COMPARISON OF IN-PERSON AND TELEPHONE RESPONSES IN A SURVEY OF THE LAST DAYS OF LIFE

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I. INTRODUCTION

The use of mixed modes for conducting surveys of various kinds has been considered in a number of studies in the past (see, for example, Hochstim, 1967, Siemiatycki, 1979, Siemiatycki and Campbell, 1984 and Brambilla and McKinlay, 1987, to name but a few). In these efforts reference has usually been made to the fact that telephone and mail surveys are less expensive than in-person interviews, but concern is usually expressed about the quality of the data (particularly non-response) from surveys conducted using those methodologies. In the studies cited above, however, the results indicated that for the most part little quality was lost by using the alternate modes for carrying out the study. In the survey being reported in this paper, we consider the quality of the data resulting from telephone and in-person interviews with informants for deceased older persons shortly after the time of death in a community in Fairfield County, Connecticut. The reasons for using telephone interviews in this study included not only the survey costs often mentioned by other authors, but also an attempt to increase response in this population because of reluctance of some respondents to be contacted in person. The latter problem is becoming more and more prevalent as the population ages and potential respondents express greater fear of contact with strangers, especially in inner city areas.

The data for this study were taken from the National Institute on Aging Survey of the Last Days of Life (Brock, 1983, Brock and Foley, 1985, Brock et al., 1987 and Brock et al., 1990). This retrospective survey was based on a stratified sample of 1,227 death certificates of persons aged 65 and older whose deaths were recorded between October 1, 1984 and September 30, 1985 in Health Service Area No.1 (HSA-1) in Connecticut. Data were gathered from the decedent's next-of-kin or another informant who was more knowledgeable of the decedent's last days. In the remainder of the paper we present a brief description of the survey, the rationale for conducting some telephone interviews in the place of in-person interviews, and some comparisons of the response characteristics resulting from the two modes of interviewing.

II. METHODS

The survey was based on a stratified sample of 1,500 death certificates registered in HSA-1 as described above. Initially, all certificates for decedents aged 65 and older were abstracted and stratified into four groups determined by sex and age (65-74 and 75 and older). The sample was selected with equal allocation to strata and proportionally by month to assure that (1) a sufficient number of younger decedents (i.e., those 65-74) was included and (2) seasonal variation in mortality was taken into account.

Further details of the design may be found in Brock et al.(1990).

Interviewing with the informant was initiated three months after the death occurred in order to minimize both respondent burden and recall error. While the objective for the study was to conduct in-person interviews, the mixed mode of telephone and in-person interviews was used for the following reasons. First, as often happens following a death, many informants (particularly widows) were no longer living in the study area three months later, and the study budget did not allow for travel to distant places for in-person interviews. Telephone interviews conducted in this situation (20% of the telephone contacts) were considered to be "legitimate." On the other hand, many persons were reluctant to allow a stranger into their homes for reasons of either security or privacy, and the busy work schedules of many informants made it difficult, if not impossible, to conduct in-home interviews. Reluctant respondents constituted 41% of the telephone interviews and "too busy" made up the remaining 39%. The latter two categories were not considered to be "legitimate" and thus, under the heading of "reluctant," became the subject of the comparisons with the in-person data.

The purpose of the comparisons contained in the remainder of the paper was to determine if differences existed in reporting of a variety of variables in the survey due to the use of the telephone and to determine whether use of the telephone was a factor in the amount of item non-response experienced in this study. The variables measured in the survey fell into four distinct categories as described previously (Brock et al., 1987): circumstances surrounding death, lifetime history of health conditions and events experienced by the decedents, health status trends and functioning in the last year of life, residential transitions among hospitals, nursing homes and private residences in the last three months of life.

Variables from three of these groups (circumstances, lifetime history and health trends) are considered here. For those variables with small amounts of missing data -- most of the lifetime history variables fit this description -- descriptive tables provide information on how the responses differed from one interview type to the other. For a set of variables with a relatively large amount of missing data, logistic regression models were fitted to explain the variation in the proportion of missing data as a function of several independent variables, including age and sex of the decedent, type of interview, and relationship of the respondent to the decedent.

III. RESULTS

The distribution of interviews by the relationship of the respondent to the decedent, type of interview, and age and sex of decedent is given in Table 1. Note

first that overall (i.e., for all ages and both sexes combined) there were more legitimate (56%) than reluctant (44%) respondents. This was true over all data sources (data source here being represented by the relationship of respondent to decedent).

