

Esther Hing
National Center for Health Statistics,
6525 Belcrest Road, Hyattsville, MD 20782

I. INTRODUCTION

The 1992 National Home and Hospice Care Survey (NHHCS) is the first nationally representative survey of hospices and home health agencies and their patients. The 1992 survey is the first of a planned annual survey designed to provide statistics on use and availability of hospice and home health care services in the nation. The survey was conducted by the Bureau of the Census on behalf of the National Center for Health Statistics (NCHS) from September to December of 1992.

This paper will examine 1992 NHHCS questionnaire response rates for both hospices and home health agencies. Characteristics of responding and nonresponding agencies will be compared using data from the 1991 National Health Provider Inventory, the sampling frame for this survey. Nonresponse at the agency level will be examined as a source of bias in the patient samples from this survey.

II. SOURCES AND QUALIFICATIONS OF DATA

The scope of the NHHCS was agencies providing home health and/or hospice services at the time of the survey. The sampling frame for the 1992 NHHCS consisted of all home health agencies and hospices identified in the 1991 National Health Provider Inventory (NHPI) and all agencies opened for business between 1991 and June 30, 1992. The National Health Provider Inventory (NHPI) is a comprehensive census of nursing and related care homes, residential care homes, facilities for the mentally retarded and mentally ill, home health agencies, and hospices conducted by the National Center for Health Statistics (Bureau of the Census, 1992).

The sample design for the 1992 NHHCS is a stratified three stage probability design. Primary Sampling Units (PSU's) are selected at the first stage, agencies are selected at the second stage, and a sample of current patients and discharged patients are selected at the third stage.

The first stage utilized the selection procedures that resulted in the 198 PSU's used for the National Health Interview Survey (NHIS), a survey of the civilian noninstitutionalized population of the United States. Home health agencies and hospices were selected within the NHIS PSU's to minimize data collection costs and to establish linkage between the two surveys which will allow future research

on availability and use of services (IOM, 1992).

The second stage involved the selection of agencies within six primary strata of agencies. These strata were formed in the 1992 sampling frame on the basis of type of agency [hospices versus home health agencies and mixed agencies (providing both types of care or unknown)], and type of PSU [Self Representing (SR) versus Non-Self Representing (NSR), and within NSR, Metropolitan Statistical Area (MSA) versus non-MSA]. Within these sampling stratum, agencies were arrayed by four regions, five types of ownership, two types of certification status, and finally by the number of patients served by the agency as reported in the 1991 NHPI. The number of agencies selected from each sampling stratum was based primarily on results of research into the optimum sample design for the 1992 NHHCS. Hospices in the NSR PSU's and home health agencies and mixed agencies in the non-MSA, NSR PSU's were selected with certainty. Hospices in the SR PSU's and home health agencies and mixed agencies in the MSA, NSR PSU's and the SR PSU's were selected with probability proportional to the patient size. A total sample of 1,500 agencies were selected; 384 were hospices, and the rest were home health agencies or mixed agencies (Hoffman, 1992).

The final stage is a systematic random selection of 6 patients currently served by the agency and 6 patients discharged from care during the last complete 12 month period.

The method of data collection was by personal interview. The interviewer conducted a personal interview with the administrator about characteristics of the hospice or home health agency using the Facility Questionnaire (FQ).

Two patient samples were then selected: a sample of 6 patients currently served by the agency (as of the night before the survey) and a sample of 6 patients who were discharged from the hospice or home health agency in the last complete 12 month period.

Once sample patients were selected, patient data was collected by personal interviews with a staff member designated by the administrator; the staff member referred to patient records when necessary. No patient was ever contacted personally. The Current Patient Questionnaire (CPQ) and the Discharged

Patient Questionnaire (DPQ), respectively, were used to collect patient information for each patient sample.

The 1992 NHHCS was designed to provide separate estimates of hospices and home health agencies and their patients. In this paper, response rates for hospices and home health agencies are presented by the classification used to select the sample. To identify characteristics of Facility Questionnaire (FQ) responders and nonresponders, FQ response rates are compared by 1991 NHPI characteristics. Response rates for the two patient samples (current and discharged patients) are also presented by the same classification used to select the agency.

IV. RESULTS

Table 1 shows the disposition of the 1500 hospices and home health agencies in the sample. Overall, 111 agencies or 7 percent were ineligible for the survey either because the facility was out of business (2 percent), out of scope (3 percent), or because the agency merged or was a duplicate of another case (3 percent). Overall 1,390 agencies were eligible to participate in the survey.

The response rate for the Facility Questionnaire among eligible facilities was high (90 percent) overall. Participation rates among eligible hospices (91 percent) and home health agencies (89 percent) were similar.

