A COMPARISON OF ALTERNATIVE PANEL PROCEDURES FOR OBTAINING HEALTH DATA[1]

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Introduction

The importance of reliable national statistics on the incidence of illnesses and the use of and expenditures for health care has led to the establishment of the Health Interview Survey, which is an integral part of the program of the National Center for Health Statistics, and to continuing studies by the National Center for Health Services Research. These surveys have proved of great importance and have provided much valuable data. However, they have also run into problems that continue to defy solution. A major problem is that these surveys depend on recall for periods of up to a year, even though it is known that substantial recall errors may occur. These errors are basically of two types:

1. Omissions--The respondent omits an illness episode or expenditure entirely. These omissions are not random, but are usually concentrated among short illnesses for which hospitalization was not required, or for routine visits to a physician.
2. Telescoping--The episode is remembered, but there is an error in the date so that the episode is remembered as occurring more recently than it did.

An alternative procedure that may help to solve or reduce some of the problems of health surveys is the use of diaries to obtain health care information. Diaries eliminate or greatly reduce the recall problem, as well as reduce interviewing costs. Diaries may present new problems, however, including level of cooperation, errors in record keeping, and possible conditioning effects. Yet, the diary approach has proven very valuable in other types of surveys, and the possibility that diaries may be equally useful in obtaining health information is sufficiently great to warrant their testing in controlled experiments.

In a study currently in progress at the Survey Research Laboratory, University of Illinois, we are attempting to determine the cost-effectiveness of diaries for obtaining health data from a general population sample. Comparisons are being made between the results obtained from diaries, personal and telephone interviews. The effects of differential diary procedures and compensation are also tested. The analyses will compare levels of cooperation and frequencies of health episodes reported by the various methods and by level of education and previous medical history of respondent households. This paper discusses only the levels of cooperation.

Method

It would be anticipated that households with lower education levels and higher levels of ill- would have the greatest difficulty in keeping diary records as well as recalling medical events. For this reason, a disproportionate stratified sample was selected. Specifically, the following procedure was used:

1. The Survey Research Laboratory screened a probability sample of about 6,000 households in Illinois during January-March, 1976, using phone interviews to obtain information on medical experiences in the previous year as well as other demographic information. The results of the initial screener interview are given in Table 1. It may be seen that screener information was obtained from 5,214 households or 81.1 percent of all contacted households. This level of cooperation is excellent, considering that two-thirds of the population in the State of Illinois is concentrated in the Chicago metropolitan area, where cooperation is usually more difficult to obtain. The reasons for this rate were that the screener questionnaire was carefully pretested three separate times, the interviewers had substantial previous telephone experience and advance post cards were sent to respondents outside the City of Chicago where telephone listings were used. In the City of Chicago, random digit dialing was used since about 40 percent of households have unlisted telephone numbers. Of course, advance postcards could not be sent to these households.

No major efforts were made to convert the refusals or to locate the remaining non-contacts. Past experience would suggest that the cooperation rate might have been increased to nearly 90 percen[illegible]f this had been attempted, but that costs would also have risen sharply. It is important to remember that when cooperation rates are discussed they refer to the households who cooperated on the initial screener. Thus, the approximately seven percent of Illinois households without telephones as well as the non-cooperators on the screener are excluded.

2. From this sample of 5,214, a disproportionate stratified sample of 1,446 households was selected (to obtain a final sample of about 1,200) with the stratifying variables being:
   a. Education of female head of household or spouse of male head;
   b. Level of medical experience in the previous year.

The definitions used for education and incidence of health experience were as follows:

Low education: 11 years or less
High education: 12 years or more

Low health incidence: 14 or fewer total health episodes in the past year and six or fewer times of limited activity and six or fewer times that a hospital was visited by all household members combined.

High health incidence: 15 or more total episodes or 7 or more times of limited activities or 7 or more times that a hospital was visited by all household members combined.

