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The program of the National Center for Health Statistics includes a variety of data collection systems designed to assemble information on the health of the United States population. One system in this program is the National Health Interview Survey (H.I.S.), a continuous nationwide sample survey of households in which household members are interviewed by Bureau of the Census interviewers to obtain information about illness, disability, medical care, and other health related items.

In assessing the reliability of the statistics derived from the H.I.S. a major concern has been the effect on the data of a respondent rule which permits any adult family member to report for other family members. Studies which have been conducted by H.I.S. to evaluate the validity of specific types of information obtained in the H.I.S., studies which involved comparison of information obtained in the interview with that obtained from records, have indicated that the most important problem in household interviews is underreporting, and that the degree of underreporting tends to be more severe when the information is obtained through a proxy rather than from the person himself.¹

The possibility of other respondents reporting less illness and disability than the person would have reported for himself has been recognized for many years. The Hunterdon County Health Survey found that persons reporting for themselves "reported proportionately nearly half again as many more of the conditions found on subsequent clinical examinations as when persons were reported for by other family members."² Results from the Baltimore Health Survey were much the same.

In the California Health Survey, reinterview data indicated that proxy respondents reported less illness than self-respondents, and that respondents other than the spouse were primarily responsible for the large net differences between self and proxy respondents.⁴

In studies where an attempt was made to control whether the individual was a self-respondent or had a proxy, results were not consistent. In a 90-household pilot study conducted by the London School of Hygiene and Tropical Medicine, more illnesses were reported when all adults were self-respondents than when wives reported for the entire_family. This was particularly true for males.⁾ In the report on males age 35 or older from the North Dakota study, no significant differences were found.⁶ The data from the Charlotte Pretest of the H.I.S. also indicated that in households where all adults were required to be self-respondents, reported illness and disability rates were higher than in households where related adults could report for those not at home when the interviewer called, but sampling and response variability were too high to permit definitive conclusions.⁷

"As a result of this lack of conclusiveness in the evidence available, the extra cost of interviewing all adults for themselves was not considered a good investment."7 Therefore, since its inception in 1957 the H.I.S. has used a respondent rule which states that adults at home when the interviewer calls should respond for themselves, but the information for all children under age 17, for adults who are incapable of being interviewed, and for adults not at home at the time of the interview is to be obtained from another adult family member such as a parent or spouse. However, the validation studies referred to above, which were not designed to test the effect of self or proxy respondents, have indicated that further research was needed.

Consequently, as part of the continuing research program of H.I.S., a special study designed to measure the degree to which the use of proxy respondents affects the national statistics was conducted during the second quarter (April, May and June) of 1972.⁸ This paper is concerned primarily with the field implementation of the study and a brief report on the substantive data.

The respondent rule study was carried out as part of the ongoing National Health Interview Survey. Including an experiment as part of an ongoing survey is desirable when the purpose is to test the effect of modifying specific procedures within the framework of the operating data collection system. It does, however, impose certain limitations on the study design as the integrity of the statistics from the ongoing survey should not be compromised.

The study required a control sample of households to be interviewed using the standard respondent rule and an experimental sample using a self-respondent rule. For the experimental households every adult capable of being a selfrespondent was required to be one. Proxy respondents were still used for all children under age 17, but were accepted for adults only if the adult was incapable of responding because of disability (usually senility) or absence over the entire interview period.

Interviewing under alternate procedures had to go on throughout the quarter to control for changes in health conditions and utilization due to seasonality. Several alternative study designs, including randomizing the interviewers' assignments, were considered and then rejected for administrative reasons. The design finally adopted was to assign pairs of weeks to each rule so that all households scheduled for interviewing during the first week of the thirteen week quarter were interviewed under the standard rule, during the next two weeks under the self-respondent rule, during the following two weeks under the standard rule, and so on through the quarter. This paired week design was adopted on the recommendation of the Bureau of the Census field supervisors to minimize confusion on the part of the interviewers and to make office administration of the study as simple as possible. The design, the number of households in the sample, the number of households interviewed, and the number of persons in the interviewed households are shown in Table 1.

The only other change in field procedures was that the rules for overtime were relaxed so that the interviewers could make all the additional call-backs needed to interview each adult for himself.

The interviewers were instructed to carry out their assignments during the experimental periods exactly as they did during the ongoing survey. They were particularly instructed not to shift their initial calls to later in the day in hope of finding more adults at home and thus easing their burden and reducing the number of call-backs.

