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Differences in Nursing Home Utilization and Clinical Outcome in Veterans Administration Nursing Home Patients

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Clinical Outcome in Veterans Administration

Nursing Home Patients

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Abstract

Differences in Nursing Home Utilization and
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Because of increasing costs and demand for nursing home care, studies are needed that can better describe the population of users and improve prediction of clinical outcomes and program requirements. The major purpose of this study was to explore the incremental and seven month outcomes of nursing home patients using the Andersen model. The design was longitudinal. Patients from one Veterans Administration (VA) hospital-based nursing home and six freestanding, VA contract community nursing homes were studied. Functional and cognitive ability were analyzed along with socioeconomic and demographic data, and utilization patterns.

A second purpose was to assess associations among variables and their interaction effects in predicting outcome. A third purpose was to assess the contribution of such independent variables as case-mix and rehospitalization rates to possible cost differences evidenced by the two nursing home types. The results of this study suggest avenues for planning and allocation of resources in the two program alternatives.

The Barthel Index (BI) (Mahoney & Barthel, 1965) was used to measure functional status and the Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975) for cognitive ability. In addition to standardized measures, sociodemographic and utilization data, perceptions of health and outcomes of care were collected on all subjects.

Analytical techniques included descriptive and inferential statistics. The major hypothesis was that veterans in the hospital-based versus contract

community nursing home program exhibit statistically significant differences in characteristics and on measures of service use and clinical outcome. Findings were evaluated for policy adequacy, adherence to program intent, federal and state cost complement and other qualitative implications.

Statistically significant differences were found between patients in the two settings on predisposing, enabling and need characteristics. The hospital-based NHCU patients were more likely to be married and living with someone. They also had higher incomes, more Medicare A coverage, a greater percentage of service-connected veterans and demonstrated greater limitation in functional ability than did those in contract.

The predominant outcome for both groups was continued nursing home care. Statistically significant differences were also found for outcome measures. Higher income and being 76 years or older were predictive of continued nursing home residence. The type of nursing home was not significant in explaining continued care. The total number of diagnoses, age group and type of nursing home were predictive of death as an outcome. There were significantly more deaths among those 75 years or younger, among those with lower incomes and among NHCU patients.

Health service utilization did not differ significantly by nursing home type. Neither group of nursing home patients demonstrated any significant improvement in functional or mental status and self-perceived health. The only differences of note were among those 75 years or less who did improve in functional ability from the third to the sixth month.

The findings suggest that the two nursing home types do have different patient population profiles. However, the continued use of nursing home care by both groups indicates some lack of fit between legislative intent and actual clinical utilization.

CHAPTER 1

Introduction

Overview of the Veterans Administration

Until World War I (WWI), pension and domicile were the main benefits provided to veterans (Mather & Abel, 1986; Veterans Administration [VA], 1977). Following WWI, the Veterans Administration (VA) experienced substantial growth in size and services including hospital and medical care. By 1930 there were 47 VA hospitals throughout the nation (Mather & Abel).

Care was initially available primarily to veterans who had service connected disabilities. In 1924, the 68th Congress approved the World Wars Veterans Act which extended the authority of the agency to provide hospitalization to those non-service connected veterans unable to defray the cost of care (VA, 1977). In 1946, PL 79-293 established the Division of Medicine and Surgery, and expanded the mission beyond the provision of clinical care to include the advancement of research and support of medical education (VA, 1977).

From WWII on, a myriad of legislative amendments has produced an intricate set of eligibility rules and an accretion of programs. Currently, the VA sponsors a variety of educational and research programs, provides acute and long-term care, as well as inpatient and outpatient services. The VA operates 172 hospitals, over 100 hospital based nursing homes and is the largest medical care system in the nation. Inevitably, this increased scope of mission, programs and entitlement has occasioned a progressive rise in expenditures and in the number of veterans served.

The Trend for Nursing Home Care

Life expectancy is increasing, and with it the likelihood of disability and chronic disease. Between 1950 and 1980, the proportion of elderly (i.e., those over 65) increased more rapidly than other segments of the population and will

more than double by the year 2030 until it becomes nearly one-fifth of the population (Doty, Liu & Weiner, 1985). The nursing home population is expected to grow by 57% between 1980 and 1995 (Doty et al; 1985).

These trends apply to veterans. In 1980, 27% of all American males 65 years and older were veterans, and by the year 2000 it is anticipated that the percentage will reach 63% or approximately nine million (Glenn & Brazda, 1985; Congressional Budget Office, [CBO], 1984). Demand for nursing home care is expected to go up 40% by 1990, 73% by 1995 and 107% by 2000. This rise should then be followed by a gradual decline beginning in 2010 (CBO, 1984).

Expenditures for veterans' nursing home care are already enormous, and the cost of providing care is projected to double within the next decade (CBO, 1984). Again, the trend parallels that of the nation at large; excluding nursing home care for the mentally retarded, spending doubled between 1976-1982 (Gibson, Waldo & Levit, 1983).

Statutory Authority for the Nursing Home Programs

The VA's response to the need for nursing home care comprises three programs: hospital based nursing home care units (VA/NHCU), state nursing homes, and government administered contracts with proprietary nursing homes. Patients in the first and last of these programs were the subject of this dissertation. "The VA Nursing Home Program began on August 23, 1963, when the President directed that 2000 nursing home beds be created within the VA through modification of existing facilities" (Mather & Abel, 1986). In 1964, PL 88-450 expanded the nursing home program to go beyond the operation of hospital based beds to include contractural arrangements with public (i.e., state) and private nursing homes (Mather & Abel; National Academy of Science [NAS], 1977). Authority for operation of all three types of programs is found in multiple laws enacted since 1964, and in Title 38, §601, §610(a), §620, §620(d), §634, §641, §643, §5010 (1982) and 38 C.F.R., §17.49, §17.50(a)(b)(c)(d)(f), §17.51 and §17.51(a) (1986).

The government owned and operated VA/NHCU program offers care for an indeterminate period. Patients may be admitted from VA hospitals, non-VA hospitals and, since 1973, directly from the community (PL 93-82). Service connected veterans receive priority (38 C.F.R., §17.49, 1986). Goals describe the need for nursing care and related medical services, rehabilitation, progress toward independent status and return to less restrictive environments. Implicitly at least, discharge is to be pursued if the veteran no longer needs this level of care. Operationally some NHCUs move in this direction by attempting target levels for discharge and turnover rates. Others, yielding to the political pressures frequently brought to bear on discharge plans, take less aggressive action.

By contrast, contract care in community nursing homes is limited to a benefit period of 180 days (38 C.F.R., §17.51(a_4), 1986) after which, veterans must either assume the cost of care themselves or exhaust their personal resources ("spenddown") to become eligible for Medicaid. Only in extraordinary circumstances may VA nursing home contracts be extended beyond the six-month benefit period (38 C.F.R, §17.51(a) (5a), 1986). An important exception applies however to service connected veterans. Public Law 91-101 permits unlimited contract care for veterans who, immediately prior to nursing home care, have been hospitalized in a VA facility for service connected disabilities.

Non-service connected veterans may only gain entry to contract nursing home care following an episode of VA hospital care (38 C.F.R., §17.52(a)(3), 1986). Veterans with service connected disabilities may be admitted to contract care directly from the community but, in the absence of a prior hospital stay, coverage is limited to six months (PL 93-82, 1973). The intent of the program is to provide a brief course of extended care to those who have achieved maximum hospital benefit (Title 38, §620(d), 1982). The stated intent of the six month limitation is to help the veteran in making the transition from a hospital to one's usual domicile

in the community (H.R., Rep. No. 680, 88th Cong., 1st session, 1963). Furthermore, unlike the NHCU program, the contract program limits the financial obligation of the federal government in two ways: the six month limitation; and the requirement that non-service connected patients only be admitted upon transfer from VA hospitals (H.R., No. 680).

<div align="center">Nursing Home Program Mix</div>

Because demographics portend vast cost increases to support nursing home needs, initiatives have recently been undertaken to mitigate the federal financial risk. Both demand and supply strategies have been employed.

Demand

In economic terms, demand can be reduced by increasing out-of-pocket expenses and restricting eligibility criteria. Past practice has been for the VA to provide first dollar coverage for both NHCU and contract care, although the latter is time limited. There has always been a provision for a means test, however ineffectual. Income was the supposed "means" for constraining services for disabilities unrelated to service. Non-service connected veterans seeking care were simply asked to declare in writing whether they were unable to defray the cost of care. No proof was required. The Veterans Health Care Amendments (PL 99-272, effective July 1, 1986) (VA, 1986a) introduced cost sharing and strengthened means testing.

The law (PL 99-272) establishes three groups of eligible veterans (called groups A, B, & C), imposes an elaborate, income based means test, and sets forth co-payment requirements for some veterans. Those eligible include veterans with service connected disabilities, those entitled to compensation, former prisoners of war, those exposed to Agent Orange, ionizing radiation or other toxic substances, veterans of the Spanish-American War, Mexican Border Period or WWI, and those with non-service connected disabilities who are unable to defray expenses. The law

describes "unable to defray expenses" as those receiving Medicaid, VA pension or not exceeding a dependent-adjusted, income ceiling.

Category A encompasses veterans meeting the qualitative criteria plus, for non-service connected veterans, conformity to income thresholds such that totals not exceed $15,000 singly, $18,000 with one dependent with $1,000 allowable for each additional dependent. Category B is identical but with a slightly higher attributable income (i.e., $20,000, $25,000, $1,000 respectively). Neither category A nor category B requires co-payment. Only Category C, where income levels exceed those of A and B, necessitates a co-payment. The dollar amount of the co-payment is based on the annual fee for the Medicare deductible. The current cost is $520 per 90 day episode of care. Within these parameters, care is provided on a space available basis; the rules apply equally to NHCU and contract programs (VA, 1986a).

It is not known how much revenue will be generated and how much the revenue will defray VA costs. A cursory survey of 110 patients in residence at the Bronx, NHCU (May, 1987) revealed only one veteran whose income surpassed the threshold, qualified as Category C and thus would be liable for a co-payment. The nursing home population as a whole may well have very modest monetary resources and therefore rarely be required to contribute toward their care in the form of co-payments.

Parenthetically, the more detailed means test is still fundamentally a process of self certification. No documentation is required as is the case for Medicaid applicants. One might speculate that more rigorous imposition of the law, however fiscally sound, must tread lightly in any departure from past practices of entitlement.

Supply

Supply oriented methods for cost containment involve restructuring nursing home bed capacity. The VA has been criticized for excessive construction costs and higher operating costs in its hospital based nursing homes. The budget for

new NHCU construction has been reduced, and the VA has been instructed to develop a prototype NHCU model in an effort to hold down the cost of approved construction projects.

The most dominant supply side financing issue has centered around the term "market share", which is the proportion of all veterans in nursing homes whose care is being supported by the VA. Recent estimates of this share range between 12-16% (Bresler & Mort, 1982; VA, 1980b; CBO, 1984). Of the usual 16% market share, 40% of veterans have been cared for in NHCUs, 40% in the contract program and 20% in state nursing homes (VA, 1977; Bresler & Mort).

The federal role in provision and financing of health care has increased (NAS, 1977) and the expensive, VA owned and operated NHCUs place an additional strain on the federal budget. In order to decrease federal outlays, proposals have been put forth to adjust the proportion of veterans being cared for in the NHCUs by changing the program mix. Already the budget outlines that the mix be deceased to 30% NHCU and increased to 30% state, specifically to shift emphasis to the less costly community and state programs (VA, FY 1987).

According to the VA's own assessment of its market share policy options, many undesirable effects could be forthcoming from modification of the current allocation plan (CBO, 1984). States are already struggling over their own nursing home costs in the form of Medicaid. Medicare and Medicaid combined paid for 50% of all nursing home expenditures in 1982 (Gibson, Waldo & Levit, 1983) but Medicaid, a largely state funded program, paid for 49% of it (Doty, Liu & Weiner, 1985). It is uncertain how much additional burden states can assume and how they might react to VA cost shifting.

Certificates of Need (CON) and other planning restrictions may be one response by states. Reliance upon proprietary homes for more nursing home beds may lengthen waiting lists for veterans or state residents (CBO, 1984). Costs

may exceed what is anticipated and become uncontrollable, and the VA may not be sufficiently flexible to respond quickly enough to secure necessary beds in the case of rate hikes. States may also choose not to expand state nursing home beds even with VA support of construction costs, or they might pass along additional costs to the VA (CBO, 1984).

Compounding these ambiguities is the fact that it is simply unknown how the costs of the various VA programs vary on other than an average per diem basis. On the face of it, the national average cost of NHCU care is almost twice that of contract nursing home care, and state care is by far the least costly alternative. However, contributing factors such as rehospitalization days at VA hospitals, travel costs to and from contract homes for VA clinic appointments, and prescription costs in proprietary facilities may render contract nursing home costs higher than envisioned. Only one VA study for example has considered the impact of hospital days on long-term care costs (Linn et al., 1985). Furthermore, it is fairly well accepted that the functional and cognitive profile of patients contributes significantly to nursing home costs. These cost-relevant differences of veterans in the three types of nursing home programs have not been analyzed systematically and over time.

Justification and Need for this Study

During its early programmatic growth, the VA nursing home program operated without serious economic controversy. More recently, the rapidly escalating numbers of aged and chronically disabled veterans have raised concerns about program expenditures. The need for nursing home care for veterans is indisputable. What is debatable are the costs associated with the three types of program alternatives and the appropriate proportions of veterans to be cared for in each of them.

Since the advent of Medicare and Medicaid, the federal role in health care financing has risen sharply. The VA system poses yet another federal responsibility both for direct provision of health care and reimbursement of costs. The demographics of the veteran population and the associated expenditures have caused alarm among recent presidential administrations. As a result, efforts have been made to curtail federal spending. One example of this in regard to the VA has been the revision of the market share formula for the nursing home program.

Community and state homes have been targeted to enlarge their share of support while that of the VA owned and operated homes will be reduced. This may be a premature change in program mix because these alternatives are founded upon superficial measures of program costs. Without accurate knowledge of the complexities of clinical needs and patterns, informed decisions are unlikely. Politically expedient cost shifting measures may thus create calamitous conditions for states while affecting only temporary relief of the VA's budgetary burden. Further, in the absence of clear clinical indications, altering the proportions of patients in each program may compromise quality of care and foil legislative intent among nursing home types.

In order to describe more exactly the variation in costs related to program elements, the composition of patients in the programs needs to be clarified. Are the NHCU and contract groups roughly equivalent groups at time of referral, or do they differ meaningfully? How do they compare in clinical progression over time? In a restorative, as opposed to curative setting, incremental changes may be as important as initial characteristics and ultimate outcome in explaining costs. Do contract patients really go home after six months, or do they actually continue in residence under state auspices? Does the absence of a time limit on the benefit period in the NHCU program operate as a disincentive

to transfer or discharge, encouraging veterans to remain institutionalized indefinitely?

Although potentially important to total costs, co-payment revenue, and prescription and transportation costs of contract care, were not considered in this study. Nor did this research analyze cost benefits and effectiveness per se and distinctions among all three program types. Instead, it focused on the major predictors of nursing home use, costs and outcomes for the NHCU and contract programs. Findings provided data for analyzing policy adequacy, adherence to program intent, federal and state cost complement and qualitative implications.

Theoretical Framework

The Andersen Model (Andersen, 1968) is a framework for exploring variation in health service use (See Figure 1). In its most complete application, the model incorporates aspects of health care utilization at the societal level, the health care organizational level, and the individual behavioral level. The assumption attendant to the model is that a complex, interrelated and dynamic set of factors underlies use of health services. The Andersen Model goes beyond simple behavioral models (e.g., Rosenstock, 1966) in that it integrates a variety of economic and social contingencies (Andersen).

At a societal level, technological innovations and cultural mores broadly affect use. Examples relevant to nursing home utilization would include life extending procedures, therapeutic or pharmachologic advances in chronic care, availability of government financing of nursing home care, and (for veterans) statutes and regulations pertaining to VA programs. "Possibly, the societal norms which have the greatest effect on health service utilization have to do with how medical care is financed" (Andersen & Newman, 1973, p. 104).

Figure 1. The Andersen Model Applied to Nursing Home Utilization

SOCIETAL DETERMINANTS		HEALTH SERVICES ORGANIZATION		
Norms	Technology	Resources	Access	Structural
Reflected in government policies concerning market share, budgetary allotments and cost sharing for VA nursing homes.	Advances in medical science which increase life expectancy and with it, prevalence of chronic diseases.	The volume and distribution including staffing, ratios, number of nursing home beds and mix of therapies.	Co-payment requirements, statutory eligibility, type of nursing home, referral source.	Rehospitalization rates.

INDIVIDUAL DETERMINANTS		
Predisposing	Enabling	Need
Age, Race, Education, Marital status, Usual living arrangement, Availability of help for activities of daily living and instrumental activities of daily living.	Income, Health insurance coverage, Statutory eligibility, Type of nursing home, Referral source, Copayment requirements.	Functional ability Mental status, Self perceived health. Diagnoses.

HEALTH SERVICE USE		
Type	Purpose	Unit of Analysis
Hospital based and contract nursing homes.	Extended care	Categorical and qualitative differences in clinical outcome of patients.

The health care organization level is arranged according to resource, access and structural determinants of health service use. Resources are described in terms of quantity and type of resources, and their organizational distribution. Resources which pertain to nursing home use include staff to bed ratios and therapeutic services.

The second organizational determinant, termed access, denotes the type of health care coverage, the degree of reimbursement, and the amount of out-of-pocket expenses borne by consumers (Andersen & Newman, 1973). "Accessibility is assumed to increase as the proportion of medical care expenditures paid for by the government, voluntary health insurance, or other third-party payers increases..." (Andersen & Newman. p. 102). In this study, the type of nursing home (i.e., NHCU or contract) is a proxy measure of health care coverage based on the presence or absence of a benefit time limit. Co-payments although not measured, represent out-of-pocket, cost sharing expenses.

Other indirect sources of health coverage for VA nursing home care are statutory eligibility and referral source which qualify one for varying constellations of services. These same factors, when viewed at the level of the individual also act as enablers or alternately, inhibitors in the "enabling" category.

Once having accessed the health care system. the last organizational determinant of structure relates the ongoing nature of health care services to the health service use under consideration. Structure frequently includes periods of hospital care, and in the case of nursing home utilization, it is any rehospitalization which occurs during the course of nursing home stay (Andersen & Newman, 1973).

Three groupings form the organizing principles at the individual level: predisposing, enabling and need determinants. Predisposing factors describe the

sociodemographic characteristics of the population of health care users. These characteristics are antecedent to any event of health service use and tend to modify health seeking behavior. Traits such as age, race, marital status and living arrangements are usual descriptors and appropriate to nursing home studies.

Enabling features are those determinants pertaining to the individual, which facilitate the access of health services. Monetary assets and financial resources such as health insurance, are considered to enable individuals to secure care. Implementation of the enabling concept in this VA nursing home study requires explanation of income levels, statutory eligibility and nursing home coverage, as implied by the type of nursing home setting.

The final individual level determinant is need. This represents the clinical indication for seeking care (i.e., illness and response), can be objective and subjective, and is the most proximal to utilization in the sense that it usually precipitates an episode of health service use. In regard to VA nursing home patients, measures of need include disease entities (i.e., diagnoses), cognitive and functional ratings, and perceptions of one's own health state.

The Andersen Model can be applied to many types of settings (e.g., hospital, physician office, clinic, nursing home) and purposes (e.g., health maintenance, health restoration, extended and supportive care), and with different units of analysis. Typical units of analysis are the number of visits made, number and types of services consumed, and length of stay. For this study, the unit of analysis is the clinical outcome of patients. Degree of clinical need in relationship to specified intervals of care, and the influence of rehospitalization are also considered in relationship to the outcomes. Cost implications associated with these events further describe the unit of analysis.

The model serves as a guide in selection of variables relevant to the analysis (Andersen & Newman, 1973). Although conceptually one might consider all dimensions within the model, as a practical matter, only a few determinants of utilization are often explored. Various aspects have discursive meaning while others are actually measured. For example, conclusions about norms and technological impacts may derive more often from inference than from quantification, while other model determinants may be more readily measured.

The Andersen Model has previously been applied to health service use by the elderly. Evashwick, Rowe, Diehr and Branch (1984) found predisposing and need variables but not the enabling variables, to be important in explaining nursing home use. Only 3% of the variance was explained; however the sample was community based, entirely self reported, and measures did not include mental status which is felt to affect nursing home use. The model has also been used in studies of ambulatory and physician services use by noninstitutionalized elderly (Wan & Arling, 1983; Wan & Soifer, 1974).

Purpose of the Study

Because of increasing costs and demand for nursing home care, studies are needed that can describe the interrelation of patient population characteristics, clinical course, utilization and outcome. Findings from such studies have implications for planning and for allocation of resources between the two VA program alternatives of NHCU versus contract care. The purpose of this study was to explore these factors and suggest avenues for continued policy formulation. The major hypothesis was that veterans in the hospital-based versus contract, community nursing home program exhibit statistically significant differences in characteristics (e.g., age, diagnoses, functional and mental status), and on measures of service use and clinical outcome.

Definition of Terms

The terms for denoting the type of nursing home program were operationally defined. One term was the hospital based. VA owned and operated nursing home care unit (NHCU) and the other was contract, community based proprietary nursing home care.

Nursing Home Care Unit:	NHCU patients were those male veterans of any military service and/or war who had been admitted to one hospital based nursing home based on clinical need and without regard to age as a selection criterion. Their disabilities may have originated during or be attributable to their course of military service (i.e., service connected) or may have been unrelated to their period of service (i.e., non-service connected). They may have entered the program from any other institutional or non-institutional origin. The nursing home was located on the medical center campus and patients were cared for in all respects by VA personnel. Length of stay was not specified.
Community Nursing Home:	Community nursing home patients were those male veterans of any military service and/or war who, based on evidence of need for continued care and without regard to age as a selection criterion, had been admitted to one of six freestanding, proprietary nursing homes under contract to the VA in the Bronx area. Patients were assigned to the respective homes for a period not to exceed six months.

The cost of care was reimbursed to the facility on a per diem basis according to a negotiated rate appropriate to the locality. Care was provided by staff employed by the home. The VA maintained regular clinical oversight of veteran patient care management by visiting teams of VA personnel and physicians review of reports. Annually the homes were inspected by the VA for conformity to standards. Veterans in these homes must have had a period of VA hospitalization immediately prior to placement.

Limitations

The sample for the nursing home study was limited to 82 patients in one hospital based NHCU and six contract facilities in the New York area. Nationally, one would expect some geographic and institutional variation. Therefore, larger and more diverse samples would be desirable but were not within the scope of this study.

Due to statutory restrictions imposed on the eligibility process, data were generated by date of application for admission; not by a randomized method. Also ideally the study would have been carried out using more than a single investigator and conducting interrater reliability to reduce any propensity towards systematic bias.

Although patients were studied longitudinally the duration of the study was necessarily limited. The most robust analysis of outcome would involve following patients for the totality of their institutional experience. Likewise, the ultimate outcome rather than an artificially truncated outcome at seven months would be preferable. The costs involved in this type of complete design account in part for the paucity of longitudinal nursing home studies.

Finally, although the data analyses were largely quantitative, the study was primarily exploratory.

Organization of the Study

Chapter 1 introduced the problem area and theoretical model, outlined the need and justification for this study and stated its purpose, hypothesis, definition of terms and its major limitations.

Chapter 2 contains the literature review which is organized according to the theoretical model and study variables.

Chapter 3 details the study design, sample and sampling procedures, independent, dependent and comparison variables, instrumentation, and statistical analyses.

Chapter 4 presents descriptive and inferential statistical findings, the analysis of the data and their statistical significance.

Chapter 5 elaborates upon the statistical findings, presents overall impressions from the data including a synoptic restatement of purpose, pertinent theoretical literature, and methodology, summary of findings and discussion and recommendations.

