

ENHANCING COMPLIANCE WITH RECORD-KEEPING BEHAVIOR IN A HOUSEHOLD SURVEY

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Household surveys that collect detailed factual and behavioral information, such as surveys of consumer expenditures or medical utilizations, frequently ask respondents to maintain personal records (calendars, diaries) and to collect documents (bills, receipts, insurance statements) that will make it possible for respondents to provide complete and accurate reports to survey questions. The challenge for survey specialists is to figure out ways to enhance the probability that respondents will comply with the request to keep accurate records in a timely fashion.

This paper focuses on the experience of the National Medical Expenditure Survey (NMES), a longitudinal household survey that collects detailed medical and financial information about health events, and encourages respondents to rely on records and other memory aids to respond to survey questions. In this presentation, we compare the study design used in 1987 NMES to a modified design used in the 1992 NMES Feasibility Study (NMES-FS), and test whether design modifications introduced in NMES-FS achieved higher rates of compliance with record-keeping behavior on the part of family respondents.

The original presentation included a second part, omitted here due to lack of space. In that section, we document the positive effects of record-keeping activities on reporting accuracy. For that purpose, we rely on NMES data collected in 1987 about household medical utilizations, and evaluate the relative contribution of calendar use and financial records to reporting accuracy. Accuracy is determined through external validation of household reports, as the 1987 NMES survey included a validation survey with facilities and doctors identified in household interviews as having cared for specific family members. Please contact the author directly if you are interested in obtaining a copy of those results.

NMES AND NMES-FS: STUDY DESIGNS

The study design for NMES-FS was generally patterned after 1987 NMES, with the exception of a few design elements that were intentionally modified in order to assess their impact on record-

keeping compliance. These modifications are discussed in the next section. The design similarities in the two studies include a Screener round to establish household eligibility, and two full rounds of data collection (Round 1 and Round 2) with selected households. NMES conducted two additional full rounds of interviewing (Round 3 and Round 4), and a very abbreviated final interview. The final round in NMES-FS (Round 3) consisted of a brief interview that had no parallel in NMES. The observation period in NMES spanned an entire calendar year (Jan 1 - Dec 31, 1987) while the observation period in NMES-FS was six months long (June 1 - Nov 30, 1992). Thus, NMES-FS was designed to replicate the first half of the NMES study design consisting of three rounds of interviewing: Screener, Round 1 and Round 2.

The sample design for both studies was identical, although the sample size in 1987 was considerably larger than in 1992. In NMES, approximately 32,000 DUs were screened, and some 17,000 ultimately selected for inclusion in Round 1. In contrast, about 2,000 DUs were screened in NMES-FS in order to select approximately 1,000 for Round 1. The sample design in both studies comprised a national area probability sample of households with oversampling of groups important to health policy decisions (the elderly, the poor and near poor, Blacks, Hispanics, and persons over 65 with functional impairments).

For methodological reasons, an attempt was made to maintain comparability in the timing of the rounds across the two studies. This goal was achieved for the most part. Fifteen weeks elapsed in NMES between the start of the Screener round and the beginning of Round 1, of which 5 weeks comprise a buffer period of field inactivity between the two rounds. In NMES-FS, the total number of elapsed weeks for the comparable period between the start of the two rounds is 13, and this number includes a buffer period of 5 weeks as in NMES. Similarly, approximately the same number of weeks elapsed between the start of Round 1 and the beginning of Round 2 in both studies (17 weeks vs 16 weeks in NMES and NMES-FS, respectively), with only a minor difference in the number of buffer weeks across studies (4 weeks vs 6 weeks in NMES and NMES-FS, respectively).

Other factors were controlled to enable valid comparisons across studies. The NMES instruments were used in NMES-FS, for the most part unchanged, although a couple of sections were redesigned to address problems known to exist from 1987. Compliance with record-keeping would not have been affected by any of these changes. Finally, an effort was made to burden respondents in NMES-FS with reporting tasks that were comparable and interviews of length similar to those in NMES.

