# SELF-CARE DEPENDENCY AMONG ELDERS IN LONG-TERM CARE SETTINGS

by

Shirley S. Travis

Dissertation submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

**DOCTOR OF PHILOSOPHY**

in

Family and Child Development

**APPROVED:**

William J. McAuley, Chairman

Leland J. Axelson

Rosemary Blieszner

Karma Castleberry

Linda Thompson

June, 1985

Blacksburg, Virginia

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Committee Chairman: William J. McAuley
Center for Gerontology

(ABSTRACT)

General acceptance of a pattern of activities of daily living (ADL) dependency has led to the use of an additive method of determining self-care dependency and need for long-term care. This traditional method of determining ADL levels is convenient, and it is practical to the extent that individuals in a long-term care population do fit a scaled pattern of dependency. This research was based on 3611 cases from the Preadmission Screening Program of the Virginia Medical Assistance Program. Tabular and staged logistic regression analyses examined: 1) characteristics of this group of long-term care elders, 2) the extent of ADL divergence in various recommended care settings, 3) the relationship between rehabilitation status and ADL divergence, 4) other factors influencing divergence from the ADL dependency hierarchy.

The results of this study demonstrated that a large proportion of those screened did not match the original Index of ADL. Therefore, the justification for counting ADL dependency, based on an underlying hierarchy of ADL, was not upheld. Further research was indicated for improving eligibility and placement criteria that would reflect a fluid rather than a static system of long-term care. For example, rehabilitative trajectory could serve as an indicator of projected changes in assistance for self-care.

ACKNOWLEDGEMENTS

I wish to extend sincere thanks to the following individuals:

Dr. William J. McAuley, the chairman of my committee, for his guidance and support during my doctoral program. His concern and interest for my professional development as a practicing gerontologist will never be forgotten;

Dr. Leland Axelson for his support and suggestions as a committee member and for sharing his knowledge in family theory;

Dr. Rosemary Blieszner for her thoughtful comments while serving on my committee. Her editorial suggestions have been especially valuable in writing my dissertation manuscript;

Dr. Karma Castleberry for her friendship and support both as a committee member and a nursing colleague. Her suggestions regarding clarity of my dissertation research have been most helpful;

Dr. Linda Thompson for her guidance and assistance as a committee member. Her comments and questions regarding methodological issues are greatly appreciated;

The Virginia Department of Health for making available the Pre-admission Screening data tapes used in my dissertation research.

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# SELF-CARE DEPENDENCY AMONG ELDERS IN LONG-TERM CARE SETTINGS

## Chapter I: Introduction

Long-term care is most often conceptualized as an array of services that address the health, social, and personal care needs of individuals who have a reduced capacity for self care. These services may be continuous or intermittent, but a consistent feature is that they will be delivered for the long term to individuals who have a demonstrated need. This need is usually determined by some measure of functional status which includes activities of daily living (ADL) as a major determinant of service needs.

Long-term care services, including newer community-based care, range from complex skilled nursing care in an institutional setting to assistance that informal support systems (friends and family) could provide if such individuals were available. One of the striking features of the long-term care literature has been, however, that differential levels of functional capacity were found in all care settings (Smyer, 1980) and appeared to be poor predictors of placement decisions (Kutza, 1981) despite widespread use of these measures as placement criteria.

The apparent variability in functional capacity among recipients of long-term care services makes long range planning for resource allocation and identification of target populations extremely difficult. The concern over the role of functional capacity, specifically self-care, in determining level of care and recommended care setting has escalated in direct proportion to the rising cost of community based and institutional services.

This research examined ADL patterns in terms of ADL divergence (ADL dependency that does not match a theoretical pattern of ADL). This new variable, divergence, was examined from a number of perspectives as both an explanatory variable and a criterion variable. The goal of the research was to determine the extent of ADL divergence in a long-term care elderly population and the explanatory value of divergence in recommendations for long-term care placement. Since prior research had failed to demonstrate the effect of ADL dependencies on long-term care recommendations, this project approached the issue of ADL dependency from the perspective that ADL divergence and not a sequential order of ADL losses was inherent in a long-term care elderly population.

The most common method of determining functional status has been a simple count of the number of ADL dependencies. Such a count results in a score of 0 for persons who are totally independent to a score of 6 for individuals who are totally dependent in the six basic activities of daily living (bathing, dressing, toileting, transferring, continence, and feeding). The underlying assumption in this simple count of ADL dependencies has been the scalability of the items and the resulting ADL pattern reported by Katz and his associates at the Benjamin Rose Hospital in the late 1950's.

Katz has shown that a hierarchy of ADL dependency does exist in a large number of individuals. This pattern follows an identifiable course of functional decline and recovery which reverses the pattern of ability acquisition in childhood (Katz, Downs, Cash, & Grotz, 1970; Katz & Akpom, 1976a).