The sample of 5,214 households was distributed as follows:

Stratum	N	Sampling interval
1. Low education, low incidence	460	1.28
2. Low education, high incidence	941	2.61
3. High education, low incidence	2,444	6.79
4. High education, high incidence	1,369	3.80

To allow for possible moves, missing

addresses and other problems unrelated to cooperation, an initial sample selection of 360 from each of the strata was used. This meant that the sampling intervals (and thus the weights) for the four strata were those seen above.

3. An initial interview was conducted with all households which were then randomly assigned to one of the following three treatments:
   a. Three personal interviews at monthly intervals
   b. Recruit to keep a diary of medical experiences for three months with total compensation of $15
   c. Recruit to keep a diary with no compensation

Within a stratum, about 100 households received each treatment.

4. The Survey Research Laboratory attempted procedures for reducing costs with half the households in each treatment method. For the personal interviews, half the households were contacted by phone, rather than face-to-face. For the diary methods, half the households were requested to mail diaries in.

5. SRL attempted to maximize the diary mail in cooperation rates by conducting reminder phone calls to respondents from whom diaries were not received within two weeks of the expected date.

Cooperation by Sample Type

The cooperation rates for the initial interview and for the three months that households were asked to participate are shown in Tables 2-4. The data are first split by sample type since differential sampling rates were used.

It may be seen in Table 2 that the highest cooperation rates are obtained from households with higher levels of education and higher levels of health problems. The lowest cooperation is from households with lower education and lower levels of health problems.

The differences are small and not statistically significant on the initial interview, but become larger during the three months. These differences are highly significant after three months using a chi-square test. Overall, there is a difference of 12 percentage points between the 78 percent cooperation rate of households with more education and more health problems as compared to the 66 percent cooperation rate of those with less education and fewer health problems.

Although these results vary by method as seen below, the effects of sample type are consistent over method. That is, there is little interaction between method and sample type. Again, the reader is reminded that these cooperation rates are based on the sample of households which had already cooperated on an initial screening interview.

The results are as expected for effects of education, but are the opposite of those predicted for levels of health problems. In retrospect, it now appears that those with more health concerns find this study more salient and are more willing to cooperate.

Cooperation by Method and Type

Table 3 presents the key results, household cooperation by method and month, controlling for sample type. The control is necessary since cooperation does vary by sample type and the strata were not selected with equal probability. Nevertheless, the same results are observed for all four sample types.

Three major findings emerge from Table 3:
1. Diary pickup methods obtain levels of cooperation as high as those found for repeated personal and phone interviews.
2. Diary mail in methods are substantially worse in obtaining household cooperation than the other methods.
3. Compensation has no significant effect on cooperation for diary pickup methods, but does have a significant effect for the mail procedures.

Initial Cooperation-There are no significant differences in the cooperation rates on the initial interview by method. Except for those households interviewed by telephone, all initial interviews were conducted face-to-face and were identical, regardless of the method to be used later. In some earlier studies in obtaining food expenditure data by diary methods, there was some evidence that interviewer knowledge of the treatment that households would receive later had an effect on initial cooperation. In this study of health data collection, no such evidence of initial interviewer effects is observed.

There is also no significant difference between the cooperation on the initial interview conducted face-to-face and the cooperation when the interview was conducted by telephone.

Cooperation rates varied from seven to 13 percentage points within types, ranging from lows just under 80 percent to highs in the low 90's, but these differences were not significant on the chi-square tests at the .05 level.

Cooperation on Diary Mail in Procedures-Diary mail in procedures are attractive from a cost standpoint because they eliminate the need for interviewer visits after the initial interview. The results in Table 3 indicate, however, that this reduced cost is at the expense of significantly reduced cooperation rates for every sample type. The highly significant chi-square values observed are due entirely to the diary mail in procedures. Overall, while cooperation after three months was about 80 percent for the other methods, averaging over sample type, it was only 54 percent for the diary mail in procedures.