STUDY DESIGN DIFFERENCES

The main design differences between NMES and NMES-FS that relate to compliance with record-keeping involve:

- a) the timing of the final sample selection after screening, which in turn affects when households can be enlisted to participate in the study,
- b) the administration of a Baseline interview in NMES-FS for selected households, and
- c) the timing of payment to compensate for the burden associated with record-keeping activities.

Sample selection in NMES took place at the home office after the Screener round had been completed; thus, selected households were recruited for NMES participation in Round 1. Family respondents relied primarily on recall to supply information for the time period from the start of the observation period (Jan 1, 1987) to the date of the Round 1 interview, as NMES respondents did not receive a study calendar with pockets for bills and receipts before Round 1. Instructions on the use of the calendar and the importance of saving financial records and receipts for future interviews were provided at the end of the Round 1 interview. NMES respondents were paid \$10 at the end of Round 1 for participating in the study. The same amount was paid at the end of Round 2 and Round 4.

In NMES-FS, screening and sample selection took place in the field during the Screener round which was conducted using CAPI. The sampling algorithm was loaded into the interviewer laptops, and household eligibility was determined immediately upon completion of the screening interview. Households thus selected were scheduled to receive a Baseline interview (also CAPI) immediately after the screening interview or as soon as possible thereafter.

The Baseline respondent was the person identified by the screening respondent as most knowledgeable about the medical use and needs of all family members. The Baseline interview was

short (average 25 mins) and included an open-ended question and several opinion items related to health care issues (e.g., satisfaction with quality of care and access to medical care; whether anyone in the family had to postpone seeing a doctor, following through with medical treatment, or purchasing specific medicines or supplies because of cost, etc.). The opinion questions were included by way of engaging the interest of respondents in the study subject matter.

The last part of the Baseline interview elicited the names of medical providers (hospitals, clinics, private medical doctors) that had cared for family members over the previous 12 months. Interviewers attempted to match each named provider to entries in a database of medical providers for the PSU in order to obtain full name, address, telephone number and specialty for potential care providers in later survey rounds. If a match was not found, the respondent was asked to provide the necessary location data. This matching exercise helped the study to identify potential providers early in the data collection cycle, and we think it also highlighted to respondents the importance of detail for this study.

At the end of the Baseline interview, the NMES-FS family respondent was handed a study calendar and an accordion folder. The respondent was asked to keep track of medical utilizations and the interviewer explained the use of the calendar and the importance of using the folder to save financial records for future interviews. Baseline respondents also received prospective remuneration for the anticipated effort and time devoted to record-keeping tasks. The amount was \$15, slightly higher than in NMES to compensate for inflation. Payment in the same amount was also given at the end of Round 1 for similar reasons, and at the end of Round 2 primarily for study participation since record-keeping was not necessary in preparation for Round 3. (In Round 3, instead of money, respondents received a small gift - a study coaster consisting of a tile with the seal of the U.S. Public Health Service.) The receipts signed by respondents in Baseline and Round 1 indicated that the respondent agreed to record medical information in the calendar to prepare for the next interview.

To summarize, the NMES-FS treatment in the Screener round includes:

- a) implementing sample selection procedures immediately upon completion of the screening interview in order to establish household eligibility during the Screener round,

b) briefing family respondents on the importance of record-keeping earlier than in NMES in order to decrease the reliance on recall during the Round 1 interview,

c) delivering materials to facilitate record-keeping (calendar, accordion file) earlier than in NMES, and mostly before the start of the study observation period,

d) the administration of a short Baseline interview to generate interest in the study and promote cooperation with study goals, and

e) prospective payment of \$15 as compensation for the anticipated burden associated with record-keeping tasks.

RECORD-KEEPING INSTRUMENTS

There are slight differences in the record-keeping instruments that respondents in each of the two studies received to keep track of medical events and collect bills and statements.