Completion rates for the Current Patient Sampling List (CPSL) used to select the sample and for the Current Patient Questionnaires among participating agencies was even higher than those for the Facility Questionnaire (Table 2). The response rate for the Current Patient Sampling List (CPSL) was 96 percent among home health agencies and 97 percent among hospices. Similarly, overall response for the Current Patient Questionnaire was 96 percent among home health agencies and 98 percent among hospices. If ineligible sample cases are removed from the denominator, the CPQ response rates are even higher (99 percent among each type of agency). Ineligible cases are cases included on the agency's roster of current patients who actually were no longer receiving care (discharged) or assessment only cases. Assessment only cases were persons who were evaluated by the agency for care needs, but who never received care. Completion of the Discharged Patient Sampling List (DPSL), the form used to select discharges showed a similar pattern (Table 3). The response rate for the DPSL was 95 percent for home health agencies, and 96 percent for hospices, while 96 percent of home health agency discharged patients and 97 percent of hospice discharged patients had responses

to the Discharged Patient Questionnaire. Thus, participation was high for both patient samples once the sampling list was completed.

As was shown in the previous tables, nonresponse was greatest at the agency level. To further explore differences in response at this level, Facility Questionnaire response rates for hospices and home health agencies were examined by 1991 NHPI characteristics (Table 4). In general, there were differences in response by ownership type, certification and location. For example, proprietary home health agencies were less likely to participate in the survey than non profit or government operated agencies, while home health agencies that were certified by either Medicare or Medicaid were more likely to respond than noncertified home health agencies. Finally, home health agencies located in non metropolitan non-self representing PSUs experienced significantly higher response (97 percent) than agencies located in more urban PSUs (86-89 percent). Self-representing PSUs generally represented larger metropolitan areas. There were fewer differences in response rates among hospices.

To predict FQ response while simultaneously controlling for the effects of the preceding variables, a logistic regression model for response among inscope agencies was developed. Because of the small sample of hospices (n=384), response to the FQ was modeled for the entire sample of 1,390 inscope agencies, with a dummy variable for type of agency according to the following equation:

$$\log(p/(1-p)) = \alpha + \beta X$$

where α is the intercept parameter and β is the vector of slope parameters for the vector X of explanatory variables shown in Table 4.

A weighted backward stepwise logistic regression using the Statistical Analysis System's LOGISTIC procedure was performed to select the best model. The weight used was the inverse of the probability of selection, "normalized" so that the sum of the weights equaled the number of cases. "Normalization" was accomplished by dividing each weight by the sum of the weights times the number of inscope cases. This model was then run using complex survey design software for logistic regression using the inverse of the probability of selection as the weight.

The final model (Table 5) found that there was no difference in FQ response between home health agencies and hospices. Medicare or Medicaid certification, however, was found to predict higher FQ response, as was having under 100 active patients, and being in the Northeast or Western census regions.

Proprietary ownership was associated with lower FQ response. Location in urban PSUs (self representing and non-self representing metropolitan statistical areas) was associated with lower FQ response.

A key measure in the NHHCS is the number of active patients served by home health agencies and hospices. To check the bias of this variable, the mean number of active patients reported in the 1991 NHPI was compared for responding and nonresponding agencies. Although the mean number of active patients appeared to be higher in responding agencies (181) than nonresponding agencies (136.9), the difference was not statistically significant.

V. CONCLUSIONS

The National Hospice and Home Care Survey (NHHCS) was developed in response to increasing availability and use of community-based long-term care in the last decade. Survey participation for the first NHHCS was high; 89 percent for home health agencies and 91 percent for hospices. Among both types of agencies, response to the patient questionnaires was also high, ranging from 95-97 percent.

Nonresponse affecting patient questionnaires was largest at the FQ level. This paper found lower FQ response among proprietary agencies and in urban PSUs. Higher FQ response was associated with certified agencies, among agencies with smaller (under 100) patient loads, and in the Northeast and West census regions. The response patterns by ownership and by certification were similar to those found among nursing homes (Hing, 1987; Potter, 1988). Potter also found similar results by urban status among nursing home patients (Potter, 1988).

The FQ results by region and urban status will be incorporated in weighting class variables as nonresponse adjustments to the final survey weights. The response patterns for the remaining variables identified in this research affect patient estimates overall and may be included in imputation procedures for missing data in the two patient samples.

The response rates from the first NHHCS are very encouraging; they are comparable to or better than those obtained in several previous studies of hospices and home health agencies. Table 6 shows that response rates from previous studies of home health agencies ranged from 18-88 percent; while response rates from hospice studies ranged from 31-100 percent. The survey will be collected annually; the 1993 NHHCS began data collection on August 2. Based on this survey's response rates, the data from this nationally representative survey has

no major biases. It also presents the first national estimates of home health and hospice patients.

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Table 1. Number of home health agencies and hospices in the 1992 National Home and Hospice Care Survey sample by disposition.