The Katz hierarchy included six basic activities of daily living which have been arranged in order from the least basic and most complex to the most essential and least complex self-care activities. These six activities of daily living have formed an ADL Guttman scale of bathing, dressing, toileting, transferring, continence, and feeding.

Recognition of the scalability of the basic activities of daily living has given rise to the theory that biological organization of neurological and neuromotor responses explains a pattern of functional decline and recovery of activities of daily living (ADL) in chronically ill and elderly individuals (Katz and Akpom, 1976b). At a time of illness or injury the pattern of ADL dependency should begin with loss of the least basic human function, bathing, and progress to dependency in the most essential human function, feeding. Conversely, in recovery the first functions to return should be the most basic and least complex functions such as feeding and continence while the last functions to return should be the more complex but least essential functions such as dressing and bathing. When variations in this pattern of ADL dependency have been found to occur, they usually occurred in recovery and not in decline of functional capacity.

The original version of the Katz Index of ADL (Appendix A) clearly depicted a hierarchy of ADL dependency. Katz and his associates have been able to categorize 86 percent of the patients in rehabilitation hospital settings into levels of dependency ranging from totally independent to totally dependent in the six activities of daily living. Once an individual was categorized at a particular level of dependency, this level became the baseline to assess progress in rehabilitation

following such illnesses or injuries as strokes and hip fractures.

In the two decades that have followed the published Katz hierarchy in 1963, general acceptance of the scalability of the ADL functions has led to the practice of counting areas of ADL dependency and translating this number into type and amount of need for long-term care. This traditional method of determining ADL dependency has been convenient and practical to the exent that individuals do, in fact, fit the underlying pattern of ADL dependency progressing in the order of: bathing, dressing, toileting, transferring, continence, and feeding.

In the Commonwealth of Virginia, the count of ADL dependencies has been a major criterion for acceptance into any of the five long-term care categories for Medicaid recipients: skilled care, intermediate care, personal care, home health, or a combination of personal care and home health. Admission criteria for institutional care of the Medicaid population in both Skilled Nursing Care and Intermediate Nursing Care Facilities have included a count of ADL dependencies. ADL dependency has also been used for determining service needs in the community based long-term care programs of Personal Care, Home Health, or a combination of Personal Care and Home Health.

Although long-term care providers as well as researchers now use counts of ADL dependencies in practice and in research applications, no one has examined the extent to which long-term care populations actually fit the ADL hierarchy. In other words, Katz found an 86 percent agreement in his study populations on the ADL hierarchy leaving 14 percent of the population to differ from the basic pattern. Functional capacity may be a poor predictor of long-term care placement decisions because

the operationalization of functional capacity by count of ADL dependencies is not valid in a long-term care population or because this measure is an inappropriate indicator of the need for care and services.

The ADL pattern of individuals who were described by Katz as differing from the basic ADL pattern was termed ADL divergence for this project. This term was intended to reflect the difference from the widely accepted ADL hierarchy.

When Katz reported the original index of ADL in 1963, he also reported that an additional 7 percent of the patient assessments differed from the basic pattern, but in an ordered fashion. Specifically, by replacing the last function in a pattern with the next function of the scale, Katz and his associates were able to achieve a 93 percent fit on the ADL classification scheme (Katz et al., 1963).

Subsequent revision of the Index of ADL published in 1976 reflected over ten years of experience with the original index and a new awareness in the medical profession that biological function was but one component of the emerging construct of holistic health. Katz clearly addressed the need to consider biological, psychological, and social factors in determining an individual's capacity for self-care.

The revised index of ADL was a less stringent hierarchy (Appendix B) of ADL dependency which accommodated the psychological and social factors in an individual's ability for self-care in activities of daily living. However, the new index of ADL weakened the underlying assumption of scalability in activities of daily living. Since the less stringent Revised Index of ADL did not contribute to the initial popularity of counting ADL dependencies it was not used in this research project. It

is mentioned only to clarify that two Indexes of ADL were developed by Katz and that only the original index of ADL was the basis of counting ADL dependencies. However, during the development of the Revised Index of ADL Katz described a phenomenon which he termed "environmental artifact" to explain divergence from the basic ADL pattern. This concept of environmental artifact is discussed more fully in Chapter II and was incorporated into this research to examine ADL divergence in a long-term care population.

