

# Patient Outcome as a Measure of Quality Of Nursing Home Care

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**Abstract:** One thousand males transferred from a general medical hospital into 40 community nursing homes were classified by their physicians as to expectations of outcome within six months and measured on physical functioning at the time of their transfer. They were followed up six months later and retested on functional status. Subjects were classified on follow-up as improved, the same, deteriorated, or dead. They were also classified as discharged from the nursing home, still in the home, or readmitted to the hospital. Nursing homes were measured every six months on structural variables. Outcomes of the patients were related to the

nursing home characteristics by multivariate analysis of variance, controlling for expected outcome, age, and diagnoses of cancer and chronic brain disease. Homes with more RN hours per patient were associated with patients being alive, improved, and discharged from the home. Better ratings on meal services were related to being alive and improved. A higher professional staff-to-patient ratio, better medical records, and more services were related to being discharged from the nursing home. (Am. J. Public Health 67:337-344, 1977)

Most of the research on quality of medical care has focused on hospital and, to a lesser extent, on ambulatory care. Brook<sup>1</sup> and Shortridge<sup>2</sup> have reviewed these efforts. Extended, long-term, or nursing home care has received relatively little research attention. Although nursing home studies vary in definitions of quality, the majority resort to a common methodology of relating the characteristics of the homes to conditions of the patients in the homes—a cross-sectional approach. No studies could be found that considered several homes and examined patients on a longitudinal basis, particularly concerning their condition before and after admission to the home.

Quality has been measured generally by observation. In Britain, Townsend<sup>3</sup> classified 173 institutions for the aged along a continuum of care based on personal inspection of the homes and found higher quality related to small nonprofit homes. Beattie and Bullock<sup>4</sup> judged 80 nursing homes in St. Louis, Missouri according to quality, defined as "social climate ratings," and observed that larger homes had more fa-

vorable climates. In Minnesota, Anderson and associates<sup>5</sup> used eight presumed quality indicators of nursing home care (such as number of physician hours) and reported more physician hours were associated with nonprofit ownership of the home. In another study,<sup>6</sup> higher quality, measured by a different set of variables, was associated with fewer welfare patients in the home. Recently, Anderson<sup>7</sup> suggested that quality might better be defined by patient choice. Levy *et al*<sup>8</sup> also developed a proxy measure of quality for a study of Massachusetts nursing homes. They selected samples of patient records from 175 homes and had consultants judge nine weighted variables. The variables were facility oriented, with the most weight given to nursing coverage and licensed nursing hours. They found higher cost and certification associated with higher quality care in 1969. Gottesman<sup>9</sup> equated quality of interactions between staff and patients in basic, medical, and psychosocial areas. He observed patients in 40 Michigan nursing homes and counted specific interactions. More services were received in homes where patients kept some of their own possessions, aides had prior experience, there were more private-pay, white patients, and patients had more visitors. Likewise, Kosberg<sup>10</sup> measured quality in terms of quantity of resources available in homes on the rationale that existence of treatment resources was a precondition for their use. In an earlier study by one of us,<sup>11</sup> quality was defined as ratings on a five-point scale made by six social workers who visited 40 homes regularly. Higher quality, in that study, was associated with higher staff-to-patient ratios in the homes and scores on two factors of a Nursing Home Rating Scale which described meal services and administrative policies.

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Most people agree that it is desirable to have information on patient outcome as a measure of quality of care. Several factors have hindered the outcome approach. Such studies are usually long-term and expensive. Further, outcome is difficult to define. In its purest sense, outcome refers to a final consequence such as recovery, restoration of function, or survival. Shapiro<sup>12</sup> modified the definition of outcome to include intermediate states—"some measurable aspect of health status which is influenced by a particular element or array of medical care." That outcome is multidimensional seems obvious. White<sup>13</sup> suggested that death, disease, disability, discomfort, and dissatisfaction (the five D's) were all areas of evaluation of care. However, given data on all these dimensions, how is a good outcome as opposed to a poor outcome defined? These questions are even more crucial in long-term care than they are in hospital care. Although "cure" is not always the only goal of hospital care, improvement in patient status is associated more often with acute care than with long-term care.