CHAPTER 2

Review of the Related Literature

Introduction

The literature was reviewed using the Andersen framework as applied to nursing home utilization. Predisposing factors under this model included sociodemographic characteristics of age, race, marital status, living arrangements and social supports. Enabling factors are those which facilitate or impede the use of health care services. The main enabling factors for nursing home use were income, health insurance coverage and cost sharing, statutory eligibility, type of nursing home (i.e., hospital-based NHCU or freestanding contract care) and referral source. Need, as conceived in the Andersen model, relates primarily to health status and degree of disability. Such variables may be measured objectively, subjectively or both. The present investigation focused on presumed need arising from cognitive and functional disability, self perceived health, and diagnostic groups. Education was assessed only in order to correctly interpret mental status scores, which were adjusted for educational level.

Health service use was the outcome as determined by location of placement at seven months. Rehospitalization rates, and their effect on actual nursing home length of stay were also analyzed along with changes in functional and mental status, and self perceptions.

There were four structural comparison variables: nursing home size, that is the number of operating beds, nursing staffing ratios (i.e., proportion of full time employee equivalents to operating beds), use of per diem nurses and type of therapies available.

Predisposing Factors

Simple cross-sectional studies have concluded that only 5% of the elderly

reside in nursing homes at any one time. This conservative estimate has many times been disputed. Kastenbaum and Candy (1973) used death certificates' data to measure frequency of nursing home placement. By determining location at death, they concluded that 23% of Americans died in nursing homes. Others using longitudinal and extrapolative designs also placed the risk between 20-26% (Palmore, 1976; Rosenberg & Short, 1983) and as high as the 40% range (Vicente. Wiley & Carrington, 1979; McConnel, 1984).

Several sociodemographic and social factors are known to be associated with nursing home placement. Findings from the most currently available National Nursing Home Survey (NNHS, 1977) (NCHS, 1979) depict the typical nursing home resident as white, female and 80 years of age or older. Factors additional to race, sex and advanced age are weak or absent social supports (e.g.. children, relatives, friends), living alone, and being unmarried (Kraus et al.. 1976; Palmore, 1976; Vincente, Wiley & Carrington, 1979; Capitman, 1984).

Greenberg and Ginn (1979) studied these same sociodemographic characteristics as well as preferences for care and major medical and functional dimensions. They found that sex, marital status, help from relatives, client and family preference, ability to perform self care, take medications, make decisions, manage income, and the number of medical condition were significant as predictors of nursing home placement ($\underline{N}$ = 266, $\underline{R}^2$ = .68, $\underline{p}$ < .001).

Some investigators report findings contradictory to the aforementioned. Branch and Jette (1982), using interview techniques and a sample ($\underline{N}$ = 825) from the first and third waves of the Massachusetts Health Care Panel Study (1974-1980), found older age and living alone to be related to risk of institutionalization. However, those who were widowed and those without close relatives were not more at risk than those who were not without social supports. Likewise, Lamont et al. (1983) found race, marital status and sex had little

effect on nursing home placement. Possibly a study by Wachtel et al. (1984) explains the different findings. For men, a spouse reduced the potential of institutional placement, for women a spouse did not, and relatives (generally a child) did not influence the need for nursing home care as did a spouse.

VA patients are predominantly male. Beyond this obvious difference, several other characteristics distinguish them from the nursing home population in general. Annual patient census data for veterans in hospital based NHCUs ($\underline{n}$ = 7400) were compared with 1977 NNHS profiles (VA, 1982). VA nursing home patients were found to be younger (i.e., 55-64 years old) on average with only 4 out of 5 being 75 years or older versus the NNHS group where 4 out of 10 were 75 or above (NCHS, 1979; VA). VA, NHCU patients were more often married, single, separated or divorced (i.e., 36% v. 30%, 27% v. 17% and 20% v. 9% respectively) and widowed less than one-half of the NNHS group (i.e., 17% v. 44%) (NCHS; VA).

Since VA contract nursing home patients are not routinely included in VA surveys, information about them is incomplete. A descriptive study of both program participants ($\underline{n}$ = 33 NHCU patients and $\underline{n}$ = 68 contract patients) found few differences (Sheehy, 1984). The samples, created from a systematic selection of alphabetized lists showed that the majority of both NHCU and contract veterans were married, in their mid-sixties, evenly distributed between black and white, and between service and non-service connected status.

Enabling Factors

One can assume that not merely income, but also the nature of health care coverage affect the amount and type of care that can be made available. One might also speculate that these serve two purposes in regard to nursing home care. They may forestall placement by the ability to purchase sufficient home care services for lengthy periods (Liu & Mossey, 1980). Further, they may enhance discharge potential by making it possible to secure help in the home following nursing home stays.

Findings concerning income are inexact; some indicate that financial inadequacy reduces access to care (Palmore, 1976; Lamont et al., 1983) while others find that lower income is associated with nursing home placement (Kraus et al., 1976). To the extent that Medicare and Medicaid act as proxy measures for income levels (i.e., one must be medically indigent in order to qualify for Medicaid), they have also been used as indicators of financial preparedness, especially for nursing home care.

Medicare as a payment source has been associated with short nursing home stays and Medicaid with long lengths of stay (Liu & Palesch, 1981; Liu & Manton, 1984; Liu & Manton, 1981). As one stays longer in nursing homes, resources tend to be depleted and the nature of the care and population become different. Liu and Manton (1984) report that the 1977 NNHS data indicate Medicare patients constituted 17% of admissions but only 3% of total days; Medicaid patients represented 32% of total days.

The effect of Medicare and Medicaid benefits on utilization of veterans' facilities has been studied primarily in relation to hospital use. A mail survey of 11,558 veterans (responses rate = 83.5%) found the most frequent reason for not using the VA was that the veteran had other adequate hospital coverage (VA, 1980a). Of those who used VA hospitals, 46% of all veterans and 55% of service connected veterans had no other health insurance (e.g., private, CHAMPUS, Medicare, Medicaid) and two-thirds had annual incomes under $10,000 (VA).

Another study found that veterans using VA care were more likely to be service connected, poor, less educated, in poorer health, with more mental problems and elderly (Horgan, Taylor & Wilensky, 1983). Most elderly veterans were covered by Medicare, two-thirds also had private insurance, and having both reduced the likelihood of seeking VA care (Horgan et al., 1983; VA, 1983). As before, these findings apply to hospital services. However, Medicare only

covers a small part of nursing home care, private insurance rarely covers the cost and Medicaid benefits vary by state and individual. Therefore, "given the lack of coverage for nursing home care, the VA may well experience a larger increase in demand for this type of service" (Horgan et al., 1983, p. 84).

Noting that there were different lengths of nursing home stay between Medicare and Medicaid patients and observing that some facilities were more expensive than others, investigators were led to explore differences based on both type of coverage and setting. Percentage of Medicare and Medicaid patients and associated patient days have been used as surrogate measures of patient complexity (i.e., casemix) for nursing home patients. The types of setting which suggest differences are hospital-based and freestanding.

Differences between types of settings have been found for outpatient departments versus private practice (Lion & Altman, 1982; Lion, Malbon, Henderson & Friedman, 1985) and renal patients (Plough, Salem, Shwartz, Weller & Ferguson, 1984). Lion and Altman found slight evidence of a difference in patients seen in hospital outpatient departments and those seen in private practice by physicians (i.e., the former were 5-15% sicker as measured by diagnoses, procedures and tests). In a similar study, Lion et al. (1985) concluded that important cost differences were attributable to diagnoses, specialty and size of setting. Comparing renal patients in 29 hospital-based and 5 freestanding treatment facilities, Pough et al. (1984) found the hospital-based group had a more severe casemix ($\underline{N}$ = 3135, $\underline{p} \geq .02$).

Shaughnessy, Schlenker, Brown and Yslas (1983) studied the differences between 19 hospital-based and 138 freestanding facilities in Colorado. They found that the hospital-based patients were older and more confused, had drug or alcohol backgrounds more frequently, needed more skilled nursing services, but had less incontinence than those in freestanding settings. Although this study

covered a two year period, it was based on four secondary data sources and entirely Medicaid samples. It also used very broad casemix measures which revealed little change (Shaughnessy et al., 1983).

A second study (Schlenker, Shaughnessy & Yslas, 1983; Schlenker and Shaughnessy, 1984) was conducted using 157 facilities for secondary data but with the advantage of collecting primary randomized data from 74 of these. Medicaid patients in hospital-based nursing homes were more functionally dependent in activities of daily living (ADL) and had more psychosocial and mental problems (Schlenker et al., 1983; Schlenker & Shaughnessy, 1984). Better data collection techniques seem to have clarified the previous findings.

Casemix accounted for variation in nursing costs ($\underline{R}^2$ = .33) and total costs ($\underline{R}^2$ = .25) in freestanding facilities, and for hospital-based and freestanding combined, the nursing and total costs explained were $\underline{R}^2$ = .43 and .45 respectively (Schlenker et al., 1983; Schlenker & Shaughnessy, 1984). Certain facility characteristics such as ownership, percent nursing pool use and percent Medicaid patients also contributed to the variance. Based on two tailed tests, casemix plus the hospital-based indicator explained 47.5% of nursing costs ($\underline{t}$ = 2.86, $\underline{p}$ < .001) and almost 63% of total costs ($\underline{t}$ = 6.59, $\underline{p}$ < .001) (Schlenker et al., 1983; Schlenker & Shaughnessy, 1984).

Building on the experience and findings of the previous work, Shaughnessy, Kramer, Schlenker and Polesovsky (1985) expanded the sample beyond Colorado to six states, and used Medicare as well as Medicaid subjects. Facilities included were hospital-based ($\underline{n}$ = 370 patients) and freestanding ($\underline{n}$ = 386 patients), samples were randomized and groups were stratified as Medicare and non-Medicare.

Medicare patients were less dependent in Activities of Daily Living (ADL), had more medical (especially heart disease, neoplasms and stroke) and nursing problems (e.g., ostomies), significantly more surgical courses post hip fracture

(i.e., 43% v. 12%, p < .001) and greater potential for rehabilitation
(Shaughnessy et al., 1985). Non-Medicare patients had more psychosocial and
constipation and incontinence problems, more organic brain syndrome, more
sensory deficits and were considered more custodial.

When analyzed further by setting, the hospital-based Medicare patients were
less dependent in ADL, more similar to acute care patients than to freestanding
Medicare patients and slightly younger; they also had shorter lengths of stay. The
non-Medicare patients in the same setting had medical and nursing problems along
with more typical functional and custodial problems (Shaughnessy et al., 1985).

Medicare as a proxy for casemix, in conjunction with facility characteristics
then, consistently points out differences between hospital-based and freestanding
groups. Multivariate regression of costs using ownership, percent Medicare days,
admissions per bed, wage index, occupancy rate, chain membership and type of
nursing home setting explained a significant amount of total costs (R^2 = .54)
and routine operating costs (R^2 = .55) (Schieber, Weiner, Liu & Doty, 1985).
Hospital-based facilities are approximately twice as expensive as freestanding,
appear to serve a more complex restorative casemix and have higher percents of
Medicare days and turnover (Schieber et al., 1985; Weiner, Liu & Schieber, 1986;
Sulvetta & Holahan, 1986).

Increasingly, more direct assessment of casemix has been pursued. Studies
which use such measures as rating scales to determine casemix differences
between the two settings support the findings of those which employ proxies
(Ullman, 1984; Shaughnessy et al., 1985). Ullman applied regression techniques
to data on 386 skilled nursing facilities. Patient data were derived from
nursing home, prescreening placement forms and reported along with other
facility characteristics for 1976. Placement forms included ADL, continence,
ambulation and mental status rankings, sensory problems and required procedures.

All variables together explained 66% of the variation in the higher cost per day for hospital-based facilities. Interquartile and average score casemix variables were significant (t = -2.6008; t = 2.2217) (Ullman).

Two additional studies merit special mention. The first is the 1986, Virginia Center on Aging (COA) Study. This well designed and rigorously executed project was commissioned to answer several questions about Virginia Medicaid patients. As part of the study, a subsample of skilled care patients was compared to the intermediate care patients. The researchers found skilled and intermediate patients to be essentially the same in ADL and continence needs; the sample differed most on specialized care (COA, 1986).

The COA authors further suggest that the groups could be collapsed into one cohort for modeling purposes. This local finding supports the work of Shaughnessy et al. (1985). The latter study concluded that when facility type was accounted for, Medicare (i.e., skilled) patients in freestanding homes have more traditional custodial care problems.

The second study explored the costs to private paying patients, of nursing home care. Liu & Mossey, (1980) found that those paying for nursing home care with personal funds were extremely ADL dependent and paid higher rates. This higher need level may have been due to the ability to delay nursing home care via payment for home care services (Liu & Mossey). The higher cost may have been due in part to this or represent a way of recouping heavy care costs for publicly subsidized patients whose reimbursement was fixed.

Cost sharing represents an additional function of health insurance coverage which includes such fees as copayments, coinsurance, deductibles, exclusions and benefit limits. To the extent that Medicare imposes a limit on benefit days and both Medicare and Medicaid do not provide total payment for care, nursing homes do engage in cost sharing strategies. Likewise, the VA contract program versus

the NHCU unlimited one, represents a form of restriction for payment of benefits. However, the effect of the levy in relationship to clinical need has not been systematically analyzed in any of the nursing home settings. Studies to date have largely focused on the cost of providing care as opposed to the cost of purchasing care.

Several factors contribute to the difficulty of assessing the effect of cost sharing in nursing homes. First, like private insurance, public insurance subsidies which cover a bulk of the care are likely to mitigate utilization rates. Second and conversely, nursing home use may be less discretionary for consumers than some other health services (e.g., physician visits). Third, nursing home populations have a complex pattern of hospitalization during their institutionalization. Readmissions to hospital may reestablish benefit periods and confound true length of stay. Fourth, bed availability may raise or lower demand for care unrelated to need.

For all of these reasons, there is virtually no information concerning the effect of cost sharing on nursing home utilization. Therefore, inferences must be drawn from that which has been studied for other health care settings. Most investigations involve varying the degree of cost borne by users in relationship to use of physician and hospital services.

Scheffler (1984) took advantage of a naturally occurring experiment when United Mine Workers changed its full coverage health care program by the introduction of cost sharing. A 40% coinsurance fee for physician and hospital services and a $250 inpatient deductible were instituted. The maximum liability per family was $500. Excluding Medicare eligibles and recipients, Scheffler compared utilization rates for 5 months prior and 5 months during copayment requirements (N = 2,600 families).

Results from the Scheffler study (1984) indicated a significant reduction in physician services ($\underline{R}^2$ = -.153, $\underline{t}$ = -9.88) and hospital admissions ($\underline{R}^2$ = -.03, $\underline{t}$ = 5.09). A reduction in number of hospital admissions was accompanied by a one day increase in length of stay supposing a more intensive course (Scheffler). Newhouse et al. (1981) pose a disadvantage of cost sharing as being the possibility that raising costs may incline people to delay seeking care. This may suggest that patients who ultimately seek care after deferring, are sicker.

Enterline, Salter, A.D. McDonald and J.C. McDonald (1973) studied physician visits before and after the introduction of a (governmental) comprehensive health insurance program in Quebec. Although they found no overall change in visits such as an escalation in number following free coverage, they did observe different distributions. Lower income groups increased health seeking behaviors (i.e., visits) and the proportion of symptoms increased from 62% to 73% (Enterline et al., 1973). Since the reasons for seeking care were not trivial, the conclusion was drawn that lack of coverage had been preventing access. Annual income did rise during the course of the study but it was believed that this did not affect findings (Enterline et al.).

In addition to studying the effects of copayments, Beck and Horne (1980) tried to determine whether effects, if any, were sustained. They analyzed a 24 month precopayment period, a 40 month period during copayment and the 29 months post copayment introduction. The copayment amount was equal to 33% of the cost for physician, emergency or outpatient visit and 6% of a hospital inpatient stay.

They found that utilization of physician services declined 5.66% during the copayment interval but found no evidence that hospital use was reduced. This finding may be due to the fact that the 6% copayment was so low as to not

present a burden. The percentage translated into $2.50 per day for the first 30 days and $1.50 maximum for each day thereafter. Length of hospital stay as a measure of rebound effect post copayment, showed no consistent increase (Beck & Horne).

Scitovsky and Snyder (1972) studied the effects of a 25% coinsurance provisions on the use of physician services. Physician services were available as part of a comprehensive prepaid plan offered to University of Stanford employees. Data were analyzed for the year preceding copayment (1966) and for the first full year after the change (1968).

Subjects were stratified by age, sex and occupation. Three occupational categories were used as proxy measures for income: faculty, other professions and non-professional staff. Findings revealed a substantial reduction in per capita physician visits of 24.1%. Any change greater than 3.6% was significant with 95% confidence intervals. Notably, the proxy variable of non-professional indicated that the lower income group reacted more strongly to coinsurance as evidenced by their decreased rates of physician utilization. A caution should be made concerning the sample at large. Comparison of utilization by Stanford enrolees against another group health plan for 1966 suggested the former to be heavier users (Scitovsky & Snyder).

Phelps and Newhouse (1972), using the same Stanford data, analyzed these differently by converting the continuous explanatory variables to intervals. "The advantage of this approach is that one does not have to assume... that each year or mile (or whatever) adds the same number of visits" (Phelps & Newhouse, 1972, p. 20).

Even with different methods, Phelps and Newhouse (1972) drew conclusions similar to Scitovsky and Snyder (1972). They also detected that female dependents of subscribers were the most sensitive to change due to their lower time costs (i.e., better coverage would increase visits (Phelps & Newhouse).

A follow-up study was done (Scitovsky & McCall. 1977) to ascertain the "staying power" of the coinsurance rate. No upward trend was found as much as 4 years later. The evidence for a discriminating effect on low income groups was more pronounced. Beyond decreased physician visits. low income subscribers had declined one-third from 1966-1968 and by 1972 were only one-fourth of subscribers (Scitovsky & McCall). It is worth mentioning that premiums had also been raised 6-8% and this too may have made the plan less attractive to those with lower incomes.

To date. the only controlled trial of the effect of cost sharing is that by Newhouse et al. (1981). The study involved 7.706 randomly selected families from six areas of the country. Subjects were assigned to one of several health insurance plans. The copayment of the plans varied on two dimensions: the coinsurance rate and the maximum dollar expenditure. The coinsurance portions were 25%. 50%. 95% or none. The maximum dollar expenditure was 5%. 10% or 15% depending on family income but not to exceed $1.000. For example. under the 25% coinsurance. one would pay one-fourth of medical expenses. such that by $4.000 worth of bills. a cap of $1.000 would have been reached (Newhouse et al.).

Interim results indicate that lower income families are not more sensitive to price change when the charges are adjusted to income (Newhouse et al.. 1981). Full coverage lends to people using more services but these tentative conclusions do not clarify whether higher use is over-utilization or less use is due to greater cost sharing (Newhouse et al.).

The only parallel that can be put forth for VA patients concerns the effect of other insurance plans on VA hospital use. Using 1978 data from a National Survey of Veterans. Page (1982) found that veterans with Medicare or Medicaid were less likely to use the VA as a source of hospital care. Age. service connected status. income and insurance all had significant effects on choice of

hospital (χ^2 = 4.88, 2 df, p = .09 and χ^2 = 46.13, 53.81, 68.47, df = 1,
p < .0001 respectively). Age and health insurance acted independently of one
another. Those persons over 65 chose VA hospitals less often than those 45-64
years of age and those with health insurance were 4.5 times more likely to go
to a non-VA hospital (Page).

As previously cited, Horgan et al. (1983) also found that most elderly
veterans were covered by Medicare and two-thirds had private insurance. Having
both of these reduced the likelihood of seeking VA care.

The last enabling factor in the applied Andersen model is the referral source.
The majority of subjects for this study enter the nursing home programs via the
hospital. The variable was added for descriptive purposes, should there be
differences observed for the few who come from other settings. Only a few
brief statements will be made about the variation in patient type and outcome
that may be attributable to referral sources.

Capitman (1984) found some differences in patient characteristics among
elderly screened for nursing home placement. Those assessed in hospitals were
more likely to have bowel incontinence, ambulation problems and ADL and IADL
disabilities. Those assessed in the community were more likely to have sensory
problems, particularly visual and auditory (Capitman). Kane, Matthias and Sampson
(1983b) found previous nursing home residence to be related to outcome. About 49%
of those admitted to the hospital from a nursing home returned to one; only 6% of
those admitted from their own home went to a nursing home (Kane et al., 1983b).

<div align="center">Need Factors</div>

For the proposed study, indicators of need include patients' perceptions of
their health, functional and mental status, and diseases. The literature on
functional and mental status is outlined in this section and elaborated upon at
great length under the review of health service use. Although disease entities

alone have not been found to be highly predictive of resource use in nursing homes, in conjunction with more functionally oriented measures, they have meaning. Most studies identify similar categories of disease. Any discrepancies in disease specific findings are probably due to aggregation of types and levels of patients. Further, not only the nature of the disease but the degree of comorbidity (i.e., the number of concurrent diseases) seems to have relevance for nursing home patients.

Numerous authors have found limitations in activities of daily living (ADL) to be associated with nursing home patients (Greenberg & Ginn, 1979; Kraus et al., 1976). Restrictions in instrumental activities of daily living (IADL) have also been found due to functional and cognitive impairment (Greenberg & Ginn; Branch & Jette, 1982). The degree of disability may vary from being bedfast (Liu & Manton, 1983a; Sulvetta & Holahan, 1986) to performing minimally on personal care management and mobility (Granger et al., 1975). Upon entry to the nursing home, Granger found the median Barthel score of patients to be 30 out of 100.

Loss of even basic functions is probable among nursing home patients. Loss of bowel and bladder control and sensory deficits are common (Kraus et al., 1976; Liu & Manton, 1983; Capitman, 1984a). Hospital-based nursing home patients were found to have significantly more physical impairments and higher percentages of persons requiring assistance in eating and ambulation, while freestanding home patients had more incontinence (α = .05) (Sulvetta & Holahan, 1986). Mental confusion is frequent among these patients (Kraus et al., 1976; NCHS, 1979; Greenberg & Ginn, 1979; Liu & Palesch, 1981; Lamont et al., 1983; Kane, Matthias & Sampson, 1983b; Wachtel, Derby & Fulton, 1984). Again, comparing hospital-based homes to freestanding ones, Sulvetta and Holahan found the latter to have more mentally impaired patients.

VA patients have been found to be less dependent than males in the 1977 NNHS in bathing, dressing, transferring, eating, toileting and continence (VA. 1982; NCHS, 1979). The VA had twice the percentage of patients in the first three categories (i.e., bathing, dressing and transferring) versus the NNHS group which demonstrated more dependence in toileting and continence (VA; NCHS).

Cerebrovascular and heart disease, strokes, fractures, amputations, diabetes and dementing illnesses are common among nursing home patients (Kraus et al., 1976; Greenberg & Ginn, 1979; Kane, Matthias & Sampson, 1983b; Wachtel, Derby & Fulton, 1984) found mental and nervous problems and respiratory disorders to be important predictors of institutionalization for men, and mental and musculoskeletal conditions to be more associated with women. The 1977 NNHS found atherosclerosis. stroke and dementia to account for 40% of primary diagnoses at admission and most had multiple chronic conditions (NCHS, 1979).

Cancer was not among those diagnoses most often attributed to nursing home patients. This may be due to the fact that they constitute part of the very brief stayers who die in the short time, and hence are not accurately represented in most cross-sectional studies.

Compared to the NNHS (1977) population which has a majority of neurological and general medical surgical problems, VA NHCU patients have a larger proportion of mental disorders (VA, 1982; NCHS, 1979). However, in the pilot work on one VA NHCU in Richmond (Sheehy, 1984), these patients were found to   have a greater number of neurologic diseases; contract nursing home patients had more mental disorders of the dementing type.

