

Experience of a Medicaid nursing home entry cohort

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Long-term care cost-containment policies have focused on reducing the numbers of persons entering nursing homes. To provide insight and background for such efforts, the authors studied the experience of Medicaid nursing home entry cohorts in three individual States. They found substantial interstate variation in rates of nursing home entry and

subsequent patterns of discharge, suggesting the operation of fundamentally different policies for provision of Medicaid nursing home services. Analysis of the cost effectiveness and quality of care implications of these policies may provide guidance for future cost-containment efforts.

Introduction

The impact of increasing nursing home utilization on publicly financed health care programs is well known (Rice and Feldran, 1983; Lave, 1982; Vladeck, 1980; Fuchs, 1984). Because of the changing age structure of the U.S. population, in which the fastest growing group is that of persons 85 years of age or over (Suzman and White-Rily, 1985; Rosenwaike, 1985; Manton and Soldo, 1985), expenditures for nursing home care increased at an annual rate of 27 percent for the period 1970 to 1980 (Burwell, 1984). In 1986, nursing home revenues totaled an estimated \$38 billion, up 9.1 percent from 1985 (Division of National Cost Estimates, 1987). Declining mortality rates among adults presage an even more rapid future growth of the population at highest risk of requiring nursing home care (Suzman and White-Rily, 1985; Rosenwaike, 1985; Manton and Soldo, 1985; Siegel and Davidson, 1984). If current policies continue, this will dramatically increase public sector expenditures for nursing home care (Foley, 1980). A recent projection is that nursing home revenues will increase to \$129 billion by the year 2000 (Division of National Cost Estimates, 1987).

Studies that have described nursing home residents at a single point in time show close agreement on the demographic characteristics of the residents: They are largely female, widowed, 80 years of age or over, with multiple chronic conditions (Rice and Feldran, 1983; Foley, 1980). However, cross-sectional analyses may give an incomplete picture of the nursing home population. Length-of-stay data from the National Nursing Home Survey (Foley, 1980) reveal two distinct subgroups in the nursing home: those termed "short stayers," who are in the nursing home for convalescent or terminal care; and those termed "long stayers," who are using the nursing home as a long-term care facility (Liu and Manton, 1984; Liu and Manton, 1983; Keeler, Kane, and Solomon, 1981). The relative proportions and demographic characteristics of these two groups, the pattern of

transfers between the inpatient hospital and the nursing home, and interstate variation in these dynamic factors are key determinants of nursing home utilization.

The dynamics of nursing home utilization influence expenditures as well: The point of entry into the nursing home is the focus of many cost-containment efforts. As Lave (1985) noted, after a person has been institutionalized, former living arrangements may no longer be available, and a degree of adaptation to the facility may have occurred that would make transition back to the community difficult. Cost-containment measures such as provision of community-based support services (Lave, 1985), preadmission screening for nursing home admission (Lave, 1985), and, to some extent, use of swing beds in hospitals (Shaughnessy and Tynan, 1985; Vladeck, 1980), all have as an objective the reduction in the rate of nursing home entry.

Medicaid nursing home utilization is of particular importance for three reasons. First, a large part of nursing home care is paid for by Medicaid (an estimated \$16 billion in 1986 [Division of National Cost Estimates, 1987]). Second, a large proportion of Medicaid expenditures goes to nursing homes (Ruther et al., 1986). Third, those 85 years of age or over, who form the most rapidly growing segment of our population and who are at high risk of nursing home entry, also have a high prevalence of Medicaid enrollment (Ray et al., 1987a). Valuable insights for cost-containment efforts can be provided by analyzing:

- Patterns of Medicaid-covered nursing home entry.
- How such entrants are divided into short stayers and long stayers.
- How the patterns for Medicaid nursing home entrants differ from those of persons not covered by Medicaid.
- How these patterns differ among specific State Medicaid programs (Ray et al., 1987b).

The purpose of this study was to describe patterns of and interstate variation in rates of entry to and exit from nursing homes in an elderly Medicaid population, from three of the four largest State Medicaid programs, which accounted for an estimated 36 percent of all Medicaid vendor payments in 1981 (Ruther et al., 1986). We used a Medicaid claims data base (Pine et al., 1985) for this purpose, following the

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cohort of Medicaid enrollees in the study States who entered nursing homes during 1981. Because this person-level data set encompassed up to a full year of experience for each Medicaid enrollee, we used life-table techniques to estimate the rates of exit as a function of length of stay in the nursing home. The specific objectives of this study were:

- To compute population-based annual rates of Medicaid-covered nursing home entry.
- To tabulate diagnoses for the inpatient stay preceding the nursing home entry for entrants with a prior Medicaid-covered hospital stay.
- To estimate the rates of rehospitalization and discharge to the community in the 180 days following nursing home admission.
- To assess demographic and interstate variation in these factors.

Methods

Sources of data

Medicaid programs

Medicaid allows qualifying low-income persons to obtain covered medical services (Ruther et al., 1986; Pine et al., 1985; Rymer, 1984). To receive such benefits, a person must first meet the criteria for Medicaid eligibility. Then the person must enroll in the Medicaid program and be assigned an identifying number. Covered services are furnished by participating providers, who then receive payment from the Medicaid program. (This describes the fee-for-service mode of Medicaid payment, which was almost universally employed during the time of this study. However, currently there are prospective capitated arrangements in some Medicaid programs.)

Because Medicaid is a joint Federal-State program, there is considerable latitude for interstate differences in its operation (Ruther et al., 1986). Some of the key variables that are controlled by the State include the income and assets level for Medicaid eligibility, the range of optional medical services covered by the program, the amount of payment for services, and whether or not Medicare part B coverage is purchased by the State for persons 65 years of age or over. The individual States can also establish certification requirements for long-term care beds, length-of-stay limitations for hospitals, prior authorization requirements for hospital or nursing home admission, and utilization review programs for these facilities.