Differences in nursing homes and their patient populations have presented other research problems. Anderson and Stone<sup>14</sup> commented that "what researchers should be doing is identifying ways of not only classifying patients but also predicting their rehabilitation or other goal achievement potential. Then quality could be measured in terms, not of input . . . or output, but of outcome . . ." This is important since usually patients cannot be randomly assigned to homes (thereby equalizing characteristics of patients among the homes to be studied). Therefore, some index of severity of illness or expectation of outcome for each patient is needed. In that way, the observed outcome can be measured against what had been expected. Further, this expectation of goal ratings can be used in analysis to control for confounding effects that might be attributed to initial differences in patient populations within or between nursing homes.

The purpose of the present study was to determine the relationship of nursing home characteristics to differential outcomes of patients placed in several homes. Since patients could not be randomly assigned to homes, because of their right to a choice of a home and being near to their families, a way was needed to control statistically for any differences that might occur between groups of patients who went to different homes. One solution was to compare patients going to the different homes to see how comparable they were on background and health variables. Where difference occurred between samples, those variables were held constant in analyses. Since type of outcome by itself indicates little about the quality of care provided by nursing homes, it was also necessary to evaluate outcome in terms of the goals or prognoses that were set at the time the patient entered nursing home care. To examine changes in functional status alone could be misleading. A downhill course for a patient, where this was the expected outcome, should not reflect poor quality care. One of the primary functions of a nursing home is to provide humane care for dying or severely ill patients. Therefore, physicians were asked to specify expected outcome (prognosis) for each patient prior to placement and this was used as a baseline against which to evaluate change in functional status.

## Method

### Data on Patients

Over a nine-year period, male patients placed from a general medical Veterans Administration Hospital in Miami, Florida were studied immediately before transfer to community nursing homes, one week after transfer, and six months later. At the time the patient was ready to leave the hospital, data were collected on demographic variables such as age, race, educational level, income, marital status, and religion. Health data were obtained from the medical records and including diagnoses, primary reason for nursing home placement, number of previous hospital admissions, length of current hospitalization, and number of exit conditions.

Each patient's physician was asked what he would expect in terms of the patient's condition if six months of optimal nursing home care were provided: improvement, deterioration or no change. The physician also completed the Cumulative Illness Rating Scale (CIRS)<sup>15</sup> which measures degree of impairment to 13 body systems on five-point scales. Inter-rater reliability for the CIRS is  $r = .862$ .

Ward nurses in the hospital completed the Rapid Disability Rating Scale (RDRS).<sup>16</sup> The RDRS has 16 items which measure functional status in terms of the degree of assistance needed in areas such as eating, dressing, toileting, bathing, and ambulation, as well as degree of mental depression and need for safety supervision. The RDRS has a test-retest reliability of  $r = .831$ .

Within the first week of nursing home placement, the nursing home was visited and the nursing home nurse repeated the RDRS. Six months from the date of nursing home placement for each patient, another nursing home visit was made and functional status ratings on the RDRS were repeated by the nursing home nurse for all subjects who were alive and in the nursing home on that day. Those discharged from the home or readmitted to the hospital received ratings at the time they left the nursing home and again at the end of six months. The latter ratings were done by VA hospital nurses. Other data collected at six months included number and length of readmission, length of survival, additional medical problems incurred after placement, and geographic location of the patient on the 180th day of followup.

Patients were classified by three types of outcome reflecting their status at the end of six months: (a) living or dead; (b) improved, the same, deteriorated\* or dead; and (c) location: discharged, still in the nursing home, readmitted to the hospital, or dead.

### Data Collected on Nursing Homes

Patients' outcomes were the dependent variables by which the nursing homes were measured. These were related to nursing home characteristics (predominantly structural variables) that described these homes.