The results summarized over methods are presented in Tables 4A and B although the significance tests are conducted on the uncombined results of Table 3. Table 4A gives the cooperation rates where each sample type is weighted to account for the differential rates of selection. Table 4B gives the unweighted results that summarize Table 3. Although the results of Table 4A are more exact since they take into account the differential

sampling rates, the differences between the weighted and unweighted summaries are quite small.

Given these results, diary mail in procedures do not appear to be an effective method for collecting health data. It might be possible to improve their efficiency if methods could be developed for quickly sending an interviewer to collect a diary if it were not received in the mail. On the other hand, such combined methods might be more difficult to control and thus less cost-effective than a simple diary pick up or personal interview method.

Cooperation on Diary Pick Up and Personal Methods-There are no significant differences between the cooperation rates for the diary pick up procedures and those using face-to-face or telephone interviewing. As in the work done earlier, almost all of the attrition is in the initial interview for diary keeping. The loss of households is only five percentage points, from 84 percent on the initial interview to 79 percent after three months, for the diary pick up method. A similar drop is observed for the telephone procedures. Households assigned to face-to-face interviews appear less likely to refuse initially, but are slightly more likely to refuse the month one and month two interviews, so that the cooperation after three months is similar to that for the diary and phone methods. Even the earlier differences are not statistically significant.

The low drop out rate after the initial period indicates that the three month record keeping period might be extended with little difficulty. The next extension attempted might be to six consecutive months or to three or four months with an additional data collection period of three or four months one year later, using the same pattern as in the Current Population Survey.

There is no evidence that less educated households with more health problems have any more difficulty with diaries than they do with personal or telephone interviews. The procedure adopted initially was to offer to switch methods for households that refused the assigned method. Only 26 households asked that the method be switched and their subsequent cooperation was lower than for other households. There were substantial problems in keeping the control records straight on these respondents, and in retrospect it is not clear that it was worth the effort. For the less educated households with more health problems, cooperation was lower on the phone than with the diary methods, although the results were not significant.

Effects of Compensation on Cooperation-A surprise in this study was the lack of effect of compensation on cooperation in keeping diaries that were picked up. In earlier health diary research in Marshfield, Wisconsin and Chicago, compensation had improved cooperation by about ten percentage points. Similar results had been observed on consumer expenditure surveys using diaries. In this study there is no evidence of any effect of compensation, either initially or after three months for diaries that are picked up. There is a marginally statistically significant difference of 14 percentage points due to compensation for diaries that are mailed in, but even with compensation, the mail in procedure results in substantially lower levels of cooperation. We can only speculate as to the reasons for the differences. Health topics are obviously more salient than purchasing of low cost food items and keeping health records is an easier task since there are many fewer entries required for most households.

Summary

Looking at cooperation and costs, three of the six methods tested in this study seem inferior to the other three. The two diary mail in procedures, although very inexpensive, are unfortunately far below the other methods in the level of cooperation obtained. The average cooperation after three months is only 54 percent on the mail in procedures, which is only about two thirds the cooperation obtained by the other methods. The diary pick up compensation method is the most expensive and produces no higher cooperation than the diary procedure without compensation.

Of the three remaining methods, telephone procedures are clearly least expensive, face-to-face interviews most expensive, with the uncompensated diary pick up procedure in the middle. Selection between these alternatives depends on the accuracy of reporting, which is now being analyzed.