For male decedents there were also more legitimate than reluctant responses except for those cases in which the data were provided by "Other respondents," cases for which the percentages were the same. The majority of respondents for male decedents were spouses, a reflection of the known higher mortality rates for males at a given age. Older decedents were less likely to have had spouses or siblings as respondents and more likely to have had children or "others" as respondents.

For female decedents again there were more legitimate than reluctant responses except for cases in which the data were provided by a sibling. The majority of the respondents for females were children of the decedent. As was the case for men, the older women (i.e., those over age 75 at the time of death) were more likely to have had children or "others" as respondents and less likely to have had spouses or siblings as respondents.

Table 2 contains prevalence estimates for the lifetime history items and the percentage of missing data for these variables by type of interview. In general three observations apply to this table. First, the proportion of missing data for these items is very small, never reaching even 1%. Second, whereas the percentage of missing data overall is larger for the telephone interviews, the difference is so small as to be of little practical importance. Third, in general the reported prevalences are higher from in-person respondents, but again, for most of these variables the differences are small, and for some of them the values are actually higher among the telephone interviews.

Table 3 contains data very similar to those in Table 2, this time concerning questions from the sections of the questionnaire on the immediate circumstances of death and functional ability of the decedent during the last year of life. As in Table 2, we see that the percentages of missing data remain small, here never exceeding 2.5%. In contrast to the data in Table 2, however, most of the prevalence estimates are larger among the telephone responses, but again, the differences are small. For these variables the percentage of missing items is greater overall among the telephone respondents, but as before, the differences are not large. Note here that the cause-of-death data have no missing values. They were taken directly from the death certificates and provide an "independent check" on the data for decedents with telephone respondents compared to in-person respondents where actual respondent reporting is not involved. On the basis of those four items, there is no reason to suspect that a systematic bias exists between decedents with telephone respondents and those with in-person respondents.

Table 4 presents the results of modeling the proportions of missing data as a function of the relationship of the respondent to the decedent, the type of interview ("legitimate" versus "reluctant"), and the age

and sex of the decedent. Logistic regression models were fitted (using SAS Proc CATMOD) for the 11 substantive variables with the highest levels of missing data. For these models, the reference group was defined as male decedents aged 65-74 whose spouses provided "legitimate" responses. The models provided dummy-variable increments for child, sibling, or other respondents, "reluctant" telephone interviews, age 75 or older, and women decedents.

As one can see in Table 4, according to the likelihood ratio criterion, for most of these variables the models fitted the percentage of missing data quite well. There do appear to be a couple of instances where interactions need to be investigated. Those issues will be pursued as time permits. Two remarkably consistent results that persist throughout this analysis are that neither the reluctant phone interviews nor the sex of the decedent contributes significantly to the amount of missing data in these variables. Further, with the exception of the variable on pain experienced by the decedent one month before death, the use of a child of the decedent as a respondent did not contribute significantly to an increased level of non-response over that of a spouse respondent.

On the other hand, a significant increase in the proportion of missing data was observed when either a sibling or other respondent was used. The only exceptions to this were for the number of days the decedent knew that the death was approaching, and whether the decedent was believed to be in pain on a typical day one month before death. Clearly, these are difficult quantities to report by someone who did not necessarily have daily contact with the decedent. In a few cases the age of the decedent was important, but as was pointed out earlier, there was a fairly strong association between age of the decedent and source of the data. In fact, when the models were refitted leaving out the age and sex of the decedent, in no case was the p-value of the likelihood ratio statistic less than 10%. One could conclude from this that if one has relationship of respondent to the decedent in the model, it appears that the age and sex of the decedent are irrelevant as predictors of the amount of missing data.

IV. SUMMARY AND CONCLUSIONS

Several questions regarding the use of mixed-mode interviewing in a community-level mortality follow-back survey have been investigated for the National Institute on Aging study known as the Survey of the Last Days of Life. The use of telephone interviews in cases where respondents were reluctant to be contacted in person appears not to have affected in an adverse way the quality of the data obtained from this study. For many of the substantive variables measured in this survey the amount of missing data was quite small, and there was little variation in responses between telephone and in-person respondents. For those variables with a relatively high proportion of missing data, the use of telephone interviews did not contribute significantly to increased amounts of missing data. Rather, the source of the

data, that is, the relationship of the respondent to the decedent, was a more important factor in determining the proportion of missing data. Finally, the fact that a telephone interview was done because the respondent was reticent to be interviewed in person was not a significant predictor of missing data in this survey.

The information gathered in this study provides assurance that this methodological strategy was successful in the survey and that continued substantive analysis of the data from the survey will yield useful results. When one considers that the use of telephone interviews more than doubled the response rate in this survey, the losses -- if any -- associated with that mode of interviewing, become small indeed! We believe that the results presented here will also be useful to others who plan and conduct similar studies in the future.