Since prior research had not examined the extent or explanatory value of divergence from the basic ADL pattern in a long-term care population, the present research was conducted to determine whether the basic ADL pattern did exist within this special group. In addition, if divergence from the basic pattern was present in a long-term care population, there was a need to understand this divergence in terms of recovery or decline since Katz had already reported greater ADL divergence in recovery of functional capacity than in decline. As a crude indicator of whether an individual was in a path of recovery, the present study explored a rudimentary classification scheme for rehabilitative trajectory. The term rehabilitative trajectory was used in the literal sense to designate a set of medical conditions with onset limitations and care and services an individual was or was not currently receiving at the time of application for long-term care. The two components of this classification scheme, rehabilitative track and nonrehabilitative/maintenance track, were used to differentiate individuals who were currently receiving rehabilitative care and services (such as

speech therapy, physical therapy, and range of motion exercises) from those who had not received or were no longer receiving rehabilitative care and services. The intent was to describe a set of medical conditions and the course of action provided by health care professionals to promote increased functional capacity of an individual by providing selected care and services.

Nonparametric statistics and a series of sequential multivariate analyses were used in this project to begin to understand ADL divergence from the Katz hierarchy in a long-term care population. The hierarchical conceptual model used for these analyses is shown in Figure 1.

Specific Aims

This research was designed to answer the following four questions. First, do the ADL divergent cases represent another pattern of ADL dependency? Second, for a select long-term care elderly population, what is the distribution of patterned and divergent cases on the original ADL hierarchy across existing long-term care settings? Third, within each recommended care setting, what is the distribution of levels of ADL dependency for cases that match the original pattern? Fourth, what factors (background, social environmental, and physical impairment) explain rehabilitative trajectory, divergence from the original ADL hierarchy and recommended care setting for a long-term care elderly population?

The first question emphasized the ADL divergent cases and the possibility of discovering a pattern of ADL dependency unique to a long-term care elderly population. It was proposed that a logical extension

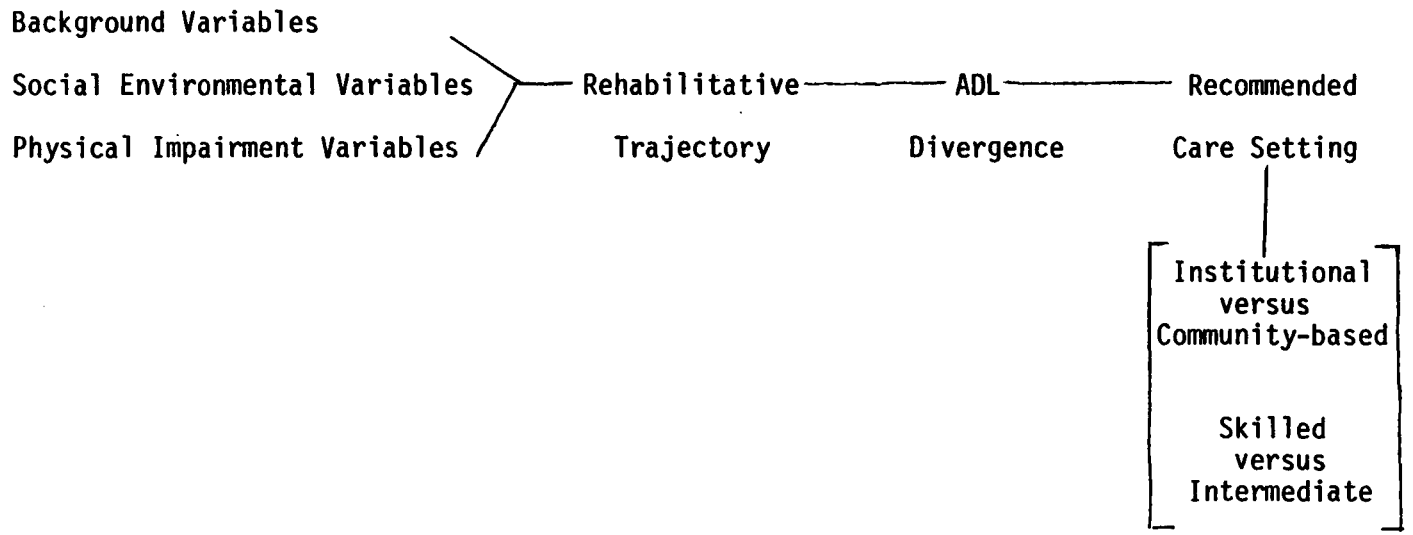


Figure 1

Hierarchical Model For Long-Term Care

to the examination of ADL divergent cases would be an exploration of another ADL hierarchy for long-term care.

The second research question was designed to identify the extent to which long-term care elderly fit the accepted ADL hierarchy. Also, this question addressed the distribution of patterned and divergent cases across three long-term care settings: skilled care, intermediate care, and community-based care. Categories of patterned ADL should reflect frequency and quantity of care for individuals because of the underlying ADL hierarchy. However, by virtue of the hierarchy, an ADL divergent case would always have more care requirements than a patterned case with the same number of ADL dependencies. A finding that a large number of individuals in intermediate care, for example, were ADL divergent could have implications for the allocation of resources as well as for the specific type and extent of care and services that should be available.

