

CHAPTER 4. SURVEY RESPONSE RATES

Westat collected data for the 2001 NHTS national sample and New York and Wisconsin add-on samples during the period from March 19, 2001 through May 9, 2002. Morpace collected data for Baltimore, Des Moines, Hawaii, Kentucky (four counties), Lancaster PA, Oahu and Texas between May 31, 2001 and July 5, 2002. As described in Chapter 2, Survey Content and Interviews, there were several stages of data collection for each sampled telephone number. First, each sample telephone number was screened to determine whether it was or was not a residential household. Second, an adult household member in screened residential households was asked a series of questions about the persons and vehicles of the household. During this household interview, the household was assigned a travel day for daily trip reporting. Following the household interview, a diary package was prepared and mailed to the household. Next, the household received a call the day prior to their travel day reminding them to record their travel the next day. Following the household's travel day, interviewers called to conduct the person interview with each household member. During the person interviews, travel information including long distance trips as well as responses to a number of additional questionnaire items were recorded. A summary of the overall response rates, as well as the rates at key stages of the survey process are documented in this section.

Tables 4-1 and 4-2 present the weighted response rates for the 2001 NHTS. These response rates were calculated using results from the weighting process. These weighted response rates provide inherently more accurate estimates of the effective response rates for the study than unweighted response rates would because the weights account for differential sampling, primarily across various geographic areas and to a lesser extent across demographic characteristics. Weighted and unweighted response rates can be far apart when there are major variations in the probabilities of selection and response rates are correlated with these probabilities. For example, the national sample of about 26,000 households represents a sampling rate of approximately one household surveyed for every 4,000 households in the US, thus each national household has an average national weight of about 4,000. At the same time an add-on sample of about 12,000 households in hypothetical State B represents a sampling rate of about one in 600 within that state. Without consideration of the weights, the State B households would contribute nearly seven times more to the

overall response rate than they should. Consider this simple example in the box below. In this example, the response rate is much higher in category A than in category B and the probability of selection is much lower in category A as well (the weight for A is higher). Thus, the unweighted response rate is only 72 percent as compared to the weighted response rate of 78 percent.

	Sample Count			Weighted Estimates (in millions)			
	Respondents	Non-Respondents	Unweighted Response Rate	Weight	Respondents	Non-Respondents	Weighted Response Rate
Category A	26,000	6,500	80%	4,000	104	26	80%
Category B	12,000	8,000	60%	600	7.2	4.8	60%
Total	38,000	14,500	72%	--	111.2	30.8	78%

This type of situation occurs in the NHTS. . The response rates for most of the add-on samples were much lower than the response rate for the national sample for a variety of reasons including differences in methodology and in the target population, and the weights for the add-on samples are much lower than weights for the national sample outside of add-on areas. Appendix I provides unweighted response rates and detailed classifications of households and telephone numbers.

Table 4-1 provides weighted household response rates, for both the full sample (national and add-on) and the national sample. The overall weighted response rate for useable households is 38.9 percent for the full sample and 41.2 percent for the national sample.

At the household level, we provide:

- the overall household response rate for all households,
- the household response rate for households where 50 percent of adult household members completed a person interview (useable households), and
- the household response rate for households where 100 percent of adult household members completed a person interview.

Table 4-1. Weighted Household Response Rates

Weighted Response Rates	Full Sample		National Sample	
	Individual Rate	Composite Rate	Individual Rate	Composite Rate
Household Response for All Households that Completed a Screener Interview	56.2%	56.2%	58.2%	58.2%
Household Response for Households where At Least Half the Adults Completed a Extended Interview (Useable Households)	69.2%	38.9%	70.8%	41.2%
Household Response for Households where All Adults Completed a Person Interview	59.3%	33.3%	60.5%	35.2%

The “individual rate” columns provide the response rate for only that stage (i.e., either the screener (household) or extended (person) interview) of the interviewing, while the “composite rate” columns provide the overall response rate. Thus, for example, for the full sample, the useable household response rate among those households that completed the screener interview was 69.2 percent. The overall useable household response rate was the product of the screener response rate and the 69.2 percent rate (response rate at the extended interview level), i.e., $(.562) \times (.692) = .389$.

In calculating household screener response rates, there are many cases where we cannot determine whether the telephone number is eligible (i.e., residential) or ineligible (e.g., business or nonworking number) because the only responses we received were ring no answer or an answering machine. If these numbers are treated as all being residential, the calculated response rate is too low. If they are treated as if none are residential, the calculated response rate is too high.

There are several ways of estimating the proportion of such numbers that are residential. One commonly used method is the so-called CASRO (Council of American Survey Research Organizations) method.¹ This method assumes that the residency rate for the numbers whose eligibility is unknown is the same as the rate for

¹ Frankel, 1983

those numbers whose eligibility is known. We have instead used a relatively new method known as the “survival analysis method”.² In this method, a small subsample of all telephone numbers is subjected to a larger number of telephone call attempts. This data is then used to fit a Kaplan-Meier estimator for the proportion of numbers that would be found to be residential after many hundreds of calls were made. In general, it is believed that the CASRO method results in overestimating the proportion of unknown numbers that are residential, and therefore produces too low a response rate. In the NHTS, however, the survival analysis method actually produced a slightly higher estimated proportion that is residential: 43.3 percent for survival analysis compared to 41.7 percent for CASRO. Thus, use of the survival analysis method results in a more accurate but slightly lower response rate than use of the CASRO method.

Table 4-2 provides person response rates for:

- Households where 100 percent of adult household members completed a person interview, and
- Households where 50 percent of adult household members completed a person interview.

For example, the individual person response rate of 54.0 percent has a numerator that is completed person interviews in only those households in which *all* adults had completed interviews. The denominator consists of all persons in all households that completed a screening interview. The corresponding composite rate is the product $(.540) * (.562) = .303$.

Data users who require additional information regarding individual response rates for the national and add-on components of the NHTS sample should contact Federal Highway Administration’s NHTS User Support (Susan Liss; (202) 366-5060).

² Brick, M., Montaquila, J., Scheuren, F. (2002) Estimating residency rates for undetermined telephone numbers. *Public Opinion quarterly*, 66, p. 18-39.

Table 4-2. Weighted Person Response Rates

Weighted Response Rates	Full Sample		National Sample	
	Individual Rate	Composite Rate	Individual Rate	Composite Rate
Person Response in Households where At Least Half the Adults Completed a Person Interview (Useable Households)	60.6%	34.1%	62.2%	36.2%
Person Response in Households where All Adults Completed a Person Interview	54.0%	30.3%	55.2%	32.2%