All nursing homes with study patients were visited by a

\*Judgment for living patients was made by difference of more than two-scale points change on the RDRS from baseline to final rating indicating an improved or deteriorated condition.

researcher each year. Interviews were scheduled with the nursing home administrator and the charge nurse. The visit also included a thorough inspection of the home and review of randomly selected records. Data were obtained from the administrator concerning number of beds; per cent occupancy; waiting lists; staffing hours for full and part-time professional nurses, licensed practical nurses, and nursing attendants; staff-patient ratios for each; total number of staff; and monthly costs. In addition to these operating characteristics of the homes, a 71-item Nursing Home Rating Scale<sup>17</sup> was completed after inspection of the home and records. The scale provides eight subscores which represent quality of records, services, meals, policies, personnel practices, physical plant, safety, and appearance of patients in the home.

The nursing homes were all proprietary and located in urban areas. They varied in size from 48 to 276 beds. About 18 to 45 patients (mean 30) were studied in each of 30 homes. Homes were under contract to the VA hospital and as such inspected regularly by a hospital medical team. Therefore, homes in the study were probably at least average in the care they provided, since very poor homes would not have qualified for contracts.

#### Data Analysis

For purpose of analysis, each patient was matched with data that described his nursing home during the time that he was there. Since data were collected on the nursing homes annually, characteristics of the homes are applicable to the time the patients were in the homes. The first step, in a series of analyses, was to determine if samples of patients going to the various nursing homes differed on background and health factors. The only statistically significant differences across the homes were age ( $F = 1.74, P < .05$ ), diagnosis of internal cancer ( $F = 2.61, P < .01$ ), and diagnosis of chronic brain syndrome ( $F = 3.01, P < .01$ ). Level of impairment, disability, expected outcome (prognosis), days hospitalized, number of exit diagnosis, and marital status were not significantly different for groups of patients going to the different homes. Based on these preliminary analyses, the decision was made to control for age, cancer, and chronic brain syndrome, along with the expected outcome variable, in subsequent analyses. In effect, this asked if patients going to the various homes had all been similar, would their outcomes have differed across the homes? If so, what characteristics of the homes were associated with the various outcomes? Multivariate analysis of covariance was used to answer these questions. A separate analysis was done for each of the three types of outcome. For example, the patients were divided into groups of living and dead and variables describing their nursing homes analyzed, controlling for expected outcome, age, diagnoses of cancer and chronic brain syndrome. In order to determine if the majority of the variance in outcome was accounted for by those patients who died, the function and location outcomes were reanalyzed using only those subjects who lived. The rationale for including deaths was that if only survivors were studied, then this might be considered an unrepresentative group of the better patients on which to judge the nursing home variables.

## Results

### Characteristics of Patients and Nursing Homes

A total of 1,000 patients, all males, with a mean age of 68 years were studied. Twenty-two additional patients (2.2 per cent) were lost to follow-up. Slightly over half of the sample was currently married. Patients spent an average of 60 days in the hospital prior to their transfer to the nursing homes. The most frequent diagnoses were chronic brain syndrome (28 per cent), stroke (21 per cent), internal cancer (21 per cent), arteriosclerotic heart disease (15 per cent), and diabetes (14 per cent). Over one-third had four or more diagnoses at the time of nursing home placement (see Appendix table 1 for these and other background variables).

Table 1 shows the ratings obtained from hospital physicians concerning projected outcomes for the patient: 30 per cent were expected to improve, 43 per cent to remain about the same, and 27 per cent to deteriorate. Table 1 also shows the per cent of the sample with some degree of impairment for each of the 13 variables on the CIRS. Degree of impairment was rated on five-point scales and the means for these ratings are also presented. The findings reflect the large number of subjects with stroke, chronic brain syndrome, and internal cancer.