Calendar. The NMES calendar is comparable to the one used in NMES-FS, but the dimensions and layout are slightly different. The NMES calendar is bound as a booklet approximately 10 x 11 1/2 inches in dimension. Facing pages comprise one month, and blocks corresponding to the seven days in a week are laid out across facing pages, while the weeks in the month comprise the rows in each page. The NMES-FS calendar is in the form of a large wall calendar (13 x 11 inches). The top page provides instructions and space where Notes could be written, and the lower page displays the month's days and weeks in the traditional grid pattern used by most wall calendars. The blocks of space used by respondents to describe the health event that took place on any given day are of identical size in both calendars. The figures and explanations defining the various event types the study is interested in tracking are identical in both calendars, and they are reproduced for each month in both calendars.

Pocket File / Accordion File. The NMES-FS accordion folder replaced pockets that were built into the covers of the NMES calendar. The accordion folder was nonetheless described as a pocket file to NMES-FS respondents.

MEASUREMENT OF BEHAVIOR

Measurement of the respondent's behavior was accomplished at the end of the interview in each round. Interviewers in both studies were asked to record the use that the respondent had made during the interview of Memory Aids identified in Table 1. All of the terms are self-explanatory except for

the following clarifications:

a) The Other Calendar category encompasses the use of a personal annotated calendar that the respondent may have used during the interview as well as the use of a (blank) NMES calendar that interviewers had been instructed to hand to respondents at the end of the Round 1 enumeration (NMES), or at the beginning of the interview (NMES Round 2; NMES-FS) if the respondent had failed to keep calendar records since the previous interview. This blank calendar was used as a recall aid during the interview.

b) In later NMES rounds and in all NMES-FS rounds the category NMES Calendar with Entries refers to a NMES calendar annotated by the respondent.

c) The term Pocket File describes the accordion file in NMES-FS whereas the term designates the built-in pockets in the covers of the NMES calendar booklet.

HYPOTHESES

The analysis that follows compares the use of Memory Aids in each of Round 1 and Round 2 of NMES to Round 1 of NMES-FS. The hypotheses can be briefly summarized as follows:

1) Family respondents in Round 1 of NMES-FS, introduced to record-keeping tasks during the Screener Round, will use Memory Aids at a higher rate than family respondents in 1987 NMES Round 1 who were not exposed to the record-keeping task until the end of that round.

2) Family respondents in Round 1 of NMES-FS will use Memory Aids at a rate that is at least comparable to the rate of use for family respondents in 1987 NMES Round 2. That is, are the rates of use of Memory Aids in both studies at least comparable in the round following the one when record-keeping tasks are first introduced (Round 2 in NMES; Round 1 in NMES-FS)?

RESULTS

Table 1 displays information on the rates of Memory Aids use across the rounds we are comparing from each study. Table 2 shows the results of two summary measures for the same study rounds. These measures are the rate at which family respondents used any financial records, and a pattern variable that captures the combined use of calendars and financial records.

Calendars. The comparison of calendar use across rounds is complicated by the fact that in NMES Round 1 only one aggregate category (CALENDAR) appeared in the questionnaire to

capture the use of at least two types of calendars (personal calendar, blank NMES calendar). In later NMES rounds and in NMES-FS the different types were tracked individually. Thus, in order to compare the other two study rounds to NMES Round 1, we aggregated the data in Table 1 to produce an overall estimate of 'any calendar use'. After doing this we see that, as hypothesized, any calendar use in NMES-FS is significantly higher than any calendar use in NMES (78% in NMES-FS vs. 69% in each of the two NMES rounds).

A more interesting comparison is the one involving the use of a NMES calendar with entries in NMES Round 2 and in the first round of NMES-FS. As we had hoped, NMES-FS family respondents used this kind of calendar at significantly higher rates than NMES respondents (62.8% vs 48%, respectively; $t=5.02$, two-sided, $p<.05$). This is important because the higher rate of use takes place in NMES-FS one round earlier than in NMES, and before the start of the observation period. From previous research, we know that respondents who annotate a NMES calendar produce the highest quality of data in NMES.

