

USE OF MULTIPLE ENTRY DIARIES IN PANEL STUDIES OF  
HEALTH CARE EXPENDITURE

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**Background/history** <sup>1</sup>

The Federal Government is currently planning the fourth in a series of national panel surveys of health care expenditures. At this juncture, with the data from the third of these surveys now undergoing analysis, and with the blueprints for the next one on the drawing board, it makes sense to examine some of the techniques and procedures used previously to see how they might be improved.

One of the key techniques used to enhance the recall of health events in all of these surveys was the multi-entry diary. This paper reviews the diaries used, and reports some of the findings gleaned from data collected about their use.

In 1975, the National Center for Health Statistics conducted a methodologically driven feasibility study of household expenditure surveys and the use of diaries, the Medical Economic Research Study (MERS). NCHS has been involved to some degree in the three major U.S. national household surveys of expenditures for health care undertaken since then.

Medical Economic Research Study <sup>2</sup>

The 1975 Medical Economics Research Study tested various methods for collecting medical care expenditure data from families and individuals in a variety of settings. About 690 Maryland households were interviewed at least three times during the period January - July 1975 to test the feasibility and features of a panel type expenditure survey.

During the first interview, the calendar diary (Figure 1) was given to the respondent with instructions to record medical events on the calendar and to record the details in the ledger portion.

During the final interview at the household, the diary was picked up by the interviewer. Since the household had not been previously informed that the diary would be collected, that fact caused no pressure on the respondents to utilize the diary more or less than they would have normally.

National Medical Care Expenditure Survey (NMCES) <sup>3</sup>

In 1977, the National Center for Health Statistics and the National Center for Health Services Research collaborated to conduct the National Medical Care Expenditure Survey (NMCES). That survey interviewed a national probability sample of about 14,000 households regarding their medical care expenditures during 1977. Each sample household was interviewed either 5 or 6 times between February 1977 - July 1978 to collect national data on medical care expenditures.

During the first interview, a revised calendar diary (Figure 2) was given to the respondent with instructions, to record medical events on the calendar and to record the details in the ledger portion.

The calendars were not collected, but questions were asked during each round of interviews in an attempt to learn which parts of the diary were being used.

National Medical Care Utilization and Expenditure Survey (NMCUES) <sup>4</sup>

In 1980, the National Center for Health Statistics and the Health Care Financing Administration collabo-

rated to conduct the National Medical Care Utilization and Expenditure Survey (NMCUES). That survey interviewed a national sample of 6,000 households about their medical care expenditures during 1980. Each sample household was interviewed either 4 or 5 times between February 1980 - July 1981 to collect national data on medical care expenditures.

During the first interview, the calendar diary (Figure 3), was given to the respondent with instructions to record medical events on it.

As in the NMCES, the calendars were not collected, but questions were asked about which parts of the diary were being used.

National Medical Expenditure Survey (NMES) <sup>5</sup>

In 1987, the National Center for Health Services Research (now the Agency for Health Care Policy and Research (AHCPR)), and the Health Care Financing Administration collaborated to conduct the National Medical Expenditure Survey (NMES). (The National Center for Health Statistics was a collaborator in the planning stages, but reduced its participation to that of consultant as a result of budgetary and other considerations). The NMES interviewed a national sample of over 14,000 households about their medical care expenditures during 1987. Each sample household was interviewed either 4 or 5 times from February 1987 - April 1988 to collect national data on medical care expenditures.

During the first interview, the calendar diary (Figure 4), was given to the respondent with instructions to record medical events on the calendar.

Again, the calendars were not collected, but questions were asked of the interviewers at each round of interviews in an attempt to learn which parts of the diary, and what other memory aids were being used during the interview. Note that this is a somewhat different procedure than the one used in the previous surveys.

Based on the experience in the 1975 MERS, the multi-entry format diaries used in all three surveys were designed to assist and encourage respondents' recording, documenting, and recalling information about health events occurring during the survey period.