**TABLE 1—Data Collected From the Patient's Hospital Physician at Time of Nursing Home Placement**

Variables	Per cent	Mean
Prognoses		
Improve	30.3	
Remain the Same	42.6	
Deteriorate	27.1	
Impairment Scale*		
Cardiac	27.2	1.6
Endocrine-Metabolic	17.3	1.4
Vascular	72.8	3.1
Respiratory	27.1	1.7
EENT	12.5	1.3
Upper GI	13.8	1.4
Lower GI	12.4	1.3
Hepatic	8.6	1.3
Renal	6.3	1.2
Other GU	28.5	1.6
Muscular-skeletal-integumentary	49.9	2.2
Neurologic	59.7	2.7
Psychiatric	45.4	2.1

\*Per cent for impairment represents patients who had some degree of impairment for that system. The mean scores are based on a 0-4 scale rating, with higher scores indicating more impairment.

Table 2 presents data on the RDRS rated by hospital ward nurses. Almost all patients were on prescribed medication, 83 per cent required some safety supervision, 82 per cent needed assistance with dressing and 76 per cent with shaving. Over half of the sample had some depression, mental confusion, were confined to bed for at least part of the day, and were incontinent for urine or feces. Items were rated on three point scales and means are shown for each of the items.

**TABLE 2—Disability Ratings from Hospital Nurses Describing Functional Status of Patients at Time of Nursing Home Placement**

Variables	Per cent	Means
Disability scale*		
Assistance Eating	47.5	1.6
Special Diet	37.8	1.9
Medication	93.6	2.7
Speech Difficulty	34.3	1.4
Hearing Difficulty	29.7	1.3
Sight Problem	21.2	1.2
Assistance Walking	43.3	2.0
Assistance Bathing	86.4	2.5
Assistance Dressing	82.2	2.2
Incontinent (Urine or Feces)	51.1	1.7
Assistance Shaving	76.2	2.2
Safety Supervision	83.0	2.3
Confined to Bed	63.8	1.7
Mental Confusion	63.1	1.8
Uncooperative	44.7	1.5
Depression	66.8	1.7

\*Per cents refer to the number of people who had some degree of disability related to each of the items. The means are based on ratings of a 1-3 scale, with 1 = no disability to 3 = severe.

### Overview of Patient Outcomes and Nursing Home Findings

Table 3 presents the findings by percents for the three patient outcomes studied. Table 4 shows the nursing home variables that were significantly related to each of the three outcomes, after age, cancer, chronic brain disease, and prognosis were held constant. Data on means and standard deviations are given in the Appendix in Tables 2 and 3 so that the distribution of variables related to each of the outcomes can be seen. Results of the analyses related to each of the three outcomes will be presented separately.

### Nursing Home Factors Related to Survival

As seen in Table 3, 30 per cent of the sample died by the end of six months. In fact, 30 per cent of all deaths occurred

**TABLE 3—Per Cent of Sample According to Classification of Outcomes at Six Months**

Outcomes	Per Cents
Mortality	
Living	70.2
Dead	29.8
Change in Functional Status <sup>1</sup>	
Improved	21.2
Unchanged	34.8
Deteriorated	14.2
Dead	29.8
Location of Patient	
Discharged from home	25.5
Still in the home	38.7
Readmitted to hospital	6.0
Dead	29.8

<sup>1</sup>Post score on RDRS subtracted from pre-score and patient assigned to different status if score varied more than 2 scale points.

within 30 days of placement. In all but 3 per cent of the cases, death occurred in the nursing home or immediately after transfer back to the hospital. Death occurred in 15 per cent of the patients who had been expected to improve. On the other hand, 6 per cent who were expected to deteriorate actually improved. Table 4 indicates that two nursing home variables were significantly related to survival. After controlling for expected outcome, age, cancer, and chronic brain disease, the nursing home variables associated with being alive on follow-up were more professional (RN) hours per patient and higher factor scores related to meal services (both at the 5 per cent level).

