Chapter Title: Long-Term Care, Wealth, and Health of the Disabled Elderly Living in the Community

Chapter Author: Alan M. Garber

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9 Long-Term Care, Wealth, and Health of the Disabled Elderly Living in the Community

Alan M. Garber

Providing and financing long-term care of the elderly are among the most pressing policy issues facing the aging American population. An expanding population at risk for chronic disability—the old and very old—promises to generate an unprecedented rise in the demand for long-term care. Advocates for the elderly, policymakers, and health care providers share a growing perception that the scope of services currently available to the elderly is inadequate, and that older Americans bear unacceptable financial risk as a consequence of chronic disability. Largely because most long-term care is uninsured, out-of-pocket expenses for health care of the elderly are greater today than they were before Medicare was instituted; in nominal terms, out-of-pocket health expenditures are estimated to have risen from $300 in 1964 to $1,575 in 1984 (U.S. Senate 1984). Secretary of Health and Human Services Otis Bowen's (1986) report on catastrophic health expenses drew attention to the financial disaster that can accompany chronic disability. Critics of Secretary Bowen's proposal, which did not recommend an expanded role for Medicare or other federally administered long-term care insurance, were quick to add that the costs of long-term care, not catastrophic hospital expenses, pose the greatest health-related financial risk confronting the elderly.

Long-term care consists of nursing home services and a variety of home health services, including visits by home health aides, nurses, physical therapists, and other nonphysician providers, as well as Meals on Wheels and other nonmedical services. Medicare's Prospective
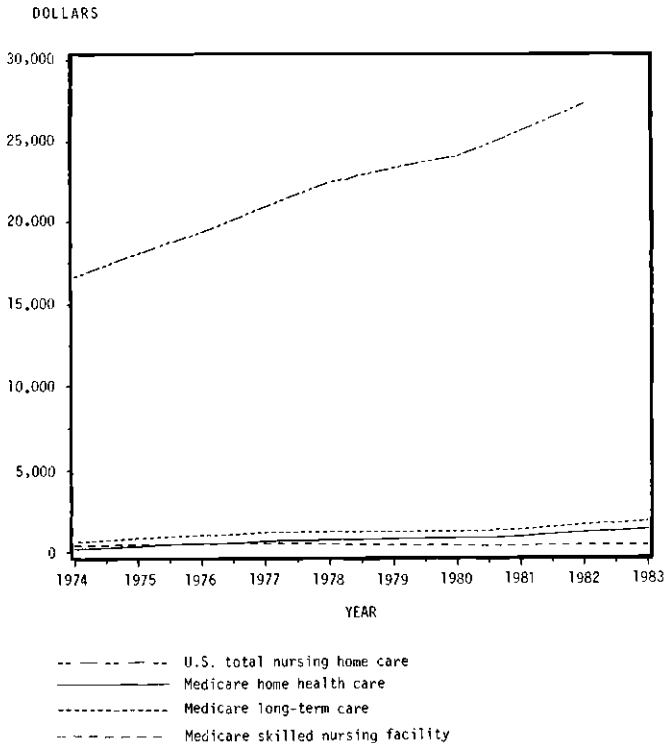
Payment System (PPS) for hospital services has increased both the number of days of nursing home care and its average resource intensity, since earlier hospital discharges have shifted some convalescent care from the hospital to homes and nursing homes.

Even before the PPS was put in place, nursing home expenditures had been rising (fig. 9.1). This trend is likely to continue in even more dramatic form as the American population becomes older. Changing demographics and changes in long-term care financing will accelerate this trend. Methods for predicting utilization will become especially important as the size of the long-term care sector grows.

This document presents the background and preliminary results of a study of the determinants of long-term care utilization by the disabled elderly. The larger study analyzes hospital, home health care, and nursing home utilization; this document describes primarily the first two aspects. The first two sections of this paper outline the background for the research. Section 9.1 describes the demographic changes that have lent

DOLLARS

-- — -- — -- U.S. total nursing home care
——————— Medicare home health care
--------------- Medicare long-term care
-- -- -- -- -- -- Medicare skilled nursing facility

Fig. 9.1   U.S. nursing home expenditures (in 1982 dollars).
Source: Doty, Liu, and Wiener 1985.

urgency to the debate over long-term care. Section 9.2 reviews the current financing of long-term care, describing the roles of government and the private sector. Section 9.3 sketches some of the previous research on long-term care utilization which has concentrated on nursing homes. Selected characteristics of a sample of disabled elderly, part of the 1982 National Long-Term Care Survey, are presented in section 9.4. Results from an analysis of health care utilization in this population appear in section 9.5. The paper concludes with a discussion in section 9.6. The findings of this preliminary study underscore the differences between measures of health status that predict mortality and hospitalization, and the measures that correspond to chronic disability and the demand for personal care assistance. Here, as in other studies of long-term care, living arrangement and family supports appear to have large impacts on long-term care utilization.

9.1   The Changing Demography of Morbidity

The number of Americans aged 65 and over will double between 1980 and 2020; the boom is expected to continue until well into the next century. The aging of America is a consequence of three factors. First, perinatal mortality has fallen, raising life expectancy at birth to 71 years for men and 78 years for women. Second, the survival of adults has improved. Today 65-year-old men and women can expect to live about 15 and 19 more years, respectively. Third, by about 2010 aging baby-boomers will begin to swell the ranks of the elderly. A declining birth rate will further augment the fraction of the American population aged 65 and older. Fewer workers will be available to help fund their care; by the year 2020, there will be only three workers for every person 65 and over, as compared to five-to-one today (U.S. Senate 1986).

Future utilization of long-term care depends on trends in the functional status (disability level) of the elderly. Forecasts of these numbers require some speculation. Standardized measures of functional status were adopted too recently to assess time trends in overall levels of disability. Advances in prevention and medical care have prolonged survival, but many of the people whose lives have been extended are chronically ill and disabled.