Medicaid data

The availability of Medicaid data parallels the Medicaid administrative structure, that is, detailed information is available only on a State-specific basis. However, a uniform, person-based Medicaid data set has been constructed for policy and research analysis by the Health Care Financing Administration (Pine et al., 1985). This data set is created by editing

and reformatting the Medicaid Management Information System (MMIS) files of each State so as to produce more uniform definitions and file formats. Data from these files for three States—Michigan, California, and New York—were used for this study.

For each of these States, we used three types of uniform Medicaid files. The enrollment file contained the identifying number and demographic characteristics of each enrollee and the periods of time in the study year during which each person was enrolled in Medicaid. The nursing home file contained a longitudinal record of each patient's nursing home stay with the following information: patient identifier, first reimbursed day of stay in 1981, last reimbursed day of stay in 1981, total reimbursed days of stay, and patient status as of the last reimbursed day in 1981 (status was listed as still a patient, discharged, eligibility ended, or dead). The hospital stay file contained a single record for each hospital stay that either began or ended in 1981. The information included patient identifier, admission date, discharge date, and primary diagnosis, coded using the *International Classification of Diseases, 9th Revision, Clinical Modification* (Public Health Service and Health Care Financing Administration, 1978).

Population studied

The study population included Medicaid enrollees 65 years of age or over who had a Medicaid-covered nursing home stay during calendar year 1981 in California, Michigan, or New York. The study excluded a very small number of blind elderly who had qualified for Medicaid on the basis of Aid to the Blind (these were excluded because they are a highly atypical Medicaid population). Because the nearly universal method of Medicaid payment at the time of this study was fee for service, we also excluded the small fraction of participants in health maintenance organizations whose enrollment fees were paid by Medicaid (these enrollees were excluded because detailed medical service information was not available from the claims files). We also excluded from this study any stay that occurred in an intermediate care facility for the mentally retarded (ICF-MR), because the ICF-MR population and services utilized are distinctly different from those of the long-term care population and have been studied previously (Burwell et al., 1987).

Definitions of events

Calculating rates of nursing home entry and exit requires the following data for members of a defined population:

- Whether or not the person was admitted to a nursing home during the period of the study, and, if so, the date of nursing home admission.
- For persons admitted, antecedent factors such as whether or not the patient was admitted to the home after discharge from an acute care hospital.

- When the patient was discharged from the nursing home.
- What type of discharge occurred: to the community, to a hospital, or because of death.
- Because our data source did not include full followup until discharge (which may be years following admission), a calculation of the length of time for which each subject was followed. Patients whose period of followup ended prior to discharge from the nursing home are referred to as "censored"; this means that they cannot be placed in numerators in the calculation of discharge rates.

Ideally, this information would be ascertained prospectively for each person in the study. However, this study had available only those data elements present in the Medicaid claims and enrollment files. For this reason, we used these files to construct operational definitions of the above events. These definitions are described in this section.

Followup period

We determined the sequence of events occurring for nursing home patients by comparing the beginning and ending of followup with dates for either nursing home or inpatient hospital services. For each person with Medicaid enrollment throughout 1981, the period of followup encompassed all of calendar year 1981. For those whose enrollment either began or ended in 1981, the followup was limited to the shorter time of Medicaid enrollment.

Nursing home entry

We used the term "entry" rather than "admission" to emphasize the operational definition of this event. Entry into the nursing home was defined to occur if the beginning date of the first Medicaid-covered nursing home stay was after that of the beginning of the followup. For example, a person who was enrolled on January 1, 1981, with a first-covered nursing home stay beginning March 15, 1981, was defined to have entered the nursing home on the 15th of March. Each entrant was counted only once.

This definition was designed to exclude as entrants those persons whose Medicaid enrollment began while they were in the nursing home—that is, those who had "spent down" their assets to the point at which they became eligible for Medicaid. Such cases were excluded because they do not represent entry into a nursing home; rather, they mark a change in the source of payment for a patient in a nursing home (Sekscenski, 1987). Because Medicaid does not pay coinsurance for skilled nursing facility stays of 20 days or fewer (Ruther et al., 1986), our study did not identify entries for such short stays. The extent of undercounting resulting from this limitation is unknown; however, stays of no more than 20 days have less impact on expenditures than do longer stays.

For Michigan and California, which included nursing home admission date as a data element, we checked the concordance of our definition with the

admission date for a sample of entrants and found a 90 percent rate of agreement.

Entry from hospital

To study the difference between patients who entered the nursing home directly from or shortly after an inpatient hospital stay and those who entered the nursing home from the community, we classified all entrants by prior-Medicaid-hospitalization status. An entry with preceding Medicaid hospitalization was defined as one for which there was a Medicaid-covered hospital discharge within the 30 days prior to nursing home admission. The 30-day period was chosen so as to include those long hospital stays for which only the first several days were covered in part by Medicaid (the remainder covered by Medicare part A). This is similar to the definition used in a recent Canadian study (Shapiro and Webster, 1984).

This definition classified those entries from the hospital in which Medicaid enrollment occurred after the hospital discharge, but before the nursing home admission, as entries with no preceding hospitalization, because non-Medicaid hospitalizations are not recorded in the MMIS data base. Thus, the true rate of entry from the hospital was underestimated by this definition. Because the nursing home stay record included all facilities with bills paid by Medicaid, transfer from one nursing home to another was not counted as an exit. Similarly, an inpatient hospital stay that occurred while a person was in the nursing home was not counted as an exit. A transfer was counted as an exit only if the patient transferred to a facility not paid by Medicaid while maintaining Medicaid enrollment.