### Nursing Home Factors Related to Change in Functional Status

The correlation between hospital ratings on the RDRS and those taken one week later in the nursing home was .894. Using change in status from baseline to six months as a criterion, Table 3 shows that 21 per cent of the patients were recorded as improved, 35 per cent as unchanged, 14 per cent as deteriorated, and 30 per cent as expired. The correlation between expected and actual outcome was .449.\* Deviations in terms of physician expectation in nursing home patients occurred in both directions. About 39 per cent of the patients expected to improve actually improved while 15 per cent of the patients who were expected to improve died. Of those expected to remain the same, 18 per cent improved and 37 per cent deteriorated or died, and for those expected to deteriorate, 6 per cent improved and 18 per cent remained the same. As previously mentioned, physician expectations did not differ significantly among the homes studied, but since initial condition of the patient was very important in evaluating any change in status, the physician's expectation was held constant in analyses. The question for analysis was whether any nursing home variables were associated with patients being improved, the same, or deteriorated, after making the patients similar by statistical techniques. Table 4 shows that using the 15 nursing home variables in the analysis of covariance, the best predictor of improved status was a higher factor score related to appearance of the patients in the homes ( $P < .01$ ). Higher cost, more RN hours per patient, better physical plant, and a higher factor score related to meal service also were associated significantly with better outcome at a .05 level of significance. When data were reanalyzed excluding the patients who died, higher cost becomes the most important predictor. The physical plant itself was no longer significantly associated with functional change. All of the other significant variables, RN hours, patient appearance, and means were essentially unchanged.

### Nursing Home Factors Related to Location

In Table 3 it can be seen that 26 per cent of the patients were discharged from the nursing home by the end of six months, 29 per cent were still in the home, 6 per cent were back in the hospital (although 35 per cent of the sample had

\*See Appendix for further detail. A correlation of .702 was obtained in the reliability study of the physician's ability to predict outcome for similar patients who did not receive nursing home care.

**TABLE 4—Nursing Home Variables Associated with Patient Outcome Determined by Multivariate Analysis of Covariance**

Nursing Home Variables	F Ratios Related to Patient Outcomes				
	Mortality	Function		Location	
		With Death	Without	With Death	Without
Size	.10	1.30	2.11	1.72	2.39
RN Hours/Pt.	4.66*	3.33*	3.03*	3.63*	3.23*
LPN Hours/Pt.	.87	.25	.21	1.21	1.26
Aide Hours/Pt.	.04	2.53	2.41	.12	.16
Total Staff/Pt. Ratio	.09	2.21	2.68	.15	.21
Professional Staff/Pt. Ratio	2.90	1.99	1.91	4.27**	5.00**
Cost/Month	.09	3.19*	5.26**	.36	.25
Factor Scores From NH Scale					
Records	1.27	.17	.18	3.34*	6.63**
Services	3.43	.62	.45	2.53	3.86*
Meals	4.46*	2.87*	3.16*	2.93	1.24
Pt. Appearance	2.22	4.46**	4.65**	2.26	1.37
Policies	.71	.24	.01	.32	.11
Personnel	1.54	.63	.12	1.83	1.90
Plant	2.21	3.20*	2.19	2.24	1.18
Safety	.85	1.66	1.47	1.55	1.66
Multivariate F-Ratio	1.64*	1.37*	1.60*	1.58*	1.72**

\*P &lt; .05

\*\*P &lt; .01

NOTE: MULTIVARIATE F-RATIO considers all 15 items together in predicting outcome. F-Ratios reported in the table are from 5 analyses with age, cancer, CBS, and prognosis held constant. Degrees of Freedom differ for each of outcomes and for with and without death group included.

returned at least once for hospital readmission), and 30 per cent had died. Over one-half (59 per cent) of the patients discharged from nursing homes were considered improved in functional status. About 19 per cent of those who remained in the homes were rated as improved, and about 95 per cent of those readmitted to the hospital were considered either the same or worse in functional status. Table 4 shows that patients who were discharged from the homes had higher scores on medical records, higher professional staff/patient ratios and more RN hours per patient. Excluding those patients who died, reanalysis of the data showed that the factor score on medical records was the best predictor of location while the other two significant variables, RN hours and staff patient ratio, remained about the same.