Three views about recent changes in the "health," as distinct from the mortality, of the elderly have been espoused. The first, from Fries (1980) and Fuchs (1984), is that improvements in morbidity have accompanied improvements in survival. They expect the average morbidity of surviving elderly of a given age to fall as mortality continues to improve. The second view is that individuals who would have died in the past now survive to be chronically ill and disabled (Verbrugge

1984). Hence age-adjusted disability may increase with time. The third view, expressed by Poterba and Summers (1987), is that increases in the "frailty" of survivors approximately offset morbidity improvements due to medical and other progress, so that average disability changes little over time.

With the exception of Verbrugge, the above authors do little to distinguish long-term care from other forms of health care. The health characteristics that lead elderly patients to obtain long-term care are not the same as the predictors of hospitalization and physician utilization. First, the consumption of formal (paid) long-term care services may depend heavily on living arrangement. Disabled individuals who live with a spouse or other family member consume fewer formal services and are much less likely to enter a nursing home; the death of a spouse commonly precipitates nursing home admission. Second, many of the conditions that prompt the utilization of long-term care services are primarily diseases or disabilities of old age that may have only a weak direct association with mortality. People are admitted to nursing homes because of disability brought about by dementia, severe arthritis, and other such chronic ailments. But the leading cause of death among the elderly is heart disease. Falling death rates from heart disease have contributed to improved survival. Since heart disease does not usually cause the disabilities that lead to prolonged nursing home stays, declines in its morbidity and mortality would not be expected to reduce nursing home admission rates. Of course, reductions in the incidence or health effects of other illnesses that cause both chronic disability and death might lower nursing home admission rates while they reduced mortality; stroke is a prominent example. Nonfatal strokes frequently result in paralysis or speech impairments that make independent living impossible, so the declining incidence of strokes may have reduced long-term care utilization.

The disability of elderly survivors in the future thus depends on the particular conditions that are ameliorated by medical care. If effective prevention or treatment becomes available for illnesses that cause chronic disability, the elderly of the future may be less impaired than those of today. If the future instead brings diminution of the incidence or severity of fatal diseases that cause little disability, more of the elderly will survive to develop chronic degenerative conditions. Increasing life expectancy alone will increase the percentage of the elderly who are disabled, since disability becomes more common with advancing age. This results in greater utilization of long-term care; in 1980, only about 1.1 percent of Americans aged 65–69 were institutionalized, compared with 18.7 percent of the "oldest old"—the group aged 85 and over (U.S. Bureau of the Census 1984b). The number of oldest old is projected to quadruple over the next fifty years (U.S.

Bureau of the Census 1984a). Hence, even if age-specific disability does not change, the size of the population likely to use long-term care will expand.

9.2 Long-Term Care Financing

Out-of-pocket expenditures figure much more prominently in long-term care than in hospital and physician services. Medicare pays for nearly half of all expenditures for the health care of the elderly. The remainder is divided among the elderly and their families, who pay for 25 percent, Medicaid, which pays for 13 percent, and other sources, which pay for the remaining 13 percent. In contrast, Medicare paid for less than 1 percent of all skilled nursing facility expenditures in 1983 (Schieber et al. 1986). Its fraction of nursing home expenditures is even smaller when the denominator includes the categories of nursing homes that Medicare does not cover, such as intermediate and custodial care facilities. Medicare accounts for a larger fraction of the payments for formal (paid) home health care. In 1981, when nursing home expenditures were $24.2 billion, Medicare paid $404 million for care in skilled nursing facilities. Medicare home health care expenditures reached $939 million that year, while out-of-pocket and private insurance expenditures for home health care were estimated to total $2.3 billion (Doty, Liu, and Wiener 1985). By 1985, when nursing home expenditures reached $35.2 billion, Medicare paid for 1.7 percent of the total; its share of nursing home expenditures has fallen at least since 1970, when it paid 5.6 percent of the total (Lazenby, Levit, and Waldo 1986).

Medicare limits its nursing home expenditures by restricting coverage to a sharply circumscribed set of services and eligibility rules. According to 1986 rules, Medicare will pay for up to 100 days of nursing home care only if the following conditions are met: the institution is a skilled nursing facility (SNF); the beneficiary has been in a hospital for at least three days prior to transfer to a SNF; the condition treated in the hospital makes the SNF care necessary; admission to the SNF takes place within a month of hospital discharge; a doctor certifies that the enrollee needs daily skilled nursing or rehabilitation services; and the stay is not disallowed by a review committee. For days 21 through 100 of the nursing home stay, the patient is responsible for $61.50 of the daily charges. By limiting coverage to skilled nursing facilities and to 100 days of nursing home care, Medicare avoids paying for long nursing home stays (these stays are usually for custodial care, which does not require skilled nursing on a daily basis). Medicare's nursing home benefits cover convalescence from hospitalization, not care of the chronic conditions that may have catastrophic financial consequences for patients and their families.

"Medigap" policies, which help pay for Medicare deductibles and copayments, and sometimes extend the period of coverage for hospital care, are popular: about two thirds of the elderly purchase some form of this private supplemental coverage. However, nursing home coverage under these policies is largely limited to reducing copayments under the Medicare benefits.

Private long-term care insurance is not new, but availability has been limited and few of the policies have been attractive. Consequently, it has paid for less than 1 percent of nursing home expenditures (Doty, Liu, and Wiener 1985). This option for financing long-term care was given a boost by President Reagan's endorsement of the recommendations of Secretary of Health and Human Services Otis Bowen (1986), which included tax incentives and educational programs to promote the development of private long-term care insurance. Blue Cross and Blue Shield programs in several states are planning to offer long-term care benefit packages, the American Association of Retired Persons is planning to market a private long-term care insurance package with Prudential, and Congress may be asked to offer federal employees a long-term care insurance option. Almost seventy companies are offering long-term care insurance policies, double the number available two years ago (*American Medical News*, 6 March 1987).