The third research question was designed to describe the distribution of levels of patterned ADL dependency within each care setting. Although the emphasis of the research was on ADL divergence, there was an interest in the levels of ADL dependency represented in each care setting. Since level of dependency for the patterned cases would be an accurate reflection of care needs, the distribution of these cases would provide an estimate of the case mixing that was occurring. This is sometimes referred to as the mix of light, moderate, and heavy care cases within a particular setting. ADL patterned cases were the only avenue of categorizing levels of ADL dependency at the onset of this project.

The fourth and final question examined a hierarchical explanatory model for long-term care placement. The emphasis of this project was, of course, ADL divergence. However, ADL divergence was conceptualized as both an explanatory and a criterion variable. This resulted in a bilateral extension of the variable in a model that included pre-existing background, social environmental, and physical impairment variables; a rehabilitative trajectory variable to explain ADL divergence in terms of current state of recovery or decline; and the outcome variable, recommended care setting.

## Chapter II: Significance

### Introduction

The principle variable this project sought to explain was ADL divergence. This variable was conceptualized within a hierarchical model of long-term care placement in an effort to study the nature of the variable and its explanatory value in recommendations for long-term care (See Figure 1). This model began with background, social environmental, and physical impairment variables which led to the provision of care and/or services of the rehabilitative trajectory variable. Rehabilitative trajectory was then conceptualized as an explanatory variable in conjunction with background, social environmental, and physical impairment variables to explain ADL divergence. The final portion of the model was recommended setting for long-term care.

Recommended care setting was conceptualized in two ways. First, it was defined as institutional versus community based care. Second, care setting was defined as skilled versus intermediate institutional care for the subsample of long-term care elders recommended for institutional care. To explain recommended care setting, ADL divergence was conceptualized as an explanatory variable along with rehabilitative trajectory, background, social environmental, and physical impairment variables. In other words, rehabilitative trajectory and ADL divergence were both explanatory and criterion variables in the hierarchical model of long-term care developed for this project.

Discussion of the significance of this project follows the order of the four criterion variables within the proposed hierarchical model: rehabilitative trajectory, ADL divergence, institutional versus com-

munity care, and skilled versus intermediate care. However, the section addressing ADL divergence is, by design, more extensive since this was the chief variable of interest. Past research has not considered rehabilitative trajectory, ADL divergence, and recommended care setting in the same study population. An advantage of this project was the wide variety of measures included in the Virginia preadmission screening process for long-term care. This made it possible to examine the criterion variables with greater confidence that important explanatory variables were included in the analyses.

The definitions of the terms impairment and disability used in this project were those proposed by the World Health Organization (1980). In this taxonomy of disablement, impairment was defined as any loss or abnormality of psychological, physiological, or anatomical structure or function; while disability was any restriction or lack of ability to perform an activity resulting from an impairment (1980).

Rehabilitative/Nonrehabilitative Tracks

One of the most straightforward definitions of rehabilitation found in the literature was "the reintegration of the patient with his original environment" (Evans, 1981, p.199). To this end, the process of rehabilitation included knowledge of the individual's present state of functioning, pre-existing physical state before the disabling event, and the environment from which he or she came (Evans, 1981).

The existing geriatric rehabilitation literature simply has not specified definitive criteria which place an individual on a particular rehabilitative trajectory. In certain cases such as stroke, fractures of the hip, and arthritis, provision of care and services for rehabilita-

tion have been more clearly guided by longitudinal studies using large samples in relatively controlled environments. In the case of older adults, however, rehabilitative trajectories have often been complicated by normal losses of aging and an array of pre-existing or coexisting chronic illnesses as well as elements of the social environment.

One of the most objective methods of determining potential for rehabilitation, developed by Katz and his associates (Katz, Ford, Downs, & Adams, 1969), has included a classification scheme of principal diagnosis, concurrent screening for chronic disease abnormalities and level of ADL disability. This method has been useful for projecting and evaluating degrees of recovery but not for describing the specific types of care and services associated with a rehabilitative trajectory.

From the lack of specificity in defining rehabilitative trajectory it was clear that some type of subjective framework underlies the provision of rehabilitative care and services to some individuals and the discontinuation or lack of provision of care and services to others. This framework has probably been influenced to a large degree by such general constructs as quality of life and societal attitudes toward aging. This project began to explore the framework by identifying explanatory variables of rehabilitative trajectory.