Exit to community

We used the term "exit" rather than "discharge" to emphasize the operational definition of this event. Exit from the nursing home was defined as the occurrence of the last day of the covered nursing home stay before the end of the followup period. For example, a person who had Medicaid enrollment on December 31, 1981, but whose last nursing home bill was for July 15, 1981, would be defined to have exited a nursing home. Paralleling the definition of entry, the definition of exit excluded those persons whose Medicaid coverage and last day of nursing home stay ended simultaneously, unless the Medicaid files noted death or discharge on the last day of the nursing home stay. This guarded against the misclassification as exits of those cases in which a patient's Medicaid enrollment was terminated while he or she was in the nursing home. Other transitions that would not be defined as exits include an inpatient hospital stay with return to the nursing home or a transition to another nursing home. However, a transfer of an active Medicaid enrollee to a facility not reimbursed by Medicaid would be incorrectly defined as an exit. Also, discharge to a domiciliary

facility other than a nursing home would be defined as an exit to the community.

Persons were defined to have exited to the community if there was no record of a hospital admission within 30 days of the nursing home exit and if the patient status in the Medicaid files was not that of death. This method probably overestimated exits to the community because, although the Medicaid files should contain reliable records of hospitalizations after the nursing home stay, the patient-status field is not as reliable for detecting deaths that occur in the nursing home.

Hospitalization from nursing home

To study the rate of hospitalization after nursing home admission—particularly the rehospitalization rate for residents admitted to a nursing home from an inpatient hospital—we computed rates of hospitalization following nursing home admission. Such hospitalizations were defined as either those that occurred during the nursing home stay or those in which the hospital admission date fell within 30 days of the nursing home discharge date. These hospitalizations, when covered by Medicaid, should have been recorded reliably in Medicaid files. This definition was conservative in that it did not define as exiting to the community those who were discharged from the nursing home to an acute care hospital.

Calculation of rates

Nursing home entry

To characterize the patterns of Medicaid-covered nursing home entry in each of the three States, we computed rates of such entry, using as the denominator the estimated numbers of State residents at risk. The numerator for each rate was the number of Medicaid enrollees in the study entering the nursing home during 1981. The denominator was the estimated size of the State population (U.S. Bureau of the Census, 1984; U.S. Bureau of the Census, 1983). Entry rates were computed for specific demographic subgroups defined by age category and sex.

We also calculated the ratio of Medicaid-covered nursing home entrants to those with any nursing home stay covered by Medicaid during the study year. This is mathematically equivalent to the ratio of the annual incidence of nursing home entry to the period (1 year) prevalence of nursing home residence. It is a measure of the turnover among nursing home residents.

Life-table estimates

Because of the variation in length of followup for the nursing home entrants, we used life-table techniques to compute rates of events as a function of length of stay in the nursing home. The events for which this technique was used were exit from the nursing home and hospitalization in conjunction with

the nursing home stay. Because estimation of multiple-event rates was desired, multiple-decrement life tables were required. For each Medicaid enrollee, there were two possible events of interest at the end of the study followup. The first event was death or discharge to an inpatient hospital. The second event was discharge to the community. In life-table terminology, this defines a model with two events of interest, in which the objective is to estimate the rates of occurrence of each as a function of length of nursing home stay. The possible censoring that occurred when a nursing home resident had neither of these events by the end of study followup was adjusted for by the life-table methodology.

Because there were large numbers of subjects, we employed the actuarial method to estimate event occurrence rates. The interval size was 15 days and the computational technique was that described by Elandt-Johnson and Johnson (1980). Because this study is population based, tests of statistical significance were not performed. However, because of the large number of subjects, essentially all differences are statistically significant.

Results

Characteristics of entrants

During the study year, there were 52,152 elderly Medicaid enrollees who met the study definition of nursing home entry in the States of Michigan, California, and New York. In Table 1, the demographic characteristics of these Medicaid entrants

Table 1
Characteristics of elderly with Medicaid-covered nursing home entries: Michigan, California, and New York, 1981

Characteristic	Michigan	California	New York
Number of entrants	9,077	29,491	13,584
Number ever in nursing home during 1981	35,851	93,748	81,571
Entrants per 100 who were ever nursing home residents	25.3	31.5	16.7
Percent of entrants 85 years of age or over	38.1	36.7	40.2
Percent of entrants who were female	69.5	69.7	71.1

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project.

are shown to resemble those of all nursing home residents (Foley, 1980): more than two-thirds were female and nearly 40 percent were 85 years of age or over. The ratio of Medicaid entrants to enrollees with any Medicaid nursing home stay during 1981 varied substantially among the States. The highest turnover was in California, where there were 31.5 entrants per 100 persons ever in a nursing home in 1981. The lowest was in New York, where the comparable ratio was 16.7 per 100.

Table 2

Annual rates of Medicaid-covered nursing home (NH) entry for the elderly¹, by State, age group, prior Medicaid hospital stay status, and sex: Michigan, California, and New York, 1981

NH entry and sex	Michigan			California			New York		
	All elderly	65-84 years	85 years or over	All elderly	65-84 years	85 years or over	All elderly	65-84 years	85 years or over
All NH entries	Number per 1,000 elderly State residents								
Both sexes	9.6	6.6	41.1	12.2	8.5	48.1	6.2	4.1	28.0
Male	7.2	5.5	30.5	8.1	6.4	34.9	4.6	3.3	22.5
Female	11.3	7.3	45.8	15.5	10.4	53.6	7.2	4.6	30.4
NH entries with prior hospital stay²									
Both sexes	1.9	1.3	7.8	5.2	3.8	19.5	1.5	1.0	6.7
Male	1.4	1.2	5.0	3.5	2.8	13.7	1.0	0.8	4.3
Female	2.2	1.4	9.0	6.7	4.6	21.9	1.8	1.2	7.7
	Percent of all NH entries								
Both sexes	19.6	20.0	19.0	43.0	44.4	40.6	24.3	24.5	23.9
Male	20.1	21.6	16.3	43.2	44.5	39.2	21.9	23.3	19.3
Female	19.4	19.1	19.8	42.9	44.4	40.9	25.2	25.1	25.4

¹Elderly is 65 years of age or over.

²Prior hospital stay was defined as a general inpatient hospital stay reimbursed at least in part by Medicaid and for which the hospital discharge date fell within 30 days prior to nursing home entry.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project.