Despite its growing availability, private long-term care insurance might not gain widespread acceptance by the elderly or by younger potential enrollees. Adverse selection and moral hazard are likely to be more severe problems for long-term care than for conventional health insurance. Patients at high risk of needing nursing home care might not be offered policies at attractive prices, unless they could enroll in a group plan. The remedies that private insurers have implemented to avoid adverse selection diminish its value as insurance. For example, several plans exclude dementia from coverage (Meiners 1984); yet "dementia is found in over 50 percent of nursing home residents and is the most common precipitating cause of institutionalization" (Rowe 1985). Additional exclusions for "preexisting conditions" further limit the range of conditions covered, so that the catastrophic nursing home costs of many subscribers would not be covered. The insurers may be prudent to refrain from offering generous benefits; already one major insurer, the United Equitable Insurance Company, has stopped offering long-term care insurance after experiencing losses that exceeded premiums by 40 percent ("Nursing Home Insurers Rise," *New York Times*, 17 March 1987).

Medicaid is the largest insurer of long-term care. The elderly account for a disproportionate share of Medicaid expenditures, and about 68 percent of Medicaid's expenditures for the elderly pay for nursing home care. An additional 17 percent is spent on hospital care. Medicaid's

share amounts to about half of the total expenditures for nursing home care of the elderly, while the disabled elderly and their families pay most of the remainder directly. If Medicaid plays an important role in financing nursing home care, many of the elderly turn to it only after they exhaust other alternatives. In order to qualify for Medicaid, individuals who are not already destitute must have medical expenses sufficient to drain their financial resources—along with, in many states, the resources of their spouses—until they approach poverty levels. Nursing home care, which costs about $20,000 to $25,000 annually, is the most common cause of the "spend-down" to impoverishment. The resource and income limits for the states that have a "medically needy" category, by which the elderly might qualify for Medicaid, are stringent. As of 1984, in states that had medically needy programs, the average allowed assets were $2,021 for a single person and $2,950 for a couple, with protected income of $286 and $367, respectively. Several states allowed only $1,500 of protected assets for individuals and $2,250 for couples, with protected income of as little as $175 for the individual and $183 for a couple (Skellan and Yanek 1985). While many of the elderly have been able to protect assets by transferring them to relatives and by divorcing their spouses, stricter enforcement at the state and federal levels will make it harder to shield assets in the future. Hence the middle-class individual who develops a condition that requires extended nursing home care faces the prospect of destitution.

Unlike care for acute conditions, informal care—services provided by family and friends—is an important component of long-term care. The costs and quantity of these nonmarket services are not readily measured, but there is evidence that they are large. Muurinen (1986) found that informal caregivers reduced labor force participation by about one fourth in order to care for disabled persons; the caregivers who did not leave the labor force suffered reduced earnings because of increased absenteeism. Muurinen claimed that savings from a home-based intervention may have resulted from a shift of costs from formal to unreimbursed care.

Spouses are an important source of informal care, so that the loss of a spouse may result in either institutionalization or more extensive utilization of formal home services. When the elderly who live in the community become older, they are more likely to live alone or with a relative other than a spouse. In the community, 23 percent of the "oldest old"—those 85 and older—live with a spouse, as compared with 63 percent of 65 to 74 year olds. Although disability in the elderly living in the community becomes more common with advancing age, people who live alone are *less* likely to have a disability than those who live with a spouse or other relatives. For example, 9.6 percent of the oldest old who live alone have at least one activity limitation requiring personal

care assistance, as compared with 18.8 percent of the oldest old who live with a spouse, and 25 percent of those who live with other family members (Feller 1983). Unless living with a spouse or other family member causes an activity limitation, these figures suggest that development of activity limitations signals an end to independent living for many of the elderly who live alone. Either they move in with relatives, or they are lost to the community because of death or institutionalization. If the future brings additional fragmentation of the family, or if a widening disparity between male and female mortality rates increases the number of single survivors, we can anticipate that more of the elderly will live alone and, if they become disabled, require either formal community services or institutionalization. Then the financing of long-term care will more closely resemble conventional health care, with increasing expenditures fueled by a reduction in the availability of unpaid help.

9.3   Determinants of Long-Term Care Utilization

As policymakers contemplate broadening insurance coverage to include long-term care, accurate prediction of long-term care expenditures and utilization has acquired new significance. Not only are such estimates needed in order to anticipate the potential financial risks faced by government programs, but they can help evaluate the risks faced by the elderly and by potential insurers. Studies of utilization might also help establish the most efficient means of providing services by assessing substitution between home care and institutional care, or between nursing homes and hospitals. Unfortunately, the literature on long-term care utilization does not provide the unequivocal answers we might desire.

Ambiguity in the literature on long-term care utilization arises from several important differences in the studies. First, the aims of the studies vary, as do their definitions of long-term care. Second, the risks of institutionalization, the socioeconomic characteristics, and the community settings differ substantially from one study to another. Finally, the methodologies also vary.

Many investigations of long-term care utilization assess the ability of community-based interventions to reduce institutionalization. The interventions usually include an array of home health services and a program or person to coordinate the services. In principle, such studies should elucidate the circumstances leading to institutionalization and utilization of community services. Most such studies collect longitudinal data on health and socioeconomic characteristics, with detailed health expenditures and utilization data as well as indicators of health and well-being. But since their goal is to determine whether the intervention is effective (and frequently the designers of the intervention

are the evaluators), they usually employ case-control methods to compare the intervention group to a group of controls. This approach (used by Branch and Stuart 1984; Hughes, Cordray, and Spiker 1984; Yordi and Waldman 1985; and Gaumer et al. 1986, among others) may accurately evaluate the impact of the intervention, but the results are not usually reported in a form that enables one to infer, for example, the effect of age or disability levels on likelihood of institutionalization.