Perceptions of health undoubtedly influence one's view of the future and its opportunities or obstacles. Perceptions may contribute to motivation and their greatest importance may be in how they relate to consequences (J. Hendricks & C.D. Hendricks, 1977). "The subjective belief that one is healthy or ill may be

more important than the actual medical status in predicting an individual's general emotional state and behavior" (Maddox & Douglass, 1974, p. 56).

Further, there is evidence that self report or perception captures an additional dimension of health status. Wolinsky, Coe, Miller and Prendergast (1984) examined the relationship among seven measures of health status using factor analysis techniques. Factors included perceptual, functional and mental measures. These resulted in a perceptual or global cluster and a functional cluster. They found little correlation between the two domains ($r = .37$) and one dimension explained less than 14% of the variance of the other (Wolinsky et al., 1984).

The findings suggest that perceptions measure a distinct aspect of health, that both are needed for a comprehensive assessment of health and using one as a proxy for the other leads to loss of information (Wolinsky et al., 1984). Self-perceived status and ADL measures had the highest factor loadings (i.e., -.73 and -.74 respectively) (Wolinsky et al.).

Heyman and Jeffers (1963) studied a representative sample of community volunteers who were part of the Duke University Interdisciplinary Research Program. Of the original 256 subjects, 182 were available for a follow up 3 years later. Objective measure of physical exam and diagnostic and laboratory data were compared to participants' self perceived health (SPH). Significant relationships were found at both times (i.e., initial $\chi^2 = 2.26$, df $= 1$, $p < .05$ and 3 year $\chi^2 = 17.85$, df $= 1$, $p < .001$) (Heyman & Jeffers).

Additional validity was concluded from associations between ratings and outcomes. Of those classified by physicians as being in good health, only 7.6% died between exams; of those classified as poor, 39.4% died (Heyman & Jeffers, 1963). The same was true for SPH. Those who described their health as good or excellent had only 8.8% deaths; of those rating themselves as fair or poor, 28.9%

died. Functioning and perceptions remained stable over time (i.e., those who were high remained high and those who were low remained so) (Heyman & Jeffers).

Self perceived health was studied by Tissue (1972) on 256 aged welfare recipients. He found good health perceptions to be associated with one's health having remained stable ($x^2 = .776$), one's health being perceived as superior to age peers ($x^2 = .772$) and that one's health was not a source of worry ($x^2 = .726$) (all results reported with 2df, $p < .001$). Functional capacity (-.661) and number of reported health problems (-.504) showed the next strongest relationships (Tissue).

Maddox and Douglass (1973; 1974) conducted a 15 year longitudinal study of noninstitutionalized elderly 60 years and older. Of the 83 available for follow up, self and physician ratings of health were largely consistent. Age and race had no significant effect upon the relationship between objective and subjective measures. At times when patients experienced physical declines, there was a tendency to overestimate health compared to the physician rating (Maddox & Douglass).

Palmore & Luikart (1972) studied multiple variables thought to affect life satisfaction including self perceived health. Again on the community sample from the Duke Study, he found that self rated health showed the strongest relationship to life satisfaction. The zero order correlation was twice that of any other independent variable and accounted for almost two-thirds of the variance. Further, the person's perception of health was more important than the physicians' rating as reflected in the performance status rating. Three-fourths of the ratings were in close agreement with the physicians (Palmore & Luikart). The age range of the group ($N = 502$) was 45-69 years.

Although age appears not to affect self perceptions in the sense of negative age stereotypes, the very old seem to report health in extremely optimistic terms.

Maddox and Douglass (1974) surmise that this is because they represent a physically and psychologically elite group.

B.S. Linn and M.W. Linn (1980) evaluated a random sample of 286 elderly living in the community. They found that more of the very old than the old reported good health (i.e., 79% v. 68%) and the former had no more pathology and even took less medication. Poor self assessed health was always associated with higher levels of functional incapacity. Problems associated with perceiving one's health as poor were heart conditions, stroke, arthritis, nervous conditions and skin problems (B.S. Linn & M.W. Linn).

Ferraro (1980) found similar results. Disability, number of illnesses, education, sex and age explained about 41% of the variance in self perceived health. Those who reported more disability and greater number of illnesses reported poorer health, and males reported poorer health than females. Older persons reported better health and again. the old-old (i.e.. 75 years and older) report more illness and disability and continue to perceive health more positively (Ferraro).

Those with higher levels of education report their health as better than that reported by persons with less education (Ferraro). A similar association was found by Palmore and Luikart (1972). Among younger and middle age men, higher education was related to being considered healthier. Being more knowledgeable may induce one to engage in better health practices or healthier lifestyles.

Even in a nursing home setting. perceptions of well being have been found. Despite the fact that 76.3% had relatively severe physical limitations. 43% rated their health as good and 33% regarded their health as fair (Schwirian, 1982). The author notes that all were fully alert and oriented and two-thirds were considered ambulatory. This suggests two explanations for the optimistic

perceptions despite severe limitations. First, the problems did not apparently adversely affect functional ability (i.e., mobility). Second, having one's mental facilities is generally considered a sign that one is still healthy.

Two studies do report tendencies to underestimate health compared to objective determination of health status. Nelson et al. (1983) found that patients were three times more likely to claim greater limitation than the physician would assess. Harris, Jette, Campion and Cleary (1986) also had similar findings. In their study of 47 elderly patients post hip fracture, validity coefficients were high between observed ADL performance and self report of ability (i.e., .77-.95). However, where the two measures differed, the subjects performed at higher levels than they reported (Harris et al., 1986). One might suspect learned helplessness. One study offers an explanation for underreporting by elderly men as a defensive denial about approaching death (McCrae, Bartone & Costa, 1976).

Health Service Use

Nursing homes have been studied qualitatively along dimensions of structure and process. Structural dimensions include such factors as nursing home size, and are related to quality of life and care (Penchansky & Taubenhaus, 1965; Tobin, 1974; Kart & Manard, 1976; Riportella-Muller & Slesinger, 1982). Other considerations are patient-to-staff ratios and organizational characteristics (Linn, 1966; Greenwald & Linn, 1971; Linn, 1974; Gottesman & Bourestom, 1974; Epstein, 1981). Process measures take into account conformance to standards and regulatory codes, and ratings by consumers (Greenwald & Linn, 1971; Levey, Ruchlin, Stotsky, Kinloch & Oppenheim, 1973; Linn, 1974; Stryker-Gordon, 1979; Riportella-Muller & Slesinger, 1982).

Exploration of structural characteristics of nursing homes has proven to be of limited practical value. Nursing home size, for example, may not be amenable to change. Furthermore, findings on the beneficial effects of various sizes are contradictory. Studies favoring larger homes may be interpreted to imply that smaller ones are not consistent with economies of scale, whereas those favoring smaller homes suggest increased quality in personal attention. Process measures, while generally more objective, often aim at basic, minimal requirements rather than quality of care. Such areas as these are also elusive and difficult to quantify. Neither approach has provided much useful information on determinants of successful outcome.

Current interest is therefore directed towards factors predicting clinical progress of patients (i.e., intermediate levels of goal achievement) and ultimate outcome. Study variables have been chosen for their possible explanatory value in the elucidation of these more quantitative features.

During the decade of 1970, attempts were made to track and predict nursing home patients' outcomes. Goldfarb (1969) studied (N = 1,280) a representative sample of those over 65 residing in three institutional settings: voluntary homes for the aged, proprietary nursing homes and state hospitals. The predictive value of physical health, functional capacity and psychological/mental status were assessed for their effect on longevity. Marked physical dependency, incontinence and loss of mental abilities were associated with the highest one year mortality. Differences in mortality rates among settings were found but may have been a result of different environments or the fact that impairment measurements were not refined (Goldfarb).

Jones, Densen and McNitt (1978) followed 1,534 patients newly admitted to seven nursing homes until discharge or for two years. Standardized classification instruments were used and reliability of the collection procedure was established.

Findings revealed the sample to be demographically similar to that of the 1977 NNHS. Of those persons admitted. 12% were discharged prior to the two-week assessment. 70% of these died in the nursing home or were sent to an acute hospital. and half of these returned to hospital subsequently died. Within 6 weeks. of the 481 whose initial assessments showed need for help in six ADL areas. 23% had died. 71% stayed dependent and 29% had improved to some extent. Baseline ADL was predictive of discharge. mortality rates varied inversely with functional status. change in functional status was common. and greater independence in ADLs was associated with discharge home (Jones et al.. 1978).

The most frequently encountered diagnoses were diseases of the heart and circulatory system. hip fractures. stroke. diabetes and arthritis. Probability of death was increased for cancers and as number of medical conditions rose. A modified life table. applied to determine probability of survival. found the 6 month death rate to be 32% (Jones et al.. 1978).

Others have found similarly high death rates by accounting for nursing home patient deaths which occur in the hospital. A 9 year retrospective study of 'Alameda County California residents aged 55 and over found that one-fourth of those who had been institutionalized died in other than the nursing home; usually an acute care hospital (Vicente. Wiley & Carrington. 1979). Only 22% went home before dying or were transferred to another level of care (Vincente et al., 1979).

Liu and Manton used data subsets from the 1977 NNHS to create synthetic admission cohorts (1983a. 1984) and to extrapolate length of stay and probability of discharge (1983b). According to their estimates. overall 30% of admissions were discharged alive to community residence. another 28% died in the facility and 7% were placed at another facility and died (Liu & Manton. 1984). Roughly one-third were discharged in 30 days or less. 48-56% could be expected to be

discharged within 90 days and three-fourths within 360 days, but only 8% of those

staying longer than one year would ever return to community placement (Liu &

Manton, 1983b, 1984). Those more disabled, with incontinence and cancer had the

worst prognoses (Liu & Manton, 1983a, 1984). These figures, utilizing the

admission cohort suggest that short term rehabilitation and possibly terminal

care patients constitute the bulk of the movement, while custodial care

contributes to length of stay. Nonetheless the discharge rates seem optimistic

compared to other studies employing more direct outcome measures.

Using the same NNHS data, Manheim and Hughes (1986) observed that the

institutionalized elderly have high mortality in nursing homes and tend not to

return to the community except for short stays.

Between 1980 and 1982 (N = 563) patients discharged to 24 stratified and

randomly selected skilled nursing homes were analyzed for immediate and

subsequent outcomes (Lewis, Kane, Cretin & Clark, 1985a). Information sources

included records and telephone contacts but no direct observation. Within a

brief (but poorly specified) time, 30% died in the home, 28% were discharged home

or community, 7% went to another nursing home, 36% were readmitted to hospital

and 11% of these died there within 2 weeks. Ultimately, the vast majority had

either died or remained institutionalized and 21% were located in hospitals and

7% in their own homes. Age, sex and marital status were not related to

discharge; ability to pay, orientation, continence and better functional

performance were associated with discharge home as an immediate outcome. Many of

these variables predicted two year outcome with the exceptions that social

supports and ability to pay for care lost their predictive power, and mental

status, continence and hip fractures increased in predictive ability

(p < .05, ± 95% confidence intervals). Functional ability was the most

consistent predictor for immediate and ultimate outcomes (Lewis et al., 1985a).

Subsequent analysis of the same data (Lewis, Cretin, Kane, 1985b) emphasized the effects of rehospitalization. Of 197 who were traced for two years, 74 died quickly and 19 were alive after a single nursing home and hospital admission. Thirty-six patients remained alive and 68 died following multiple transfers between the two settings. Eliminating the 74 who died almost immediately, the remaining 123 had a complex, "ping pong" pattern between hospital and nursing home (Lewis et al., 1985b). Those transferred two or more times were 39%; 21% transferred four or more times. The multiple admission groups (i.e., with dichotomous outcomes of being dead or alive) were frail elderly, incontinent, confused, with poor functional status who succumbed at different times (χ^2 results significant at p = .05 and .001) (Lewis et al., 1985b).

Secondary and cross-sectional data sets have been used repeatedly to ascertain patient outcomes. Weissert and Scanlon (1985) divided nursing home destination into two groups: favorable and less favorable. The favorable group was defined as a private residence or community setting and less favorable included hospital, other nursing home or death. Community discharges were significantly younger (α = .05), married, less dependent, with fractures or respiratory disease, and non-Medicaid. Less favorable outcomes were demonstrated by the very old, lacking a spouse, with mental and functional impairment and cancers, and those receiving Medicaid (Weissert & Scanlon, 1985).

Using Tennessee Medicaid data, Lichtenstein, Federspiel and Schaffner (1985) strengthened the application of the secondary source by matching (N = 49 pairs) decedent-survivor pairs on age, race, sex, nursing home and diagnosis. There were no significant differences between groups for sensory disorders, marital status, number of children and previous living arrangement. Admission ADL level was a powerful predictor. Survivors were more independent in bathing, dressing, mobility and continence (Lichtenstein et al., 1985).

Most recently, there has been an effort to tie payment to incremental and ultimate outcomes. Two of the most prominent are the works of R. L. Kane, Bell, Hosek, Riegler and R.A. Kane (1983a), and Thorburn and Meiners (1986).

R.L. Kane, Bell, Hosek, Riegler and R.A. Kane (1983) conducted a prospective study of (N = 250) patients in four, Los Angeles Medicaid skilled nursing homes. They sought to predict patients' changes in function (i.e., scale scores) and status (i.e., outcome), and determine the feasibility of linking payment to these findings. The study was well designed, performed stringent reliability testing and used the SPMSQ (Pfeiffer, 1975) and a modified version of the Barthel (Mahoney & Barthel, 1965). Reliability coefficients for mental status (i.e., SPMSQ) and ADLs (Barthel instrument) were r = .89 and .80 respectively.

Status changes or outcomes were categorized as being discharged clinically better or worse. Additional categories were death as an outcome or discharge to another type of long-term care setting. In using scale scores to predict outcomes, neither ADL nor cognitive scores showed any relationship except to "discharge better" where these functions were positively associated within 3 months (p < .06). Recently admitted patients were more likely to have some sort of discharge status change, death rates stabilized and discharges decreased for those who remained longer, social supports showed no association to status changes and those with multiple diagnoses were more apt to die. Marital status, sex, number of children and siblings were not significant and age only showed a marginal association (p = .05) to leaving the home (Kane et al., 1983).

The predictive ability of clinicians was better for scale scores than for status changes. The model is a comprehensive scheme which has not been finalized as a prospective payment methodology.

The Thorburn and Meiners (1986) study represents another major demonstration and evaluation project. This paradigm (originally done by Weissert, Scanlon, Wan

& Skinner, 1983), evaluated the effects of incentive payments on admissions, discharges and outcome of patients. The study was based in San Diego and again used a longitudinal design of new admissions, but added the payment inducement as an intervention. Further, those homes receiving the financial incentive (i.e., the treatment group) were compared to another group where payments were made according to routine reimbursement procedures (Thorburn & Meiners).

Patient specific goal setting included admission incentives to encourage taking sicker patients and outcome incentives to target nursing services toward the improvement and/or resolution of pressure sores, tube feedings, ADL levels and musculoskeletal integrity. A third goal involved incentives to encourage discharge (Thorburn & Meiners, 1986).

There were no statistically significant differences in patient outcomes in terms of goal achievement between the experimental and control groups; goal achievement was approximately 30% for both. Both groups had similar numbers of heavy ADL patients. ADL goals were those most often pursued, most heavy ADL patients returned to the hospital or died, and few other patients qualified for the other goals (e.g., termination of nasagostric feeding, discharge) (Thorburn & Meiners).

The authors suggest that the absence of differences between groups may be due to the fact that the model is purely economic. It seems unlikely however, because the findings are similar to other studies in describing the very limited discharge potential and functional change possible in severely debilitated groups. These heavily dependent, high skill level types may become an increasing proportion of the nursing home population. Faster hospital outplacements with DRG's and more aggressive screening to assure appropriate placement may create a more clinically intensive population.

Focusing on VA nursing homes, some patient outcomes have been determined. Mitchell (1978) compared the health status outcomes of veterans ($\underline{N}$ = 318; $\bar{x}$ age = 65.5 years) discharged from hospitals to three different VA, long term vcare (LTC) programs: hospital based home care, contract nursing home care and hospital based NHCU care. A non-equivalent control group design was used (i.e., within each program type, patients were randomly selected from hospitals with all three LTC alternatives and those with only one).

Results from standardized instruments showed that patients improved most in home care, followed by NHCU, with the least progress being made in contract care (Mitchell, 1978). There was no significant difference in overall mortality among the three settings; alcohol, cancer, neurologic and respiratory diseases were the most common diagnoses. There was no significant difference found among groups by age, race or diagnoses and almost half of NHCU and contract patients lived with a spouse prior to hospitalization. However, considerable intraprogram variation was noted for initial levels of disability (Mitchell).

M.W. Linn et al. (1985) conducted a longitudinal study of psychiatric patients in eight VA medical centers in different states. Upon discharge, patients were randomly assigned to four locations: continued care on the same ward ($\underline{n}$ = 75; wards = 9), another psychiatric ward in the same hospital ($\underline{n}$ = 43), NHCU ($\underline{n}$ = 109; sides = 9) and contract nursing home ($\underline{n}$ = 146; homes = 52). Diagnoses were limited to schizophrenia and organic brain syndrome. Those with cancer or expected to die within 12 months were excluded, and this may represent a substantial portion of LTC patients. Attrition was minor: 93% and 89% completed 6 and 12 month follow-up respectively.

Those transferred to another psychiatric ward did the best and those who went to contract did the worst (M.W. Linn et al., 1985). At six months, physical functioning as measured by self care ability was worse in contract ($\underline{F}$ = 2.83,

$p = .04$) and better in the hospital and NHCU. At 12 months, contract and NHCU patients functioned less well ($\underline{F} = 2.98$, $p_1 = .03$) than those in the VA hospital. There was no significant difference in mortality among settings (M.W. Linn et al.).

A study of 1,000 veterans placed in 30 Florida contract nursing homes found that more than three-fourths needed assistance with dressing and grooming, more than half had some depression or confusion, and were bedbound for some part of the day, and had incontinence of bowel or bladder (M.W. Linn, Gurel & Linn, 1977). By the end of six months, 26% were discharged, 29% were still in the nursing home and 6% were rehospitalized. Of those discharged, 60% had improved in ADL; of those still institutionalized, 21% were improved and 14% deteriorated (M.W. Linn et al.).

In relationship to the 29% remaining at six months, 35% had returned for at least one hospitalization. Although not reported by the authors, it is possible that contract periods may have been reinitiated as a product of the hospital stay.

Finally, 30% died within six months, 30% of all deaths were within 30 days of placement and 97% died in the nursing home or immediately after transfer to hospital (M.W. Linn et al., 1977). The most frequent diagnoses were chronic brain syndrome (28%), stroke (21%), cancer (21%), arteriosclerotic heart disease (15%) and diabetes (14%), and more than a third had four or more diagnoses when originally placed (M.W. Linn et al.).

The National Academy of Science (NAS) report (1977) also indicates that few NHCU patients return to independent living or leave in fewer than five months. For FY 1975, 28% of discharges from NHCUs were attributable to deaths, 35% to VA hospitals and 33% to independent living (NAS). The same source reviewed contract nursing home programs at 15 VA medical centers and found evidence that clinicians manipulate contract benefit limits. At least some staff admitted to the practice or readmitting non-service connected veterans to VA hospitals to institute a new contract (NAS).

VA staff defended their behavior on the grounds that there was great difficulty in obtaining alternate funding such as Medicaid to continue nursing home coverage (NAS, 1977). They also expressed concerns about the effect of Medicaid conversion on the patient's spouse. These facts suggest two conclusions. First, the need for nursing home care extends beyond six months for an undetermined number of contract patients. Second, the ease or difficulty in securing Medicaid varies from state to state and so probably, the degree of machination by those involved in arranging care. VA expenditures for contract care decrease as per capita Medicaid expenditures increase and the converse is also true (NAS).

From the preceding it is apparent that there is a relationship between hospitalization of nursing home patients, and clinical progress, level of functioning and outcomes. The impact on nursing home length of stay, and for contract patients, their benefit periods, is less clear.

Gooding and Jette (1985) studied the 6 month hospital readmission rates of (N = 444) patients 65 years and older who had been admitted for cerebrovascular disease, fractures or congestive heart failure (CHF). More than one-half were female, under 75 years of age, and had three or more major secondary diagnoses.

The overall readmission rate was 24%. Almost 40% of CHF patients discharged home were readmitted to hospital within 6 months compared to only 20% of those discharged to secondary facilities (Gooding & Jette, 1985). There was variability in readmission rates by sex, length of stay (LOS), site of discharge and secondary diagnosis but age had no effect. The only difference by age was that different diagnostic groups had different age distributions. The LOS pattern was 1 week for 25% of the group, 3 weeks for another 25% and approximately 50% stayed 8-20 days (Gooding & Jette).

In a Canadian study, Robertson and Rockwood (1982) followed all patients 85 and older admitted to hospital. Nearly 60% were admitted from the community and 40% from a variety of extended care settings. Again females made up slightly more than half of the sample. Eighty percent had one admission during the year, 20% had more than one. Of those with more than one admission, 104 had two, 27 had three to five, and one had six admissions. The mean LOS of 18.8 days was similar to that of Gooding and Jette (1985). The hospital mortality was 13% and at one year follow up it was 21.6% (Robertson & Rockwood).

Several studies have been conducted specifically on nursing home patients. Gabow et al. (1985) did a prospective study of consecutive admissions to hospital of 96 nursing home residents, and 88 community elders with similar sociodemographic characteristics. The major diseases for both groups were cardiovascular and cerebrovascular disease, chronic obstructive pulmonary disease and diabetes; dementia was found in 33% of nursing home patients v. only 6% of the community sample. Nursing home patients had a larger number of preexisting conditions (Gabow et al.).

The reasons for admission of nursing home patients included altered mental status, fever, gastrointestinal symptoms, dehydration/anorexia, pneumonia and dyspnea in that order (Gabow et al., 1985). Altered mental status was rarely a reason among community admissions and nursing home patients more often had multiple reasons for admission (i.e., 72% v. 44%). The average LOS was significantly longer for nursing home patients by 36% (11.4 ± 9.4 v. 8.4 ± 7.8, $p < .025$), and more costly. Deaths during hospitalization were 27% for nursing home patients versus 11% for community admissions, 36% versus 20% at 6 months ($p < .005$), with combined mortality of 53% versus 29% (Gabow et al.).

Gordon, Kane and Rothenberg (1985) traced the course of hospital admissions ($\bar{x}$ age = 87.5, 4:1 female to male) from a 229 bed nursing home which offered

several levels of care. There was great variety in presenting symptoms and diagnoses. Most admissions were for respiratory symptoms, malaise or other signs of infection, and abdominal complaints. Unlike the findings of Gabow et al. (1985), dementia occurred less than 1% of the time. Urinary tract infection (UTI) was the most common reason for hospitalization (Gordon et al.). Shaughnessy et al. (1985) found the percentage of UTI to be almost twice as high in freestanding (19.7%) facilities as in hospital-based ones (8.9%) ($p = .014$).

Of 239 persons admitted, 116 were hospitalized only once, 53 twice and 5 patients had seven episodes (Gordon et al., 1985). Those over 85 years old accounted for 75% of the hospitalizations. The average LOS was 11.6 days with 25% having 9.14 days and 15% remaining 15-21 days (Gabow et al.).

Four variables were significant in predicting death within 6 months of hospitalization: age and onset of new problems during hospitalization ($p < .001$). and surgical procedures or diagnosis of acute myocardial infarction ($p < .05$) (Gordon et al., 1985). During first hospitalizations, 14% died and 19% survived but required higher levels of nursing home care. One year post hospitalization, 40% had died and 17% needed higher levels of care. The survival rate for those hospitalized once was 80% and dropped to 34% with two or more admissions (Gordon et al.).

Irvine, Van Buren and Crossley (1984) analyzed the hospitalization patterns of ($n = 128$) nursing home residents in comparison to those of elderly patients ($n = 320$) from an outpatient clinic. Their findings again are supportive of nursing home patients being fairly ill, with high incidence of infection, and a reasonably predictable LOS and mortality rate.