#### Consistency of Nursing Homes Variables Related to Outcomes

As demonstrated by Table 4, only two variables held up as predictors for at least two of the types of outcome. The RN hours per patient was significant at the 5 per cent level for all three outcomes. Factor scores related to meal service were important for two of the outcomes. Using all 15 variables, the outcome that could be predicted most accurately (indicated by the multivariate F-ratios) was location of the patient at the end of six months.

#### Discussion

The one variable consistently related to patient outcome was RN hours. Homes with more RN hours per patient were associated with patient survival, patient improvement, and

patient discharge from the nursing home. Better records and meal services were also related to survival and improvement.

RN hours specifically were related to outcome whereas hours per patient of other service providers or the total staff/patient ratio were not so related. Nursing hours (including RN, LPN, and Aides) were 2.47, 2.26, 2.40, and 2.27 for improved, the same, deteriorated, and dead respectively. It has been reported<sup>22</sup> that 3.2 hours for each patient is deemed to be borderline for severely ill patients who require almost total nursing care in nursing homes. Although staffing hours appeared to be quite high in the homes where more of the patients deteriorated, these homes also had more severely ill patients with cancer. Therefore, when means were adjusted for differences in severity of the patient's condition, the staffing favored the improved patient groups. The actual differences in amount of RN nursing time per patient for each of the outcome groups appears similar (Appendix Table 2). However, the difference between .25 in the improved patient group and .22 in the group where patients died represents one more RN in terms of total staffing. In fact, a difference of about 10 per cent more or less RN nursing staff exists between all of the outcome groups. RN hours may reflect a kind of philosophy and organization of the home rather than the provision of direct nursing care. It may also account for the higher cost and appearance of the patients in the homes associated with improved status.

Ratings on meals were determined by such items as having records of past and future menus, separate and attractive dining area, and provision for snacks. Other studies<sup>11, 23</sup> have emphasized the importance of food in nursing homes.

Although the relationship between diet and behavior is not fully understood, food is a symbol of security and a medium for socialization.<sup>24-26</sup>

The fact that more professional staff/patient ratios, more RN hours, and better records and services related to being discharged from the nursing homes suggests that more staff time was available and more attention was given to evaluating patients.

Lastly, it should be emphasized that although some nursing home variables were studied, many others were not studied. Likewise, some types of patient outcome such as assessment of patient satisfaction with care were not included. This study also dealt only with male patients who were somewhat younger than most nursing home patients. Data on the nursing homes in this study describe only proprietary homes in urban areas and should not be generalized to non-proprietary homes or those in rural environments. It is also recognized that "expectation of outcome" is less than a perfect measure. However, the idea of goal attainment as one dimension of evaluation of care, which has been developed fully in another article,<sup>27</sup> seems an appropriate direction for research and evaluation.

Perhaps an equally important finding in the study was the fact that over half of the nursing home variables (size, LPN hours, aide hours, total staff-patient-ratios, factor scores on administrative policies, personnel practices, and safety) were never associated significantly with any of the patient outcomes. This finding is keeping with those of others<sup>28</sup> who have reported that structural variables rarely correlated significantly with other means of evaluating quality of care. Certainly, there are minimum standards below which homes cannot fall without effecting quality, but it may be that once these standards are met that it is other factors, such as a kind of atmosphere of the home or personalities of the staff, that influence patient outcome. Unfortunately, these are qualities not so easily measured. The two variables found to be associated with patient outcome in this study may be indicators of this intangible quality rather than RN hours and meals *per se*. However, this research does suggest that giving more attention to meal service (which provides an atmosphere for patient communication and socialization) and increasing RN hours in nursing homes (which also increases cost) will have a positive impact on patient outcome.