Differences among the interventions, the populations studied, as well as definitions thwart direct comparisons of these studies. Weissert (1985), reviewing eight community-based interventions, noted that institutionalization rates in the control groups varied tenfold. Some of the studies do not report the costs of home care (Branch and Stuart 1984; Nocks et al. 1986) or the amount of home care provided in the control and intervention groups (Nocks et al. 1986); few studies attempt to measure informal care.

Several other studies have sought to predict nursing home utilization. The dependent variable representing utilization varies from study to study. Several investigations estimate the lifetime risk of being admitted to a nursing home at least once. Others estimate the probability of nursing home admission during a fixed interval, such as a month, a year, or five years. Very few seek to predict the measure of utilization most appropriate for forecasting demand or expenditures—the probability distribution of nursing home days. Since nursing home stays fall into at least two groups—short stays and long stays—with very different implications for expenditures and for occupancy rates, predicting a lifetime risk of nursing home admission or admission rates in fixed intervals is less useful.

The studies that attempt to predict the lifetime risk of nursing home admission produce disparate estimates, ranging from about 25 percent to 50 percent (Palmore 1976; Vicente et al. 1979; McConnel 1984). Branch and Jette (1982), in a prospective study of 1,625 elderly Massachusetts individuals, used logistic regression to predict the likelihood of nursing home entry in a six-year period. Kane and Matthias (1984) used a similar method to predict likelihood of discharge to a nursing home for a sample of elderly hospitalized patients drawn from hospital cases reviewed by four Professional Standards Review Organizations (PSROs). Several other studies have used life-table methods or Markov models to predict likelihood of nursing home admission; some of these studies control for individual patient characteristics (Manton, Woodbury, and Liu 1984; Liu and Manton 1984), but most do not (Shapiro and Webster 1984; McConnel 1984; Lane et al. 1985; Cohen, Tell, and Wallack 1986).

Failure to control for individual characteristics severely impairs the ability to predict utilization from these studies. Those studies that predict the likelihood of institutionalization over a given interval, such as

five years, are not suitable for estimating likelihoods of institutionalization during shorter intervals, unless a set of strict assumptions is valid. Furthermore, if they do not estimate duration and likelihood of institutionalization simultaneously, these studies may lead to erroneous forecasts of nursing home demand and occupancy rates. A researcher interested in assessing the effects of a change in age might use such studies to obtain the change in likelihood of institutionalization and multiply the result by either a mean or predicted length of stay (as suggested in Liu and Manton 1984). Unless certain conditions apply (e.g., the estimates are obtained in the same population), the result will be a biased and statistically inconsistent estimate of the expected change in nursing home days.

9.4   The Disabled Elderly Living in the Community

As the population at risk, the disabled elderly living in the community are the key to understanding several aspects of the future of long-term care and its financing. Health, disability, and living arrangement determine the utilization of formal long-term care services; financial status determines whether an older person can purchase private insurance, enroll in a continuing care facility, or participate in other privately funded forms of long-term care. Although long-term care insurance will be offered to nearly all of the elderly (as well as younger people), the disabled elderly are the most likely to collect benefits. Studies of long-term care utilization have concentrated on the high-risk elderly in order to obtain sufficient numbers of hospitalizations, deaths, and nursing home admissions. This section describes results from a national sample of disabled, noninstitutionalized Medicare enrollees, obtained from the 1982 National Long-Term Care Survey (NLTCS). Several aspects of the survey have been described by Macken (1986). The following discussion emphasizes disability in relation to socioeconomic characteristics and measures of hospital and long-term care utilization.

In 1982, the Health Care Financing Administration collected extensive data on a sample of Medicare enrollees who lived in the community and had an impairment in performing at least one "activity of daily living" (ADL) or "instrumental activity of daily living" (IADL). The ADLs were developed more than twenty years ago (Katz et al. 1963) and are widely used measures of functional impairment that have been found to help predict utilization and several aspects of outcomes. Besides obtaining information about the disabled elderly, the study also directed its attention to their caregivers—both paid helpers and the unpaid, informal caregivers who were usually spouses or other family members.

This data set gives important insights into the group of people most likely to receive long-term care. However, it has important limitations

as a source of information. People who entered nursing homes for a prolonged time were likely to be censored from the sample, since the survey excluded institutionalized individuals. Hence the NLTCS does not illuminate one of the key issues confronting government and private insurers: whether home health care can prevent or delay long nursing home admissions.

Included in the NLTCS is extensive information about living arrangement, functional status, income, wealth, education, hospital utilization, and a host of other individual characteristics. The survey also included extensive information about paid and unpaid (informal) caregivers along with data on the sources of payment and insurance coverage.

The NLTCS data were constructed by screening 26,000 Medicare enrollees for activity limitations lasting at least three months. From the original sample, about 6,400 were found to have at least one limitation in an ADL or an IADL. This core group was interviewed in detail or, in those cases in which the study subject was unable to respond because of a mental or other limitation, interviews were conducted with proxies.

Tables 9.1 and 9.2 show sample means or proportions and ranges for key variables from the NLTCS. Respondents who did not complete the "reinterview" portion of the survey are deleted from these figures. Approximately 60 percent of the 1982 Medicare population was female.

Table 9.1   **Sample Characteristics**

Name	Description	Mean or Proportion	Range
AGE		77	65–108
EDUC	Highest grade completed	8.5	0–18
ALONE	Live alone	32%	
MEDCAID1	Have Medicaid card	24%	
PRIHOSP	Have private hospital insurance	57%	
PRIDOC	Private physician insurance	53%	
HOSPDAYS	Days in hospital, past year	5.4	0–115
NHDAYS	Days in nursing home, past year	.3	0–90
INC1	Household income last 12 months	$11,711	$2,000–$75,000
LQ1	Home owned by household member	71%	
HOMEVAL	Value of home/property	$34,725	0–$200,000
HOMEWLTH	Value of home minus amount owed	$31,974	*–$200,000
ADL	Number of ADL limitations	1.9	0–9
IADL	Number of IADL limitations	4.0	0–9
HELPCT	Number of helpers	1.8	0–11
HPAID	Number of paid helpers	.3	0–8
DAYSCT	Days of help past week	6.2	0–42
DAYSPAID	Days of paid help	.7	0–21
ICDAYS	Days of unpaid help	5.5	0–42

*One respondent claimed to owe more than the value of the house; otherwise the minimum value of home wealth was 0.