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TABLE 1

SCREENER INTERVIEW RESULTS

	N	%
Total sample	7,956	
Non-housing units	1,524	
Total housing units	6,432	100.0
Completed	5,214	81.1
Refused	892	13.8
Non-contacts or unavailable	326	5.1

TABLE 2

COOPERATION BY SAMPLE TYPE AND MONTH

Sample type		Percent Cooperating			
			Month		
	n	Initial	1	2	3
Low education	675	87.9	75.1	71.1	67.9
Low health experience	338	87.0	73.3	69.2	66.0
High health experience	337	88.7	76.9	73.0	69.7
High education	685	87.9	78.5	75.5	74.0
Low health experience	335	84.5	74.3	71.0	69.6
High health experience	350	91.1	82.6	79.7	78.3
$\chi^2(3)$		7.13	9.9	11.04	16.04
Probability		.07	.025	.01	.001

TABLE 3

COOPERATION BY METHOD, SAMPLE TYPE AND MONTH

Sample type	n	Percent Cooperating			
			Month		
		Initial	1	2	3
Low education, low health experience					
Personal	56	89.3	83.9	78.6	78.6
Phone	66	83.3	69.7	66.7	65.2
Diary pickup-compensation	54	87.0	81.5	79.6	77.8
-no compensation	52	84.6	82.7	78.8	78.8
Diary mail-compensation	59	93.2	62.7	59.3	54.2
-no compensation	51	84.3	60.8	52.9	41.2
$\chi^2(5)$		5.28	14.2	17.47	29.74
Probability		.40	.02	.005	<.001
Low education, high health experience					
Personal	60	91.6	90.0	85.0	83.3
Phone	60	85.0	81.6	81.6	81.6
Diary pickup-compensation	56	80.4	75.0	75.0	75.0
-no compensation	52	90.4	4	84.6	82.7
Diary mail-compensation	53	92.5	69.8	62.3	58.5
-no compensation	56	92.9	53.6	48.2	35.7
$\chi^2(5)$		7.66	30.85	31.25	47.81
Probability		.18	<.001	<.001	<.001
High education, low health experience					
Personal	57	89.5	80.7	77.2	75.4
Phone	62	85.5	82.3	82.3	82.3
Diary pickup-compensation	54	79.6	75.9	74.1	72.2
-no compensation	57	78.9	75.4	75.4	73.7
Diary mail-compensation	51	86.3	70.6	64.7	62.7
-no compensation	54	87.0	59.3	50.0	48.1
$\chi^2(5)$		4.11	10.32	17.87	19.65
Probability		.55	.07	.005	.002
High education, high health experience					
Personal	58	94.8	94.8	91.4	91.4
Phone	68	88.2	85.3	83.8	82.4
Diary pickup-compensation	57	94.7	94.7	94.7	94.7
-no compensation	50	90.0	88.0	86.0	86.0
Diary mail-compensation	60	88.3	73.3	66.7	61.7
-no compensation	57	91.2	59.6	56.1	54.4
$\chi^2(5)$		3.63	38.3	40.13	48.03
Probability		.60	<.001	<.001	<.001

TABLE 4A

COOPERATION BY METHOD AND MONTH
(Weighted)

Method	Percent Cooperating			
		Month		
	Initial	1	2	3
Personal	91.3	86.4	82.5	81.4
Phone	86.0	82.7	81.2	80.6
Diary pickup	84.3	81.7	80.1	79.0
Compensation	84.5	81.3	80.3	79.3
No compensation	84.1	82.2	79.9	78.7
Diary mail	88.8	71.0	58.0	54.0
Compensation	88.6	74.8	64.3	60.9
No compensation	89.0	67.2	51.6	47.1

TABLE 4B

COOPERATION BY METHOD AND MONTH
(Unweighted)

Method		Percent Cooperating			
			Month		
	n	Initial	1	2	3
Personal	256	91.3	87.4	83.1	82.3
Phone	231	85.5	79.7	78.5	77.7
Diary pickup	432	85.6	82.9	81.0	80.1
Compensation	221	85.5	81.9	81.0	80.1
No compensation	211	85.8	83.9	80.1	80.1
Diary mail	441	89.6	63.7	57.6	52.2
Compensation	223	90.1	69.1	63.2	59.2
No compensation	218	89.0	58.3	51.8	45.0