Such a shift would mean that data from the experimental weeks on persons who would have had proxy respondents would not be comparable to the data from the control weeks on persons who did have proxy respondents. We needed these data to evaluate whether the difference between self and proxy respondents which we had found in the survey was due to reporting errors or to actual differences in the population.

The key question was whether the interviewers made more initial contacts in the evening (6 PM or later) during the experimental weeks than during the control weeks. There is evidence that some interviewers did deviate from their usual procedures particularly in suburban areas. During the experimental weeks approximately 22 percent of the calls were made at 6 PM or later, compared with 19 percent during the control weeks. The comparable percentages in suburban areas are 23 and 18 percent.

As a result, the proportion of adults not at home at the time of the initial call was lower during the experimental than during the control weeks. During the experimental weeks only 26 percent of the adults were not at home and thus required an additional call to convert them from proxy to self-respondents. During the control weeks, 37 percent of the adults were not at home and had proxy respondents. The National estimates based on the experimental and control weeks are not affected by this deviation from design specifications, but evaluation of field costs and some of the comparisons between procedures are affected.

The introduction of a self-respondent rule was expected to introduce some new problems in data collection and to increase some existing ones. In general, there were fewer problems than anticipated.

Response rates were almost unaffected. The household response rate remained unchanged at 96 percent. The individual response rate (persons within interviewed households for whom information was obtained) decreased only from 99.85 percent during the control weeks to 98.72 percent during the experimental weeks. Obviously response rates were still high enough that problems of response would not preclude adopting a selfrespondent rule.

Interviewing schedules were maintained remarkably well. During the control weeks almost 94 percent and during the experimental weeks 93 percent of the interviews were completed during the scheduled week. During the control weeks 68 percent and during the experimental weeks 79 percent of the interviews were actually completed during the first three days of the scheduled week (Table 2).

The cost of utilizing a self-respondent rule in household interviews was the third major concern. We measured cost by: number of calls required to complete the interview, monetary cost of the field work, and interviewers' subjective judgement.

During the experimental weeks the average number of calls was 2.53 per household--36 percent more than the 1.86 calls per household during the control weeks (Table 3).

The percentage increase in the average number of calls was approximately the same for households located in urban (34 percent), suburban (36 percent), or rural non-farm (38 percent) areas. Rural farm households required 47 percent more calls during the experimental weeks. Only 3 percent of the households were in rural farm areas but, because of travel time and distance, the large increase in the number of calls could have a disproportionate effect on monetary costs.

The monetary cost of introducing the selfrespondent rule was calculated by the Bureau of the Census which kept special records of field costs for both the experimental and control weeks. Overall, the nonlisting costs for the experimental weeks were about 17 percent higher than they would have been without the self-respondent rule. The 95 percent confidence interval around the 17 percent cost increase is from 5 to 28 percent.

These measures of cost increase are upper limits. The interviewers were working under the field instructions designed to keep the experimental and control weeks comparable, additional calls and overtime were authorized, and additional record keeping was required. These inefficient procedures, which were instituted as part of the study design, increased the cost beyond what would be expected in the ongoing Health Interview Survey which would utilize more efficient methods.

The interviewers' subjective evaluation was that any improvement in the quality of the data under this particular self-respondent rule was not worth the cost of collecting it. The necessity for more evening calls presented major problems for them--particularly in urban areas. HIS interviewers are women and they did not feel safe interviewing at night. Several said that if the rule became part of the survey, they would be forced to quit; others said that "It took the fun out of interviewing." They were willing to carry out the experiment but the prospect of implementing the self-respondent rule permanently would cause them to reevaluate their participation. A higher rate of interviewer turnover is a cost factor which we cannot measure. On the other hand, it takes 18 months for an interviewer to reach peak efficiency so we certainly cannot ignore the impact of increased turnover either on costs or on the quality of the data.⁹

The experiment was successful in demonstrating that it is possible to institute a selfrespondent rule in a national survey if you are willing to pay for it. In contrast to the control weeks when 67 percent of the adults aged 19 or older were self-respondents, 96 percent were self-respondents during the experimental weeks. As shown in Table 4, the great difference was for males; instead of 49 percent there were 95 percent self-respondents. An unexpected difference was that during the experimental weeks mothers were more likely to respond for children under 17, particularly girls, than during the control weeks. This difference for the children is noteworthy as the interviewers repeatedly stated that the rule change they would like to see is a tightening in the rule about who is eligible to respond for children.