Table 9.2   **Percentage of Sample Respondents with Specific Activity Limitations**

ADL1	Eating	12%
ADL2	Getting in/out of bed	30
ADL3	Did not get out of bed at all	1
ADL4	Getting around inside	44
ADL5	Did not get around inside at all	2
ADL6	Confined to wheelchair	3
ADL7	Dressing	24
ADL8	Bathing	47
ADL9	Getting to/using toilet	26
IADL1	Doing heavy work	77
IADL2	Doing light work	27
IADL3	Doing laundry	47
IADL4	Preparing meals	35
IADL5	Shopping for groceries	61
IADL6	Getting around outside	59
IADL7	Going outside/walking distance	51
IADL8	Managing money	30
IADL9	Making telephone calls	18

Only 9.9 percent of the total Medicare population was aged 85 and over, as compared to 17.9 percent of the NLTCS population (Macken 1986). The sample analyzed here included 1,213 individuals less than 70 years old; 1,334 70–74 year olds; 1,301 75–79 year olds; 1,074 80–84 year olds; and 1,062 who were 85 and older. The picture that emerges from these statistics is of a population in which severe disability was relatively uncommon and in which a substantial minority lived alone. Although the less severe ADL impairments were relatively common, only 1 percent were unable to get out of bed at all, and 2 percent were unable to get around inside their living quarters at all. Difficulties in mobility and bathing were most common among the ADL impairments. Most sample respondents required assistance with some IADLs, such as heavy work, shopping for groceries, and getting about on the outside.

The medical conditions of the NLTCS population reflect the toll of chronic disease. Senility was identified as a problem afflicting 35 percent, and the questions were answered by a proxy about a third of the time. Nearly three quarters of the respondents complained of arthritis, about half complained of circulation trouble (peripheral vascular disease), about half had hypertension, and about a quarter complained of permanent numbness or stiffness. Only 7 percent noted a previous stroke, and about 7 percent had a prior heart attack. About 6 percent claimed to have cancer.

About 7 percent of the respondents had been in a nursing home before, mostly for brief stays. More than a third had been hospitalized during the preceding year.

Although the NLTCS did not collect detailed information about the financial assets of the participants, it queried them about home ownership, value of home, indebtedness, and income. About 71 percent of them owned, were buying, or lived with the owner of the housing they occupied. Only 14 percent of the sample still owed mortgage money. The variable HOMEWLTH was created to approximate the value of equity in the home; it is the difference between the respondent's estimate of the value of the home and the amount still owed. As figure 9.2 shows, not only did most of the respondents own their homes, but the value of equity averaged more than $30,000 for individuals with anywhere from 1 to 9 limitations in ADLs. The average annual income was about $12,000, and the family income per household member was about $7,150. Figure 9.3 demonstrates that above age 75, the difference between estimated home value and indebtedness increased with age, and there was no clear trend in income. These figures are approximate, since the NLTCS recorded only categorical information about income and home values. Despite these caveats, there is no evidence of a
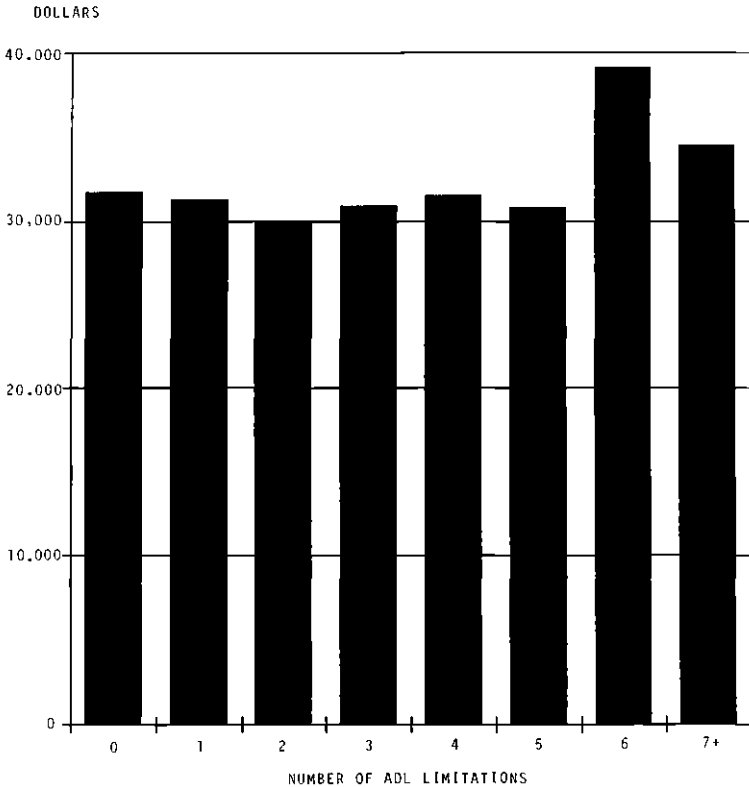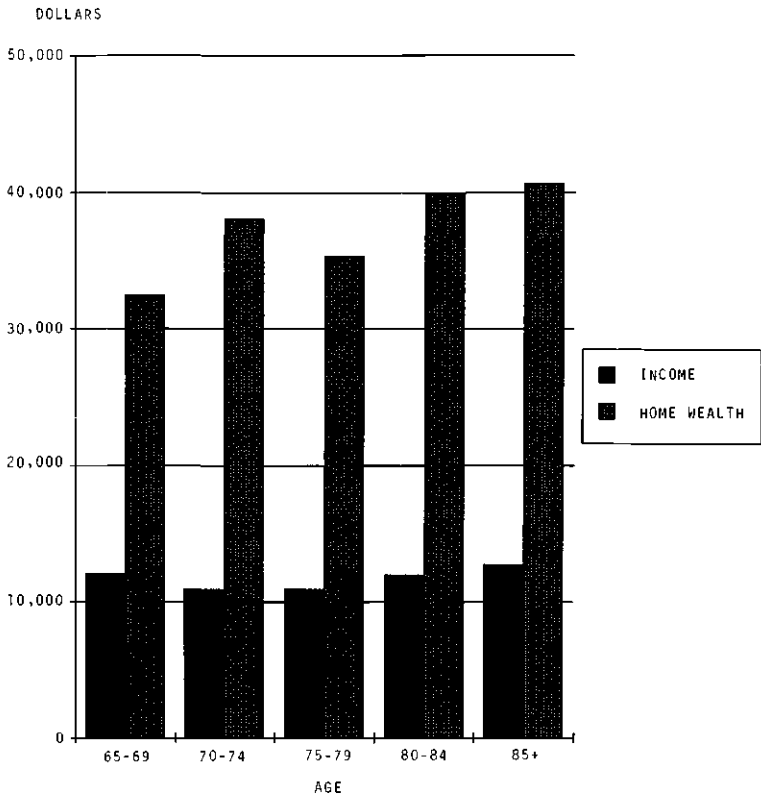
DOLLARS