Although the age of clinic patients was nearly 10 years younger than those from nursing homes, both groups had LOS of 9-10 days (Irvine et al., 1984). However, more than twice the proportion of nursing home patients died during

hospitalization (11% v. 4%, p = .01), and more than one-half had been hospitalized more than once in the last year compared to 25% of the outpatient group. Nursing home patients were admitted significantly more often for pneumonia and UTI (27% v. 12%, p < .001) (Irvine et al.).

To recapitulate, VA patients have similar profiles for hospital stays while exhibiting some differences within the VA nursing home programs (M.W. Linn et al.. 1977; Mitchell, 1978; Sheehy, 1984; M.W. Linn et al.. 1985). A study of VA contract patients found that 35% had returned for at least one hospitalization and death was frequently the outcome either in hospital or immediately after transfer (M.W. Linn et al., 1977). In comparison to NHCU patients, VA contract patients were found to be more likely to deteriorate and be readmitted to the hospital (Mitchell, 1978). The hospitalization rates were twice as high (i.e.. 28.4% v. 10.3%) and a larger number of contract patients died in the nursing home without any readmission to hospital (Mitchell).

At six months, significant differences in hospitalization were found between NHCU and VA contract patients. Of the former, 62% were in hospital and for the latter, 80% were located there (χ^2 = 5.50, p < .02) (M.W. Linn et al.. 1985). Further, the cost of care was less by $3,000 for contract care, even when the cost of rehospitalization was factored into the price. In interpreting this finding, it should be noted that case-mix was not a part of the cost formula (i.e., the numbers used were based on per-diem costs rather than weighted. clinical need costs).

The VA pilot study had nearly identical findings. The number of episodes of rehospitalization was almost twice as high for contract patients as those of NHCU patients, and the number of hospital days was also substantially greater (Sheehy, 1984). As a proxy measure of illness level, contract patients appeared to be sicker or at least more medically labile.

Rehospitalization may seriously confound findings on nursing home length of stay (LOS). Limitations notwithstanding, some general statements can be made. First, nursing home patients are a heterogeneous population which can be broadly compartmentalized into those patients who stay a short time and those who stay for much longer periods. Second, these two groups have different characteristics. Third, there is a relationship between LOS and discharge.

Typical staging of length of stay (LOS) statistics is for 3 and 6 months, 1 year and 3 years. Between 25% (Liu & Palesch, 1981) and 50% of patients (Vicente et al., 1980-81; Liu & Manton, 1984) have a 3 month (or less) length of stay. Another 40-60% stay 6 months (Vicente et al., 1979, 1980-81). One third remain a year or longer (Vicente et al., 1980-81). Depending upon whether the data source is cross-sectional or a subset of discharges. LOS exceeding 3 years varies from 10% to 31% (NNHS, 1979; Liu & Palesch, 1981; Liu & Manton, 1984). The median LOS is 75-79 days (NCHS, 1979; Liu & Manton, 1983b).

Those patients who have a LOS less than 3 months (i.e., average of 1.8 months) are termed "short-stayers," and those who remain an average of 2.5 years are "long-stayers" (Keeler, Kane & Solomon, 1981). In contradistinction to reports of median stays, the nursing home population has been found to have a bimodal distribution around two means.

Short-stayers are more likely to be married, male, convalescing from an acute illness, referred from hospital and more frequently having diagnoses of fractures and cancer (Keeler et al., 1981). They predominate in admission and discharge statistics, representing 61% of discharges, but make up only 9% of the nursing home population. Long-stayers more often have mental disorders, are usually older and no longer able to live independently. They make up only 39% of discharges but constitute 91% of the nursing home population (Keeler et al.). These same findings have been described by Vicente et al. (1979). Liu and

Palesch (1981). and Liu and Manton (1983a. b). A large proportion of nursing home days is consumed by a relatively small number of patients (Liu & Manton. 1984).

Comparison of annual VA patient census data with that from the 1977 NNHS (NCHS). revealed that NHCU patients have longer lengths of stay than the national average (VA. 1982). The attained LOS for VA. NHCU patients is 3 years or longer; only 19% of the NNHS group had the same LOS (VA). Conversely. 39% of NNHS patients had attained LOS under 6 months whereas only 19% of VA. NHCU patients stayed this length of time (VA).

In the pilot study of veterans in Richmond nursing home (Sheehy. 1984). NHCU and contract groups were comparable for age. sex. race. marital status. diagnoses and income support as measured by pension data. Rehospitalization rates and lengths of stay differed. The NHCU had significantly longer LOS ($\underline{N}$ = 68. t = 2.73. α = .05). Episodes of hospitalization were associated with increased LOS but not enough to be statistically significant.

Staffing is the organizational characteristic most frequently examined in relationship to quality of care and patient welfare. Findings indicate some trends which may need to be considered in interpreting results of the proposed study. Beyond that. the effects of variation in staffing ratios are minimal. and numbers of staff have little predictive value for patient outcomes.

The major component of nursing home costs in 1977 was labor (60%) and the nursing staff to patient ratio as a national average was 41.4 full-time employees per 100 beds (NCHS. 1979). Higher costs of hospital based facilities have been found to be due in part to higher nursing and rehabilitation services (Wiener et al.. 1986). In one study. nursing home quality was judged to be poorer in homes which made greater use of staffing pools (Shaughnessy et al.. 1983). Hospital-based facilities were found to engage significantly fewer pool nurses

(n = 19, t = 1.89, p = .06) and also to have more staff available. Freestanding nursing home pool use was only 5% but this was still five times higher than hospital-based facilities (Shaughnessy et al.).

Two studies by the same investigator yielded different results. No significant difference was found among VA extended care settings in one (M.W. Linn et al.. 1985) and associations between RN staffing and patient survival. improvement and discharge were observed in another (M.W. Linn et al.. 1977). The National Academy of Science (1977) reported large variation in staffing adequacy for VA nursing home care units.

The literature deemed most relevant to the study area has been summarized in Chapter 2. Both confirmation of trends as well as some inconsistencies have been found depending upon the particular variable considered and/or study design. The following chapter puts forth the methodology.

CHAPTER 3

Methodology

Introduction

The major purpose of this investigation was to explore the incremental and seven month outcomes of nursing home patients. The study was organized according to the Andersen model and the design was prospective. Patients from one VA hospital based nursing home and six freestanding, VA contract community nursing homes were each followed prospectively for a seven month period. Functional and cognitive ability and self perceived health were analyzed along with socioeconomic and demographic data, and utilization patterns. A secondary purpose was to assess associations among variables and their interactive effects in predicting outcome. A third purpose was to assess the contribution of such independent variables as casemix and rehospitalization rates to anticipated differences between the two nursing home types. Statistical techniques included inferential and descriptive analyses. A strength of the study was the use of repeated measures over time to confirm multiple indices of need. The VA offered an advantage over other hospital based versus freestanding nursing home studies because patients could be easily tracked longitudinally, and the two program alternatives allowed some naturally occurring cost comparisons.

Sample Size

The sample was obtained from referrals for nursing home care submitted to the Bronx, Veterans Administration Medical Center. The design of the study was prospective and for this reason, there was a need to conclude data collection within a reasonable time frame. The sample size was therefore restricted. Although the projected sample size was smaller than would be desired given unlimited time and resources, it was considered preferable to using secondary

data sets, about which the limitations of the data would be unknown. Variables which are well specified in primary data collection methods can be more correctly interpreted (Wan, 1986). Further, because patients are captured sequentially upon entry, there is no overrepresentation or "prevalent case" bias for long stay residents as is frequently the case in cross-sectional nursing home survey data.

In specifying the value for estimation of sample size, α was set at the .05 level. The effect size (ES) was based on conventional definitions for detecting small differences using a value of .20 (Cohen, 1977). The likelihood of death as an outcome within six months varies according to study design and source of data. A probability of death, p = .32, was used as a compromise among findings as well as a respected conclusion of the longitudinal nursing home study by Jones, Densen and McNitt (1978). Because of greater ease in accessing the hospital-based patients, roughly twice as many NHCU as contract cases were anticipated. Based on these assumptions, samples of 58 NHCU and 24 contract patients were projected. These numbers were acceptably close to those which would be required for a sample to yield significant results.

A refusal rate of 25% was added to the estimated sample size which meant that 120 subjects needed to be screened in total. Loss of subjects after enrollment is a potential problem in a prospective study. However, the attrition rate was anticipated to be small. Continued participation was expected to be enhanced by the fact that the patients were in an institutional environment as opposed to an unspecified and/or unrestricted setting.

Procedures

The study data were derived from three constituent sources. Diagnoses and information about statutory eligibility were obtained from the medical record.

Self-perceptions of health, and cognitive and functional ability were measured and interviews were conducted to obtain personal and social data. Finally, follow-up was done by telephone, personal contact and computer retrieval to determine placement, payment source and hospital and nursing home utilization during the seven month period of longitudinal study. The outcomes were determined at the seventh month because the benefit period for contract care ends at 180 days and by one month later, disposition should have stabilized sufficiently. A contact was also made to ascertain selected structural comparison variables of contract nursing homes.

Data collection began in May of 1986 and continued through June, 1987. Subjects were enrolled in numbers of approximately 12 per month, (see Figure 2) depending upon variation in nursing home application rates. Sampling was continuous according to date of application for nursing home care. No random assignment was conducted since this could not be done without a waiver of statutory entitlement. Recruitment of subjects was from two sources. The hospital based NHCU group was identified from minutes of the hospital's screening committee which indicate those who have been accepted. The contract nursing home group was referred by the office of the Chief of Staff when those contracts for community nursing home placement were processed for approval. Both of these methods allowed some turnaround time (i.e., at least 24 hours) from the point of decision to actually accessing subjects for consent and baseline data. Applications for NHCU came from many sources such as the Veterans Administration Medical Center, other hospitals and home. The vast majority were referred from hospitals. Potential participants were contacted either at their current location or within two weeks of placement.

Female patients were excluded from this study since their number was too small to justify consideration as a separate cohort. Patients being actually

Figure 2. Timetable

| | Months | | | | | | | | | | | | | |
Cohort/No. Patients	(1) 5/86	(2) 6/86	(3) 7/86	(4) 8/86	(5) 9/86	(6) 10/86	(7) 11/86	(8) 12/86	(9) 1/87	(10) 2/87	(11) 3/87	(12) 4/87	(13) 5/87	(14) 6/87
Cohort 1 (6-16)	T_1		T_2			T_3	T_4							
Cohort 2 (6-16)		T_1		T_2			T_3	T_4						
Cohort 3 (6-16)			T_1		T_2			T_3	T_4					
Cohort 4 (6-16)				T_1		T_2			T_3	T_4				
Cohort 5 (6-16)					T_1		T_2			T_3	T_4			
Cohort 6 (6-16)						T_1		T_2			T_3	T_4		
Cohort 7 (6-16)							T_1		T_2			T_3	T_4	

Legend: T_1 *Baseline data

T_2, T_3 **Three and six month assessments

T_4 ***Follow-up assessments of placement

treated for psychiatric disorders were also excluded. This was due to a preliminary experience that their mental status. although sufficient to be considered adequate for informed consent purposes. tended to be associated with erratic behavior. This was evidenced as paranoia. agitation and subsequent refusal to further participate. Such changes could seriously and adversely impact sample size. This exclusion of psychiatric patients did not exclude those with dementias.

Patients already in residence at a contract community nursing home who re-entered the hospital for a short stay. within their six month contract period, were also excluded. This was done to avoid confounding of contract benefit periods. It was not possible to verify that either of these groups of patients had never been institutionalized since nursing home candidates usually have a complicated pattern of health care utilization.

Initial testing and collection of sociodemographic information was done at bedside or some other convenient location. Repeated measures were conducted at the various clinical sites at three and six months. Interviews, observations and demonstrations were kept brief to avoid fatiguing these disabled patients. At seven months, a follow-up contact in person or by phone was done with the subject. family and/or social worker to learn current patient status and outcome. At that time, the directors of nursing for the six contract homes were queried as to selected structural variables of the facility.

Tracking of patients was done using a cross indexed card system. As subjects were entered into the study they had cards established by date of admission as well as by alphabetical listing. The files were scanned monthly to ascertain patients due for re-assessment.

Informed consent (see Appendixes A. B. C. D) was obtained from either patients or their representatives; usually family members. Determination of

competence in this sample was a concern since some degree of altered mental
status was expected to be common. Nurses or relatives were asked to make a
judgment as to whether or not the patient was competent to give his own consent.
If it was decided that the patient was competent, he was asked to give consent.
If the patient was clearly not capable, the family member was contacted and an
appointment made. If the ability of the patient to render an informed consent
was questionable, the Short Portable Mental Status Questionnaire (SPMSQ)
(Pfeiffer, 1975) was administered. A score of five errors or more, out of ten,
indicated the need for a proxy consent. The baseline MSQ was then not
readministered for at least 24 hours to avoid the possibility of learned effects.
All consent forms were produced in triplicate and filed with the original to the
investigator, one copy for the medical record and one copy to the participant or
representative. Reporting guidelines for conducting of research on human
subjects were followed as outlined by VA regulations. No invasive procedures
were proposed. Confidentiality was assured by use of numerical codes with the
name matched list maintained separately.

Sociodemographic information was collected by the investigator using direct
questionnaire. This was done to minimize response error. The only data to be
extracted from medical records were diagnoses and statutory eligibility (i.e.,
service connected status). Hospital admissions occurring during the six month
study period and the subsequent discharge dates were retrieved from the VA's
automated data processing systems. In some instances this source was also used
to confirm the accuracy of the survey component of the data. All other aspects
of data collection were done by interview or observation and, as appropriate,
validated by demonstration as described in the section on instrumentation.

All data collection was done by the investigator. Potential for systematic
bias in data collection cannot be eliminated but was carefully considered. The

potential for bias derived from two main sources: 1) the process of sample selection and 2) administration of instruments. Because sampling was not randomized, it must be highly representative. That is, it should not favor inclusion of subjects on the basis of some suspected outcome. In order to minimize this possibility and assure a typical, unbiased assignment of patients to the two programs (i.e., NHCU or contract), the investigator was excused from the NHCU screening committee and all its deliberations. This measure should have prevented any influencing of preliminary assignment by the investigator, but it did not preclude knowledge of committee decisions after the fact. Such knowledge was not only unavoidable but necessary for follow-up and management responsibilities. Instruments were administered according to detailed instructions which substantially reduced the chance of orienting questions and interpreting responses in favor of one group over another, or from one period of time to another. A more comprehensive discussion of this potential source of error is offered in the section describing study instruments.

Variables

This study used discrete and continuous measures in both the independent and dependent variables (see Figure 3). Only two variables required consideration of issues of instrumentation (e.g., validity, sensitivity) applicable to tests and measurements. The remainder were simple sociodemographic and economic variables, diagnostic profiles or indicators of social support (see Appendix E).

Independent Variables

The independent variables were age, race, marital status, years of education, primary and secondary medical diagnoses, referral source, usual living arrangement, total number in household, availability of help with activities of daily living, abilities in instrumental activities of daily living, presence and type of supplementary health insurance, VA statutory eligibility, type of nursing home

(NHCU v. contract), income, functional ability, cognitive ability and self-perceived health.

Discrete Variables. Race (RACE) was dichotomized as non-white equals one and white equals zero. No further breakdown was performed because the racial overlap in the Bronx area, especially between Black and Hispanic groups, was pronounced. Marital status (MARST) was categorized as never married, married, separated/-divorced or widowed.

Primary (PRIMDX) and secondary (SECONDX) diagnoses were organized by 12 groupings. These are disorders of blood and blood forming organs, circulatory disease, endocrine and metabolic disorders, genitourinary disorders, mental problems, musculosketetal disability, neoplasms, neurological motor dysfunction, pulmonary disease, sensory disorders, skin disorders, and all other. Within the groups, further specification is made according to International Classification of Disease (ICD) Codes (see Appendix F). For purposes of this study the ICD codes were modified slightly by subsuming peripheral vascular disease under circulatory disease and counting gastrointestional disorders under the heading of "other".

This 12 group framework was selected because it is similar to that formulated by current prospective reimbursement methodologies. It outlines disease clusters which are not excessively diverse, and it is likely to be the format for reporting of diseases in future nursing home research studies. Diagnoses per se have not been found to be particularly meaningful in describing resource utilization in long term care. They may, however, affect hospital utilization during the nursing home stay. Also, recent studies suggest that diagnoses may offer some explanatory power depending upon whether the nursing home sample is community or hospital based.

Figure 3. Study Variables For The Andersen Model Applied To Nursing Home Utilization

INDEPENDENT VARIABLES

Discrete

Marital Status (MARST)
Race (RACE)
Primary diagnoses (PRIMDX)
Secondary diagnoses (SECONDX)
Referral source (REFS)
Usual living arrangement (ULA)
Availability of help with
  activities of daily living (AADL)
Availability of help with
  instrumental activities of daily
  living (AIADL)
Type of supplementary insurance (INSR)
Statutory eligibility (ELIGB)
Type of nursing home (TYPE)

Continuous

Income (INC)
Percent service connected (PCTSC)
Age (AGE)
Education (EDUC)
Self-perceived health (SPH)
Mental status score (STS)
Functional ability score (BTL)

DEPENDENT VARIABLES

Discrete

Continued nursing home residence (CNHR)
Death (DEATH)
Discharged worse, admitted to hospital (DWAH)
Discharged better (DB)
Discharged other nursing home (DONH)
Discharged other (e.g., against
  medical advice) (DO)
Method of payment (MOP)

Continuous

Number of days of nursing home care
  (NNHD)
Number of episodes of hospital
  readmission (NEHR)
Number of days of hospital readmission
  (NDHR)
Actual length of stay in nursing home
  (ALOS)

COMPARISON VARIABLES

Nursing home size (the number of operating beds)
Nursing staff to patient ratio (proportion of full-time,
  employee equivalents to operating beds)
Use of per-diem nurses
Type of therapies available

Referral source (REFS) identified the place from which patients originated. The locations were Bronx VA hospital, other hospital, home, other nursing home, domicilliary, community residential care and other. Usual Living Arrangements (ULA), availability of help with Activities of Daily Living (AADL) and Instrumental Activities of Daily Living (AIADL) were measures of social support. Usual living arrangement categories incuded living alone, with spouse only, with spouse and other relatives, with non relatives, group quarters other than nursing homes and a not applicable option. Availability of help with Activities of Daily Living encompassed help with bathing, dressing, eating, transfer, toileting and walking. Abilities in Instrumental Activities of Daily Living covered such activities as shopping, meal preparation, housekeeping, medication administration, telephone use, mobility outside the household and financial management.

Response categories for AADL and AIADL were identical. Not applicable means the person either does not have any assistance, does not need any or came from a nursing home setting. Other responses to explain support were spouse or other household member, relative outside of the household, friend or paid helper. The choices were not mutually exclusive e.g., one may not have needed help (NA) but still have had it available (wife). These support systems may be important as predisposing factors for nursing home placement as well as a measure, however crude, of "potential" for discharge.

Type of supplementary insurance (INSR) was measured as Medicaid, Medicare A and B, and private insurance. Statutory eligibility (ELIGB) was measured as service connected or non-service connected. Type of nursing home (TYPE) was dichotomous where one equaled NHCU and zero equaled contract.

Continuous Variables. There were six sources of income (INC): compensation (COMP) (i.e., the service connected income benefit), VA pension (PENS) (i.e., the non-service connected income benefit), social security (SSEC), supplementary

security income (SSI), spouse's contribution in the form of social security,

pensions or salary (SPOU) and other pensions (OTHR) from private companies or

Railroad Retirement. There was no attempt to probe into equities such as home

ownership, savings or other holdings and reserves. The income variable was

intended to measure the amount of money which was routinely used to manage one's

financial affairs and not that which could be mobilized through liquidation of

assets and spenddown. All income was combined in dollars minus cents.

If a veteran was service connected, the percentage (PCTSC) will be recorded.

The discrete variable of this same nature qualified the subject simply as being

either service connected or non-service connected. Age (AGE) and education

(EDUC) were recorded in exact number of years.

Self perceived health (SPH) was ascertained by asking the subject how he

would rate his overall health at the moment. Response categories were limited

to five: excellent, very good, good, fair and poor. Comatose patients and

those too confused to render a thoughtful opinion were rated as "unable".

Functional and cognitive ability were evaluated using standardized instruments

which are described in the instrumentation section.

Dependent Variables

Discrete Variables. The disposition of patients at seven months was analyzed

as a measure of utilization. This outcome variable was categorized as (a) continued

nursing home residence (CNHR), (b) death, (c) discharged worse: admitted to

hospital (DWAH), (d) discharged better (DB), (e) discharged other nursing home

(DONH), and (f) discharged other (DO) such as in the event of against medical

advice. Qualitative information as to location of patients at outcome and the

source of payment for care was also recorded.

Continuous Variables. At the end of six months, nursing home and hospital utilization was assessed. Data included the number of nursing home days (NNHD), the number of episodes of hospital readmission (NEHR), the number of days of hospital readmission (NDHR) and the actual length of stay (ALOS) in the nursing home.

The actual duration of nursing home stay was calculated from date of placement through the day prior to expiration of six months (e.g., 5/15 - 11/14) or discharge; whichever occured first. All months were added in exact calendar days. For consistency, persons going to hospital were assumed to spend one-half of the admission and discharge days in each of the two settings: hospital and nursing home. For example, a hospital stay from 5/10 through 5/12 was counted as two days, thus preventing inflation of figures for hospital days. Actual nursing home length of stay was tallied by subtracting the number of hospital days from the length of stay in the nursing home.

Comparison Variables

Four structural measures were used as comparison variables. These were: 1) nursing home size measured as the number of operating beds, 2) nursing staff to patient ratio (i.e., proportion of full time employee equivalents to operating beds), 3) use of per diem nurses and 4) type of therapies available.

Instrumentation

Functional ability and mental status are widely accepted measures for describing nursing home populations. In clinical practice, these suggest patients' needs, guide team discussions and aid in targeting discharge goals and social support requirements (Blass, 1985). Also, they are frequently used to measure progress or decline over time and determine effectiveness of interventions.

At the organizational level, these indicators constitute a large part of what is currently termed "casemix". As such they have become an important source of information for studying costs of care, resource allocation and subsequent policy formulation.

Historically the mix of patient cases has, for policy and reimbursement purposes, been divided into skilled and intermediate levels of care. This distinction has proved inadequate due to the crudity of descriptors. The degree of refinement for any proposed taxonomy depends on its use. Some measurement schemes lend themselves more readily to quantitative analysis and are largely applied to research aims. Others are almost exclusively qualitative and best suited to individualizing treatment approaches.

The most advantageous measurement instruments combine both aspects in order that information may have clinical and policy usefulness. In sum, they should be brief, easily understood and administered, appropriate to the population, cover major pertinent domains and be reasonably objective, valid and reliable. These attributes form the basis for selection of tools.

Numerous instruments were reviewed. Those most suitable for measuring mental status reduced to two options: the Mini Mental Status Exam (MMSE) by M.F. Folstein and S.E. Folstein (1975) and the Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975). The SPMSQ was not used. However, the MMSE will be expounded upon as to why it was not selected despite its vogue in the geriatric literature. The Barthel (BI) (Mahoney & Barthel, 1965) was used to determine functional ability.

Originally the MMSE was found to have concurrent validity and to be effective in identifying cognitive dysfunction and clinical change (M.F. Folstein & S.E. Folstein, 1975). The authors found high interrater reliability over 24 hour and 28 day periods (Pearsons $r = .887$ and $.98$ respectively). Further study

of sensitivity and specificity of the MMSE (Anthony, LeResche, Niaz, Von Korff & Folstein, 1982) indicated that the prescribed cut-off scoring of the instrument resulted in high false positives (i.e., denoting cognitive impairment where there was none) among older and poorly educated persons. Specificity was especially low among those with less than eighth grade education, blacks and those 60 years and older (Anthony et al., 1982).