All the diaries included a calendar portion for recording health events chronologically, similar to the ones in Figures 5 and 6. It is a familiar block design of the type used to keep track of appointments, etc. The NMCUES calendar portion included symbols and instructions about what to enter in the calendar blocks, an innovation (Figure 7) which was intended to increase use of the diary and thereby increase the accuracy of survey reporting.

Figure 8 shows the latest version of the calendar, the one for the 1987 NMES. It opens from side to side, rather than from bottom to top, an innovation that makes it easier to print the calendar on two pages. This also allows more room for entries. However, it makes the calendar more difficult to hang on the wall while open; a fact that may influence how often it gets used. The NMES calendar also contained

additional symbols and instructions about how to use the calendar.

Another feature, common to all of the diaries, is the pocket for household members to collect bills, receipts, and other information which aids the respondent in recalling events.

The MERS, NMCES, and NMCUES pockets (Figures 9 - 11) were appended to the bottom of the back page of the respective calendars. For the 1987 NMES there were two pockets (Figure 12), one fashioned on the inside of each cover.

A feature of the first two diaries, but not of the NMCUES or NMES, was a ledger where details of health events could be recorded. In the MERS the ledger (Figures 13 and 14) was located at the back of the calendar. There were different sections for different types of events: doctor visits, hospitalizations, prescribed medicines, etc.

In the NMCES a different ledger (Figure 15) was placed on each monthly page of the calendar, keeping the details of the visit located physically near the block calendar for easy use and reference.

Based on a review of the 1977 NMCES experience, no ledger was included in the NMCUES or NMES diaries.

A diary with more than one method of entry was used to enhance the probability of its use. Respondents vary in their ability to understand and their need to use the different methods. For a few respondents, the ledger provides a place on which to record almost all the information needed about a particular event. For many others, the calendar provides sufficient space and complexity for recording details. At a minimum the fact that an event took place can be indicated and the date is thus known; the bills and receipts collected in the pocket form the detailed record.

TABLE 1: Diary status at the end of the Medical Economic Research Study. SOURCE: NCHS, MERS, 1975

Status	Number	Percent
Returned diary	428	65.8%
used diary	311	47.8%
did not use diary	107	16.5%
Did not return	222	34.2%
lost	126	19.4%
threw away	36	5.5%
other	60	9.2%
Total	650	100.0%

In the 1975 MERS, about 66% of the households returned the diaries (Table 1). Forty-eight percent were coded as having been used. Most of the 34% not returned, were reported to have been lost or thrown away. The characteristics of the two groups are known, however. The median age and education of the head of the household, and the median household incomes were not appreciably different between those who did, and did not, return the diary (Table 2).

The mode of interviewing was not different, nearly the same percentage of both groups were interviewed by telephone.

A somewhat larger percentage of the persons who returned their diary were interviewed every other month. The only characteristic which was noticeably different between those returning the diary and those not returning it was the lower percentage of persons who returned the diary who lived in urban residences (Table 3).

Usage versus no usage was the dependent variable in a step-wise regression analysis of the 428 households who returned their diaries. The independent variables

were the demographic and interview variables. For the

TABLE 2: Selected Characteristics, Medical Economic Research Study. SOURCE: NCHS, MERS, 1975

	Diary returned	Diary not returned
Number	428	222
Percent distribution	66%	34%
Percent urban	48%	64%
Percent rural	52%	36%
Median:		
Age, reference person	46	43
Educ., reference person	12	12
Income	\$13,900	\$12,900
Mode		
Personal interviews	48%	47%
Telephone interviews	52%	53%
Frequency		
Monthly interviews	45%	53%
Bimonthly interviews	55%	47%

basic question of diary usage, there were three regressions: diary use versus no use; calendar use versus no use; and ledger use (Table 4). In all three regressions, income was the most significant independent variable with rural residence second.