Fig. 9.2.   Home wealth by number of ADL limitations

DOLLARS

Fig. 9.3.   Financial status by age

decline in wealth with age or with increasing numbers of functional limitations among the disabled elderly in the community.

One might argue that the very old who are able to remain in the community are a hardier group, since they have survived and managed to stay out of nursing homes. However, the number of functional limitations increases with age, as shown in figure 9.4.

About a third lived alone; most of the remainder lived with a spouse. The income, home value, and age distribution of those who lived alone were very similar to those who were not alone. Children can be important additional supports, especially for the elderly who live alone. The average respondent who lived alone had 2.5 children, compared with 2.2 children for the others. Half of the children of the respondents lived less than an hour away. The number of children did not vary significantly with the age of the respondent. As in other studies, the number of activity limitations was somewhat lower for the elderly who lived alone; those who lived alone had 1.61 ADL impairments and 3.55
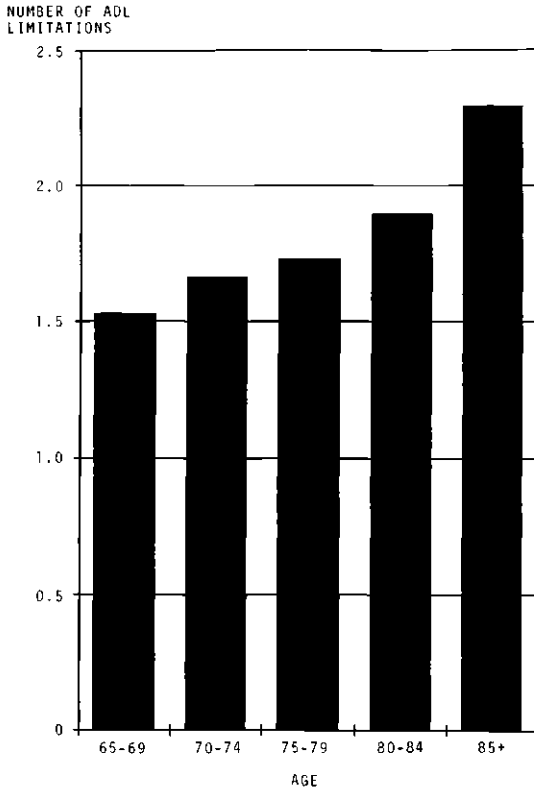
NUMBER OF ADL
LIMITATIONS

Fig. 9.4.   Number of ADL limitations by age

IADL impairments, on average, while those who did not live alone had 1.99 ADL impairments and 4.20 IADL impairments.

9.5   Health Service Utilization by the Disabled Elderly Living in the Community

Other studies have produced evidence that chronic disability is associated with increased hospital and long-term care utilization. Nursing home patients are frequently admitted to hospitals; we might expect to observe the same phenomenon in the disabled elderly who are in the community. Although the NLTCS did not survey individuals who were in nursing homes, by querying participants about prior nursing home admissions it produced substantial information about short-term nursing home admissions. These nursing home stays were almost always associated with hospital admission. Providers of home health care were asked how many days they had visited the sample person during

the week prior to the interview. Paid helpers were also asked how much they were paid and who paid them.

About one third of the sample was hospitalized during the preceding year. As figure 9.5 demonstrates, the annual number of hospital days fell with age. If the very old who get severe acute illnesses are likelier to die, to be admitted to nursing homes, or to stay in institutions longer, they may have been censored from the NLTCS sample. Figure 9.6 illustrates the strong positive association between hospital utilization and the number of ADL limitations, even though the ADL limitations were not consistent predictors of number of unreimbursed care days. People without ADL limitations averaged less than four days of hospital care; those with five ADL limitations averaged about 11 days in the hospital. Not shown is the similar relation for nursing home days and ADL limitations; sample persons averaged only 0.3 nursing home days during the year prior to the interview.