Entry rates

The substantial interstate variation present in both the overall and the age- and sex-specific rates in Medicaid enrollees entering a nursing home during 1981 is shown in Table 2. For California, there were 12.2 Medicaid enrollees entering a nursing home per 1,000 elderly State residents, compared with approximately one-half that number for New York. Michigan had an intermediate entry rate of 9.6 per 1,000.

These data show the strikingly greater annual rate of nursing home entry among the very old Medicaid enrollees in each of the three study States. For those 85 years of age or over, the rates of nursing home entry were 6 to 7 times greater than those for persons 65 to 84 years of age. Within each age group, the annual rate of nursing home entry for females was 60-90 percent greater than that for males. Thus, the rate of nursing home entry among females 85 years of age or over was 8 to 9 times greater than that for males 65 to 84 years of age.

The marked interstate variation in the percentage of Medicaid enrollees entering the nursing home who had a Medicaid-covered inpatient hospital discharge during the 30 days preceding nursing home entry is also shown in Table 2. In California, 43.2 percent of all entrants had a prior Medicaid inpatient stay. In contrast, only 24.3 percent of entrants in New York and 19.6 percent in Michigan had such a recent Medicaid inpatient stay before nursing home entry.

The within-State variation in the proportion of entrants with prior inpatient hospital stay by age and sex was relatively small in comparison to the magnitude of interstate variation. However, there were two small differences that were consistent for the three States. First, for males, a smaller proportion of

those 85 years of age or over had a prior Medicaid hospital stay than did males 65 to 84 years of age (16.3 percent versus 21.6 percent for Michigan; 39.2 percent versus 44.5 percent for California; 19.3 percent versus 23.3 percent for New York). Second, among the very old, a greater proportion of females had a prior inpatient hospital stay than did comparable males (19.8 percent versus 16.3 percent for Michigan; 40.9 percent versus 39.2 percent for California; and 25.4 percent versus 19.3 percent for New York).

Diagnoses for prior hospitalization

For those Medicaid enrollees entering the nursing home with a previous recent Medicaid hospital stay, the distribution of diagnoses for the hospitalization for entrants 65-84 years of age and for those 85 years of age or over is shown in Table 3. Note that these proportions are not population-based rates of specific diagnoses; rather, they describe the case mix among those entering the nursing home with a closely antecedent Medicaid inpatient hospital stay.

The reasons for hospitalization prior to nursing home entry were generally comparable among the States. The primary diagnostic area was that of vascular disease, accounting for about 30 percent of all stays, followed by injuries, which accounted for about 16 percent of all Medicaid hospitalizations preceding nursing home entry (derived from Table 3). Other major reasons for a Medicaid-covered hospitalization prior to nursing home entry included gastrointestinal diseases, respiratory diseases, cancer, and metabolic disorders (primarily diabetes).

Although the general case mix within each State was similar, there were small specific interstate differences, primarily between New York and the

Table 3

Percent distribution of nursing home entrants with prior Medicaid hospital stay, by age group, State, and hospital diagnosis: Michigan, California, and New York, 1981

Hospital diagnosis	65-84 years			85 years or over		
	Michigan	California	New York	Michigan	California	New York
All hospitalizations	1,123	8,149	1,756	656	4,301	1,131
	Percent					
Cardiovascular and cerebrovascular disease	28.0	27.2	33.4	35.2	29.9	33.5
Cerebrovascular accident	11.4	10.2	14.9	11.0	10.3	11.3
Congestive heart failure	4.5	4.9	5.8	9.3	6.6	8.5
Chronic ischemic heart disease	2.2	1.9	1.5	3.0	2.8	1.9
Chronic cerebrovascular disease	1.7	1.2	1.7	2.6	1.9	2.0
Other heart disease	1.6	1.4	1.1	1.4	1.6	1.3
Atherosclerosis	1.2	.5	.5	1.7	.8	.6
Arrhythmia	.7	1.4	1.1	1.8	1.7	1.7
Myocardial infarction or other acute ischemic heart disease	.7	2.0	2.3	.8	1.6	2.5
Other	3.9	3.8	4.6	3.7	2.6	3.6
Trauma	15.2	17.5	12.6	21.3	22.2	17.4
Fracture of femur	8.3	8.4	6.6	13.1	11.5	10.4
Other fracture	4.3	5.5	3.1	4.0	6.1	3.3
Other injury	2.7	3.6	2.9	4.3	4.6	3.7
Gastrointestinal disease	7.0	6.7	6.9	7.9	8.3	6.8
Gastrointestinal hemorrhage	1.2	.8	.7	.3	1.0	1.0
Intestinal obstruction	1.1	.7	.8	.9	1.1	.7
Noninfectious gastrointestinal disease	1.0	.6	.7	1.7	1.2	.3
Diverticulitis	.5	.4	.6	.3	.6	.8
Other	3.2	4.3	4.2	4.7	4.5	4.1
Respiratory disease	7.6	8.7	6.0	5.9	7.7	7.0
Pneumonia	2.8	3.1	2.4	4.0	4.3	4.1
Chronic respiratory disease	3.3	3.9	2.4	.8	1.9	1.1
Pneumonitis—solid or liquid	.2	.1	.3	.0	.2	.3
Other	1.2	1.6	.9	1.2	1.3	1.5
Metabolic disease	7.8	5.5	6.3	6.1	5.0	6.1
Diabetes	3.5	2.8	3.8	2.4	1.2	1.7
Electrolyte disorder	3.4	2.1	1.8	3.4	3.3	3.4
Malnutrition	.8	.2	.2	.3	.3	.2
Other	.2	.4	.5	.0	.2	.8
Neoplasms	8.3	7.9	4.9	4.3	4.8	3.9
Lung	1.4	1.3	.9	.2	.5	.3
Prostate	.7	.6	.3	.5	.5	.3
Breast	.5	.5	.2	.0	.5	.3
Colon	.4	.6	.7	.5	.5	.6
Rectum	.9	.4	.5	.2	.2	.3
Secondary	1.0	.8	.5	.5	.3	.4
Other	3.3	3.8	1.9	2.6	2.2	1.9
Mental and/or nervous system disorders	8.1	7.3	12.1	4.9	4.5	8.3
Senile dementia	3.7	2.7	6.3	3.4	2.6	6.4
Parkinsonism	.5	.7	1.1	.3	.3	.3
Psychosis	.6	1.1	1.8	.5	.4	.5
Paralytic central nervous system disease	1.2	.6	.4	.2	.3	.4
Other	2.1	2.3	2.6	.6	.9	.7