The experiment was also successful in detecting differences in health measures based on the two rules. Our hypothesis had been that rates of illness, disability, and outpatient utilization based on a self-respondent rule would be higher than those based on the standard rule. Of the ten routinely collected measures which we analyzed six were significantly higher under the selfrespondent rule using a one-tailed test (Table 5). We find this impressive as these are relatively objective measures, items which are not subject to large respondent bias as more subjective measures such as attitudes are, and because sampling errors based on six weeks of data collection are large, particularly for the two-week recall items, which makes it difficult to detect differences.

We have tried to predict the effect a selfrespondent rule would have on H.I.S. estimates. The results are given in Table 6. If a selfrespondent rule had been in effect in 1971, we might have estimated 225 million more days of restricted activity, 123 million more doctor visits and 2.4 million more persons who were limited in their usual activity. The confidence intervals around these estimates are large and a much larger sample would be needed to speak with any confidence.

In the future, the question of deciding who is an eligible respondent is expected to become more critical as the National Health Interview Survey moves into questions on attitude, costs of health care, extent of insurance coverage and other areas where personal or specialized knowledge is being elicited. Fortunately, the routine items are not so sensitive but the experiment has demonstrated that it is possible, if necessary, to collect information directly from the household member best qualified to give it. For children that is the person responsible for their care, usually the mother, and for most adults it is the individual himself.

References

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Table 1. Experimental Design, Number of Households in Sample and With Completed Interviews, and Number of Persons in Interviewed Households: National Health Interview Survey, United States, April-June, 1972.

			Number of			
Week	Week Designation	Respondent Rule	Households in Sample	Households Interviewed	Persons in Interviewed Households	
1	Control	Standard	881	850	2,643	
2	Experimental	Self	918	895	2,556	
3	Experimental	Self	903	879	2,708	
4	Control	Standard	829	806	2,483	
5	Control	Standard	880	857	2,574	
6	Experimental	Self	912	873	2,477	
7	Experimental	Self	841	806	2,313	
8	Control	Standard	931	897	2,778	
9	Control	Standard	877	841	2,497	
10	Experimental	Self	888	843	2,495	
11	Experimental	Self	924	873	2,629	
12	Control	Standard	916	867	2,693	
13	Control	Standard	866	820	2,477	
Total	All Weeks Control Experimental	Standard Self	11,566 6,180 5,386	11,107 5,938 5,169	33,323 18,145 15,178	

Table 2. Percent Distribution of Completed Interviews According to Day and Week of Comletion for Control and Experimental Weeks: National Health Interview Survey, United States, April-June, 1972. Table 3. Average Number of Calls Required to Complete Interviews in Sample Households by Area of Residence and by Time of Day of Initial Contact for Control and Experimental Weeks: National Health Interview Survey, United States, April-June, 1972.

Week Interview Completed	Percent Distribution of Completed Interviews		
Day	Control Weeks	Experimental Weeks	
Total	100.0	100.0	
Scheduled Week	93.8	93.0	
Monday	20.0	21.7	
Tuesday	25.4	27.2	
Wednesday	22.9	21.3	
Thursday	14.7	12.8	
Friday	6.1	5.6	
Saturday	4.4	4.0	
Sunday	0.2	0.5	
Second Week	4.8	5.1	
Monday	2.4	2.2	
Tuesday	1.0	1.6	
WednSunday	1.4	1.4	
Third Week or Later	0.3	0.9	
Not Ascertained	1.1	1.0	

Residence	Average Number of Calls per Household	
Time of Initial	Control	Experimental
Contact	Weeks	Weeks
All Residence Areas	1.86	2.53
Inside SMSA	1.97	2.66
Central City	2.04	2.74
Outside Central City	1.90	2.58
Outside SMSA	1.65	2.28
Nonfarm	1.67	2.30
Farm	1.46	2.15
All Times	1.86	2.53
Before Noon	1.75	2.38
Noon - 6 PM	1.70	2.40
6 PM or Later	2.46	3.00
Time Not Recorded	1.00	2.39

Table 4. Percent Distribution of Persons According to Who Responded by Age and Sex of Sample Person for Control and Experimental Weeks: National Health Interview Survey, United States, April-June, 1972.