Since most of the sample was not hospitalized, simple linear regressions are not appropriate for estimating the number of hospital days.
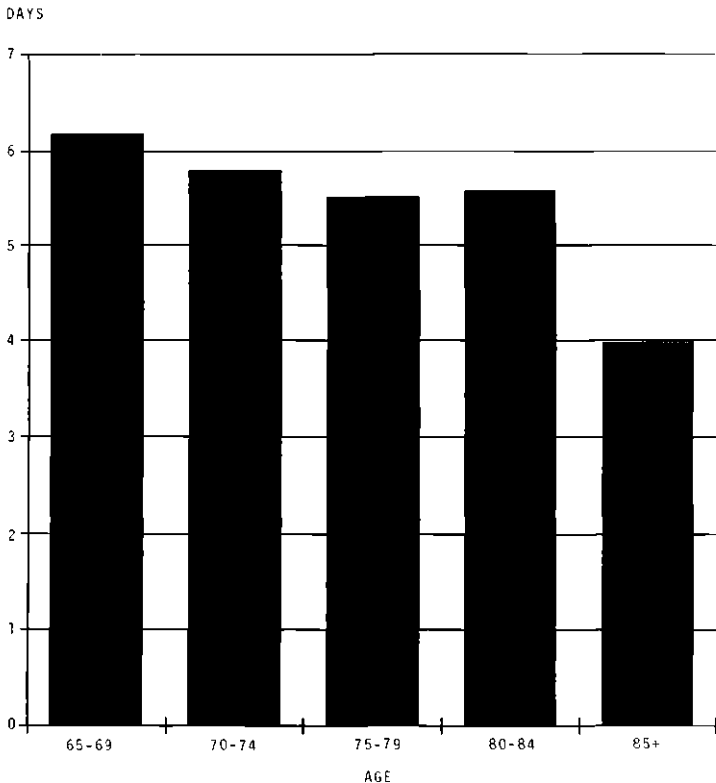
Fig. 9.5.   Hospital days (in preceding year) by age
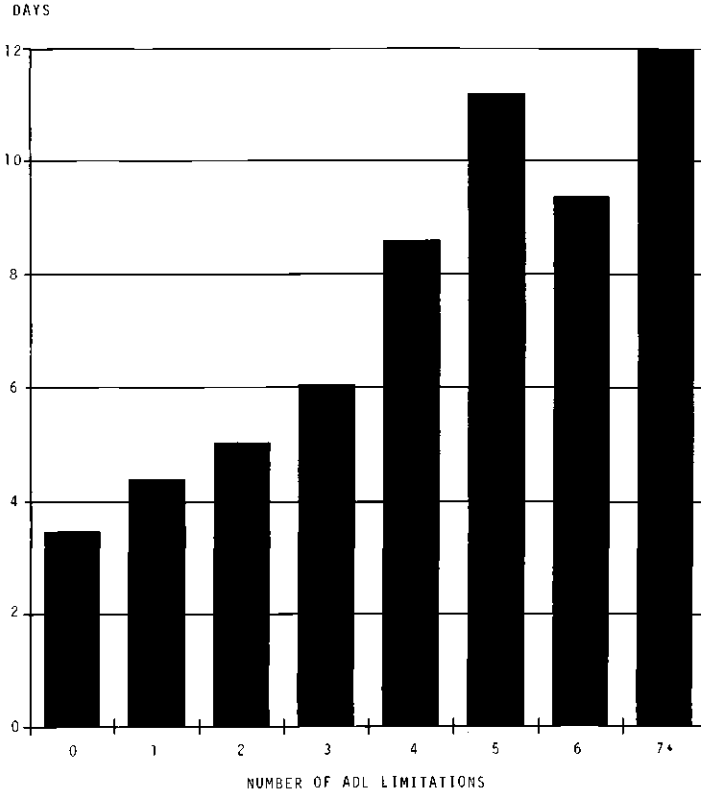
DAYS

Fig. 9.6   Hospital days by number of ADL limitations

Instead, Tobit regressions were performed to assess the correlates of various dimensions of utilization. A Tobit explaining hospital utilization, shown in table 9.3, confirms these univariate associations. Age has a highly significant negative association with hospital days, and the number of both ADL and IADL impairments are strong predictors of hospitalization. Increasing education has a positive effect on hospital days. The effects of variations in income, value of home, private supplemental insurance, and living arrangement are not statistically significant at conventional levels.

The number of days of informal care was strongly related to the number of children; days of formal home health care were higher for respondents who lived alone and who had more children. The number of children did not vary significantly with age of the respondent. These measures of utilization were also examined with Tobit regressions.

Table 9.4 reports estimates predicting days of unreimbursed home care. The actual number of days is the sum over all unpaid care providers

Table 9.3   Tobit Estimation of Hospital Utilization

	Parameter Estimate	t-Statistic
Constant	10.169	1.8606
AGE	−0.43604	−6.2500
SEX	0.65650	0.64330
ADL	2.0015	6.9891
1ADL	1.4799	6.1158
MEDCAID1	−2.1157	−1.6971
ALONE	−0.34007	−0.29740
PRIDOC	0.64558	0.30685
PRIHOSP	1.4315	0.66567
1NC1	−0.51890E−04	−1.0678
CHILDREN	0.19112	0.91169
HOMEWLTH	−0.20894E−04	−1.4254
EDUC	0.28777	2.1302
SIGMA	24.051	43.669

Dependent variable: HOSPDAYS (number of days in hospital past year)
Log of likelihood function = −6863.99
Number of observations = 3688
Number of positive observations = 1227
Percent positive observations = 0.332701

Table 9.4   Tobit Estimation of Unpaid Home Care Days

	Parameter Estimate	t-Statistic
Constant	5.2844	4.1480
AGE	−0.21325E−01	−1.3183
SEX	0.15167	0.63318
ADL	−0.40240E−01	−0.57851
1ADL	0.10984E−01	0.19393
MEDCAID1	−0.50578	−1.7445
ALONE	0.14044E−01	0.52615E−01
PRIDOC	−0.99702	−2.0042
PRIHOSP	0.63032	1.2406
1NC1	−0.21385E−04	−1.8473
CHILDREN	0.49610	9.9241
HOMEWLTH	0.45330E−05	1.3224
EDUC	0.21204E−01	0.66598
SIGMA	6.6807	70.335

Dependent variable: ICDAYS (days of informal care past week)
Log of likelihood function = −10071.4
Number of observations = 3688
Number of positive observations = 2776
Percent positive observations = 0.752711

of the number of days that they saw the respondent during the preceding week; hence, the total can exceed seven. The individuals who had supplementary insurance that paid for physician care received fewer days of informal care; the number of children, which may reflect the availability of informal caregivers, had a dramatic positive impact on the number of days of informal care. Living arrangement, however, had little effect on reported days of informal care.