See source note at end of table.

other two States. In New York, there were, relative to the other two States:

- A larger proportion of entrants with a prior Medicaid hospitalization for cerebrovascular accident, particularly among those 65 to 84 years of age.

- A larger proportion of entrants with prior Medicaid hospitalization for neurologic disorders, particularly senile dementia.
- A smaller proportion of entrants with a prior Medicaid hospitalization for cancer, particularly among those 65 to 84 years of age.

Table 3—Continued

Percent distribution of nursing home entrants with prior Medicaid hospital stay, by age group, State, and hospital diagnosis: Michigan, California, and New York, 1981

Hospital diagnosis	65-84 years			85 years or over		
	Michigan	California	New York	Michigan	California	New York
Genitourinary disease	3.8	3.7	4.4	4.0	3.2	3.9
Urinary tract disease	1.2	1.2	1.3	.9	1.3	1.1
Renal failure	.9	.6	.9	.3	.4	.4
Kidney infection	.4	.2	.1	.9	.2	.2
Other	1.2	1.6	2.1	1.8	1.2	2.3
Ill-defined symptoms	4.9	5.1	4.6	3.8	4.6	4.8
Cardiovascular	.7	.7	1.1	.3	.4	.7
Respiratory	.7	.6	.3	.3	.5	.4
Urinary tract	.3	.3	.2	.5	.3	.5
Other	3.2	3.5	3.0	2.7	3.4	3.1
Musculoskeletal	3.9	3.9	2.9	2.9	4.2	3.1
Osteoarthritis	.8	1.0	.8	.9	1.0	1.1
Osteoporosis	.7	.9	.4	.5	1.2	.4
Rheumatoid arthritis	.7	.3	.4	.0	.2	.1
Other	1.7	1.7	1.3	1.5	1.8	1.5
Skin diseases	2.0	2.0	2.1	1.4	1.4	1.8
Decubitis	.9	1.1	1.1	.8	.8	.4
Abscess	.6	.7	.9	.5	.4	.9
Other	.4	.3	.1	.2	.3	.4
Blood disorders	1.4	.9	1.2	.9	1.2	1.3
Anemia	1.2	.8	1.1	.9	1.1	1.2
Other	.2	.1	.1	.0	.0	.1
Infectious diseases	1.2	1.2	1.0	.5	.8	.8
Other	.6	.9	.6	.0	.6	.1
Septicemia	.6	.3	.4	.5	.2	.7
Eye and/or ear diseases	.5	1.0	.7	.6	1.2	.7
Cataract	.3	.7	.4	.5	.8	.4
Other	.3	.4	.3	.2	.4	.3
Other	.2	1.3	.8	.3	1.0	.6

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project.

- A slightly smaller proportion of entrants with prior Medicaid hospital stay for injuries (generally fracture).

These differences suggest that New York nursing homes were utilized less frequently for patients whose stay was related to either short-term convalescence or terminal illness.

There were several consistent differences in diagnostic mix between the entrants who were very old and those who were 65 to 84 years of age. For the very old there were:

- A greater proportion of entrants with fracture and other injuries.
- A greater proportion with cardiovascular diagnoses, primarily heart failure, and chronic ischemic heart disease.
- A smaller proportion with cancer.
- A smaller proportion with neurologic disorders other than dementia.

Exit after short stay

In this section, we present the rates of nursing home exit after a relatively short stay. Separate estimates were computed by age group and sex, as

well as for those with and without a Medicaid hospital stay immediately prior to nursing home entry. The analysis used life-table techniques to account for variable followup. Estimates were computed for cumulative exit rates after 30, 90, and 180 days of stay. Exits from the nursing home for which there was no evidence in the Medicaid files of either death or hospitalization following discharge from the facility were analyzed separately, because they indicate discharge to the community from the nursing home after a convalescent stay.

Exit rates

There was striking interstate variation in nursing home exit rates (Table 4). California had exit rates that were substantially higher than those of the other States: 22.8 percent of entrants left the nursing home within 30 days of entry, 40.8 percent within 90 days, and 51.0 percent within 180 days. For Michigan, the comparable nursing home discharge rates were 10.3 percent within 30 days, 24.2 percent within 90 days, and 34.2 percent within 180 days. Rates of discharge were lowest in New York, always less than one-half that of comparable rates for California. Among those entering in New York, 7.7 percent were

Table 4

Estimated¹ cumulative proportions of Medicaid nursing home (NH) entrants discharged from nursing homes, as a percent of all elderly² persons, by State, age group, time interval, and sex: Michigan, California, and New York, 1981

Time interval and sex	Michigan			California			New York		
	All elderly	65-84 years	85 years or over	All elderly	65-84 years	85 years or over	All elderly	65-84 years	85 years or over
Percent of entrants									
Within 30 days of NH admission									
Both sexes	10.3	10.8	9.6	22.8	24.5	19.9	7.7	7.7	7.6
Male	12.4	12.3	12.6	25.4	26.0	23.8	8.9	9.3	8.5
Female	9.4	10.0	8.6	21.7	23.7	18.8	7.1	7.0	7.3
Within 90 days of NH admission									
Both sexes	24.2	25.3	22.3	40.8	43.8	35.8	16.7	17.1	16.1
Male	29.5	30.1	28.1	45.9	47.1	42.5	18.7	19.3	17.4
Female	21.8	22.8	20.5	38.6	41.9	33.9	15.9	16.0	15.7
Within 180 days of NH admission									
Both sexes	34.2	35.5	32.1	51.0	54.4	45.1	24.0	24.5	23.2
Male	41.5	42.6	39.0	57.0	58.4	52.9	26.6	27.3	25.2
Female	30.9	31.6	30.1	48.3	47.9	43.0	22.9	23.1	22.6

¹Estimates were computed using life-table methods.