More importantly the MMSE is too long and complex for institutional use. The MMSE has 20 items; twice that of other conventional assessments. Several of these (e.g., writing a sentence, copying a geometric design, three stage command, serial 7's subtraction) require that the subject be able to read, write and incorporate motor function. This requirement may seriously limit applicability to nursing home patients due to visual problems uncompensated by large print or glasses and/or functional illiteracy. Paralysis and a host of other neurologic diseases could prevent manipulation of objects. A recent study confirms these problems. In MMSE testing, sample selection criteria excluded those who were deaf, blind, very ill and those who could not read or write (Klein et al., 1985).

Short Portable Mental Status Questionnaire

The Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975) is a 10 item test which evaluates orientation and memory. It is concise, does not require physical dexterity or visual capability and has the added advantage of adjusting for education and race (see Appendix G). Items one, three, five, six, seven and eight deal with orientation; item four checks one's ability to manage in a community environment; item nine tests remote memory and item 10 evaluates mental agility.

Results are reported as number of errors. The range is 0 to 10. For statistical analysis purposes, the number of "correct" responses rather than errors were recorded. This inversion made scores compatible with the activities

of daily living scale where higher scores represented better function. Scores can be interpreted using four categories: intact mental functioning (i.e., 0-2 wrong/8-10 correct), borderline or mild impairment (i.e., 3-4 wrong/6-7 correct), definite but moderate impairment (i.e., 5-7 wrong/3-5 correct), and severe organic problems (i.e., 8-10 wrong/0-2 correct). Refusal or inability to answer was given a score of zero. One additional point was added to the number correct if the subject had only grade school education. One point was subtracted from the total correct if the subject had education beyond high school. One extra correct point was given if the subject was black, using identical educational criteria. Standard prompts were incorporated into the questionnaire to reduce the tendency to lead respondents in any particular direction (i.e., systematic bias) (see Appendix G).

Pfeiffer (1975) administered the SPMSQ to groups of elderly in three settings: community, clinic and a broadly defined institutional setting. The SPMSQ was shown to correlate with clinical diagnosis of organic brain syndrome (OBS) and test-retest reliability was greater than .80 suggesting negligible practice effects (Pfeiffer). Smyer, Hofland and Jonas (1979) studied the validity of the SPMSQ using clinician ratings and a well established self care index. Their findings did support those of Pfeiffer. It was noted however that the four impairment groupings were not as discriminating as one might hope and that greater explanatory power was yielded with two and three categories (Smyer et al., 1979).

Fillenbaum (1980) compared the SPMSQ against another standard mental status measure and the opinion of 10 psychiatrists. Patients (N = 83) were randomly selected and physicians were randomly assigned. The SPMSQ explained 50% of the variance between clinical judgments and test results, with three items (i.e., date of birth, naming the previous president and day of the week) accounting for

almost 47% (Fillenbaum). The author further reported that sensitivity (i.e., true positive ratio) was a low 55% (Fillenbaum). This finding may not be unusual in a sample of community elderly whose dementia may be marginal. Dementia sufficiently mild to permit continued independent living might be undetectable by even the most rigorous test. It has also been observed that at high and low ends of the scale the patients profile can vary considerably (Wylie, 1967) and this may also explain the finding of low sensitivity.

Barthel Index

The Barthel Index (BI) (Mahoney & Barthel, 1965) was used as the measure of functional ability. It has several advantages over other rating scales. The BI has been used in many settings for over 20 years and is simple to use and easy to score. It covers a broad range of functions and yields ratio data which enhance statistical manipulations (Gresham, Phillips & Labi, 1980).

The instrument (see Appendix H) consists of 10 items which measure feeding, mobility, bathing, grooming, toileting and control of bladder and bowel. High points are given for ablility to perform the activity independently, fewer points when help is required and no points if the activity cannot be performed. The highest attainable score is 100. Values are weighted in favor of those most important to independence. For example, walking independently is given higher maximal points (i.e., 15 points) than bathing which can only be worth five points. High scores indicate independence although the authors caution that this does not necessarily mean the person could live alone without social supports (Mahoney & Barthel, 1965).

Decision rules were specified in the tool where any ambiguity might exist (see Appendix H). Again, this was done to reduce the possibility of systematic bias. Where possible, patients demonstrated the activity. For items not easily observable (e.g., bowel function), nursing staff and family members were queried.

No instrumental activities of daily living were measured as part of the test battery. These activities (e.g., cooking and cleaning) are heavily influenced by cultural norms. Male subjects especially older subjects may be capable, yet not perform them because these are roles ascribed to women. Instrumental activities are difficult to measure in nursing home settings since patients do not routinely cook or clean for themselves. In order to measure abilities, one would have to rely on self report, subject to the aforementioned inaccuracies, or laboriously create a mock-up situation. Further, these are higher order activities than self care and one can reasonably assume that nursing home patients are comprised. The baseline demographic profile did include some inexact but qualitatively important information about this topic.

The BI has been studied extensively on stroke patients in chronic care and rehabilitation hospitals. In a 47 month follow up of stroke cases, Wylie (1967) correlated the BI with mortality. He found an inverse relationship between BI scores and deaths (i.e., the higher the score the less likely death as an outcome and vice versa). BI scores were also associated with improvement; 36% of patients whose admission BI was 0-15 improved compared to 76% of those ranking 60-100 on the point scale (Wylie). A two year study by Granger, Sherwood and Greer (1977) corroborated Wylie's findings that those who die have lower scores than survivors. The BI was associated with outcome. and age added only slightly to predictive power (Granger, Sherwood & Greer). Another prospective study (Granger, Dewis, Peters, Sherwood & Barrett, 1979) found BI scores to be correlated with length of stay, outcome and rehospitalization rates.

Cross sectional studies of validity produce like results. Donaldson, Wagner and Gresham (1973) compared the BI to two other standard tests of functional ability and found them all to be sensitive with the BI ranking intermediate between the other two. Using the same three instruments, Gresham, Phillips and Labi (1980) showed high agreement among scores and adequate sensitivity.

Granger and Greer (1976) expanded use of the BI to other than stroke patients. Using a sample size of $\underline{N}$ = 552. three different clinical settings and three diagnostic categories (i.e., stroke, amputations and spinal cord injuries), they again found the BI closely related to outcome and hospital readmissions. On an even more heterogeneous sample (Granger, Albrecht, Hamilton & Byron, 1979), the BI was found to be valid, with high test-retest reliability and interrater reliability above .95.

Most recently, Hertanu, Demopoulös, Yang, Calhoun and Fenigstein (1984) compared the BI with findings on brain scans. Ongoing functional evaluations were found to explain more variance and be more reliable than cat scans over the 13 month period.

Preliminary to the dissertation, the BI was piloted on 100 male patients in a VA hospital based nursing home in Virginia. Nurse raters found significant correlations between the BI and another instrument which is considered to be valid. Concurrent validity was demonstrated (r > .80) and interrater reliability was high (r = .98) (Jacobs & Merwin, 1986). These cross-sectional data were widely distributed.

Analysis

The analysis consisted of four parts: (1) characterizing the NHCU and contract nursing home patients in terms of predisposing and enabling characteristics; (2) determining the relative contribution to outcomes of need, and selected continuous predisposing and enabling characteristics; (3) examining the associations among variables and (4) comparing the clinical progression and outcomes of patients between the two groups.

The longitudinal study included information gathered in three waves from each of 82 subjects. After the baseline assessment, two additional waves of data were collected at three and six months. The SPMSQ, BI and self perceived

health (SPH) were administered at these times. This procedure allows estimates of the stability of functional and mental status and subjective measures, and the factors that may affect the variation in these measures. The three wave study design supports stronger, less ambiguous causal inferences than would a cross-sectional design. At the seventh month of each patient's participation, current location and payment source were ascertained. The outcome was determined at the seventh month because the benefit period for contract care ends at 180 days and by one month later, disposition should have stabilized sufficiently.

Differences between the two nursing home types and on continuous and discrete outcomes and incremental changes over time were tested by chi-square and one-way analysis of variance (ANOVA) calculations. Multiple regression analysis was used to determine the relative contribution of selected independent variables on continuous outcome variables. When the outcome was discrete, however, logistic regression was used.

Logistic regression is preferable to ordinary least squares (OLS) analysis in such cases because of the binary nature of the dependent variable (Aldrich and Nelson, 1984). The more straightforward OLS technique, applied to a binary dependent variable Y with values 0 and 1, models the probability that $Y = 1$ as a linear function of the independent variables. While this is sometimes acceptable as an approximation, it is deficient in that it can lead to predicted values for Y outside the 0 to 1 limits of a legitimate probability. In contrast, the logistic regression model predicts the logarithm of the odds in favor of $Y = 1$ and as a result all predictions from this model are interpretable.

The SAS procedure LOGIST was used to find maximum likelihood estimates of the parameters of the logistic regression models. According to Aldrich & Nelson (1984) this procedure, which has desirable asymptotic (large sample) properties,

performs "moderately well even in moderate-sized samples on the order of N - K = 100 (p. 53). Since the N for this study was only 82, the number of variables (K) used in any logistic regression was deliberately kept small by limiting the independent variables to those which the literature suggested would be major predictors.

CHAPTER 4

Results

Presentation of the Data

The findings of the study are presented in this chapter. These include descriptive and inferential analyses, and for the latter, results of statistical significance for the study variables. Data are presented narratively, and where useful to consolidate numbers and illustrate trends, tables are also employed.

Samples for Analyses

In total, 163 patients were screened in order to attain the estimated sample size of 82. It was anticipated that only 100 patients would have to be queried to account for a 25% refusal rate. Although the projected refusal rate was adequate, when combined with the number lost for other reasons, the total of 100 proved to be conservative. In fact, fully as many were lost as were enrolled (i.e., 81 and 82 respectively). Of the NHCU candidates, 34 were lost to study and 58 participated; for the contract group, 47 were lost and 24 participated.

Reasons for loss of subjects were broadly categorized. Of the NHCU patients, ten had no one available for proxy consent, three refused, seven declined admission or were placed in other settings, ten died prior to admission, three females were excluded, and one was a chronic hospital patient who was not considered to be representative. For the contract group, twelve had no one available to provide informed consent, seven refused, five were placed in other types of long-term care, eight died prior to placement, two were readmissions from existing contract nursing home placement, four were sent to contract homes other than those in our catchment area, six were missed due to communication breakdown and three were psychiatric patients. Empirically, the patients who were lost did not differ substantially from those who participated in regard to sociodemographic and diagnostic characteristics.

Descriptive Statistics

Table 1 shows predisposing patient characteristics by total sample and, contract and NHCU subgroups. The average age was 70 years, with the average for NHCU patients being four years older than that of those in contract (i.e., 71 vs. 67). Closer inspection revealed that the within group distribution varied considerably. The NHCU group had nearly 30% of the sample over 75 years of age. For that reason, further analyses were stratified by age group: 75 and less, and 76 and greater. Because only two of the contract patients were over 75, it was not possible or necessary to stratify by both age group and nursing home type. Those two subjects were simply considered in the two age group divisions.

Both groups had more non-white than white patients. In contract the non-white percentage was only slightly greater (i.e., 54% vs. 45%), while in the NHCU the non-white percentage constituted 72%. Educationally, the mean years of education differed little between groups and was less than high school. Almost two-thirds of the NHCU patients were married compared to only one-third of those in contract. Thirty percent of contract patients lived alone compared to only 14% of the NHCU patients.

Interestingly, and despite the apparent difference in marital status, both groups relied on a spouse or other household member for assistance with activities of daily living (AADL) (45.8% and 44.8%) (Table 1). Few found assistance from those outside the household or in the form of paid or agency help. The same pattern held for availability of assistance with instrumental activities of daily living (IADL).

The enabling characteristic of income showed notable disparity between the mean monthly totals of the two types of nursing home patients. The NHCU average was $1,172 as compared to only $747 for the contract average (Table 2). Sources contributing to the monthly incomes differed less than did the dollar amounts.

Table I

Frequency Distributions, Percents and Means of Predisposing Characteristics, by Nursing

Home Type

Characteristics	Total Group N = 82		Contract n = 24		NHCU n = 58	
	#	%	#	%	#	%
AGE (in years)						
23-56	8	9.7	2	8.4	6	10.2
60-65	20	24.4	12	50.0	8	13.6
66-69	14	17.0	3	12.5	11	18.9
70-75	21	25.6	5	20.9	16	27.4
76-99	19	23.0	2	8.4	17	29.1
Mean Age	70		67		71	
Race						
Non-white	55	67.1	13	54.2	42	72.4
White	27	32.9	11	45.8	16	27.6
Education						
< Grade School	20	20	7	29.2	13	22.3
8th Grade	17	20.7	5	20.8	12	20.7
Some High School	12	14.6	3	12.5	9	15.5
Completed High School	19	23.2	6	25.0	13	22.4
> High School	14	17.1	3	12.6	11	18.9
Mean Years of Education	10		9		10	
Marital Status						
Never Married	10	12.2	5	20.8	5	8.6
Married	42	51.2	7	29.2	35	60.3
Widowed	14	17.1	4	16.7	10	17.2
Separated/Divorced	16	19.5	8	33.3	8	13.8
Usual Living Arrangement						
Not Applicable, Comes From a Nursing Home	7	8.5	--	--	7	12.0
Lives Alone	15	18.3	7	29.2	8	13.8
Lives with Spouse Only	30	36.6	4	16.7	26	44.8
Lives with Spouse and Other Relatives	10	12.2	2	8.3	8	13.8
Lives with Relatives Only	13	15.9	8	33.3	5	8.6
Lives with Non-Relatives	2	2.4	1	4.2	1	1.7
Lives in Group Quarters Other than Nursing Home	4	4.9	2	8.4	3	5.2

Legend: Dashes = No score or value attributable; not missing data.

Table I (cont.)

Characteristics	Total Group N = 82		Contract n = 24		NHCU n = 58	
	#	%	#	%	#	%
Type of Help Available for ADL						
Spouse or other Household Member	37	45.1	11	45.8	26	44.8
Relative Outside of Household	2	2.4	--	--	2	3.4
Friend	1	1.2	--	--	1	1.7
Paid Helper/Agency	4	4.9	3	12.5	1	1.7
Not Applicable, Independent or None	38	46.3	10	41.7	28	48.3
Type of Help Available for IADL						
Spouse or Other Household Member	48	58.5	12	50.0	36	62.1
Relative Outside of Household	3	3.7	1	4.2	2	3.4
Friend	--	--	--	--	--	--
Paid Helper/Agency	3	3.7	2	8.3	1	1.7
Not Applicable, Independent or None	28	34.1	9	37.5	19	32.8

Legend: Dashes = No score or value attributable; not missing data.

Table 2

Percents and Means of the Enabling Characteristic of Income, by Nursing Home Type

Monthly Income (Dollars) Percent	Total Income (All Sources)			Compensation			Pension		
	Total Group	Contract	NHCU	Total Group	Contract	NHCU	Total Group	Contract	NHCU
<500	15.6	29.3	10.2	90	95.9	87.6	97	96	96.5
500-999	44.4	46.1	44.2	2.4	4.2	1.7	3.9	4.2	3.6
1000-1999	30.0	25.2	32.3	6.0	--	8.5	--	--	--
2000+	8.4	--	11.9	1.2	--	1.7	--	--	--
Mean Income	1,048	747	1,172						

	Social Security			SSI			Spouse		
	Total Group	Contract	NHCU	Total Group	Contract	NHCU	Total Group	Contract	NHCU
<500	55	66.8	51.6	97.4	95.9	98.4	88.8	95.9	86.0
500-999	43.4	33.6	50.4	2.4	4.2	1.8	6.0	4.2	6.8
1000-1999	--	--	--	--	--	--	4.8	--	6.8
2000+	--	--	--	--	--	--	--	--	--

	Other		
	Total Group	Contract	NHCU
<500	77.6	75.1	78.9
500-999	14.5	16.8	13.6
1000-1999	7.2	8.4	6.8
2000+	--	--	--

Legend: § Percentages may not total 100% due to rounding; N = 82; n (contract) = 24; n (NHCU) = 58
Dashes = No score or value attributable; not missing data

Neither group received much in the way of compensation (i.e., the service-connected pension benefit) nor pension (i.e., the non-service connected pension allotment) (Table 2). More than 50% of both nursing home patient types were non-service connected. One-third to one-half of all patients received social security payments between $500 and $1,000 per month. These payments provided the majority of funds for both groups. Although the NHCU group had many more married patients, neither group's spouses contributed financially to any great extent. This likely reflected the meager earnings and subsequent low benefits of women in this age category.

There were some differences in health insurance coverage between the two groups (Table 3). Of the NHCU patients, 86% had additional insurance plans and only 14% did not. By contrast, 41% of the contract patients lacked any other health insurance source. Where additional coverage was available, the types were Medicare A, private and Medicare B in that order for both groups. Only seven patients of the total 82 had Medicaid at the time of nursing home placement.

The NHCU and contract patients differed little in regard to number of diagnoses. The average number for both was five (Table 4). However, 15 had as many as six and two had over ten. The actual diagnostic profile of patients revealed some differences. The NHCU patients had much more neurological motor dysfunction. The category included patients with stroke, multiple sclerosis, convulsions, Parkinson's and one status-post motor vehicle accident (Table 5). Ranking together as the second most frequent diagnostic categories for the NHCU group were pulmonary disease and neoplasms. These were followed by circulatory disease as third, mental problems and blood and genitourinary disorders fourth, miscellaneous "other" and endocrine and metabolic fifth, and sensory skin and musculosketetal disabilities sixth.

Table 3

Frequency Distributions and Percents of Enabling Characteristics. by Nursing Home Type

Characteristics	Total Group N = 82		Contract n = 24		NHCU n = 58	
	#	%	#	%	#	%
Statutory Eligability						
Non-service Connected	56	67	21	87.5	35	60.3
Service Connected	26	33	3	12.6	23	39.7
% Service Connected						
10-20	9	10.9	1	4.2	8	13.7
30-40	8	9.8	1	4.2	7	12.1
50-70	3	3.6	1	4.2	2	3.4
100	6	7.3	--	--	6	10.3
Health Insurance						
None Other than VA	18	22	10	41.7	8	13.8
Additional to VA	64	78	14	58.3	50	86.2
Type						
Medicaid	7	8.5	4	16.7	3	5.2
Medicare A	52	63.4	12	50.0	40	69.0
Medicare B	19	23.2	4	16.7	15	25.9
Private	30	36.6	6	25.0	24	41.4
Total Sources of Insurance						
Additional to VA						
One	32	39.0	5	20.8	27	46.6
Two	20	24.4	6	25.0	14	24.1
Three	12	14.6	3	12.5	9	15.5
Referral Source						
VA Hospital	53	64.6	24	100.0	29	50
Other Hospital	15	18.3	--	--	15	25.9
Home	11	13.4	--	--	11	19.0
Other Nursing Home	3	3.7	--	--	3	5.2

Legend: § Percentages may not total 100% due to rounding and the use of multiple response categories. Dashes = No score or value attributable; not missing data.

Table 4

Frequency Distributions, Percents and Ranks of the Diagnostic Need Characteristic, by

Nursing Home Type

Characteristics	Total Group			Contract			NHCU		
	#	%	Rank	#	%	Rank	#	%	Rank
Primary Diagnoses									
Neurological Motor									
Dysfunction	21	25.6	1	2	8.3	4	19	32.8	1
Pulmonary Disease	10	12.2	2	2	8.3	4	8	13.8	2
Circulatory Disease	10	12.2	2	3	12.5	3	7	12.1	3
Neoplasms	10	12.2	2	2	8.3	4	8	13.8	2
Mental Problems	9	11.0	3	6	25.0	1	3	5.2	4
Other	7	8.5	4	5	20.8	2	2	3.4	5
Endocrine & Metabolic									
Disorders	5	6.1	5	3	12.5	3	2	3.4	5
Blood Disorders	4	4.9	6	1	4.2	5	3	5.2	4
Genitourinary Disorders	3	3.7	7	--	--	--	3	5.2	4
Musculoskeletal									
Disability	1	1.2	8	--	--	--	1	1.7	6
Sensory Disorders	1	1.2	8	--	--	--	1	1.7	6
Skin Disorders	1	1.2	8	--	--	--	1	1.7	6
Secondary Diagnoses									
Circulatory Disease	53	--	1	14	--	1	39	--	1
Neurological Motor									
Dysfunction	32	--	2	--	--	--	20	--	3

Legend: § Percentages may not total 100% due to rounding and the use of multiple response
categories. N = 82; n (contract) = 24; n (NHCU) = 58
Dashes = No score or value attributable; not missing data.

Table 4 (cont.)

Characteristics	Total Group			Contract			NHCU		
	#	%	Rank	#	%	Rank	#	%	Rank
Secondary Diagnoses									
Other	29	--	3	11	--	3	19	--	4
Endocrine & Metabolic									
Disorder	26	--	4	4	--	4	22	--	2
Mental Problems	25	--	5	12	--	2	13	--	6
Musculoskeletal									
Disability	20	--	6	4	--	4	16	--	5
Pulmonary Disease	13	--	7	4	--	4	9	--	8
Genitourinary									
Disorder	13	--	7	2	--	5	11	--	7
Blood Disorder	10	--	8	2	--	5	8	--	9
Sensory Disorder	8	--	9	1	--	6	7	--	10
Neoplasm	6	--	10	1	--	6	5	--	11
Skin	5	--	11	2	--	5	3	--	12
Total Number of Diagnoses									
One	2	--	2.4	1	--	4.2	1	--	1.7
Two	2	--	2.4	1	--	4.2	1	--	1.7
Three	17	--	20.7	3	--	12.5	14	--	24.1
Four	15	--	18.3	7	--	29.2	8	--	13.8
Five or more	46	--	56.0	12	--	50.1	34	--	58.5
Mean No. of Diagnoses	5			5			5		

Legend: § Percentages may not total 100% due to rounding and the use of multiple response
categories. N = 82; n (contract) = 24; n (NHCU) = 58
Dashes = No score or value attributable; not missing data.

Table 5

Subcategory Description of Total Nursing Home Patients in Rank Order by Diagnoses

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DIAGNOSES

Primary
Neurological Motor Dysfunction (n = 21)
New Onset and/or Late Cerebrovascular
  Accident
Multiple Sclerosis
Convulsions/Siezures
Paraplegia
Motor Vehicle Accident

Pulmonary Disease (n = 10)
COPD
Pneumonia
Idiopathic Pulmonary Fibrosis
Pleural Effusion

Circulatory Disease (n = 10)
Congestive Heart Failure
Syncope
Angina
Hypertension
Peripheral Vascular Disease
Aneurysm

Neoplasms (n = 10)
Prostate
Pancreas
Esophagus
Colon
Urethra and Bladder
Meningeoma

Mental Problems (n = 9)
Dementia
Organic Brain Syndrome
Organic Mental Syndrome
Alzheimers

Other (n = 7)
Sepsis
Hepatic Encephalopathy
Rectal Bleeding
Abscess

Endocrine and Metabolic Disorders (n = 5)
Insulin Dependent Diabetes Mellitus
Cirrhosis
Dehydration/Anorexia
Gouty Attack

Blood Disorders (n = 4)
Anemia
Leukemia

Genitoruinary Disorders (n = 3)
Urosepsis
Urinary Tract Infection

Musculoskeletal Disability (n = 1)
Fracture

Sensory Disorder (n = 1)
Blindness

Skin Disorder (n = 1)
Ulcer

SECONDARY

Circulatory Disease (n = 53)
Hypertension   .
Arrythmias
Peripheral Vascular Disease
Valve & Major Vessel Disease
Angina
Pacemaker Replacement
Post Myocardil Infarction
Phlebitis
Congestive Heart Failure
Deep Vein Thrombosis
Gangrene

Neurological Motor Dysfunction (n = 32)
New Onset and/or Late Cerebrovascular Accident
Siezures/convulsions
Parkinsons
Hemi or Paraplegia
Multiple Sclerosis

Other (n = 29)
Wide Variety of Medical and Surgical Conditions:
Too Diverse to Categorize

Endoctrine & Metabolic Disorders (n = 26)
Non-insulin Dependent Diabetes Mellitus
Insulin Dependent Diabetes Mellitus
Thyroid Problems
Cirrhosis
Anorexia/dehydration
Folate Deficiency

Table 5 (cont.)