Financial Records. Use rates for two out of the three types of financial records displayed in Table 1 are significantly higher in NMES-FS as compared to NMES Round 1. The significant categories are bills from providers and insurance payment statement. The third category, checkbook, shows a significant decrease in use in NMES-FS compared to each of the two NMES rounds. This decrease may reflect structural changes in the organization of health care delivery since 1987, most notably the increase in managed care and HMO arrangements which bypass billing the patient. This explanation seems plausible in view of the fact that use of checkbook records is essentially identical for both rounds in NMES, and significantly different from the estimated rate for use in NMES-FS.

There are no significant differences, however, in the rates of use of bills from providers and insurance payment statements in NMES Round 2 as compared to NMES-FS. Comparable use rates are achieved in these two studies after respondents are asked to save these financial records. The important difference, of course, is that NMES-FS family respondents started collecting those records one full round ahead of NMES respondents, and before the start of the study observation period.

The financial records summary measure in Table 2 essentially duplicates the results discussed above - NMES-FS yields a significantly higher use rate

compared to NMES Round 1, and a rate of use comparable in magnitude to the one achieved in NMES Round 2.

Other memory aids. As reported in Table 1, NMES-FS respondents used the pocket file (accordion folder) at significantly higher rates than the pockets built in the covers of the NMES calendar. No differences are registered across all three groups in the rate of use for prescriptions or medicine bottles as memory aids.

Pattern of Aids Use. The combined use of calendars and financial records appears in Table 2. Because of the definitional differences for calendars, the only valid comparison between NMES-FS and NMES Round 1 involves the percent of family respondents that did not use any of these aids during that interview. This comparison reveals that, compared to NMES-FS and as hypothesized, a significantly higher percent of NMES Round 1 respondents did not use any memory aids during the interview. The same is true for NMES Round 2 respondents as compared to NMES-FS.

Furthermore, compared to NMES Round 2, the NMES-FS treatment yields a significantly higher percent of users in the two categories that index more complete and careful reporting. These are the categories for persons who used an annotated NMES calendar to report information, sometimes in combination with financial records.

A more extensive comparison of the kinds of people that used memory aids in NMES and NMES-FS was carried out by Robert Johnson, Jiahe Qian, and Rashna Ghadially from the NORC Washington Office as part of contract requirements for the Feasibility Study. Their analyses show that the gains in memory aids use registered in NMES-FS are not restricted to specific categories of respondents (e.g., the better educated, the older, etc.) but that, compared to 1987, gains in use were registered across subgroups for a variety of demographic groups.

CONCLUSIONS

Compared to NMES, the design modifications tested in NMES-FS, including the Baseline treatment, appear to have achieved greater compliance with record-keeping on the part of family respondents who participated in the first round of that study. As the analysis shows, NMES-FS respondents used the study calendar at a higher rate than respondents did in either of the first two NMES rounds. Also, the rate of financial records use in NMES-FS exceeds the rate

in NMES Round 1 and matches the rate obtained in NMES Round 2. We believe that the behavior differential between NMES and NMES-FS respondents can be attributed to various factors. First, NMES introduced record-keeping tasks at the end of the Round 1 interview. That interview averaged two hours in length and was demanding for both respondents and interviewers. The timing of the task request in NMES was probably less than optimal, and interviewers may have felt pressured to rush through the presentation after the long interview. In contrast, record-keeping was introduced in NMES-FS at the end of the short Baseline Interview. Second, NMES Round 1 respondents relied primarily on recall to answer questions during that first interview. This fact may have served to diminish the importance of record-keeping in the eyes of at least some NMES respondents. They could have reasoned that if the Round 1 NMES interview could be completed without prior record-keeping, then why not later study interviews? In NMES-FS, respondents were introduced to record-keeping tasks during the Screener round, before the first interview. Thirdly,

the Baseline Interview and the prospective payment for the burden associated with record-keeping are probably partly responsible for the boost in memory aids use in NMES-FS, especially calendar use. Future research will explore whether the effects documented here persist in the second round of NMES-FS. Finally, the modifications to the NMES calendar and the replacement of calendar pocket files with an accordion file may have also contributed to facilitating the recording task of NMES-FS respondents. Unfortunately, there is no way to disentangle the contribution of each of these individual factors to the increase in the use of memory aids in NMES-FS.