Age		Respondent				
Sex Week Designation	Total	Self	Spouse	Mother	Father	Other and Unknown
Age: Under 17 Years						
Both Sexes						
Control Experimental	100.0	0.3	0.0	84.4	9.5	4.2 3.0
Males						
Control Experimental	100.0	0.0	0.0	85.1	11.2	3.6
Females						
Control Experimental	100.0	0.5	0.1	83.7	10.9	4.8
	10010	0.0				5.5
Age: 17-18 Years			1			
Both Sexes Control	100.0	24.5	1.2	57.7	10.0	67
Experimental	100.0	23.7	0.8	63.1	9.1	3.3
Males Control	100 0	17.2	1 2	62.2	11.3	9.1
Experimental	100.0	15.6	1.3	69.0	9.4	4.6
Females	100.0	21 0	0.0	52.2	0 6	E /
Experimental	100.0	31.3	0.3	57.5	8.8	2.1
Age: 19-44 Years						
Both Sexes						
Control Experimental	100.0	63.7	24.0	8.2		2.3
Males	10010	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
Control Experimental	100.0	43.5	40.8		2.3	2.8
Females	100.0	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	2.7		0.5	0.5
Control Experimental	100.0	82.6	8.3	5.9	1.2	1.9
Age: 45-64 Years	100.0	57.4	0.5	0.0	0.1	1.0
Both Sexes						
Control	100.0	67.5	27.3	0.7	0.0	4.5
Experimental Males	100.0	96.5	2.5	0.2		0.7
Control	100.0	48.4	46.0	0.8	0.1	4.7
Experimental Females	100.0	95.4	3.7	0.2	-	0.7
Control	100.0	84.6	10.5	0.6	0.0	4.2
Experimental	100.0	97.6	1.5	0.2	-	0.7
Age: 65 Years or Older						
Both Sexes Control	100.0	80.6	12.2	0.2	_	7 1
Experimental	100.0	93.7	2.5	-	-	3.8
Males Control	100 0	71 7	22.1	· _	_	5.2
Experimental	100.0	93.9	4.2	-	-	1.9
Females	100.0	96.0	4.3	0.3		o /
Experimental	100.0	93.7	4.3	-	-	o.4 5.1
-		1				

Table 5. Rates for Selected Health Measures According to Respondent Rule Used and the Percent Difference by Type of Recall Question: National Health Interview Survey, United States, April-June, 1972.

Type of Recall Question	Respond	lent Rule	Democrat	7
Health Measure	Self Standard		Difference ¹	2 Statistic
Two-Week Recall	Rate per 100 persons per quarter			
Restricted Activity Days	404.3	377.4	7.1	1.173
Bed Days	141.1	148.9	-5.2	.686
Work-Loss Days	140.7	117.6	19.6	1.694
Doctor Visits	128.9	114.8	12.3	1.696
Dental Visits	36.4	38.3	-5.0	.587
Acute Conditions	47.9	42.6	12.4	1.698
Six-Month Recall	Rate per 100 persons per year			
Hospital Discharges	14.7	13.8	6.5	1.198
Twelve-Month Recall or Prevalence	Percentage of	persons with		
Limitation of Activity	13.6	12.4	9.7	2.838
Limitation of Mobility	3.6	3.1	16.1	1.745
Doctor Visits in 12 Months	73.6	72.0	2.2	21.560

¹Percent Difference = $\left(\frac{\text{Self} - \text{Standard}}{\text{Standard}}\right) \times 100$

Table 6. National Estimates of Selected Health Measures for 1971 and Estimates of Change Under Self-Respondent Rules by Type of Recall Question: National Health Interview Survey, United States, 1971 and April-June, 1972.

		Change Under Self-Respondent Rule			
Type of Recall Question			Confidence Intervals		
Health Measure	National Estimate 1971	Estimate	One Standard Deviation	Two Standard Deviations	
	(in thousands)				
Two-Week Recall					
Restricted Activity Days Bed Days Work-Loss Days Doctor Visits Dental Visits Acute Conditions	3,175,594 1,238,873 396,210 999,289 311,943 442,203	225,467 -64,421 77,657 122,913 -15,597 54,833	192,263 93,924 45,882 72,506 26,578 32,311	384,526 187,849 91,764 145,012 53,156 64,622	
Six-Month Recall Hospital Discharges	27,571	1,792	1,496	2,992	
Twelve-Month Recall or Prevalence Limitation of Activity Limitation of Mobility Doctor Visits in 12 Months	24,817 NA 146,465	2,407 NA 3,222	848 NA 150	1,697 NA 300	

Source 1971 Estimate: Current Estimates from the Health Interview Survey, Series 10, No. 79, DHEW Publication No. (HSM) 73-1505.