Mental Problems (n = 25)
Dementias
Alcohal Abuse
Depression
Neuroses/Psychoses

Musculoskeletal Disability (n = 20)
Fractures
Arthritis
Contractures
Degenerative Joint Disease

Pulmonary Disese (n = 13)
COPD
Pneumonias
Tuberculosis

Genitourinary Disorders (n = 13)
Urinary Tract Infections and Related Bladder
  Disorders
Renal Insufficiency and Related Disorders
Prostate Problems

Blood Disorders (n = 10)
Anemia
Polycythemia

Sensory Disorders (n = 8)
Visual Impairments
Hearing Loss
Aphasia

Legend: § Percentages were not reported for secondary diagnoses since the numbers have no common demoninator

The contract patients had only 8% (compared to 32% for the NHCU group) of patients with neurological motor dysfunction. Their number one disorder was mental problems, primarily dementias (Table 5). This was followed by the general category of "other". Diagnoses in this category covered a wide range of medical and surgical conditions which were too diverse to cluster meaningfully. Endocrine and metabolic disorders were the third most frequent. neurological problems. pulmonary disease and neoplasms were fourth. and blood disorders ranked last.

Secondary diagnoses were even more diversified. Pulmonary and circulatory diseases were common, along with endocrine disorders. The contract patients continued to have a large proportion of patients identified as having dementia; the NHCU patients had a much smaller proportion so diagnosed even as a secondary diagnosis (Table 5).

In addition to diagnoses, functional and mental status and self-perceived health were used to characterize need. Despite the fact that NHCU patients were seldom diagnosed as having dementias compared to contract patients. mental status scores indicate that both groups were about equally impaired. The mean score derived by actual testing was approximately six for both groups (Table 6). The baseline and three and six month Barthel scores were much lower for NHCU patients than for contract patients (i.e., $x = 35\text{-}39$ vs. 60-65) (Table 6). There was little between group difference in perceptions of health. On all assessments. the majority of patients considered their health to be fair to poor (Table 7).

Inferential Statistics

Predisposing, Enabling and Need Characteristics

The major hypothesis was that veterans in the hospital-based versus contract, community nursing home program exhibit statistically significant

Table 6

Descriptive Statistics of the Functional and Mental Status Need Characteristic, by

Nursing Home Type

Characteristics	Mean	Median	Range	Standard Deviation
TOTAL GROUP				
Functional Status (Barthel)				
Baseline	42.74	35	(0-100)	35.06
3 month follow-up	47.14	45	(0-100)	36.48
6 month follow-up	44.82	40	(0-100)	35.95
Mental Status (SPMSQ)				
Baseline	6.48	8	(0-10)	3.80
3 month follow-up	6.03	7	(0-10)	3.94
6 month follow-up	6.48	9	(0-10)	4.09
CONTRACT				
Functional Status (Barthel)				
Baseline	60.62	73	(0-100)	34.36
3 month follow-up	65.78	80	(0-100)	33.42
6 month follow-up	60.00	65	(0-100)	35.27
Mental Status (SPMSQ)				
Baseline	6.83	8	(0-10)	3.55
3 month follow-up	6.52	8	(0-10)	3.86
6 month follow-up	6.72	8.5	(0-10)	3.99
NHCU				
Functional Status (Barthel)				
Baseline	35.34	25	(0-100)	32.87
3 month follow-up	39.09	25	(0-100)	35.09
6 month follow-up	37.82	20	(0-100)	34.48
Mental Status (SPMSQ)				
Baseline	6.32	8	(0-10)	3.87
3 month follow-up	5.81	7	(0-10)	4.00
6 month follow-up	6.72	8.5	(0-10)	3.99

Legend: $\underline{N}$ = 82; $\underline{n}$ (contract) = 24; $\underline{n}$ (NHCU) = 58

Table 7

Frequency Distributions and Percents of the Self Perceived Health Need Characteristic,

by Nursing Home Type

Characteristics	Total Group		Contract		NHCU	
	#	%	#	%	#	%
Self Perceived Health (Categorized)						
Baseline	N = 82		n = 24		n = 58	
Excellent-Good	15	18.3	5	20.8	10	17.2
Fair-Poor	44	53.7	12	50.0	32	55.2
Unable	23	28.0	7	29.2	16	27.6
3 month follow-up	N = 61		n = 18		n = 43	
Excellent-Good	13	15.9	2	8.3	11	19.0
Fair-Poor	31	37.8	12	50.0	19	32.8
Unable	17	20.7	4	16.7	13	22.4
6 month follow-up	N = 57		n = 18		n = 39	
Excellent-Good	15	18.3	3	12.5	12	20.7
Fair-Poor	29	35.4	11	45.8	18	31.0
Unable	13	15.9	4	16.7	9	15.5

Legend: §Percentages may not total 100% due to attrition

differences in characteristics (e.g.. age. diagnoses. functional and mental status). and on measures of service use and clinical outcomes.

Table 8 illustrates the chi-square and significance levels for differences between nursing home types and between age groupings on categorical variables. To recapitulate, descriptive analysis indicated that one-third of the NHCU group were 76 years or older. Therefore. comparisons were made not only by nursing home type but also by two major age cohorts (i.e.. over and under 76 years). Table 9 provides the F-Ratios and significance levels similarly stratified for continuous variables.

Comparing NHCU and contract patients on predisposing characteristics, marital status and usual living arrangement emerged as being statistically significant (i.e., $\underline{x}^2$ = 6.60, $\underline{p}$ = .01, and $\underline{x}^2$ = 2.68. $\underline{p}$ = .10 respectively; $\underline{N}$ = 82, df = 1). More NHCU patients were married and living with someone(s) whereas contract patients were more often not married and their living arrangement was alone. The two types of nursing home patients demonstrated several differences in enabling characteristics. The most pronounced difference was for income (F = 7.61, $\underline{p}$ < .01, $\underline{N}$ = 82. df = 1) which was much greater for NHCU than contract patients. More NHCU patients were service-connected and. less pronounced but still significant, fewer NHCU patients had Medicaid and more had Medicare A (see Tables 8 and 9).

Neither type of nursing home patient demonstrated statistically significant improvement in functional ability. mental status or perceptions of health. This held true for baseline to three month scores. three to six month scores and baseline to six month scores. Improvement was defined as any increase in points scored over the preceding assessment. There was a highly significant difference between NHCU and contract patients on their baseline functional status ($\underline{F}$ = 9.78. $\underline{p}$ < .01). The NHCU patients were much more dependent as measured by the Barthel

Table 8

Statistical Comparisons of (Categorical) Predisposing, Enabling and Need Variables by Type of Nursing Home and Selected Age Grouping (Chi-square)

VARIABLES	Contract vs. NHCU		$\geq$ 76 years vs. $\leq$ 75 years	
	$\underline{n} = 24$	$\underline{n} = 58$	$\underline{n} = 19$	$\underline{n} = 63$
	x^2	$\underline{p}$ levels	x^2	$\underline{p}$ levels
Predisposing				
RACE	2.55	.11	2.33	.12
Marital Status	6.60	.01***	.44	.50
Usual Living Arrangement	2.68	.10*	.12	.72
Avail. Assist with ADL	.29	.58	.17	.67
Avail. Assist with IADL	.17	.68	.67	.41
Enabling				
Statutory Eligability	4.06	.04**	.02	.88
Presence of Medicaid	2.87	.09*	.12	.72
Presence of Medicare A	2.63	.10*	10.45	.00$^\tau$
Presence of Medicare B	.80	.36	.13	.71
Presence of Other Insurance Sources	1.96	.16	1.12	.28
Need				
Improvement in Functional Ability from Baseline to 3 month	.85	.35	.07	.78
Improvement in Functional Ability from Baseline to 6 month	.00	.99	.10	.74
Improvement in Functional Ability from 3 to 6 month	.05	.81	3.34	.06*
Improvement in Mental Status From Baseline to 3 month	.28	.59	.00	.99
Improvement in Mental Status from Baseline to 6 month	.00	.95	.06	.80
Improvement in Mental Status from 3 to 6 month	1.04	.30	1.73	.18
Improvement in Self-perceived Health from Baseline to 3 month	.18	.66	1.33	.24
Improvement in Self-perceived Health from Baseline to 6 month	.00	.98	.36	.54
Improvement in Self-perceived Health from 3 to 6 month	.50	.47	.74	.38

Legend: *$\underline{p} \leq .10$; **$\underline{p} \leq .05$; ***$\underline{p} \leq .01$; $\tau\underline{p} \leq .001$; $\underline{N} = 82$, df = 1

Table 9

Statistical Comparisons of (Continuous) Predisposing, Enabling and Need Variables by
Type of Nursing Home and Selected Age Grouping (One-Way Analysis of Variance)

VARIABLES	Contract vs. NHCU		≥ 76 years vs. ≤ 75 years	
	$\underline{n} = 24$	$\underline{n} = 58$	$\underline{n} = 19$	$\underline{n} = 63$
	F-Ratios	p levels	F-Ratios	p levels
Predisposing				
Age	2.03	.15	--	--
Education	1.44	.23	5.38	.02**
Enabling				
Income	7.61	.00***	1.44	.23
Total No. of Health Insurance				
Coverage Plans	1.95	.16	1.78	.18
% Service-Connected Disability	3.75	.05**	.44	.50
Need				
Baseline Functional Ability	9.78	.00***	3.97	.04**
Baseline Mental Status	.28	.59	.07	.79
Baseline Self-Perceived Health				
Status	.00	.96	.00	.98
Total Number of Diagnoses	.07	.79	.06	.81

Legend: *$\underline{p} \leq .10$; **$\underline{p} \leq .05$; ***$\underline{p} \leq .01$; $\underline{N} = 82$, df = 1

-- Not Applicable

Index. For eight out of ten items, NHCU patients were significantly more limited

in function. The only exceptions were personal hygiene and bladder control

(Table 10).

When patients were compared by age group, additional differences were found

for functional levels. Those 75 years and younger were less dependent ($F = 3.97$,

$p < .05$) and even improved in self-care ability between the third and sixth months

($x^2 = 3.34$, $p < .10$). Analysis of individual Barthel items indicated that those

75 years and younger were more capable of independence. Specifically, the older

group (i.e., 76 plus) were significantly more impaired in feeding, transferring,

bathing and dressing (Table 10). The older group also had Medicare A more often

and less years of formal education.

Clinical Outcomes

The predominant outcomes for all patients were either continued nursing home

residence (CNHR) or death. Table 11 depicts the nature and sequence of clinical

outcomes. At the end of seven months, 59% of NHCU patients and 54% of contract

patients remained in nursing home care. The sources of payment for continued

contract care were 11 by Medicaid, one self pay and one reinitiation of contract

coverage following a period of hospital stay. Thirty-four percent of NHCU

patients and 17% of contract patients had died. The greatest number of deaths

occurred within the first three months of placement. For the NHCU, 13 died within

three months, four more within six months and an additional three by the seventh

month for a total of 20. For the contract home, all four deaths had taken place

by the third month. Eleven of the NHCU deaths were in the hospital and nine were

in the nursing home. All four contract patients died in the hospital.

More contract patients than NHCU patients had favorable outcomes and the

proportion was greater (i.e., 6 of 24 vs. only 2 of 58); the number was small for

both. The discharge destinations for contract patients included one to a private

Table 10

One-Way Analysis of Variance for Individual Functional Assessment Items (Barthel) by

Type of Nursing Home and Selected Age Grouping

Barthel Items	Contract vs. NHCU		$\geq$ 76 years vs. $\leq$ 75 years	
	$\underline{n} = 24$ $\underline{n} = 58$		$\underline{n} = 19$ $\underline{n} = 63$	
	F-Ratios	$\underline{p}$ levels	F-Ratios	$\underline{p}$ levels
Item 1, Feeding	3.51	.06*	3.31	.07*
Item 2, Moving/transfer	14.85	.00$^\tau$	4.42	.03**
Item 3, Personal Toilet/hygiene	2.26	.13	2.35	.12
Item 4, On and Off Toilet	9.58	.00***	1.93	.16
Item 5, Bathing	4.91	.02**	6.35	.01***
Item 6, Walking	14.71	.00$^\tau$	1.28	.26
Item 7, Ascending/descending stairs	10.17	.00***	2.38	.12
Item 8, Dressing	6.83	.01*	5.30	.02**
Item 9, Control of Bowels	3.18	.07*	1.30	.25
Item 10, Control of Bladder	2.41	.12	2.52	.11

Legend: *$\underline{p} \leq$ .10; **$\underline{p} \leq$ .05; ***$\underline{p} \leq$ .01; $^\tau\underline{p} \leq$ .001; $\underline{N} = 82$, df = 1

Table 11

Outcomes of Nursing Home Patients by Type of Home and Outcome, and Period of Outcome

Outcome	3 month		6 month		7 month	
	NHCU	Contract	NHCU	Contract	NHCU	Contract
Continued Nursing Home Residence						
#	44	19	39	18	34	13
%	76	79	67	75	59	54
Death						
#	13	4	17	--	20	--
% of n	22	17	29	--	--	--
% of Deaths	65	100	85	--	--	--
Discharged Worse: Admitted to Hospital						
#	--	--	--	--	1	1
Discharged Better						
#	2	1	--	2	--	6
Discharged Other Nursing Home						
#	1	--	--	--	--	1
Discharged Other						
#	1	--	--	--	--	--

Legend: n / NHCU = 58; n / Contract = 24

Dashes = no score or value attributable; not missing data.

apartment, one home with home-health-aid assistance, two home with relatives and two placed in subsidized housing. Both NHCU discharges were to home with relatives; one of those also received hospital based home care support. One NHCU and one contract patient were discharged to other nursing homes, and one from each nursing home type was found to be hospitalized at the seventh month. One NHCU patient was discharged as "other" when he signed out against medical advice.

Based on the finding that most patients either remained institutionalized or died, the outcomes were collapsed to these two for purposes of logistic regression analyses. The results of the LOGIT procedure are shown in Tables 12 and 13. Using nursing home type as a variable in the equations (Table 12) revealed no significant differences for continued nursing home residence except for income ($t = 2.25$, $p < .05$, $n = 48$, $df = 4$). This enabling characteristic suggests that the higher income patients stayed longer in nursing home care. When the same independent variables were regressed against death as the outcome, more variables showed significance. Greater numbers of diagnoses were associated with increased deaths and the NHCU had significantly more deaths than contract (Table 12).

Repeating the calculations but including age group rather than nursing home type as a variable, results again showed income to be significant to continued stays ($t = 1.96$, $p < .05$). Being 76 years or older was predictive of continued stay in the equation for need characteristics ($t = 2.44$, $p < .01$, $df = 5$), and among predisposing variables ($t = 1.69$, $p < .10$, $df = 6$) (Table 13). Using death as the dependent variable, age group and number of diagnoses were significant in explaining that outcome at the $p \leq .10$ level.

Further investigation was done for the outcome of death. Selected characteristics of those who had died were compared to the characteristics of all patients who were alive at the end of seven months (Table 14). Statistically significant results were found by ANOVA for baseline functional status ($F = 2.72$,

Table 12

Nursing Home Patient Outcomes (Logistic Regressions with Nursing Home Type)

Independent Variables	Dependent Variable = Continued Nursing Home Residence (CNHR)			Dependent Variable = Death		
	t	p values	Beta	t	p values	Beta
Equation 1: Predisposing Variables						
Age	1.31	.18	.03	1.13	.25	.02
Marital Status	.14	.89	.07	.20	.85	.11
Usual Living Arrangement	1.19	.23	.83	.48	.62	.40
Availability of Assistance for ADL	.00	.97	.02	.17	.86	.11
Availability of Assistance for IADL	.17	.87	.11	.66	.50	.51
Type of Nursing Home	.44	.65	.24	1.23	.21	.81
Model Chi-square =	4.60 with 6 df			5.10 with 6 df		
Equation 2: Enabling Variables						
Total Sources of Insurance	1.40	.16	-.90	.37	.70	.26
Statutory Eligibility	.79	.42	.43	1.02	.30	-.59
Income	2.25	.02**	.00	1.21	.22	-.00
Type of Nursing Home	.00	.97	.01	1.87	.06*	1.26
Model Chi-square =	8.11 with 4 df			6.03 with 4 df		
Equation 3: Need Variables						
Baseline Functinoal Score (Barthel)	.65	.51	.00	.72	.47	-.06
Baseline Mental Status Score (SPMSQ)	.97	.96	.00	.20	.83	.01
Baseline Self-Perceived Health Rating	.43	.19	.30	1.37	.16	-.40
Total Number of Diagnoses	.61	.38	.10	1.66	.09*	-.27
Type of Nursing Home	.88	.79	.14	1.40	.16	.93
Model Chi-square =	3.30 with 5 df			8.52 with 5 df		

Legend: #1 *$p \leq .10$; **$p \leq .05$

#2 Perceptions of health were dichotomized to excellent-good and fair-poor

#3 n for CNHR = 48 of total 82

n for Death = 24 of total 82

Table 13

Nursing Home Patient Outcomes (Logistic Regressions with Selected Age Grouping)

Independent Variables	Dependent Variable = Continued Nursing Home Residence (CNHR)			Dependent Variable = Death		
	t	p values	Beta	t	p values	Beta
Equation 1: Predisposing Variables						
Age	.24	.81	.00	.14	.87	.00
Marital Status	.22	.81	.12	.10	.92	.05
Usual Living Arrangement	1.39	.16	-.98	.60	.54	-.50
Availability of Assistance for ADL	.22	.82	.14	.26	.79	.17
Availability of Assistance for IADL	.14	.88	.10	.60	.54	-.46
Age Group	1.69	.09*	-1.28	1.20	.22	.96
Model Chi-square =	7.33 with 6 df			5.32 with 6 df		
Equation 2: Enabling Variables						
Total Sources of Insurance	.84	.39	-.55	.31	.75	.22
Statutory Eligibility	.95	.33	.52	.78	.43	-.45
Income	1.96	.04**	.00	.54	.58	-.00
Age Group	1.53	.12	-.91	1.60	.10*	.95
Model Chi-square =	10.47 with 4 df			5.07 with 4 df		
Equation 3: Need Variables						
Baseline Functional Score (Barthel)	1.47	.13	-.01	.67	.50	-.00
Baseline Mental Status Score (SPMSQ)	.43	.66	.03	.10	.94	.00
Baseline Self-Perceived Health Rating	1.38	.16	.35	1.27	.20	-.38
Total Number of Diagnoses	.76	.44	.09	1.67	.09*	0.28
Age Group	2.44	.01***	-1.46	1.75	.07*	1.05
Model Chi-square =	9.31 with 5 df			9.91 with 5 df		

Legend: #1 *$p \leq .10$; **$p \leq .05$; ***$p \leq .01$

#2 Age group was dischotomized to ≥ 76 and ≤ 75

#3 n for CNHR = 48 of total 82

n for Death = 24 of total 82

Table 14

Statistical Comparison of Selected Characteristics for Those Who Died Versus Those Who Survived (One-Way Analysis of Variance)

Characteristics	F-Ratios	p levels
Number of episodes of hospital readmission	4.11	.04**
Number of days of hospital readmission	3.98	.04**
Actual length of nursing home stay	189.39	.00τ
Total number of diagnoses	2.25	.13
Age	2.06	.15
Income	.80	.37
Percent: service connected disability	.30	.58
Total sources of insurance	1.80	.18
Baseline perception of health	3.17	.07*
Baseline mental status (SPMSQ)	1.94	.16
Baseline functional ability (Barthel)	2.72	.10*
Barthel Items		
Item 1. Feeding	1.11	.29
Item 2. Moving/transfer	1.93	.16
Item 3. Personal toilet/hygiene	.91	.34
Item 4. On and off toilet	3.95	.05*
Item 5. Bathing	1.43	.23
Item 6. Walking	.62	.43
Item 7. Ascending/descending stairs	3.37	.07*
Item 8. Dressing	1.24	.26
Item 9. Control of bowel	3.63	.06*
Item 10. Control of bladder	2.66	.10*

Legend: survivors, $n = 58$; deaths, $n = 24$

$*p \leq .10$; $**p \leq .05$; $***p \leq .01$; $^{\tau}p \leq .001$; $N = 82$. $df = 1$

$p = .10$), baseline self perceived health ($\underline{F} = 3.17$, $p < .10$), number of episodes and days of hospital readmission ($\underline{F} = 4.11$ and 3.98 respectively, $p < .05$) and most dramatically for length of nursing home stay ($\underline{F} = 189.39$, $p < .001$).

Within the realm of functional status, those who died scored lower on ability to go up and down stairs, ability to get on and off the toilet and continence items for bowel and bladder control. Because there was found to be a significant difference between nursing home types on baseline functional status, the deaths versus survivors were also explored on this dimension by nursing home type. For those in the NHCU who survived, the average baseline score was eight points higher on the Barthel Index ($\bar{x} = 38$ vs. 30). The contract group difference was 16 points (63 vs. 47). Both groups had approximately one more episode of hospital readmission among those who had died and the number of days of hospital readmission were double ($\bar{x} = 15$ vs. 7.8 for NHCU survivors and descedents respectively, and $\bar{x} = 13.75$ vs. 6.4 for contract). The actual number of nursing home days for descedents was almost than-one-third that of survivors ($\bar{x} = 61.5$ vs. 170 for NHCU and $\bar{x} = 67.25$ vs. 168.45 for contract).

Chi-square analysis was also performed for the group of survivors and decedents. Most results were either not significant or based on cell sizes which were too small to be meaningful. However, qualitative review of the diagnostic groups revealed that none of the deaths for either group had a primary diagnosis of dementia. Of those whose primary diagnosis was neoplasm, four were alive at the seventh month and six had died. Pulmonary disease accounted for six deaths and neurological motor dysfunction for three.

By age group, nine of the deaths were among those over 76 years and 15 were among the younger group. Differences in mean functional scores by age group were less pronounced; number of episodes and days of hospital readmission and length of nursing home stay trends were similar.

Health Services Utilization

Table 15 shows the utilization patterns for hospital and nursing home care. For both NHCU and contract patients, more than 50% of the patients had no episodes of hospital readmission during a six month period. Twenty-nine percent of contract patients and 26% of NHCU patients had one admission; the remainder did not exceed three episodes. The number of days of hospital readmission also varied little between groups. Most stays were less than 20 days and the average was six for contract patients, and eight for NHCU patients.

The length of nursing home stay includes the entire period during which patients were listed on the nursing home census. Days of rehospitalization were not subtracted from these totals. More than 60% of both types of nursing home patients stayed greater than six months. The slight difference in numbers between Tables 15 and 11 are simply attributable to a refinement in the latter table. There were 15 contract patients still on board as nursing home residents at seven months; one of these was in the hospital and one was transferred to a different nursing home. There were 36 NHCU patients still on the rolls; one of these was hospitalized and one was in another nursing home setting. Of the 17 patients whose lengths of stay were 90 days or less, all of these were deaths.

In addition to profiling the utilization patterns, multivariate analyses were done. The results of the multiple regression model are shown in Table 16. Statistically significant variables affecting the number of episodes of hospital readmission were baseline functional status ($t = -2.40$, $p = .01$) and income ($t = -2.63$, $p = .01$). Episodes of hospitalization increased as functional status declined. Lower income was associated with greater number of hospital episodes. Baseline Barthel scores and income were also predictive for number of days of hospital admission and the relationship remained inverse. The days of hospital readmissions were greater for non-white ($t = -2.36$, $p < .05$). The only two variables influencing the actual length of nursing home stay were income ($t = 1.64$, $p = .10$ and RACE ($t = 1.85$, $p < .10$).