TABLE 3: Returned diary usage in the Medical Economic Research Study. SOURCE: NCHS, MERS, 1975

Selected characteristics	Diary used	Diary not used
Number	311	117
Percent distribution	73%	27%
Percent urban	41%	62%
Percent rural	59%	38%
Percent distribution	73%	27%
Median age, ref. person	44 Yrs	46 Yrs
Median educ., ref. person	12 Yrs	12 Yrs
Median income	\$15,100	\$10,800

In the 1987 National Medical Expenditure Survey (NMES), 31 percent of the households were reported to have used the diary during the interview, but without having entries on it (Table 5).<sup>6</sup> An additional 7.3 percent of the households were reported to have used the diary during the interview, and to have had entries on it. Fourteen percent of the households were reported to have used the pocket during the interview. Note that these may be some of the same people reported as having used the calendar, since one action does not preclude the other.

TABLE 4 Independent variables kept in regression, Medical Economics Research Study. SOURCE: NCHS, MERS, 1975

Diary use	Calendar use	Ledger use
1. Income	Income	Income
2. Rural residence	Rural residence	Rural residence
3. Telephone interviewing	Age	Telephone interviewing
4. Age	Monthly interviewing	Age
5. Monthly interviewing	Telephone interviewing	Monthly interviewing
6. -	Education	-

This is substantially lower than the 73 percent usage reported in the MERS. But remember that 34 percent of the MERS diaries were not available for coding, most because they had been lost or thrown away before the last interview. We can only speculate that they were thrown away because they were not being used.

A look at the median income of the households reported as using the calendar, with or without entries, and/or using the pocket, does not agree with the findings from the MERS.

TABLE 5 Use of memory aid, National Medical Expenditure Survey. SOURCE: AHCPR, NMES, 1987

Status	Calendar		Pocket
	Without entries	With entries	
Using	31.1%	7.3%	14.3%
Not using	62.8%	85.3%	78.4%
Median education of reference person			
Using	12 Yrs	12 Yrs	12 Yrs
Not using	12 Yrs	12 Yrs	12 Yrs
Median income			
Using	\$25,903	\$19,886	\$25,760
Not Using	\$20,910	\$22,779	\$22,000

### Conclusions

I have examined a very limited set of the information collected in the area of multiple entry diaries in health expenditure surveys. All three national surveys conducted in the past 15 years have collected such information, but most of it remains buried in sparsely documented data files, in variables that have never undergone the editing and review given the substantive data. Questions that cry out for examination as we move toward future surveys of this type, involve extending the analysis discussed here, which was begun with the 1975 MERS.

It involves examining the characteristics and the extent to which respondents in such surveys use their own memory aids, such as their own calendar, their checkbook, etc. in place of, or as an adjunct to the survey provided diary. It involves examining the levels of reporting of different types of health events in relation to use of various memory aids. And it involves examining the trends, if any, in these measures in the three national surveys.

These examinations will require some effort in resurrecting the unedited data tapes from the earlier surveys, a task which may be daunting. It will also require a careful linking of the questions about memory aids to the final data tapes.

Despite these problems, it could be very enlightening with regards to what types of memory aids to include in future health expenditure surveys.

### BIBLIOGRAPHY

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MEDICAL ECONOMIC SURVEY  
NATIONAL CENTER FOR HEALTH STATISTICS  
UNITED STATES PUBLIC HEALTH SERVICE



**RECORD  
OF  
FAMILY  
MEDICAL EXPENSES**

Medical Economic Research Study (MERS)  
Calendar-Diary

(figure 1)



**NATIONAL MEDICAL CARE  
EXPENDITURE SURVEY**

National Medical Care Expenditure Survey  
(NMCES) Calendar-Diary

(figure 2)

1980 HEALTH RECORD

For \_\_\_\_\_

National Medical Care Utilization  
and Expenditure Survey  
Sponsored by  
National Center for Health Statistics and  
Health Care Financing Administration

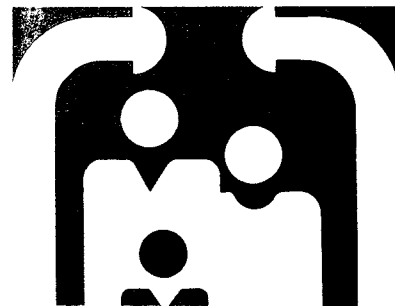
**National Medical Care Utilization and  
Expenditure Survey (NMCUES)  
Calendar-Diary**

(figure 3)

**National  
Medical  
Expenditure  
Survey**

1987 CALENDAR DIARY

Conducted for  
the United States  
Public Health Service  
and the Health Care  
Financing Administration



**National Medical Expenditure Survey  
(NMES) Calendar-Diary**

(figure 4)

FEBRUARY 1977

MARK EACH DAY THAT A FAMILY MEMBER IS SICK OR DOES NOT GO TO WORK BECAUSE OF ILLNESS.

SUNDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4	5
7	8	9	10	11	12
14	15	16	17	18	19

NMCES calendar

(figure 5)

January Health Record








Sunday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 New Year's Day	2	3	4	5
8	9	10	11	12	
15	16	17	18	19	
22	23	24	25	26	

NMCUES calendar

(figure 6)

Thanks for taking part in this impc

Please use this calendar to keep tr about during the next interview. M your family . . .

-  stays in bed beca
-  misses work beca
-  cuts down on noi
-  goes to a dentist
-  visits a doctor, cli
-  gets any prescrib
-  has special exper equipment, an an

When you note any medical care c or service and then keep your rec

NMCUES symbols

(figure 7)

Please use this calendar to keep track of events your interviewer will ask you about during the next visit. Mark the name of your family member next to the date each time someone in your family . . .

Thursday	Friday	Saturday
3 Name: _____ Event: _____ <i>John's office brought change medicine @ 9:00</i>	4 Name: _____ Event: _____ <i>Payment</i>	5 Name: _____ Event: _____
10 Name: _____ Event: _____ <i>John emergency room out for 2 hrs. brought medicine @ 3:30</i>	11 Name: _____ Event: _____ <i>John missed work</i>	12 Name: _____ Event: _____
17 Name: _____ Event: _____	18 Name: _____ Event: _____ <i>John John's office Satchel</i>	19 Name: _____ Event: _____
24 Name: _____ Event: _____ <i>George visiting nurse home and clean</i>	25 Name: _____ Event: _____ <i>Mary dental cleaning check up</i>	26 Name: _____ Event: _____ <i>Sally clinic for shot @ 8</i>
31 Name: _____ Event: _____	Christmas	

- A** Stays in bed because of sickness or injury
- B** Misses work or school because of sickness or injury
- C** Goes to the dentist
- D** Enters a hospital or nursing home
- E** Visits a doctor, or any other medical person, office, clinic, emergency room, etc.
- F** Gets any prescribed medicines
- G** Is visited at home by a doctor, or other medical person, or is helped by anyone else because of a health problem
- H** Has special expenses for eyeglasses, hearing aids, diabetic equipment, ambulance, or crutches wheelchairs, etc.

NMES calendar

(figure 8)

24	25	26	27	28	29	30
----	----	----	----	----	----	----

*Mrs. Jane Doe  
ANY STREET  
CITY, STATE 22222*

Medical Economic Survey

This survey is designed to collect nationwide statistics on the use and cost of medical care. Information from this survey will be translated into valuable statistics which will describe the medical care patterns of the population of the country and show the relationship between the use of medical care and associated costs. Since a healthy population is one of the nation's most important resources and since the cost of medical care is rising at an increasing rate, it is essential for the U.S. Public Health Service to monitor and assess this type of information.

The purpose of this calendar is to help you and your family keep a record of your medical expenses. When the interviewer \_\_\_\_\_ calls on you next, this information will be used in filling out the questionnaire. If you have any questions about this calendar or the survey, please call \_\_\_\_\_

MERS pocket

(figure 9)

OTHER MEDICAL	DATE	DESCRIPTION	AMOUNT
1			
2			
3			

*Mrs. Jane Doe  
ANY STREET  
CITY, STATE 22222*

KEEP YOUR MEDICAL BILLS IN HERE  
NATIONAL MEDICAL CARE EXPENDITURE SURVEY



Research Triangle Institute  
Post Office Box 12138  
Research Triangle Park, N. C. 27709

National Opinion Research Center  
817 Broadway  
New York, New York 10003

NMCES pocket

(figure 10)

