions (versus no mentions) of “too busy,” significant differences in don’t know rates were identified for only two of six items. More surprising were the results for mentions (versus no mentions) of “privacy concerns”—no significant differences were identified. For each of the significant findings, sample adults from households where concerns were mentioned had higher don’t know rates.

In contrast, the don’t know results for mentions of “not interested/does not want to be bothered” were consistent with the item refusal results. For all six items, sample adults from households where “not interested/does not want to be bothered” was mentioned had significantly higher don’t know rates than sample adults from households where this concern was not mentioned. Again, these results appear to be consistent with earlier studies.

### **3.4 Multivariate Analysis of Item Nonresponse**

Can the item nonresponse results be explained by sample adult, household, and geographic characteristics? To assess this, we performed logistic regressions. Two dependent variables were created. One was based on the number of refusal responses provided by the sample adult respondent, and the second was based on the number of don’t know responses provided by the sample adult respondent. Counts of the two types of responses were generated from 146 items asked of all sample adults. Because the counts were highly skewed, we collapsed the counts into two dichotomous measures: one or more refusal responses (8.5%) versus zero refusal responses (91.5%), and three or more don’t know responses (8.3%) versus two or fewer don’t know responses (91.7%).<sup>8</sup>

The independent variables in the logistic regressions included dichotomous measures for the three most frequently mentioned concerns (“too busy” (yes/no), “privacy concerns” (yes/no) and “not interested/does not want to be bothered” (yes/no)), and mention of any other concern (yes/no). Control variables were broken into three components: sample adult characteristics, household-level measures, and larger geographic indicators. Sample adult characteristics included age, race/ethnicity, education, marital status, employment status, U.S. or foreign born, and health status. Household-level measures included the presence of children under the age of 18 in the household, the number of adults in the household, and whether or not the residence was owned/being bought or rented. Finally, geographic measures included U.S. Census Bureau region of residence and metropolitan statistical area (MSA) status (a measure of population density defined by the U. S. Census Bureau). The controls were limited to measures associated (via bivariate analyses) with either dependent variable or any of the three specific concerns included in the model.

Table 2 presents adjusted odds ratios and 95% confidence intervals for the concern/reluctance measures included in both models, controlling for sample adult, household, and geographic characteristics.<sup>9</sup> The findings for both models are largely consistent with the bivariate analyses of item nonresponse. For each of the three specific concerns, sample adults from households where the concern was mentioned were more likely to produce one or more refusal responses than sample adults from households where the concern was not mentioned. Mention of any other concern was also positively associated with one or more refusal responses. Conversely, of the three specific concerns, only mentions of “not interested/does not want to be bothered” were associated with three or more don’t know responses.

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<sup>8</sup> To produce the dependent variables, sample adult records were limited to those from fully complete sample adult interviews (over 90% of sample adult interviews that were started). This likely reduces the number of refusal and don’t know responses available for analysis since the counts are essentially based on records from more willing respondents. However, more recent (preliminary) analyses using dependent variables based on the percentage of questions asked that were answered as refused or “don’t know” produced results consistent with those in Table 2.

<sup>9</sup> Complete logistic regression results and coding of the control variables are available upon request to the authors.

Sample adults from households where this concern was mentioned were more likely to produce three or more don't know responses than sample adults from households where this concern was not mentioned. Consistent with the refusal results, mentions of any other concern were positively associated with three or more don't know responses.

**Table 2. Results from Logistic Regressions Predicting One or More Refusal Responses and Three or More “Don’t Know” Responses with a Set of Concern/Reluctance Measures, Controlling for Sample Adult, Household, and Geographic Characteristics**

Independent Variables	One or More Refusals		Three or More Don't Knows	
	AOR <sup>1</sup>	95% CI <sup>2</sup>	AOR <sup>1</sup>	95% CI <sup>2</sup>
<b><i>Concern/Reluctance</i></b>				
Mention “too busy”				
Yes (versus no)	1.39*	1.19-1.62	0.98	0.80-1.19
Mention “privacy concerns”				
Yes (versus no)	1.44*	1.17-1.77	1.12	0.89-1.40
Mention “not interested”				
Yes (versus no)	1.46*	1.15-1.85	1.34*	1.07-1.68
Mention any other concern				
Yes (versus no)	1.74*	1.45-2.08	1.36*	1.13-1.63

\* p < .05; <sup>1</sup> AOR=adjusted odds ratio; <sup>2</sup> CI=confidence interval

#### 4. Discussion

Overall, our results clearly suggest that reluctance to participate has implications for the quality of subsequent data, once participation is secured. First, respondents from households where some type of concern/reluctance was mentioned produced higher rates of partially complete interviews. This was especially true when statements such as “not interested/does not want to be bothered” were made. The resulting loss in data is not trivial. In 2005, 84.0% of partially complete interviews involved the partial or complete loss of sample adult records. This is particularly concerning since, as we noted earlier, numerous health estimates produced from the survey data are based on data collected from sample adult respondents.

Second, when sample adults from households where concern/reluctance was expressed were asked questions, they were more likely to refuse to answer or to answer “don't know.” Furthermore, the effects of reluctance could not be eliminated by controlling for a set of sample adult, household, and geographic characteristics. Again, this is consistent with earlier studies of respondent reluctance and data quality.

And third, we also revealed variation in data quality by the type of concern/reluctance expressed. Similar to work by Couper (1997) and Campanelli and colleagues (1996), we found that respondents from households where “not interested/does not want to be bothered” was mentioned produced fewer complete interviews and more item nonresponse than when mentions of “too busy” or “privacy concerns” were made. These findings appear to confirm the notion that statements of concern/reluctance are more than polite declinations of the survey request. When respondents say “I'm not interested,” they are sending clear signals of their likely degree of commitment to the survey should they agree to participate.<sup>10</sup>

So how do we ensure that reluctant respondents remain engaged in the interview? How do we minimize satisficing behaviors? For respondents expressing time burdens, more flexibility in data collection could be exercised. Examples might include greater use of telephone interviewing, and conducting interviews at work or other locations outside the home (Stussman, Taylor, and Riddick, 2004). For respondents expressing privacy concerns, experimenting with the wording and frequency of confidentiality assurances may be useful. But how do we encourage full engagement from respondents for whom health is not a topic of interest? One possibility may be the

<sup>10</sup> Researchers should also be cognizant of the possibility that interviewers encourage satisficing behaviors when confronted with reluctant respondents (Triplett et al., 1996).

use of promotional materials detailing the indirect benefits of participation (e.g., changes in or the enactment of health-related legislation based on NHIS data). Another might be the use of monetary incentives, a practice not currently employed with the NHIS. While the latter may be a better strategy for securing participation, research has shown that respondents receiving incentives produce less item-missing data and provide longer open-ended responses (Singer, 2002).

Prior to tackling these larger issues, however, we plan to extend our current work by exploring sociodemographic differences of respondents/households by type of concern/reluctance. Coupling this with analyses of response propensities by type of concern/reluctance may shed light on possible nonresponse bias. Existing analyses of NHIS data show a strong relationship between final household refusals and mentions of “not interested/does not want to be bothered,” but not with mentions of “too busy” or “privacy concerns” (Bates, Dahlhamer, and Singer, 2006). And finally, we plan to explore additional data quality indicators including length of interview, time spent on individual questions, and recency and primacy effects in the use of flashcards.

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