The major emphasis in the geriatric rehabilitation literature has been in the areas of stroke and hip fracture. This was not particularly surprising since stroke and hip fracture are the two most commonly reported disabling categories for adults in acute care and rehabilitation facilities (Andrews, Brocklehurst, Richards,& Laycock, 1984; Eggert, Granger, Morris, & Pendleton, 1977; Katz, Ford, Downs, Adams, &

Rusby, 1972). Time of onset has appeared to be an important component of rehabilitation because it has been reported in the literature that the majority of recoveries from stroke occur within six months with little likelihood of recovery after two years (Katz, Ford, Chinn, & Newill, 1966). For hip fracture patients, the likelihood of recovery of activities of daily living and walking functions was greatest during the first year after injury (Katz, Heiple, Downs, Ford, & Scott, 1967).

Although certainly not considered an axiom of geriatric rehabilitation, one might conclude that beyond one year the elderly patient may expect to gain little benefit from prolonged rehabilitative services. This notation was supported in part over thirty years ago when Downes and Keller (1952) presented a longitudinal description of disability from chronic illness. In each of sixteen chronic disease categories, the highest risk of permanent disability occurred in the first year after diagnosis. It appeared that time since onset and type of disease/injury would be reasonable explanatory variables for rehabilitative trajectory, except for the knowledge that a single illness rarely occurs in isolation in older adulthood. For example, the five most prevalent chronic disabling conditions which affect the physical health of 86% of the general older population are arthritis (38%), hearing impairments (29%), vision impairments (20%), hypertension (20%), and heart conditions (20%) (Harris, 1978). Therefore, in order to have a measure of health that would reflect the effect of multiple health problems, this project used a seriousness of illness measure which summarized the individual's total diagnostic profile. This measure developed by Wyler and his associates (Wyler, Masuda, & Holmes, 1968; 1970) used a set of

ranks and weights which could be summed across medical diagnoses for each person. Other physical impairment variables that were explored in the explanation of rehabilitative trajectory were physical care needs, behavior pattern, nutritional needs, and mobility. It was expected that these variables would influence an individual's ability to participate in rehabilitative activities and, thus, would contribute to the explanation of the rehabilitation variable.

As with the physical impairment and background variables, the role of social environmental variables in rehabilitative trajectory could not be determined from prior research. Both the definition and process of rehabilitation described at the onset of this chapter include mention of social environment. The definitions do not, however, indicate which components of the social environment might affect rehabilitative trajectory or how they might operate to influence this variable. It was not known to what extent available social support, living arrangements, or available living space might affect the provision of care and services which may promote increases in independence.

In summary, this area of exploration regarding rehabilitative trajectory began to look at the variables that might explain which individuals were currently receiving rehabilitative care and services. In isolation, this inquiry would not explain a great deal about recommended care settings in the study population of long-term care elderly adults. In combination with the following issues it did, however, begin to identify subpopulations of elderly individuals who were currently benefiting from intervention strategies that suggested the potential for re-

covery to perform basic ADL and the care setting perceived by screeners to be most appropriate for this care.

ADL Divergence

Historical development and theoretical significance. Medical diagnosis has been a common basis for classifying patients' needs for care and organizing services. It has not always been possible, however, to establish specific diagnoses, or to classify the wide variability of chronic disease characteristics. The use of signs of disease as another means of classification has also had limitations as well since specificity of signs and symptoms were often not well understood in the medical sciences with respect to most chronic diseases (Katz, Ford, Downs, Adams, & Rusby, 1972).

The first attempt to conceptualize a classification scheme for patients at various times during the course of illness and one that took into account host and environment factors began in the mid 1950's (Staff of the Benjamin Rose Hospital, 1958). Consistent with the recommendations by the Commission on Chronic Illness (1956), this early attempt at classification emphasized functional status of activities of daily living. In order to produce reliable data, the research group led by Dr. Sidney Katz, limited their study to a single type of illness, fractures of the hip.

Guided by the Commission of Chronic Illness recommendation for a single measure of functional status in activities of daily living (1956), the research group constructed the "Index of Independence in Activities of Daily Living" later popularized to the "Index of ADL" (Staff of the Benjamin Rose Hospital, 1959). This index included six

activities of daily living: bathing, dressing, going to toilet, transferring in and out of a bed or a chair, continence, and feeding. The Index allowed for a patient to be classified into one of seven categories from independence to total dependence (Appendix A). The Index of ADL provided the first established method for obtaining quantitative information about the progressive loss of ADL or return to independence in response to health care intervention and rehabilitative services.

Subsequent studies by Katz and his associates continued to examine the utility of the Index of ADL with patients suffering from hip fracture (Katz, Heiple, Downs, Ford, & Scott, 1967; Katz, Jackson, Jaffe, Littell, & Turk, 1962), stroke (Katz, Ford, Chinn, & Newill, 1966) and rheumatoid arthritis (Katz, Vignos, Moskowitz, Thompson, & Svec, 1968). After observations of over 1,000 individuals with a variety of chronic illnesses, the theoretical significance of the Index of ADL began to emerge in relation to primary biological and psychological functions of human behavior (Katz, Ford, Moskowitz, Jackson,& Jaffe, 1963).