Table 15

Frequency Distributions, Percents and Means of Health Services Utilization, by Nursing Home Type

Health Service Indicators	Total Group N = 82		Contract n = 24		NHCU n = 58	
	Number	%	Number	%	Number	%
Number of episodes of hospital readmission						
Zero	46	56	14	58	32	55
One	22	27	7	29	15	26
Two	8	10	2	8	6	10
Three	6	7	1	4	5	9
Mean number of episodes	1		.33		.61	
Number of days of hospital readmission						
Zero	46	56	14	58	32	55
1-10	13	16	4	17	9	15
11-20	8	10	3	13	5	9
21-30	4	5	1	4	3	5
31-40	5	6	1	4	4	7
41-61	6	7	1	4	5	9
Mean number of days	15		6		8	
Length of nursing home stay						
0-30 (one month)	3	4	0	0	3	5
31-60 (two months)	8	10	0	0	8	14
61-90 (three months)	6	7	3	13	3	5
91-120 (four months)	4	5	1	4	3	5
121-150 (five months)	5	6	3	13	2	3
151-180 (six months)	3	4	1	4	2	3
181-186 (greater than six months)	51	62	15	63	36	62
Mean length of stay	76		179		179	

Legend: §Percentages may not equal 100% due to overlapping response categories

Table 16

Health Service Utilization (Ordinary Least Squares (OLS)

Independent Variables	Dependent Variable = Number of episodes of hospital readmission (NEHR)			Dependent Variable = number of days of hospital readmission (NDHR)			Dependent Variable = actual length of nursing home stay (ALOS)		
	Equation 1			Equation 2			Equation 3		
	t values	p levels	Beta	t values	p levels	Beta	t values	p levels	Beta
(Predisposing)									
Marital Status	-.80	.42	-.18	-1.25	.21	-4.85	-.01	.99	-.11
RACE	-1.54	.12	-.34	-2.36	.02**	-8.75	1.85	.06*	26.41
Age group	-1.04	.30	-.27	-1.58	.11	-6.81	-1.26	.21	-20.96
(Enabling)									
Income	-2.36	.01***	.00	-2.63	.01***	-.00	1.64	.10*	.01
Statutory eligibility	1.61	.11	.36	.76	.44	2.86	.81	.41	11.76
Type of nursing home	.34	.73	.08	.71	.47	3.02	-1.09	.28	-17.73
(Need)									
Baseline functional ability (Barthel)	-2.40	.01***	-.00	-2.53	.01***	-.16	.35	.72	.08
Baseline mental status (SPMSQ)	.38	.70	.01	.82	.41	.43	.35	.72	.71
Total number of diagnoses	.25	.80	.01	.93	.35	.80	1.02	.31	3.40
		$R^2 = .17$			$R^2 = .22$			$R^2 = .15$	

Legend *$p \leq .10$; **$p \leq .05$; ***$p \leq .01$; $N = 82$, df = 9

Age group was dichotomized to ≥ 76 and ≤ 75

ALOS was the total length of nursing home stay minus days of hospitalization

Although several variables were found to be predictive the overall variance explained was very small. There were no statistically significant differences between nursing homes types or between those 76 years and greater versus those who were younger.

Comparison Variables

Of the six contract nursing homes. five were 200 bed facilities and one had 240 operating beds. Attempts to relate nursing staff to patient ratios among homes were futile. Some homes reported RN's as the number employed full and part-time. plus per diem staff. Others counted the usual RN's available for the facility and/or particular units. Still others considered only those on duty at any particular point in time. These inconsistencies held across all categories of nursing personnel (i.e., RN. LPN. NA). Further. some ratios were based on number of operating beds while others used average daily census. Size of units had some differences as well. Only one of the nursing homes did not use agency or per diem nurses at all: the rest employed them with varying frequency. All homes had physical occupational. recreational and speech therapies available.

By contrast, the NHCU staff numbers were known but were no more easily translated into pertinent ratios. For example. 26 registered nurses were allocated in the ceiling but due to illness. vacation and the like. the on-duty strength of the R.N. force was frequently altered. Further. several other professional nurse positions were a part of the staffing pattern but were dedicated to such roles as nurse practitioner. clinical specialist and nurse managers.

CHAPTER 5

Summary, Conclusion and Recommendations

Introduction

The purpose of this study was to examine the sociodemographic
characteristics, clinical profile and course, utilization patterns and outcomes
of patients in two types of VA nursing home programs. The program types were
the hospital-based nursing home and contract, community nursing home care.
Increasing costs and demand for nursing home services suggest that findings from
studies such as this have implications for planning and allocation of resources
between the VA program alternatives. The objective was to explore these factors
and recommend avenues for continued policy formulation.

Summary

This study builds upon the work of numerous authors in the field of nursing
home care. Development of the subject area began with inspection of organizational
characteristics of long-term care facilities and process measures, such as
conformity to standards and regulatory codes. The research focus expanded to
include the contribution of sociodemographic characteristics of patients and the
role these played in predicting institutionalization. Most recently, investigators
have undertaken to analyze patient casemix, the costs and outcomes of care, and the
differences between hospital-based and freestanding nursing homes.

From the dearth of studies, trends have emerged but many inconsistencies
remain. Some of the conflicting findings are attributable to differences in study
design and specification of variables. Other disparities are due in part to the
use of cross-sectional, retrospective and/or secondary data sets, about which the
limitations of the data may be unknown. Sources such as these may yield varying
conclusions.

In this study patients were followed longitudinally; thereby generating primary data which could be more accurately interpreted. Patients from one VA hospital-based nursing home and six freestanding VA contract nursing homes were studied. A total of 82 patients participated from May of 1986 through June, 1987. Each patient was followed for a seven month period, during which time background information and multiple clinical status indicators were obtained.

The research was intended to clarify the composition of patients in two types of nursing home settings, compare their clinical courses and utilization patterns, and evaluate outcomes. Further, it sought to relate the findings to the expressed mission, criteria and legislative intent of the government agency.

The Andersen Model (1968) was used as the organizing framework for the study variables. Predisposing, enabling and need factors are the major components of the model. Predisposing factors include selected sociodemographic characteristics. Income, health insurance and other economic means which facilitate or impede access to health services represent enabling factors. Health status and disability levels constitute need. Together, these help to explain variation in health service use. The reciprocal nature of the model lends itself to an iterative process which is particularly useful to identification of need and potential policy influence.

Two standardized test instruments were used. The Barthel Index (BI) (Mahoney & Barthel, 1965) was used as the measure of functional ability. The Short Portable Mental Status Questionnaire (SPMSQ)(Pfeiffer, 1975) was used to evaluate orientation and memory. Statistical methods included descriptive analyses, logistic regression, ordinary least square, chi-square and one-way analysis of variance.

Findings

It was hypothesized that veterans in the hospital-based versus contract, community nursing home program would exhibit statistically significant differences in characteristics, and on measures of service use and outcome.

Statistically significant differences were found between patients in the two settings on predisposing, enabling and need characteristics. Variables included marital status, usual living arrangement, income, statutory eligibility, supplemental insurance policies and functional ability. The hospital-based, NHCU patients were more often married (i.e., two-thirds vs. one-third of contract patients) and living with someone. They also had significantly higher incomes than those in contract ($\bar{x} = \$1,172$ vs. $747), more Medicare A coverage and a greater percentage of service-connected veterans (39.7% vs. 12.6%). NHCU patients demonstrated far greater limitation in functional ability ($p < .001$). Their reduced function was evident in eight of the ten Barthel items; personal hygiene and bladder control were the only two exceptions.

Contract nursing home patients more often lived alone prior to nursing home placement and were unmarried. Their income thresholds were lower and they had higher proportions of non-service connected veterans. Although neither group had much Medicaid coverage prior to admission, the percentage was significantly greater for contract (16.7% vs. 5.2%). The greater independence in activities of daily living (ADL) was statistically significant. The average baseline Barthel score was twice as high for contract patients ($\bar{x} = 60$-65 vs. 35-39).

Descriptively, both groups had more non-white than white patients owing possibly to the catchment area of the study. Groups were almost identical for availability of assistance with activities of daily living (58.3% contract and 51.6% NHCU), and instrumental activities of daily living (63.5% contract and 67.2% NHCU). The primary source of help was either spouse or other household member. Rarely were paid agency helpers employed.

Patients in contract homes were more often diagnosed as having mental problems (i.e., largely dementia), although actual test results of mental status suggested that the two groups were similar in this domain. The average baseline score for

both was six which indicates mild intellectual impairment. The range for both was zero to ten, the median eight and the mode ten. Both groups averaged five diagnoses but the nature of the conditions requiring nursing home care were different. The NHCU patients had 32% of the diagnoses listed as neurological motor dysfunction compared to only 8% of contract patients. The most prevalent diagnosis for contract patients was mental problem; for NHCU neurological motor dysfunction ranked first.

Patient's perceptions of their health differed little. Most patients in both settings rated their health as fair to poor. This likely reflects their assessment of institutionalization as a negative experience and one of decline. Their perceptions were not predictive of outcome.

Although there was no statistically significant between group difference by age, one-third of the NHCU patients were 76 years of age or older. The mean ages for NHCU and contract patients were 71 and 67 respectively. The older age of the NHCU patients may account for their increased Medicare A coverage. Fifty-eight percent of contract patients and 75% of NHCU patients had some sort of coverage additional to that of the VA.

The predominant outcome for both groups was continued nursing home care: 59% for NHCU patients and 54% for contract. Of the 13 contract patients who remained institutionalized, 11 converted from VA funding to Medicaid coverage, one continued under self-payment and one was still under the auspices of the VA following an episode of hospitalizations (i.e., reinitiation of contract).

Statistically significant differences were found on outcome measures. Higher income and being 76 years or older were predictive of continued nursing home residence. The type of nursing home was not significant in explaining continued care. The total number of diagnoses, age group and type of nursing home were predictive of death as an outcome. There were significantly more deaths among those 75 years or younger, among those with lower incomes and among NHCU patients.

Further investigation of the death outcome revealed additional differences. Selected characteristics of those who died were compared to all patients who were alive at the end of seven months. Statistically significant results were found for baseline functional status, baseline self-perceived health, number of episodes and days of hospital readmission and length of nursing home stay. Of those in the NHCU who survived, the average baseline score was eight points higher on the Barthel Index ($\bar{x}$ = 38 vs. 30). The contract group difference was 16 points (63 vs. 47). Those who died demonstrated particular decline in toileting and continence. Both groups had approximately one more episode of hospital readmission among those who had died and the number of days of hospital readmission was double ($\bar{x}$ = 15 vs. 7.8 for NHCU survivors and descedents respectively), and 13.75 vs. 6.4 for contract. The length of nursing home stay of descedents was only about one-third that of survivors ($\bar{x}$ = 61.5 vs. 170 days for NHCU and $\bar{x}$ = 67.25 vs. 168.45 days for contract).

There were no reported deaths among those whose primary diagnosis was mental problem. Six deaths were attributable to cancer; however four persons with diagnoses of neoplasms were alive at the end of their study period. Pulmonary and neurological motor dysfunction accounted for nine other deaths. By age group, nine of the deaths were among patients 76 years or older and 15 were among those younger.

Health service utilization did not differ significantly by nursing home type. More than 50% of the patients in both groups (i.e., NHCU and contract) had no rehospitalization experience during the study period. One-third of contract patients and one-fourth of NHCU patients had one episode of rehospitalization. The remainder did not exceed three episodes. Most stays were less than 20 days; the average was six for contract patients and eight for NHCU patients. Reduced functional ability and lower income were predictive of increased episodes and days

of hospital readmission. Non-whites had a greater number of hospitals days. The length of nursing home stay rose as income levels went higher and declined markedly among descedents. Neither group of nursing home patients demonstrated any significant improvement in functional or mental status and self-perceived health. The only statistically significant difference was found among those 75 years or less who did improve in functional ability from the third to the sixth month.

Discussion and Recommendations

The findings indicate that patients are being placed according to expressed differences in criteria between the two VA program types. The median functional status score for NHCU patients at intake (Mdn = 35) is like that found by Granger et al., (1975) (i.e., Mdn = 35) for nursing home patients. The median Barthel score for contract patients was 60; a level requiring less skillful care. This implies cost-relevant differences in casemix between the hospital-based and freestanding groups as measured by functional status.

The contract patients had greater frequencies of mental problems identified both as primary and secondary diagnoses. Interestingly, when actually tested using a standardized mental status instrument, the two group were found to be similar. This may suggest two possibilities. First, the greater physical dependencies of those in the hospital-based setting may displace the attention of clinicians to their dementing illnesses. Second, dementias represent more custodial needs which are not consistent with the NHCU mission. Formalizing these considerations in the form of stated diagnoses may preclude admission of patients, and practitioners may therefore, consciously or unconsciously omit them from medical problem lists. The question may also be raised as to the legitimacy of any diagnostic findings of mental impairment among nursing home patients from studies which do not employ well accepted measurement techniques.

The NHCU group did, as per the criteria, select many patients with service-connected eligibility. Also, according to NHCU criteria, patients with diagnoses of cancer should not be admitted unless they have a life expectancy of greater than 90 days. There were four times the number of admissions for neoplasms in the NHCU group as compared to the contract group. Since some of these were alive at the end of the study, one might speculate that this criterion was met. Any implications then for hospice care as opposed to nursing home care being provided could not be accurately judged in the context of this study.

Strictly speaking, neither group resembled the profile of nursing home patients from the 1977 NNHS (NCHS, 1979). Rather, both groups had some characteristics in common, but they differed as to the nature of commonalities. The average NHCU patient had reasonable financial resources and was married. The combination did not sufficiently offset the clinical need factors to prevent nursing home placement. The contract patients were much less functionally dependent but more often unmarried, living alone and lacking financial adequacy. Again, but conversely, their greater physical capabilities did not deter those with weak or absent social supports from incurring nursing home care. Both groups claimed to have compensating help available for performance of activities of daily living and instrumental activities of daily living.

Unlike the NNHS (1977) patients, all VA patients were male. The NHCU had more with advanced age; the contract average age was younger. Like the NNHS patients, the NHCU group had a preponderance of neurological and medical problems; the contract group did not. The VA's own surveys suggest that NHCU patients have more mental disorders than patients in the national nursing home survey. However, the pilot study done on a hospital-based population of VA patients in Richmond (Sheehy, 1984) found mental illness not to be the leading diagnosis as did this study. Perhaps the explanation lies in the type of medical facility to which the nursing

home is attached. Those medical centers which are tertiary may refer more medical management patients (e.g., neuromuscular motor disorder) while those hospitals which are primarily psychiatric reflect that focus. National averages may not accurately reveal these stratified differences.

Findings were confirmed for the 1977 NNHS (NCHS, 1979), M.W. Linn et al., (1977) and others, that both groups have multiple diagnoses. Comorbidity in conjunction with more functionally oriented measures, did have meaning in regard to the outcome of death.

Despite differences in composite profile between the two groups, they both continued nursing home care beyond six months. The intent of the contract program to provide a brief course of extended care and facilitate transition to the community, did not appear to be realized. Based on the fairly high functional level of the contract patients, one might speculate that placement in a nursing home may not have been necessary at the onset. It is possible that community resources were unavailable, or that they were not adequately mobilized prior to discharge, such that lower levels of care could be obtained. It is also possible that once placed in contract, continuing care coordinators did not aggressively use the six month period to explore deinstitutional alternatives.

There was no evidence that practitioners manipulated readmissions for the purpose of reinstituting contract benefits. In this sample nearly every contract patient who remained in nursing home care did so by converting to Medicaid payment. Pursuing the latter explanation, the lower incomes of the majority of contract patients made it possible for them to secure Medicaid coverage. This effectively mitigated the impact of major out-of-pocket expenses following the six month period and probably created the same limitless benefit as exists for the hospital-based program. In conjunction with their lesser physical care needs, this possibility may suggest over-utilization for the state Medicaid, nursing home benefit.

The number of patients discharged from either setting was too small to warrant generalizations. Certain legislative restrictions could impact discharge patterns. Service-connected veterans who enter NHCU care without a period of hospitalization cannot be sent to lower levels of nursing home care under VA coverage, and outpatient treatment cannot be provided to non-service connected veterans who might be discharged from the hospital-based setting (Bonanno, 1984). It is unlikely that these situations affected patients in this study to any great extent since almost all entered via the hospital.

No support was found for improvement in functional status over a six month period for either group. There was a significantly higher death rate for NHCU patients. This is contrary to the results of Mitchell (1978) and M.W. Linn et al., (1985) for VA patients. Their results showed greater progress among NHCU patients and no significant differences in mortality.

Mortality rates varied inversely with functional status and low admission Barthel scores were predictive of death as an outcome. This upheld the findings of Wylie (1967), Goldfarb (1969), Granger, Sherwood and Greer (1977) and Lichtenstein et al., 1985. It also supported the conclusion that lower functional status is associated with higher rates of hospitalization, longer lengths of stay and poor outcome (Granger & Greer, 1979; Granger, Dewis, Peters, Sherwood & Barrett, 1979). Total number of diagnoses was associated with death as in the study of Jones et al., (1978). The expected six month death rate (i.e., 32%) proposed by Jones, Densen and McNitt (1978) was confirmed for the NHCU. That rate was 30% versus a 17% rate for contract.

Among those who died, episodes of hospital readmission and number of days were higher, functional levels were lower and lengths of nursing home stay were shorter. Unlike the pilot study of VA patients (Sheehy, 1984), there was no significant difference in the hospital readmission rates between the two program types.

Semi-annual costs were estimated for the two nursing home settings. Figures used in the calculations were based on costs per day (CPD) for VA medical programs (VA, 1986b). NHCU patients used 7,690 days of care in the nursing home at an average CPD of $117. The total was $899,730. They also had 599 days of hospital readmission. Computing the cost on the average price of an acute medical bed (i.e., $256/day), the amount equaled $153,344. The six month cost of care for the NHCU was concluded to be $18,156 per patient or an approximate per diem of $100.

The same computations were applied to the contract program. This group had 3,638 days of nursing home care and 183 days of hospital readmission. Their total costs were $12,256 per patient and a per diem rate of about $68.00. The average cost per day quoted for contract care in the VA source is exactly this amount.

This study supports the findings of studies which show that the hospital-based facilities serve a more complex casemix (Schieber et al., 1985; Weiner, Liu & Schieber, 1986; Sulvetta & Holahan, 1986). However, the outcome of patients in the NHCU was not found to be discharge, nor was there significant restorative care being accomplished. In fact, most turnover was attributable to death. Therefore, although a difference in cost would be expected based on differences in types of patients served, the precise amount of additional cost in the absence of more favorable outcomes needs to be developed further.

In sum, the two nursing home types do have different patient profiles. The intent of the NHCU program to select in favor of more need dependent patients appeared to be met. The greater functional need level of NHCU patients seems to warrent higher program costs. The lack of improvement in clinical course for functional and mental status, and the frequent outcome of death make it unclear as to how much cost difference can be justified. The likelihood of co-payments contributing to cost containment for either program seems unlikely. Although the NHCU patients' incomes were higher than in contract, they were still typical of retirement and low in comparison to the legislative income threshold.

The goal of the contract program to provide temporary care did not seem to be achieved. The majority of patients who continued under the auspices of Medicaid suggest a shifting of costs rather than a true resolution of need and augur increased financial burdens to states. The twice higher functional level of these patients suggests the possibility of over utilization of nursing home care.

Presumably, reimbursement based on a per case methodology will eventually clarify the issue. There is a need to study a larger sample of NHCU's, in several areas and stratified by medical facility type. The contract programs need further exploration by geographic area and community resource availability.

Appendix A

Information About

Differences in Nursing Home Utilization and Patient
Outcome in VA Nursing Home Patients

INVESTIGATOR: Christine M. Sheehy. R.N.. M.S.N.
(Tel: 584-9000 extension 1900)

PURPOSE OF   You are being asked to participate in a study to find out what
STUDY: factors contribute to human health of persons in nursing homes.

PROCEDURES: Specifically, you are being asked to:

1. Give us personal information about such things as age.
   education, marital status, income, insurance coverage,
   living arrangements and diagnoses.

2. Let us ask you questions about your physical and mental
   health.

3. Allow us to measure your physical and mental health
   several times by questionnaire and review of medical
   records. The first time would be while you are
   hospitalized. The second and third times would be while
   you are a patients in a nursing home, at three and six
   months respectively.

4. Complete the study by contacting you in seven months to
   ask some follow up questions of you or your family.

RISK AND   1. You should not experience any risk in being asked
BENEFIT: information. No invasive procedures will be used.

2. Privacy will be provided in asking you questions. The
   questioning would last 30-60 minutes on four occasions,
   and will be done by me.

3. You will not be paid for participation in this study, nor
   will you be expected to make any payments for costs.

4. Any new information that is discovered during the course
   of this study that could possibly help you will be made
   known to you.

5. Participation in this study will not change in any way,
   your course of therapy or treatment in the nursing home.

CONFIDENTIALITY: The information you provide will be kept strictly
confidential in exactly the same way that hospital records
are restricted. If results of this study are published or
otherwise reported, there will be no identification of you
as a participant.

Patient's Signature: _____

Information About

Differences in Nursing Home Utilization and Patient
Outcome in VA Nursing Home Patients

RIGHT TO
WITHDRAW:

You have the right to withdraw from this study at any time
without being required to give a reason or explanation. Your
decision to withdraw will not adversely affect any health care
you receive from the VA Medical Center or nursing home.

VOLUNTARY
CONSENT:

Before, during or after the study has been completed you have
the right to contact the principal investigator at the telephone
number listed on page one.

In signing this form, I certify that I have read the preceding
information, or had it read to me, and that I understand its
contents. I have freely agreed to participate in this study.

I understand that should I wish to discuss my participation in
this project with another doctor or lay person, I can contact
Dr. H.G. Rose, Director of Medical Research, by requesting an
appointment (extension 2046 or 2047; office, room I-133, first
floor in the Research Building).

Patient's Signature: _____

_____   _____
Date   Client's Signature or Representative's Signature

                         _____
                         Relationship (if other than client)

                         _____
                         Witness

                         _____
                         Investigator's Signature

Desire for Copy
of Results: Indicate below if you want a copy of results of this study.

                         [ ] I <u>do not</u> want a copy of results.

                         [ ] I <u>do</u> want a copy of results. Send them to:

                         Name: _____

                         Address: _____
                                  Street   Apt #

                                  _____
                                  City   State   Zip Code

PART I-AGREEMENT TO PARTICIPATE IN RESEARCH BY OR UNDER THE DIRECTION OF THE VETERANS ADMINISTRATION	DATE

1. I, _____, voluntarily consent to participate as a subject
   (Type or print subject's name)

the investigation entitled _____
   (Title of study)

. I have signed one or more information sheets with this title to show that I have read the description including the purpose and nature of the investigation, the procedures to be used, the risks, inconveniences, side effects and benefits to be expected, as well as other courses of action open to me and my right to withdraw from the investigation at any time. Each of these items has been explained to me by the investigator in the presence of a witness. The investigator has answered my questions concerning the investigation and I believe I understand what is intended.

. I understand that no guarantees or assurances have been given me since the results and risks of an investigation are not always known beforehand. I have been told that this investigation has been carefully planned, that the plan has been reviewed by knowledgeable people, and that every reasonable precaution will be taken to protect my well-being.

. In the event I sustain physical injury as a result of participation in this investigation, if I am eligible for medical care as a veteran, all necessary and appropriate care will be provided. If I am not eligible for medical care as a veteran, humanitarian emergency care will nevertheless be provided.

. I realize I have not released this institution from liability for negligence. Compensation may or may not be payable, in the event of physical injury arising from such research, under applicable federal laws.

. I understand that all information obtained about me during the course of this study will be made available only to doctors who are taking care of me and to qualified investigators and their assistants where their access to this information is appropriate and authorized. They will be bound by the same requirements to maintain my privacy and anonymity as apply to all medical personnel within the Veterans Administration.

. I further understand that, where required by law, the appropriate federal officer or agency will have free access to information obtained in this study should it become necessary. Generally, I may expect the same respect for my privacy and anonymity from these agencies as is afforded by the Veterans Administration and its employees. The provisions of the Privacy Act apply to all agencies.