²Elderly is 65 years of age or over.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project.

discharged within 30 days, 16.7 percent within 90 days, and 24.0 percent within 180 days.

Exit rates also differed with patient age and sex. Although these differences were smaller than interstate differences, they were consistent for the three States. Males had higher rates of exit after short stay than did females. The rates of exit after 90 or fewer days of nursing home stay for males and females were: 29.5 percent versus 21.8 percent for Michigan; 45.9 percent versus 38.6 percent for California; and 18.7 percent versus 15.9 percent for New York. Nursing home entrants 65 to 84 years of age had higher rates of exit after short stay than did the very old. The rates of exit after a stay of no more than 90 days for those 65 to 84 years of age versus those 85 years of age or over were: 25.3 percent versus 22.3 percent for Michigan; 43.8 percent versus 35.8 percent for California; and 17.1 percent versus 16.1 percent for New York.

Exit to community

The rates of nursing home exit after short nursing home stay with no subsequent Medicaid-covered hospitalization or indication of death are shown in Table 5. Differences among the States dominated variation in these rates. The highest rates were for California, where 16.5 percent were discharged to the community within 30 days of nursing home entry, 29.4 percent within 90 days, and 36.0 percent within 180 days. For Michigan, the comparable rates were 6.5 percent within 30 days, 15.4 percent within 90 days, and 21.4 percent within 180 days. Rates of discharge to the community after short nursing home stay were lowest for New York: 5.5 percent within

30 days, 11.9 percent within 90 days, and 16.8 percent within 180 days.

Thus, the majority of interstate variation in overall exit rates after short nursing home stays was the result of variation in the discharge rates to the community. The difference between the rate of discharge of any type and the rate of discharge to the community (which is the rate of death or discharge to an inpatient hospital) showed less interstate variation. For California, this rate was 6.3 percent for 30 days or fewer of nursing home stay, 11.4 percent for 90 days and 15.0 percent for 180 days. For Michigan, the comparable rates were 3.8 percent for 30 days, 8.8 percent for 90 days, and 12.8 percent for 180 days. For New York, these rates were 2.2 percent, 4.8 percent, and 7.2 percent.

The variation of discharge rates to the community by patient characteristic was similar to that for overall discharge rates. Controlling for age, males were more likely to be discharged to the community after a short stay than were females. Controlling for sex, those 65 to 84 years of age were more likely to be discharged to the community than were those 85 years of age or over.

Effect of prior hospital stay

If discharge to the community after a short nursing home stay marks the use of the nursing home for short-term convalescence, then the rates of such discharge should be greater for those entering the nursing home with a recent Medicaid hospital stay than for those entering without such hospitalization. This was the case, as can be seen in Table 6. Consider the rates of discharge to the community within 90

Table 5

Estimated¹ cumulative proportions of Medicaid nursing home (NH) entrants discharged to the community, as a percent of all elderly² persons, by State, age group, time interval, and sex: Michigan, California, and New York, 1981

Time interval and sex	Michigan			California			New York		
	All elderly	65-84 years	85 years or over	All elderly	65-84 years	85 years or over	All elderly	65-84 years	85 years or over
Percent of entrants									
Within 30 days of NH admission									
Both sexes	6.5	7.4	5.1	16.5	18.2	13.5	5.5	5.6	5.4
Male	7.6	7.9	6.9	17.7	18.7	14.7	6.4	6.8	5.6
Female	6.0	7.2	4.5	15.9	17.9	13.2	5.2	5.0	5.4
Within 90 days of NH admission									
Both sexes	15.4	15.1	12.9	29.4	32.6	24.0	11.9	12.6	10.9
Male	17.8	18.7	15.7	32.2	34.2	26.5	13.2	14.1	11.4
Female	14.3	16.0	12.1	28.2	31.7	23.3	11.4	11.9	10.7
Within 180 days of NH admission									
Both sexes	21.4	23.2	18.5	36.0	39.9	29.3	16.8	18.0	15.0
Male	25.8	27.1	22.8	39.4	41.8	32.7	18.3	19.6	15.7
Female	19.5	21.1	17.3	34.5	38.8	28.4	16.2	17.3	14.8

¹Estimates were computed from a multiple-decrement life table.

²Elderly is 65 years of age or over.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project.

Table 6

Estimated¹ cumulative proportions of Medicaid nursing home (NH) entrants discharged to the community, by Medicaid prior-hospital-stay status in the 30 days prior to nursing home entry, by State, age group, time interval, and prior-stay status: Michigan, California, and New York, 1981

Time interval and prior-stay status	Michigan			California			New York		
	All elderly ²	65-84 years	85 years or over	All elderly	65-84 years	85 years or over	All elderly	65-84 years	85 years or over
Percent of entrants									
Within 30 days of NH admission									
No prior Medicaid hospital stay	5.8	6.6	4.3	13.4	15.0	10.8	4.5	4.5	4.6
Prior Medicaid hospital stay	9.6	10.7	7.7	20.5	22.1	17.6	8.6	8.9	8.2
Within 90 days of NH admission									
No prior Medicaid hospital stay	14.4	16.0	11.8	24.4	27.3	19.8	9.9	10.5	9.1
Prior Medicaid hospital stay	19.7	20.7	18.0	36.1	39.3	30.1	18.2	19.1	16.8
Within 180 days of NH admission									
No prior Medicaid hospital stay	20.9	22.7	18.1	30.8	34.4	24.9	14.5	15.7	12.9
Prior Medicaid hospital stay	23.7	25.4	20.7	43.0	46.8	35.9	24.1	25.4	22.2

¹Estimates were computed from a multiple-decrement life table.