According to Katz and his colleagues, the definitions in the Index of ADL for feeding, continence, and transfer were recognized as reflecting the organized locomotor and neurologic aspects of simple vegetative functions, exclusive of their more complex cultural and learned characteristics (1963, p.917). In contrast there was also a prominent influence of cultural forces and learning on the other three ADL items (bathing, dressing, and going to toilet) in addition to requirements for organized locomotor and neurologic functioning (Katz et al., 1963, p.917). The order inherent in the Index of ADL was illustrated by the fact that 86% of the cases in a study of hip fracture patients could be

assigned to the original index categories (Katz et al., 1963) with similar results reported for subsequent study groups.

Further evidence of the theoretical significance of the Index of ADL was found in the self-regulation of feeding and elimination as basic requirements for survival by all people, primitive and advanced (Katz et al., 1963). It appeared that decline and recovery from a disabling illness in later life paralleled early childhood development. That is, functions which were most essential for survival and least complex were acquired first and retained longest, while those which were most complex and least basic to survival were acquired later and lost sooner (Katz et al., 1963; Katz & Akpom, 1976b; Katz, Downs, Cash, & Grotz, 1970).

Wide acceptance of the Index of ADL has been found in the health, long-term care, rehabilitation, and gerontology literature. Over the years the research teams led by Katz have demonstrated a hierarchical nature of the ADL items which form a scale of ordered profiles of levels of dependence (Katz, Hedrick, & Henderson, 1979). Measuring functional disability in the older adult population has become synonymous with activities of daily living and the original or some modified version of the original work by Katz (German, 1981).

Since the original efforts of the 1950's to describe a theoretical framework for ADL, three self-maintenance components of daily living have been identified (basic ADL as defined by Katz, mobility, and instrumental activities of daily living) (Katz, 1983). An evaluation of the compatibility among 24 assessment instruments used to measure these three components of daily living reported the highest degree of compatibility among measures of basic activities of daily living and mobility

(Katz, Hedrick, & Henderson, 1979). More recently, 24 assessment instruments for long-term care were reviewed to determine the degree to which a common language now exists for activity of daily living items. Seventy-five percent of the items measuring ADL were viewed as comparable or compatible with only minor problems (Hedrick, Katz, & Stroud, 1981). Thus, it appeared that "activities of daily living" was common terminology with generally universal meaning.

Despite the popularity of the Index of ADL, the acceptance of a hierarchy for determining elderly individual's eligibility for long-term care had one major area of concern for care providers and discharge planners who make decisions regarding services and care setting placements. The ordered nature of activities on the Index of ADL originally suggested that dependency in particular functions would be indicative of level of over-all performance and therefore frequency and type of assistance needed (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). Individuals who need assistance at the lower levels, for example bathing and dressing, generally require assistance at isolated times in a given day, while those in the highest levels (toileting, continence) need assistance at more frequent intervals (Katz et al., 1963). The convenient method of counting dependencies in activities of daily living inherent in the original hierarchy reflected these care requirements. However, to the degree that individuals are divergent from the original ADL pattern, the convenient method of counting ADL dependencies can still yield two dependencies, but, the frequency and type of assistance required can be vastly different. This was a particularly critical issue in the present study population of institutionally vulnerable elders,

because number of ADL dependencies has been a portion of the admission criteria for institutional care (skilled care and intermediate care facilities).

Social environmental deficits may create barriers to continued in-home care that would result in decisions to seek institutionalization by the elder or the family members. At the time of preadmission screening, an individual may actually have a high frequency, high level of assistance pattern of ADL dependency that would not necessarily be adequately reflected in a simple count of ADL dependencies. Conversely, even among the cases which follow the typical pattern of loss of ADL functions, prior research has shown that differential levels of functional capacity are found in all care settings and appear to be poor predictors of placement decisions (Kutza, 1981; Smyer, 1980).

For more than twenty years a simple count of ADL dependencies has gone unchallenged as an appropriate assessment datum for recommending long-term care settings. This has continued to be true despite the fact that number of ADL dependencies has been a poor predictor of long-term care placement. For example, Smyer (1980) studied clients from community and institutional care settings samples matched for functional ability as rated on the Katz Index of ADL. His results indicated that "level of functioning did not in and of itself dictate a particular level of care" (Smyer, 1980, p.254). Rather, prior service contact, less available social support, greater mental impairment, and more impairments of social resources were the variables that discriminated between the institutionalized and the community samples. Of these four statistically

significant variables, all except mental impairment reflected the social environment of the individual (Smyer, 1980).