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## APPENDIX

**Additional Information on Method**

1. Ratings on the RDRS were taken one week after placement into nursing homes to determine reliability between the two sources of ratings on functional status. If reliability were established, then any changes observed in levels of disability between hospital and final six month ratings would not be a function of nursing home nurses rating the scale differently from hospital nurses.

2. The rationale for using six months as a follow-up time was arbitrary and based on what seemed a reasonable amount of time for physicians to be able to estimate expected outcome and yet a long enough exposure to the nursing home to evaluate its impact.

3. A crucial variable in this study concerns the physician's ability to predict outcome. In order to better interpret findings of the present study, 20 randomly selected physicians (who also were among those participating in this study) used the same three prognostic categories for five of their patients. These 100 subjects were rated on the RDRS and judgments made about improvement or deterioration in the same fashion as that used in the present study. Patients were all over age 65 but not in nursing homes. The correlation between prognosis and outcome was  $r = .702$ .

4. Three types of outcome were used because no one outcome by itself was a perfect measure, even when expectations for the patients were held constant. Survival as an outcome is appropriate for nursing home patients only when it deviates from what was expected. There is a high risk of mortality in the nursing home population. As previously mentioned, providing humane care to patients where death or deterioration in condition is expected should not indicate poor quality of care because the patient dies or becomes more dysfunctional. It is where improvement is expected and the patient dies that this might indicate less than desirable care. However, even this assumption is fraught with complications. In numerous studies,<sup>18-21</sup> increased mortality has been demonstrated to occur when elderly patients were moved from one setting to another. At first this was thought to be associated with any relocation; however, more recently, it has been found that death occurred only when the environment differed drastically from the previous one. In this study, the baseline environment (hospital) was the same for all patients and it might be concluded that any increase in mortality associated with the different nursing homes, at least in part, could be a reflection of impact of that type of nursing home, after samples going to the different homes were statistically equated. However, survival by itself seemed a limited way to describe outcome, since it does not differentiate the variance in outcome for survivors. A more meaningful classification seemed to be change over time in functional status as measured by the RDRS. But, as with mortality, any change needed to be interpreted against what had been expected for that particular patient.

Neither of these classifications answered an additional question about appropriate length of care. Being improved does not always mean being discharged from a home. Know-

ing which homes tend to hold or discharge patients inappropriately seemed another marker of quality of care. Therefore, a third outcome concerning location of the patient at the end of six months was included and allowed us to examine nursing home action related to changes in patient status. It was decided to accept only those findings as valid that were consistent with more than one type of outcome classification.

**APPENDIX TABLE 1—Hospital Data Collected from Medical Records at the Time of Nursing Home Placement**

Variables	Per Cent
<b>Age</b>	
Under 29	0.2
30-39	0.8
40-49	7.2
50-59	17.6
60-69	19.9
70-79	42.5
80-89	9.4
Over 90	2.4
<b>Marital Status</b>	
Married (Including Separated)	52.8
Divorced	16.1
Widowed	17.6
Never Married	13.5
<b>Race</b>	
White	93.4
Black	6.6
<b>Income (per month)</b>	
None	16.5
\$1-\$99	14.8
\$100-\$199	31.9
\$200-\$299	23.0
Over \$300	13.8
<b>Religion</b>	
Protestant	59.3
Catholic	22.7
Jewish	14.9
Other	3.1
<b>Days Hospitalized</b>	
1-30	39.7
31-60	30.3
61-90	13.3
91-120	6.9
121-150	3.8
Over 150	6.0
<b>Most Frequent Diagnoses*</b>	
Chronic Brain Syndrome	27.7
Stroke	21.4
Internal Cancer	20.8
Recurrence (yes) 12.9%	
Metastasis (yes) 57.2%	
ASHD	14.8
Diabetes	13.8
Alcoholism	12.3
Emphysema	11.7
Infection	10.0
<b>Surgery during Hospitalization</b>	
Yes	31.1
No	69.9

\*Only those diagnoses that accounted for 10 per cent or over were included in the table.