Disposition	Total	Home health agencies	Hospices
1. Total in sample	1500	1116	384
2. Not eligible for survey	110	92	18
Out of business	23	20	3
Out of scope	45	42	3
Duplicate	15	8	7
Other noninterview	27	22	5
3. Eligible for survey	1390	1024	366
4. Percent of sample eligible for survey (3 divided by 1)	92.7	91.8	95.3
5. Responded	1245	913	332
6. Refused	141	108	33
7. Unable to locate	3	3	0
8. Response rate (5 divided by 3)	89.6	89.2	90.7

Table 2. Disposition of current patient sample in the 1992 National Home and Hospice Care Survey.

Disposition	Total	Home health agencies	Hospices
1. Number of responding agencies	1245	913	332
2. Completed Current patient sampling list (CPSL) 1/	1196	876	320
3. CPSL response rate (2 divided by 1)	96.1	95.9	96.4
4. Total Current patients sampled on CPSL	7109	5232	1877
5. Total ineligible cases	144	125	19
Selected in error	96	85	11
Assessment only	48	40	8
6. Total eligible cases (4 minus 5)	6965	5107	1858
7. Number of Current patient questionnaires completed	6897	5052	1845
8. Overall CPQ response rate (7 divided by 4)	97.0	96.6	98.3
9. In-scope CPQ response rate (7 divided by 6)	99.0	98.9	99.3

1/ Excludes one agency that refused response to the FQ but did respond to the CPSL.

Table 3. Disposition of discharged patient sample in the 1992 National Home and Hospice Care Survey.

Disposition	Total	Home health agencies	Hospices
1. Number of responding agencies	1246	913	333
2. Completed Discharged patient sampling list (DPSL) 1/	1177	858	319
3. DPSL response rate (2 divided by 1)	94.5	94.0	95.8
4. Total Discharged patients sampled on DPSL	7040	5135	1905
5. Total ineligible cases	202	163	39
Selected in error	81	64	17
Assessment only	121	99	22
6. Total eligible cases (4 minus 5)	6838	4972	1866
7. Number of Discharged patient questionnaires completed	6765	4910	1855
8. Overall DPQ response rate (7 divided by 4)	96.1	95.6	97.4
9. In-scope DPQ response rate (7 divided by 6)	98.9	98.8	99.4
1/ Excludes one agency that refused response to the FQ but did respond to the DPSL.			

Table 4. Facility Questionnaire response rates for home health agencies and hospices by selected facility characteristics: 1992 NHHCS.

Selected facility characteristics from 1991 NHPI	Home health agencies	Hospices
All facilities	89.2	90.7
OWNERSHIP		
For profit	83.4	83.3
Nonprofit	92.7	91.8
Government	93.6	76.5
Other or unknown	83.6	100.0
MEDICARE OR MEDICAID CERTIFICATION		
Certified by either or both	91.3	89.2
Not certified by either	72.2	95.1
Unknown	82.4	100.0
ACTIVE PATIENTS		
Less than 100	91.8	90.4
100-199	87.8	95.7
200-299	91.9	100.0
300-399	88.5	100.0
400-499	89.5	100.0
500 or more	89.7	100.0
Unknown	83.5	85.2
REGION		
Northeast	90.8	89.3
Midwest	87.1	87.3
South	88.3	92.1
West	91.0	93.2
LOCATION		
Self-representing PSU	86.1	89.7
Non self-representing PSU		
MSA	89.1	88.9
Non-MSA	97.1	100.0

Table 5. Logistic regression model to predict response to the Facility Questionnaire

Term	Coefficient	Standard error	T-Test $\beta=0$	Odds Ratio
Constant	2.50	0.56	4.44	12.24
Ownership				
Proprietary	-0.86	0.26	-3.27	0.42
Census region				
Northeast	0.70	0.28	2.5	2.02
West	1.10	0.34	3.21	3.00
Medicare or Medicaid certification				
Yes	1.13	0.27	4.16	3.10
Location				
Self-representing PSU	-1.78	0.54	-3.29	0.17
Non self-representing Metropolitan Statistical Area PSU	-1.21	0.57	-2.10	0.30
Number of active patients				
Under 100 patients	0.65	0.31	2.08	1.91

Table 6. Response rates from previous studies of hospices and home health agencies.

Study	Scope	Response rate	Method of data collection
Evaluation of long-term care minimum data set (1982)	Long-term care providers	81% - home health agencies 86% - hospices (Pretest and Main Study combined)	Record abstraction by facility staff and by interviewers
Joint Commission Accreditation of Health Organizations (1981-86)	Hospices	77% - 1981 31% - 1982 51% - 1983 100% - 1984 1985-86 79% - Certified 65% - Noncertified	Mail survey
Select Committee on Aging, House of Representatives (1985)	Medicare certified home health agencies	18%	Mail survey
Non-certified hospice cost analysis (1987)	Non-certified hospices	59%	Personal interview by site visit team (accountant and researcher)
National Medical Expenditure Survey, Provider Survey (1992)	All health providers	88% - home health providers	Mixed mail and personal interview