Lawton (1974, p.257) proposed the "basically simple-minded idea" that the social context in which older people behave is a significant determinant of how they perform. The ability to promote functional recovery and independence in daily living has been a classical attribute of medical management of disease and rehabilitation of residual impairments (Downes & Keller, 1952; Sheps, 1980; Williams, Hill, Fairbank, & Knox, 1973). Slowly, however, physical impairment variables, which include physical and mental functioning, have been joined in the literature with social environmental and backgound variables in explaining ADL dependence (Lerner, 1973). It has also become clear that degree of family solidarity with the patient's goals of re-entering an established family role (Litman, 1966) and available social supports for the family and the elderly individual (Scranton, Fogel, & Erdman, 1970) as well as age, sex, race, and education (Nagi, 1976) all serve to explain capacity to perform activities of daily living in later life. What was not clear in the literature was how these variables influenced ADL divergence.

Functional losses among the institutionalized elders have been attributed to the closed social systems that normally exist within institutional settings. The elderly resident is frequently forced to rely on a limited number of helping relationships for personal care while the staff is forced to adhere to routines and schedules for the efficient delivery of care to large numbers of individuals (Spasoff, Kraus, Beattie, Holden, Lawson, Rodenburg, & Woodcock, 1978; Tobin, 1969).

When Katz and his associates developed the Index of ADL, they recognized the fact that the study population was in a formalized, structured health care setting. They acknowledged that the social environment of an individual (in their case, a rehabilitation hospital) may affect how that person's needs are met as well as which needs are met by available care givers (Katz, Ford, Downs, Adams, & Rusby, 1972). Therefore, functional loss could sometimes be attributed to characteristics of helping relationships in the environment rather than to biological causes. The impact of social-environmental factors on functional status has been termed "environmental artifact" (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963, p.916).

Subsequent modification of the Index of ADL reflected a less stringent pattern of ADL dependency (Appendix B). The modified version may have served to accommodate environmental artifact by providing for variations from the ADL hierarchy. However, an apparent gap between the Katz research and practical application has resulted, since the modified Index of ADL no longer represents an inherent hierarchy of ADL. Practitioners and researchers are still counting ADL dependencies in spite of the evidence in the modified Index of ADL that the ADL hierarchy no longer represents a scale. As discussed in Chapter I, this research project used the original Index of ADL to identify divergence from the ADL dependency pattern in order to examine the issue of environmental artifact and to add to the long-term care literature regarding the appropriateness or lack of appropriateness regarding simple counts of ADL dependencies.

It was suspected that the concepts of a closed social system and environmental artifact might contribute to an understanding of ADL divergence. For many elderly individuals seeking long-term care placement, the restricted social environment in which they lived and/or a reliance on a limited number of helping relationships for activities of daily living were expected to partially explain divergent functional losses.

Past research has not addressed divergence from the ADL pattern in a group of long-term care elders in terms of the environmental artifact that might explain a divergent ADL pattern. Yet, a simple count of ADL dependencies has not been a significant explanatory variable for long-term care placement. The expected contribution to the long-term care literature was a critical examination of factors affecting altered patterns of ADL dependency and the introduction of a new variable, ADL divergence to explain care setting recommendations.

Factors influencing ADL divergence. A variety of background, social environmental, and physical impairment variables in the ADL dependency literature were expected to be of value in this project to explain ADL divergence. The dependency literature created the framework for determining which elderly persons became dependent and their source of assistance. Therefore, it was expected that absence, modification, or interaction of these factors may partially explain divergence. For example, the likelihood of widowhood and thus the probability of living alone was associated with increased age (Glick, 1979). Increased need for assistance with activities of daily living also occurred in older age, when physical capacity, atypical living arrangements, limited resources

(Maddox, 1975), and family composition, structure, and organization (Henrard, 1980; Townsend, 1965) were least adequate to provide support to the older adult. While past research has examined the relationship between these factors and ADL dependency there has been no systematic examination of how these variables may be related to ADL divergence.

Marital status also appeared to be a critical variable in the ability to sustain patterns of ADL functioning. Spouses have been reported to be the major source of support for performance of ADL for married elders with impaired capacity (Stoller, 1982, Stoller & Earl, 1983). For childless elders, in particular, the husband-wife dyad has appeared to be the most viable source of social support for activities of daily living (Johnson & Catalano, 1981). When a spouse was not present or was not able to provide sufficient assistance, adult daughters (Brody, 1981; Stoller & Earl, 1983) or other immediate family members (Shanas, 1979a; Shanas, 1979b; Stoller & Earl, 1983) became the critical social supports of those in need of ADL assistance.