**APPENDIX TABLE 2—Means and Standard Deviations Related to Function of Patient on Follow-Up**

NH Variables	Function							
	Improve		Same		Deteriorate		Dead	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Size	140.01	51.04	148.44	59.68	153.00	60.92	146.37	49.36
RN Hr/Pt.	.25	.12	.24	.11	.23	.12	.22	.13
LPN Hr/Pt.	.37	.13	.35	.12	.34	.12	.36	.12
Aide Hr/Pt.	1.80	.42	1.67	.44	1.81	.41	1.69	.56
Staff/Pt. Ratio	.57	.15	.53	.16	.57	.18	.54	.16
P. St/Pt. Ratio	.44	.11	.39	.13	.42	.14	.30	.13
Cost/Month	391.85	201.91	379.32	200.10	340.90	218.90	369.24	292.29
Factor Scores								
Records	5.14	1.22	5.00	1.29	5.02	1.13	4.94	1.39
Services	9.05	1.18	9.08	1.07	9.05	1.19	9.06	1.06
Meals	4.00	.18	3.90	.29	3.86	.29	3.85	.18
Pt. Appear.	2.75	.58	2.61	.72	2.41	.78	2.70	.58
Policies	9.90	.83	9.89	.88	9.89	1.05	9.94	.99
Personnel	5.90	.98	5.85	1.01	5.93	.95	5.90	.82
Plant	9.45	.89	9.35	1.24	9.11	1.17	9.43	.91
Safety	5.81	.61	5.65	.75	5.65	.74	5.75	.57

NOTE: Staff/pt. ratios are computed to represent staff per patient. One reflects all staff and the other only nursing staff. Cost per month may seem low; however, this represents the average cost over a nine-year period. Means in the table are the unadjusted means before each of the four covariates were applied. F-ratios in Table 4 are those obtained when all four variables (age, cancer, CBS, and expectations) were held constant.

**APPENDIX TABLE 3—Means and Standard Deviations Related to Location of Patient of Follow-Up**

NH Variables	Location					
	Discharged		In Nurs. Home		Readmitted	
	Mean	SD	Mean	SD	Mean	SD
Size	139.91	49.86	151.72	59.91	144.11	66.95
RN Hr/Pt.	.27	.14	.23	.15	.25	.13
LPN Hr/Pt.	.37	.12	.34	.11	.34	.11
Aide Hr/Pt.	1.84	.47	1.66	.49	1.82	.41
Staff/Pt. Ratio	.59	.15	.53	.16	.55	.19
Pro. St/Pt. Ratio	.43	.14	.39	.13	.42	.14
Cost/Month	393.54	205.15	386.32	203.05	315.26	220.70
Factor Scores						
Records	5.29	1.12	4.85	1.34	5.16	1.03
Services	8.89	1.18	9.17	1.09	8.98	1.11
Meals	3.95	.20	3.90	.29	3.87	.33
Pt. Appear.	2.71	.62	2.57	.73	2.49	.82
Policies	9.98	.87	9.92	.93	9.10	.88
Personnel	5.84	1.03	5.94	.92	5.67	1.14
Plant	9.46	.97	9.29	1.02	9.10	1.31
Safety	5.85	.60	5.60	.74	5.73	.80

NOTE: Staff/pt. ratios are computed to represent staff per patient. One reflects all staff and the other only nursing staff. Cost per month may seem low; however, this represents the average cost over a nine-year period. Means in the table are the unadjusted means before each of the four covariates were applied. F-ratios in Table 4 are those obtained when all four variables (age, cancer, CBS, and expectations) were held constant.

**Additional Information on Results**

Appendix Table 1 presents general characteristics of the sample. Appendix Tables 2 and 3 give the means and stand-

ard deviations for the 15 variables studied. Appendix Table 2 relates to variables associated with functional outcomes (including those patients who died) and Appendix Table 3 presents data related to location.