. In the event that research in which I participate involves certain new drugs, information concerning my response to the drug(s) will be supplied to the sponsoring pharmaceutical house(s) that made the drug(s) available. This information will be given to them in such a way that I cannot be identified.

I _____

   NAME OF VOLUNTEER

   HAVE READ THIS CONSENT FORM. ALL MY QUESTIONS HAVE BEEN ANSWERED, AND I FREELY AND VOLUNTARILY CHOOSE TO PARTICIPATE. I UNDERSTAND THAT MY RIGHTS AND PRIVACY WILL BE MAINTAINED. I AGREE TO PARTICIPATE AS A VOLUNTEER IN THIS PROGRAM.

). Nevertheless, I wish to limit my participation in the investigation as follows:

A FACILITY	SUBJECT'S SIGNATURE
WITNESS'S NAME AND ADDRESS *(Print or type)*	WITNESS'S SIGNATURE
INVESTIGATOR'S NAME *(Print or type)*	INVESTIGATOR'S SIGNATURE

☐ Signed information sheets attached. ☐ Signed information sheets available at:

SUBJECT'S IDENTIFICATION *(I.D. plate or give name - last, first, middle)*	SUBJECT'S I.D. NO.	WARD

**AGREEMENT TO PARTICIPATE IN
RESEARCH BY OR UNDER THE DIRECTION
OF THE VETERANS ADMINISTRATION**

VA FORM 10-1086
SEP 1979

SUPERSEDES VA FORM 10-1086
JUN 1975, WHICH WILL NOT BE
USED.

PART II - AGREEMENT BY SUBJECT'S REPRESENTATIVE TO ALLOW SUBJECT TO PARTICIPATE IN RESEARCH BY OR UNDER THE DIRECTION OF VETERANS ADMINISTRATION

DATE

1. I, _____, am authorized to give consent
(Type or print name of subject's representative)

for _____ by virtue of _____
(Type or print subject's name)   *(Relationship, legal appointment, etc.)*

I voluntarily consent for this person to participate as a subject in the investigation entitled _____

(Title of study)

2. I have signed one or more information sheets with this title to show that I have read the description including the purpose and nature of the investigation, the procedures to be used, the risks, inconveniences, side effects, and benefits to be expected, as well as other courses of action open to me and my right to withdraw the subject from the investigation at any time. Each of these items has been explained to me by the investigator in the presence of a witness. The investigator has answered my questions concerning the investigation and I believe that I understand what is intended.

3. I understand that no guarantees or assurances have been given me since the results and risks of an investigation are not always known beforehand. I have been told this investigation has been carefully plannned, that the plan has been reviewed by knowledgeable people, and that every reasonable precaution will be taken to protect the well-being of the subject.

4. In the event the subject sustains physical injury as a result of participation in this investigation, if the subject is eligible for medical care as a veteran, all necessary and appropriate care will be provided. If the subject is not eligible for medical care as a veteran, humanitarian emergency care will nevertheless be provided.

5. I realize I have not released this institution from liability for negligence. Compensation may or may not be payable, in the event of physical injury arising from such research, under applicable federal laws.

6. I understand that all information obtained about the subject during the course of this study will be made available only to doctors who are taking care of the subject and to qualified investigators and their assistants where their access to this information is appropriate and authorized. They will be bound by the same requirements to maintain the subject's privacy and anonymity as apply to all medical personnel within the Veterans Administration.

7. I further understand that, where required by law, the appropriate federal officer or agency will have free access to information obtained in this study should it become necessary. Generally, I may expect the same respect for the subject's privacy and anonymity from these agencies as is afforded by the Veterans Administration and its employees. The provisions of the Privacy Act apply to all agencies.

8. In the event that research in which the subject participates involves certain new drugs, information concerning the subject's response to the drug(s) will be supplied to the sponsoring pharmaceutical house(s) that made the drug(s) available. This information will be given to them in such a way that the subject cannot be identified.

I _____
    NAME OF SUBJECT'S REPRESENTATIVE

HAVE READ THIS CONSENT FORM. ALL MY QUESTIONS HAVE BEEN ANSWERED, AND I FREELY AND VOLUNTARILY CHOOSE THAT THE SUBJECT PARTICIPATE. I UNDERSTAND THAT THE SUBJECT'S RIGHTS AND PRIVACY WILL BE MAINTAINED. I AGREE TO THE SUBJECT'S PARTICIPATION AS A VOLUNTEER IN THIS PROGRAM.

9. Nevertheless, my consent for the subject's participation in the investigation is limited as follows:

ADDRESS OF SUBJECT'S REPRESENTATIVE (Print or type)	SIGNATURE OF SUBJECT'S REPRESENTATIVE
WITNESS'S NAME AND ADDRESS (Print or type)	WITNESS'S SIGNATURE
SUBJECT'S NAME (Print or type)	SUBJECT IS NOW A PATIENT AT (Name of VA Facility)
INVESTIGATOR'S NAME (Print or type)	INVESTIGATOR'S SIGNATURE

☐ Signed information sheets attached.   ☐ Signed information sheets available at:

SUBJECT'S IDENTIFICATION (I.D. plate or print name - last, first, middle)

SUBJECT'S I.D. NO.	AGE	WARD

AGREEMENT BY SUBJECT'S REPRESENTATIVE TO PARTICIPATE IN RESEARCH BY OR UNDER THE DIRECTION OF THE VETERANS ADMINISTRATION

Appendix C

Explanatory Letter to Contract
Nursing Home Administrators

526/18

Dear Administrator:

Some VA contract patients at your facility are participating in an approved VA study of their functional and cognitive status. This will involve visiting each of them twice over a six month period.

In addition to some assessment of the patients by me. your nursing staff will be asked to tell me how the patients rate on their ADL levels. The questions are brief and should not pose any interruption or burden. The time frame for the study extends over a one to one and a half year period.

I appreciate your cooperation and if any further clarification is necessary. please do not hesitate to contact me. I can be reached at ███████████.
███.

CHRISTINE SHEEHY. RN. MSN
Associate Chief. Nursing Service for Extended Care

Appendix D

Thank-you Letter to Contract
Nursing Home Administrators

526/18

Dear Administrator,

As I informed you selected patients placed on contract in your nursing home were being followed for a VA study. The study period is now concluded.

I would like you to express my gratitude to your nursing staff for their assistance in helping me locate patients and rate their progress. Their efficiency and gracious manner certainly eased the job of data collection.

Once again, it was a pleasure visiting your facility.

Warm regards,

CHRISTINE SHEEHY, RN
Associate Chief, Nursing Service/Extended Care

Appendix E

DATA CODE SHEET

Identification Number (IDN) - - -
(3)

1. Age (AGE) (in years) - - -
(3)

2. Race (RACE) -
(1)
Non White = 1
White = 0

3. Education (EDUC) - -
(2)

4. Marital status (MARST) -
(1)
Never married = 1 Married = 2
Sep/divorced = 4 Widowed = 3

5. Primary diagnoses (PRIMDX) - -
(2)
(1) Blood and Blood-forming
organ disorders
(2) Circ disease
(3) Endocrine and Metabolic
disorders
(4) Genitourinary disorders
(5) Mental problems
(6) Musculosketal disability
(7) Neoplasms
(8) Neurological motor dysfunction
(9) Pulmonary disease
(10) Sensory
(11) Skin disorders
(12) Other

6. Secondary diagnoses (SECONDX)

Present = 1
Not present = 0

(1) Blood and Blood-forming (2)
organ disorders
(2) Circ disease (2)
(3) Endocrine and Metabolic (2)
disorders
(4) Genitourinary disorders (2)
(5) Mental problems (2)
(6) Musculosketal disability (2)
(7) Neoplasms (2)

6. Secondary diagnoses (SECONDX) (cont.)

(8) Neurological motor
dysfunction (2)
(9) Pulmonary disease (2)
(10) Sensory (2)
(11) Skin disorders (2)
(12) Other

7. Total number of diagnoses (TD)
(2)

8. Referral source (REFS) - -
(1)
(1) BX VA Hospital
(2) Other Hospital
(3) Home
(4) Other Nursing Home
(5) DOM
(6) Comm. resid care
(7) Other

9. Usual living arrangement (ULA)
(1)
(1) NA (comes from Nursing Home)
(2) Lives alone
(3) With spouse only
(4) Lives with spouse and other
relatives
(5) Lives with relatives only
(6) Lives with nonrelatives
(7) Lives in group quarters other than
Nursing Home
(8) None of the choices

10. Total number is household (TH) -
(counting patient excluding
group quarter members) (2)

11. Availability of help ADL: (bathing.
drsg. eating. transfer. toileting.
walking) (AADL)

Present = 1
Not present = 0

(1) NA or independent or none
(2) Spouse or other household member
(3) Relative outside of household
(4) Friend
(5) Paid helper/agency

12. Availability of help with IADL
(shopping, meal preparation,
housekeeping, medications, telephone,
mobility outside household, financial
management) (AIADL)

Present = 1
Not present = 0

(1) NA or independent or none (2)
(2) Spouse or other household
member (2)
(3) Relative outside of household(2)
(4) Friend (2)
(5) Paid helper/agency (2)
Total Sources Help (2)

13. Income (all sources in dollar,
exclude cents) (INC) (5)

Compensation (COMP) - - - - -
(5)
Pension (PENS) - - - - -
(5)
Social Security (SSEC) - - - - -
(5)
Social Security 1 (SSI) - - - - -
(5)
Spouse (SPOU) - - - - -
(5)
Other (OTHR) - - - - -
(5)

14. Health Insurance (INSR)

Present = 1
Not present = 0

(1) Medicaid (2)
(2) Medicare A (2)
(3) Medicare B (2)
(4) Private Insurance (2)

15. Statutory eligibility (ELIGB) - -
(1)
Service connected = 1
Non SC = 0

16. Percent SC (PCTSC) - - -
(3)

17. Barthel baseline =

(B1) Feeding 0 5 10   (2)
(B2) Moving 0 5 10 15   (2)
(B3) Personal 0 5   (1)
(B4) Toilet   0 5 10   (2)
(B5) Bathing 0 5   (1)
(B6) Walking 0 5 10 15   (2)
(B7) Stairs   0 5 10   (2)
(B8) drsg   0 5 10   (2)
(B9) Bowels 0 5 10   (2)
(B0) Bladder 0 5 10   (2)

18. Total Score (BTL) - - -
(3)

19. SPMSQ

Correct = 1
Not correct = 0

(ST1) Date _____   (1)
(ST2) Day _____   (1)
(ST3) Place_____   (1)
(ST4) Telephone_____   (1)
(ST5) Age_____   (1)
(ST6) Birthdate_____   (1)
(ST7) President _____ (1)
(ST8) Former pre._____ (1)
(ST9) Mother's name ____ (1)
(ST0) Subtraction _____ (1)

20. Total Score (STS) - -
(2)

21. Self perceived health (SPH) - -
(1)
Excellent   = 1
Very Good   = 2
Good   = 3
Fair   = 4
Poor   = 5
Unable   = 6

22. Type (TYPE) -
(1)
NHCU   = 1
Contract   = 0

Appendix F

ICD-9 Codes for Common Diseases
(Listed Alphabetically Within Disease Category

1. Blood and Blood-forming Organ Disorders

    Anemia NOS*   285.9
    (Additional) Leukemia
               (include all anemias)
               Polycythemia

2. Cardiac Disease and Peripheral Vascular Disease

    Acute myocardial infraction, NOS   410.9
    Aneurysm - Aortic only   441.9
    Aneurysm - Unspecified site   442.9
    Angina pectoris   413.9
    Arteriosclerotic cardiovascular disease (ASCVD)   429.2
    Arteriosclerotic heart disease (ASHD)   414.0
    Atherosclerosis   440.9
    Cardiac dysrhythmias   427.9
    Cardiac arrest   427.5
    Chronic ischemic heart disease NOS   414.9
    Congestive heart failure   428.0
    Congestive heart failure with pulmonary edema   428.1
    Essential hypertension NOS   401.9
    Chronic heart disease NOS   429.9
    Hypertensive heart disease c/o congestive heart failure   402.9
    Mitral valve disease   394.9
    Myocarditis NOS   429.0
    Chronic rheumatic heart disease   398.90
    Generalized arterioslerosis   440.9
    (additional) Gangrene   785.4
               PVD, NOS   443.9
               Phlebilitis/thrombo ph.   451.9
               Venous thrombosis or unspecified site   453.9
               Aortic stenosis
               Atrial stenosis
               Syncope
               S/P pacemaker insertion/orthost. hypotension

3. Endocrine & Metabolic Disorders

    Dehyration
    Diabetes complicated - noninsulin dependent   276.5
    Diabetes uncomplicated - insulin dependent   250.00
    Electrolyte imbalance NEC⁺   250.01
    Gout   274.9
    Hypothyroidism NOS   274.9
    Thyrotoxicosis   242.90
    (additional) Thyroidectomy
               Cirrhosis of liver
               Hypercalcemia/hypocalcemia, folate defic

*Not otherwise specified
⁺Not elsewhere classified

4. Genitourinary Disorders

Acute renal failure	584.9
Chronic pyelonephritis	590.00
Hyperplasia of prostate	600.
(additional) Prostatitis BPH	
Infections of kidney, unspecified	590.9
Urinary tract infection (site not specified)	599.0
(additional) Urosepsis	
Incontinence	
Nephrolithiasis	
Urinary Retention	
Renal insufficiency	

5. Mental Problems

Alcohol dependence syndrome	303.9
Alzehimer's disease 331.0	
Arteriosclerotic dementia	290.40
Chronic organic brain syndrome (COBS) NOS	294.0
Depressive disorder NEC*	311.
Manic depressive psychosis NOS⁺	296.80
Mental disorder (non-psychotic) following	
organic brain damage	310.9
Mental retardation NOS	319.
Organic personality syndrome	310.1
Paranoid state NOS	297.9
Presensile demential NOS	290.10
Psychosis NOS	298.9
Schizophrenia NOS	290.0
Senile dementia	290.0
Senility without psychosis	797.
(additional) Korsakoffs	
Nervous breakdown	

6. Musculosketal Disability

(additional) Degenerative Joint Disease	
Arthropathy excluding osteoarthrosis	716.90
Contusion of hip	924.01
Fx ankle	824.8
Fx carpal bone(s)	814.00
Fx humerus	812.20
Fx neck of femur	820.09
Fx unspecified part of neck of femur NOS	820.08
Fx other unspecified part of femur	821.00
Fx pelvis	808.8
Fx rib(s), sternum, larynx, and trachea	807.
Fx tibia and/or fibula	823.
Fx vertebral column without spinal cord injury	805.8
Late amputation stump complication	997.60
Osteoarthrosis and allied disorders	715.00
Osteoarthritis, unspecified whether	
generalized or localized	715.90

6. Musculosketal Disability (cont.)

Osteoporosis	733.00
Rheumatoid arthritis	714.0
Spondylosis and allied disorders	721.90
Traumatic amputation leg(s) - late effect	905.9
(additional) Skeletal fusion	
Osteomyelitis	
Contractures	
AKA/BKA	

7. Neoplasms

Malignant neoplasm female breast (if breast removed use V10.3)	174.9
Malignant neoplasm colon	153.9
Malignant neoplasm of lung	162.9
Carcinomatosis, generalized cancer (if cancer has	
been removed, use V10.5)	199.0

8. Neurological Motor Dysfunction

Cerebral arteriosclerosis	437.0
Cerebral degeneration unspecified 331.9	
Cerebral infraction NOS	434.9
Cerebral palsy NOS	343.9
Cerebral thrombosis	434.0
Cerebrovascular disease NOS	437.9
Cerebrovascular accident, NOS, acute phase	436.0
Cerebrovascular accident, late effects	438.
Convulsions (additional)/Seizure disorder and Paraplegia	780.3
Hemiplegia	342.9
Huntington's choreae	333.4
Intercerebral hemorrhage	431.
Multiple sclerosis	340.
Occlusion of cerebral arteries	434.9
Paralysis agitans (Parkinson's)	332.0
Quadriplegia	344.0
Transient cerebral ischemia (TIAs)	435.9
Unspecified non-psychotic mental disorder following	
organic brain damage	310.9

9. Pulmonary Disease

Acute pulmonary edema (if patient has congestive	
heart failure, then use 428.1)	518.4
Asthma	493.9
Bronchitis NOS	490.
Chronic bronchitis	491.9
Chronic obstructive pulmonary disease (COPD) NOS	496.
Emphysema	492.8
Food, vomit pneumonitis	507.0
Pleurisy,	511.0
Pneumonia, organism unspecified NOS	486.
Upper respiratory infection, acute	465.9

9. Pulmonary Disease (cont.)

   (additional) Idiopathic Pul. fibrosis. Tb
            Pleural effusion
            Aspiration pneumonia

10. Sensory Disorders

Blindness and low vision	369.9
Cataract	366.9
Glaucoma	365.9
Hearing loss	389.9
(additional) Communication. aphasia	
Conjunctivitis	

11. Skin Disorders

Cellulitis and abscess (excluding finger and toe)	682.9
Chronic skin ulcer NOS	707.9
Decubitis ulcer	
(additional) Keratitis	707.9
Ischemic	

12. Other

   Gastrointestinal Disorders

Cholecystitis NOS without mention of calculus	575.1
Cholelithiasis (gall stones) without cholecystitis	574.2
Diverticulitis of colon	562.11
Gastric ulcer	531.9
Gastroenteritis and colitis. non-infectious NOS	558.9
Gastrointestinal hemorrhage	578.9
Intestinal obstruction without mention of hernia	560.9
Peptic ulcer NOS	
(additional) Constipation	533.9

   All other diseases not otherwise specified
   are counted under this category.

Appendix G

Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer. 1975)

Ask questions 1-10 and record all answers. (Ask question 4a only if subject has no telephone). Total the numbers of errors and correct responses based on ten questions.

1. What is the date today?
   Month   Day   Year

2. What day of the week is it? _____

3. What is the name of this place? _____
   *Prompt: The place in which your are now residing.

4. What is your telephone number? _____

   a. (ask only if subject does not have a phone).
      What is your street address? _____

5. How old are you? _____

6. When were you born?
   Month   Day   Year
   Prompt: What is your birthdate and the year you were born?

7. Who is the president of the U.S. now? _____
   Prompt: The movie actor?

8. Who was the president before him? _____
   Prompt: The peanut farmer?

9. What was your mother's maiden name? _____

10. Subtract 3 from 20 and keep subtracting 3 from each new number you get. all the way down. Correct answer is: _____
    17   14   11   8   5   2

    Prompt: Take 20 minus 3 and keep minusing 3 from each new number you get.

Instructions for scoring SPMSQ:

    0-2 errors/8-10 correct = intact
    3-4 errors/6-7 correct = mild intellectual impairment
    5-7 errors/3-5 correct = moderate intellectual impairment
    8-10 errors/0-2 correct = severe intellectual impairment

Allow one more error if subject had only grade school education.

Allow one fewer error if subject has had education beyond high school.

Allow one more error if subject is black using identical educational criteria.

*Prompts were added and are not contained in the original instrument.

Appendix H

Barthel Index (BI) (Mahoney & Barthel. 1965)

Ask questions 1-10 and record all answers. (Ask question 6a only if subject is wheelchair bound). Total the number of correct responses based on ten questions.

1. Feeding

   10 = Independent. The patient can feed himself a meal from a tray or table when someone puts the food within his reach. He must put on an assistive device if this needed. cut up the food. use salt and pepper. spread butter, etc. He must accomplish this in a reasonable time.

   5 = Some help is necessary (with cutting up food. etc., as listed above).

*Decision Rule: Score zero if the patient is nasogastric and/or gastrostomy fed, completely fed by hand or continuous supervision required to assure intake.

2. Moving

   15 = Independent in all phases of this activity. Patients can safely approach the bed in his wheelchair. lock brakes. lift footrests. move safely to bed. lie down. come to a sitting position on the side of the bed. change the position of the wheelchair. if necessary. to transfer back into it safely. and return to the wheelchair.

   10 = Either some minimal help is needed in some step of this activity or the patient needs to be reminded or supervised for safety of one or more parts of this activity.

   5 = Patient can come to a sitting position without the help of a second person but needs to be lifted out of bed. or if he transfers with a great deal of help.

3. Personal toilet

   5 = Patient can wash hands and face. comb hair. clean teeth. and shave. He may use any kind of razor but must put in blade or plug in razor without help as well as get it from drawer or cabinet. Female patients must put on own makeup. if used. but need not braid or style hair.

4. Getting on and off toilet

   10 = Patient is able to get on and off toilet. fasten and unfasten clothes. prevent soiling of clothes. and use toilet paper without help. He may use a wall bar or other stable object for support if needed. If it is necessary to use a bed pan instead of a toilet. he must be able to place in on a chair. empty it. and clean it.

   5 = Patient needs help because of imbalance or in handling clothes or in using toilet paper.

*Decision Rules were added and are not contained in the original istrument.

5. Bathing self

   5 = Patient may use a bath tub. shower. or take a complete sponge bath. He must be able to do all the steps involved in whichever method is employed without another person being present.

6. Walking on a level surface

   15 = Patient can walk at least 50 yards without help or supervision. He may wear braces or prostheses and use crutches. canes. or a walkerette abut not a rolling walker. He must be able to lock and unlock braces if used. assume the standing position and sit down. get the necessary mechanical aides into position for use. and dispose of them when he sits. (Putting on and taking off braces is scored under dressing.)

   10 = Patient needs help or supervision in any of the above but can walk at least 50 yards with a little help.

Decision Rule: Score zero if the patient is physically capable but dementia or respiratory problems prevent the activity.

6a. Propelling a wheelchair

   5 = If a patient cannot ambulate but can propel a wheelchair independently. He must be able to go around corners. turn around. maneuver the chair to a table. bed. toilet. etc. He must be able to push a chair at least 50 yards. Do not score this item if the patient gets score for walking.

7. Ascending and descending stairs

   10 = Patient is able to go up and down a flight of stairs safely without help of supervision. He may and should use handrails. canes. or crutches when needed. He must be able to carry canes or crutches as he ascends or descends stairs.

   5 = Patient needs help with or supervision of any one of the above items.

Decision Rule: Score 5 if the patient could ascend and descend stairs with assistance but has no occasion to demonstrate. Score zero if the patient is physically capable but dementia or respiratory problems prevent the activity.

8. Dressing and undressing

   10 = Patient is able to put on and remove and fasten all clothing. and tie shoe laces (unless it is necessary to use adaptations for this). The activity includes putting on and removing and fastening corset or braces when these are prescribed. Such special clothing as suspenders. loafer shoes. dresses that open down the front may be used when necessary.

   5 = Patient needs help in putting on and removing or fastening any clothing. He must do at least half the work himself. He must accomplish this in a reasonable time.

   Women need not be scored on use of a brassiere or girdle unless these are prescribed garments.

9. Continence of bowels

   10 = Patient is able to control his bowels and have no accidents. He can use a suppository or take an enema when necessary (as for spinal cord injury patients who have had bowel training).

   5 = Patient needs help in using a suppository or taking an enema or has occasional accidents.

Decision Rule: **Score 5 if the patient is on a bowel program and generally kept continent and for colostomies when routine care and irrigations keep the patient dry. Score zero if the bowel program does not work, for colostomies which lack predictable evacuation and for patients who use attends to protect against accidents.**

10. Controlling bladder

   10 = Patient is able to control his bladder day and night. Spinal cord injury patients who wear an external device and leg bag must put them on independently, clean and empty bag, and stay dry day and night.

   5 = Patient has occasional accidents or cannot wait for the bed pan or get to the toilet in time or needs help with an external device.

Decision Rule: **Score 5 if the patient is on a toileting program and generally kept continent, for external catheters which generally keep the patient dry and for ilioconduits which do not regularly leak. Score zero if the patient uses an indwelling catheter, has frequent episodes of leakage or pulling off an external catheter and if the patient wears attends to protect against accidents.**

A score of 0 is given in all of the above activities when the patient cannot meet the criteria as defined above.

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