²Elderly is 65 years of age or over.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project.

days of nursing home entry. For California, this rate was 36.1 percent for those entering with prior Medicaid hospital stay versus 24.4 percent for other entrants; for Michigan, 19.7 percent versus 14.4 percent and for New York, 18.2 percent versus 9.9 percent. These data also show that, regardless of prior Medicaid hospitalization status, there was a substantially greater rate of discharge to the community for California than for the other States.

Hospitalization following nursing home entry

The rates of admission to inpatient hospitals from the nursing home, by duration of stay in the nursing home, are shown in Table 7. Because the preceding data derived from Tables 4 and 5 suggest that in California nursing homes are used more frequently for short-term convalescence after an inpatient stay,

Table 7

Estimated¹ cumulative proportions of Medicaid nursing home (NH) entrants admitted to an inpatient hospital during or shortly after nursing home stay², by State, age group, time interval, and prior-stay status: Michigan, California, and New York, 1981

Time interval and prior-stay status	Michigan			California			New York		
	All elderly ³	65-84 years	85 years or over	All elderly	65-84 years	85 years or over	All elderly	65-84 years	85 years or over
Percent of entrants									
Within 30 days of NH admission									
All entrants	1.6	1.6	1.5	5.1	5.6	4.3	3.6	3.8	3.3
No prior Medicaid hospital stay	1.2	1.1	1.4	4.1	4.2	3.8	2.2	2.3	2.1
Prior Medicaid hospital stay	3.2	3.8	2.2	6.4	7.2	4.9	7.9	8.5	7.0
Within 90 days of NH admission									
All entrants	4.5	4.6	4.3	10.0	10.8	8.5	12.1	8.5	7.6
No prior Medicaid hospital stay	3.8	3.6	4.1	9.2	9.6	8.6	6.5	6.8	6.0
Prior Medicaid hospital stay	7.6	8.6	5.6	11.0	12.3	8.4	13.4	13.8	12.7
Within 180 days of NH admission									
All entrants	8.0	8.4	7.3	14.5	15.4	13.1	19.3	10.5	12.0
No prior Medicaid hospital stay	6.5	6.7	6.4	14.3	14.5	14.0	11.1	11.4	10.6
Prior Medicaid hospital stay	13.8	15.3	11.4	14.9	16.5	11.7	18.2	19.3	16.5

¹Estimates were calculated from a multiple-decrement life table.

²This includes hospital stays that either occurred during the nursing home stay or for which the hospital admission was in the 30 days following nursing home discharge.

³Elderly is 65 years of age or over.

SOURCE: Health Care Financing Administration, Office of Research and Demonstrations: Data from the Medicaid Tape-to-Tape project.

one might expect a greater rate of transfer to a hospital from a nursing home in California than in the other States. However, this was not the case. For Medicaid enrollees entering a nursing home with a prior Medicaid hospital stay, the rates of rehospitalization were highest for New York: 7.9 percent within the first 30 days of nursing home stay, 13.4 percent within 90 days, and 18.2 percent within 180 days. For California, the comparable figures were 6.4 percent, 11.0 percent, and 14.9 percent. For Michigan, they were 3.2 percent, 7.6 percent, and 13.8 percent.

For those 65 to 84 years of age entering the nursing home with a prior hospital stay, rates of rehospitalization were higher than for those 85 years of age or over. For the 90-day rehospitalization rate, the figures for persons 65 to 84 years of age versus those 85 years of age or over were: 8.6 percent versus 5.6 percent for Michigan; 12.3 percent versus 8.4 percent for California; and 13.8 percent versus 12.7 percent for New York.

Comparison with national data

Nursing home entry

There is little data on annual rates of nursing home entry from large populations. Most of the population- or sample-based studies of nursing homes are either cross-sectional or have focused on rates of discharge

(Foley, 1980; Ricker-Smith, 1982). Longitudinal studies have been performed in selected groups, but the focus has been on risk factors for institutionalization, rather than on rates of entry (Branch and Jette, 1982). However, it is known that there is a high rate of turnover among nursing home patients (Liu and Manton, 1984; Liu and Manton, 1983; Keeler, Kane, and Solomon, 1981).

Cohen, Tell, and Wallack (1986) studied a sample of Medicare (part B) beneficiaries who were living in the community at the beginning of 1977 and found that 3 percent (N=125) had a physician visit in the nursing home in a 1-year followup. From these data, they estimated the 5-year risk of nursing home entry. They observed a striking increase in risk of nursing home entry with increasing age. They also found that, among persons 75 years of age or over, females had a greater rate of nursing home entry than did males. These findings are similar to those of our Medicaid study. A Manitoba study (Shapiro and Webster, 1984) also noted similar age- and sex-specific patterns, although the absolute rates were different. Our study results provide specific annual rates of Medicaid-covered nursing home entry for policy or planning analysis.

Entry from hospital

Data from the 1977 National Nursing Home Survey (NNHS) showed that 32 percent of all patients enter

the nursing home from a general, acute care hospital (Foley, 1980). NNHS data for New York showed that 41 percent of all patients had entered a nursing home from the hospital in 1977. However, for the elderly Medicaid-covered nursing home entrants in New York during 1981, only 24 percent of those who entered had a recent Medicaid hospital stay. The proportion of entrants with such prior Medicaid hospital stays was even lower for Michigan (19 percent). This difference could reflect relatively less use of the nursing home as a short-stay facility by Medicaid patients in these States or changes in nursing home utilization that have occurred since the NNHS (all NNHS respondents had entered the home in 1977 or earlier). Supporting this hypothesis are results from a Colorado study that found that Medicaid nursing home residents were less ill than comparable non-Medicaid residents (Shaughnessy, Schlenker, and Polesovsky, 1986) and an NNHS analysis that found that Medicaid residents had longer stays than non-Medicaid residents (Weissert and Scanlon, 1980). However, part of the difference may also reflect the inability of our methodology to identify hospital stays prior to the beginning of Medicaid enrollment.