We are confident, however, that the effects are not due to the current attention to health care reform and the fact that the survey sponsor is the Agency for Health Care Policy and Research. Round 1 of NMES-FS started in August of 1992 and ended ten weeks later in October. Health care reform rose to the top of the national agenda after President Clinton's election in November. The NMES-FS treatment, therefore, appears to have made the difference.

Table 1. Comparison of Memory Aids Use in NMES Rounds 1 and 2 and NMES-FS Round 1

	1987 NMES		1992 NMES-FS	t-test statistic for paired comparison:	
	(A) Round 1	(B) Round 2	(C) Round 1	C vs A	C vs B
MEMORY AIDS	% Used SE	% Used SE	% Used SE		
<u>Calendars</u>					
NMES Calendar with Entries	--	48.0 (0.82)	62.8 (2.83)	xx	5.02
Other Calendar (incl. NMES Calendar w/o entries)	69.3 (0.84)	21.2 (0.54)	15.6 (1.80)	xx	-2.98
<u>Financial Records</u>					
Bill from Provider	25.9 (0.61)	34.0 (0.80)	39.0 (3.52)	3.67	ns
Insurance Payment Statement	7.2 (0.34)	13.5 (0.53)	14.8 (2.26)	3.33	ns
Checkbook	15.1 (0.51)	15.7 (0.56)	8.3 (1.27)	-4.97	-5.33
<u>Other Memory Aids</u>					
Rx or Bottle	45.3 (0.70)	39.5 (0.69)	42.3 (2.21)	ns	ns
Pocket File	--	22.4 (0.76)	37.9 (3.68)	xx	4.12
TOTAL (unweighted)	13501 RUs	13726 RUs	929 RUs		

Table 2. Comparison of Summary Measures of Memory Aids Use

MEMORY AIDS	1987 NMES		1992 NMES-FS	t-test statistic for paired comparison:	
	(A) Round 1	(B) Round 2	(C) Round 1	C vs A	C vs B
SUMMARY MEASURES	%Used SE	%Used SE	%Used SE		
Any Financial Record	35.4 (0.71)	42.4 (0.89)	45.7 (3.34)	3.02	ns
Pattern of Aids Use:					
NMES Calendar w/ entries + Financial record(s)	--	27.1 (0.70)	37.2 (2.92)	xx	3.36
NMES Calendar w/ entries only	--	20.9 (0.59)	25.6 (2.54)	xx	1.80
Other Calendar + Financial records(s)	31.0 (0.74)	9.4 (0.36)	4.2 (0.85)	xx	-5.63
Financial Record(s) only	4.4 (0.22)	6.0 (0.28)	4.3 (0.71)	xx	-2.23
Other Calendar only	38.3 (0.62)	11.9 (0.44)	11.4 (1.54)	xx	ns
No such aids used	26.3 (0.77)	24.8 (0.67)	17.3 (1.15)	-6.50	-5.64
TOTAL (unweighted)	13501 RUs	13726 RUs	929 RUs		

NOTES:

The term RU denotes a Reporting Unit, basically a family unit.

Sample sizes exclude RUs where responses to all memory aids variables are missing (87Rd1=2.7% / 87Rd2=1.5% / 92Rd1=1.2%), and cases where the family respondent did not participate for the entire period of NMES eligibility (INCALPER=0).

SE estimates are adjusted for the complex sample design used in NMES and NMES-FS. 1987 NMES data are weighted by INCALPER of the family respondent; 1992 NMES-FS are weighted by RN1WT87.