V. REFERENCES

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Table 1. Distribution of interviews by relationship of respondent to decedent, type of interview, and age and sex of decedent

Relationship and type of interview	Men 65-74	Men 75-84	Men 85+	Women 65-74	Women 75-84	Women 85+
Spouse						
In-person and legitimate phone	107	42	11	47	7	3
Reluctant Phone	99	38	6	33	11	2
Child						
In-person and legitimate phone	20	44	34	82	39	69
Reluctant phone	26	20	42	63	34	53
Sibling						
In-person and legitimate phone	18	10	2	19	12	4
Reluctant phone	14	6	4	19	10	8
Other Respondent						
In-person and legitimate phone	10	14	14	27	21	33
Reluctant phone	3	9	6	10	7	15
Total						
In-person and legitimate phone	155	110	61	175	79	109
Reluctant phone	142	73	58	125	62	78

Table 2. Lifetime prevalence of health conditions and diagnosis by interview-type and percentage of missing data by interview type

Condition or diagnosis	Prevalence by interview type		Percent missing data by interview type	
	In-person	Telephone	In-person	Telephone
Blindness	6.5	5.0	0.2	0.0
Deafness	8.5	7.4	0.2	0.0
Use of pacemaker	8.5	8.6	0.2	0.3
Ostomy	4.0	4.7	0.2	0.4
Hip fracture (one)	8.3	7.1	0.4	0.3
Hip fracture (more than one)	1.1	1.6	-	-
Stroke (one)	17.0	13.3	0.4	0.7
Stroke (more than one)	11.1	9.2	-	-
Alzheimer's disease	11.1	7.9	0.0	0.3
Cancer	38.0	37.2	0.2	0.3
Heart disease	42.8	39.6	0.2	0.6
Parkinson's disease	4.5	2.4	0.2	0.3

Table 3. Percentages related to the circumstances of death and functioning in the last year of life by interview type, and missing data by interview type

Variable	Percent with characteristic by interview type		Percent missing by interview type	
	In-person	Telephone	In-person	Telephone
Death was not expected	46.4	55.0	0.0	0.3
Heart-first listed cause	58.5	56.4	-	-
Cancer-first listed cause	13.2	10.8	-	-
Stroke-first listed cause	4.4	4.2	-	-
Pneumonia-first listed cause	4.2	5.3	-	-
Excellent or good health day before death	9.6	12.4	1.5	1.8
Excellent or good health month before death	22.6	27.9	0.5	0.9
Excellent or good health year before death	52.4	57.6	1.5	0.7
Able to recognize family month before death	92.9	93.6	1.3	1.8
Able to recognize family year before death	96.2	97.0	1.3	0.7
Orientation good month before death	89.7	92.2	1.8	1.9
Orientation good year before death	93.9	96.3	1.6	0.7
Mobility good day before death	12.7	16.0	2.1	2.4
Mobility good month before death	31.9	34.2	0.5	1.8
Mobility good year before death	62.9	64.4	1.3	0.6

Table 4. Results of modeling missing data proportion as a function of relationship of respondent to decedent, type of interview, and age and sex of decedent: selected outcome variables.

Outcome Variable	Percent Missing	Predictor Variables				Age of Decedent	Sex of Decedent	Likelihood Ratio
		Child	Sibling	Other Respondent	Reluctant Phone Interview			
		p-values				**p-values**	**p-values**	**p-values**
Time of death	5.1	NS	.0001	.0002	NS	NS	NS	.08
Died in sleep	10.9	NS	.0001	.0005	NS	NS	NS	.09
No. of days decedent knew of impending death	5.1	NS	NS	NS	NS	NS	NS	NS
Clergy present 3 days before death	8.6	NS	.0001	.0001	NS	.03	NS	NS
Nurse present at time of death	15.4	NS	.0099	.02	NS	.05	NS	NS
Other persons present at time of death	16.2	NS	.04	.07	NS	.07	NS	.04
Decedent in pain 24 hours before death	16.0	NS	.001	.0003	NS	NS	NS	NS
Decedent in pain one month before death	7.3	.0035	.0031	NS	NS	.006	NS	NS
Decedent able to recognize family one day before death	5.9	NS	.0003	.0001	NS	NS	NS	NS
Decedent oriented as to location day before death	7.0	NS	.005	.0001	NS	NS	NS	NS
Decedent had urinary incontinence day before death	10.4	NS	.0001	.0001	NS	NS	NS	.04

NOTE: "NS" indicates a p-value $\geq$ .10.