Table 9.5, which presents the results for a Tobit estimation of days of paid home care, shows that respondents who lived alone received more paid care; respondents who had more children were also likely to receive more paid care. In contrast to the results for informal care, the number of days of paid care rose with the number of ADL limitations (but not with IADL limitations). The value of home equity had a positive association with days of paid care. The purchase of private insurance for hospital care or physician care had statistically insignificant effects on the utilization of formal home care, a result that might have been anticipated since few supplemental insurance plans would have provided substantial benefits for home health care. Medicaid enrollment was associated with fewer reported days of both paid home care and informal care. Several hypotheses are consistent with this observation. Perhaps children and relatives felt less willing to provide free long-term care when the respondent was eligible for nursing home care that would be paid by Medicaid; perhaps the individuals on Medicaid

Table 9.5   **Tobit Estimation of Days of Formal Home Health Care**

	Parameter Estimate	t-Statistic
Constant	-4.4526	-2.3900
AGE	$-0.29884E-01$	-1.2655
SEX	-0.31956	-0.92219
ADL	0.19969	2.0154
IADL	$-0.49798E-01$	-0.60410
MEDCAID1	-0.65376	-1.5390
ALONE	1.0629	2.8051
PRIDOC	-0.38879	-0.54029
PRIHOSP	-0.56444	-0.77056
INC1	$0.56184E-07$	$0.33083E-02$
CHILDREN	0.23018	3.2367
HOMEWLTH	$0.98799E-05$	2.0252
EDUC	$-0.70257E-01$	-1.5237
SIGMA	6.8054	28.127

Dependent variable: DAYSPAID
Log of likelihood function $= -2,887.50$
Number of observations $=$ 3,688
Number of positive observations $=$ 576
Percent positive observations $=$ 0.156182

who became disabled were more likely to enter nursing homes because they bore none of the cost of their stay.

The Tobits predicting these measures of home health care utilization show a trend toward decreasing utilization with age; although the age coefficient does not achieve statistical significance, the pattern is consistent across all the measures of utilization that were examined.

9.6 Discussion

Although the NLTCS provides a detailed look at the disabled elderly who live in the community, it has important limitations as a source of data on long-term care utilization. The failure to track individuals into nursing homes is its most obvious shortcoming. The censoring of the elderly who went into nursing homes may also complicate the interpretation of some of the results. The very old in this sample spent fewer days in the hospital than did the younger old, and they tended to receive fewer days of home health care. But we would expect hospital utilization to increase with age. One explanation for this phenomenon is that the very old who had long hospital stays or frequent admissions were likely to be removed from the sample—either by death or institutionalization. If long-term care is a continuum that ranges from less intensive informal and formal home care to nursing home care, censoring due to institutionalization means that the "oldest old" in the community are very different from the 25 percent in nursing homes.

It is noteworthy that many of the personal characteristics that are widely considered to be predictive of health status generally—such as education, wealth, and income—were not nearly as predictive of home health service use, activity limitations, or hospitalization in this data set. The activity limitations are self-reported, highly subjective appraisals, so their reproducibility and validity as measures of underlying chronic disability are debatable (see Feinstein, Josephy, and Wells 1986 for a detailed critique of indexes of functional status). However, many of the health characteristics that lead to institutionalization and the need for personal care assistance are degenerative conditions for which no effective preventions are known. For example, most dementia in the elderly is due to senile dementia of the Alzheimer's type (SDAT); as of this writing, its cause is unknown, and there is no effective prevention, treatment, or cure. In contrast, it has been known for several years that elevated cholesterol, smoking, and hypertension increase the risk of heart disease. Individuals can modify these risk factors, and there are effective treatments for some of the associated morbidities; there is no analogous opportunity for the prevention of most cases of dementia, incontinence, or joint disorders. Hence the beneficial effects of schooling (see Grossman 1975), income, and wealth on health, which

depend in part on individual choices to improve health, might not be observed here.

These data are insufficient to predict the expected costs of nursing home care faced by this population. Another study conducted in the early 1980s suggests that the expected costs are manageable. The National Long-Term Care Channeling Demonstration, a large, multiple-site randomized trial of an intervention designed to reduce institutionalization, enrolled individuals who were thought to be at very high risk of institutionalization; they were older and had more severe disabilities than the NLTCS sample. Adjusted for age, the Channeling population had somewhat higher nursing home admission rates than did other Medicare recipients. Even in the Channeling demonstration, mean nursing home expenditures for the participants in the control group were less than $900 during the twelve months following enrollment (Wooldridge and Schore 1986, pp. D.10, D.11). The NLTCS population had substantial assets, and within this sample there was no clear association between disability and wealth. Severe disability resulting in institutionalization and depletion of assets may be responsible for the negative association between disability and wealth that has been observed elsewhere, rather than lower wealth causing increased disability. If so, the disabled elderly in the community might have sufficient assets to purchase long-term care insurance, at least at actuarially fair prices. If moral hazard and adverse selection are sufficiently severe, and administrative costs sufficiently high, it may not be feasible to offer private long-term care insurance plans at prices low enough to attract widespread participation.

Although the 1982 NLTCS provides a great deal of information about the characteristics of the disabled elderly in the community, censoring by death and institutionalization limits its usefulness for predicting either hospital or nursing home utilization. These drawbacks will be rectified by the 1984 follow-up to the NLTCS, which determined institutionalization rates and mortality for the 1982 sample. Analysis of this data set should resolve many of the censoring problems and enable us to trace the changes in health status, wealth, mortality, and health service utilization that occur with aging.

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