For California, the proportion of elderly Medicaid entrants with recent Medicaid hospital stays in 1981 was 43 percent. This was nearly identical to the proportion of residents whose prior living arrangement was a hospital, as reported in the California data from the 1977 NNHS survey (42 percent).

Exit after short stay

The distribution of length of stay in the nursing home is known to be bimodal, with one population characterized by stays that are quite short (persons who use the home for convalescent care following hospitalization or who die shortly after entering the home) and a second population with longer stays (Liu and Manton, 1984; Liu and Manton, 1983; Keeler, Kane, and Solomon, 1981). Liu and Manton (1984) used the NNHS national sample of discharges from 1976 to construct a synthetic cohort of nursing home entrants and employed life-table methods to estimate rates of discharge from the nursing home by length of stay for this hypothetical cohort. An estimated 34 percent of all entrants were discharged within 30 days of nursing home admission; 52 percent were discharged within 90 days; and 63 percent were discharged within 180 days. These rates are higher than any found in our study, but most resemble those in California, where the comparable figures among elderly Medicaid enrollees in 1981 were 22.8 percent within 30 days, 40.8 percent within 90 days, and 51.0 percent within 180 days. For the other two States, the proportions of entrants with short stays were substantially smaller. Indeed, for New York, only 24.0 percent of Medicaid entrants in 1981 were discharged from the nursing home within 180 days.

Exit to community

An estimated 16 percent of this synthetic cohort of nursing home admissions (Liu and Manton, 1984) were discharged to the community within 30 days of admission to the nursing home; an estimated 23 percent went to the community within 90 days. These data are comparable to the California rates for elderly Medicaid nursing home entrants in 1981: 16.5 percent exited to the community within 30 days and 29.4 percent within 90 days. As was the case for all exits, rates of exit to the community after a short stay in the nursing home were considerably lower among elderly Medicaid enrollees in 1981 for the other two States than for the synthetic national cohort. This finding is consistent with the NNHS analysis, which showed Medicaid residents had longer lengths of stay than non-Medicaid nursing home residents (Weissert and Scanlon, 1980).

Importance of the Medicaid population

The population of elderly Medicaid enrollees by definition differs substantially from that of all the elderly, so the differences between the Medicaid data from 1981 and national survey data from 1976 and 1977 might be expected. Furthermore, the survey data contained information for respondents who were under 65 years of age; this younger group may have contained a disproportionate number of short stayers. Nonetheless, the differences suggest caution in the use of national survey data for Medicaid policy analysis and planning. First, they suggest that there is substantial interstate variability in rates of nursing home entry and exit among Medicaid enrollees. Second, if the patterns seen in Michigan and New York are more typical than those in California, they suggest that a Medicaid entry cohort has a greater proportion of entrants from the community and a smaller proportion of persons who will be discharged after a short stay than does a general cohort of entrants.

Consistent demographic differences

The greatest source of variation in the rates of events for the entry cohort of Medicaid enrollees was the State. However, there were several patterns of demographic differences that were consistent for each of the three States.

The most striking demographic patterns were the markedly higher annual rates of Medicaid-covered nursing home entry for the very old and the higher rates for females. Thus, not only is the prevalence of Medicaid-covered nursing home residence highest for the very old who are female (Ray et al., 1987a; Ricker-Smith, 1982), but the annual rate of entry to the nursing home is highest for this group as well.

Females who were very old also had the lowest rates of both nursing home discharge of any kind and discharge to the community. Both of these factors

increase the likelihood that a female who is very old will reside in a nursing home. Recent trends in mortality have caused this group to be the fastest growing segment of our population (Suzman and White-Rily, 1985), suggesting continuing strong growth in demand for nursing home services (Rice and Feldran, 1983; Russell, 1981).

Implications of interstate variability

Cross-sectional analyses of nursing home residents that focus on demographic characteristics but do not study the dynamics of entry and exit can mask significant interstate variability. In this study, for example, each of the States had similar 1-year rates of Medicaid-covered nursing home residence, and the demographic characteristics of the residents were quite comparable. However, the rates of entry and exit differed substantially between California and the other two States, suggesting a different style of interaction between the inpatient hospital and the nursing home for California than for the other two States.

In California, the nursing home clearly was used more frequently for convalescence after a hospital stay than was the case in the other two States. This fact was reflected in population-based entry rates that were twice those of New York, a proportion of entrants with a recent Medicaid hospital stay that was twice that of either of the other two States, rates of nursing home discharge after short stay that were twice those of New York, and the highest rates of discharge to the community. The finding that California entrants with a prior Medicaid hospital stay had no higher rates of rehospitalization than did patients entering without such a stay again suggests a lower proportion of terminal care patients among short stayers in California. These findings are consistent with the California policy of minimizing use of nursing homes for long-term care (State of California, 1984).

In contrast, the lower rates of entry and exit (particularly from the hospital and to the community) in New York and Michigan indicate that, for the elderly Medicaid enrollees in these States, the nursing homes focus more on long-term care. In particular, the entry and exit rates for New York and the differences in case-mix show a considerably more static nursing home population. Other data (Ray et al., 1987b) suggest a tight supply of nursing home beds in New York at the time of this study, with a long preadmission wait in the hospital. This "nursing home backup" would curtail the use of these facilities for convalescent or terminal care.

The presence of "natural experiments," in which different styles of nursing home utilization for elderly Medicaid patients have evolved, presents an opportunity for studies of the implications of these patterns for cost and quality of care. The results of such studies could be critical as policymakers confront the reality of growing numbers of the elderly who are

likely both to be enrolled in Medicaid and to require nursing home services.

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