The effect of race in sustaining independence in daily living through utilizing informal social supports has been less clear in the literature. It has appeared that blacks were more versatile in substituting informal helpers one for the other as they approached old age (Gibson, 1982).

When sex was considered in relation to ADL needs, the picture of available social support was somewhat different for men and women. Men were more likely than women to name their spouses as sources of help during a three-month period of disability (Stoller, 1982). Women, on the other hand, were more likely to depend upon children for assistance

in basic activities of daily living than men (Branch & Jette, 1983). Unfortunately, the dependency on children by either sex becomes a problem when considering the high degree of geographic mobility experienced in today's society (Hays, 1984) as well as the changing roles of women, the traditional caregivers of aging parents (Brody, 1966; 1981). Both of these trends have altered patterns for traditional caregiving to elderly, dependent parents.

Both loss and recovery of ability to perform ADL has been reported to be closely related to mental capacity and behavior patterns of the individual. Traditionally, age, chronic illness, and mental capacity have been described as interrelated variables influencing the ability to perform activities of daily living (Berg, Browning, Hill, & Wendert, 1970). At least one research team concluded that mental status was a better predictor of independence in daily living than age (Kahn, Goldfarb, Pollack, & Gerber, 1960).

More recently, Vetter, Jones, and Victor (1982) studied the relationship between mental disabilities and the need for in-home assistance with self care. After controlling for physical disability, they found that individuals with mental disabilities in a large noninstitutionalized sample aged 70 years and older were over three times more likely to require in-home assistance than those without mental disabilities. (Vetter et al., 1982). Information was not available to explain the effect that combinations of background, social environmental, and physical impairments have on ADL and their possible relationships to altering a patterned capacity for independence in activities of daily living.

The literature reported here had several methodological shortcomings. Many studies were done in other countries and the generalizations to the United States population were limited. For example, Townsend (1965) studied old people in residential homes in England and Wales; Henrard (1980) studied elderly residents in private households in Paris, France; and Vetter, Jones, and Victor (1982) interviewed 1288 rural and urban community residents in South Wales. The sample for the Kahn and associates study (1960) was limited to residents of homes for the aged, nursing homes, and psychiatric hospitals where altered mental status may have been an effect rather than a cause of changes in the ability to perform independence in daily living.

In addition, the statistical analyses reported in the literature of ADL dependency were chiefly descriptive in nature. Branch and Jette (1983) were the only investigators to use multivariate analyses. Furthermore, interaction of variables such as sex and marital status or age and race were suggested by the literature and deserved examination.

Finally, although most of the literature cited had large sample sizes, this was not always the case, particularly for studies that utilized difficult subsamples such as the childless elders. Johnson and Catalano (1981) reported findings on only 28 childless elderly individuals. Similarly, Gibson reported her longitudinal cross-sectional national data on 32 older blacks in 1957, and 55 older blacks in 1976.

Recommended Care Setting

In past years, a popular statistic regarding the institutionalization of older adults has been that only 5% of those over 65 years of age are in extended care facilities. This has been disputed in the past

decade by evidence indicating that approximately one in four older adults will die in an extended care facility (Kastenbaum & Candy, 1973; Lesnoff-Caravaglia, 1978). The statistic has now been clarified to mean that only 5% of those over 65 years of age are in extended care facilities at any one time. Recently, McConnnel (1984) produced estimations that an elder's total risk of institutionalization may exceed 50 percent.

Consensus on the factors associated with institutionalization has been lacking. Branch (1984) has suggested that this lack of consensus appears to be an effect of methodological differences and inadequacies rather than contrary findings from comparable methods. The result has been that a large number of variables are associated with risk of or actual institutionalization, with few variables consistently related to recommended long-term care settings.

Among the major methodological differences in the literature are geographic differences in the samples, samples with restricted generalizability, and the nature of comparisons used in the studies between community elders and long-term care residents (Branch, 1984). One contribution that the present project sought to make to the literature was to address factors influencing recommended care settings at the time of application for long-term care rather than examining populations that are only theoretically at risk of institutional care.

This project included elderly applicants for institutional and community based care settings. That is, both individuals recommended for institutionalization and institutionally vulnerable elders recommended for community care were represented in the study. Drawing from the literature of both institutionalized and institutionally vulnerable

elders in long-term care, the following vaiables were identified as useful explanatory variables in explaining long-term care recommendations.

Significant background variables from a variety of studies have included advanced age (Branch, 1984; Branch & Jette, 1982; Davis & Gibbin, 1971; Kraus, et al., 1975; Liu & Manton, 1983; McCoy & Edwards, 1981; Vincente, Wiley, & Carrington, 1979), marital status (not married) (Butler & Newacheck, 1981; Davis & Gibbin, 1971; Greenberg & Ginn, 1979; Liu & Manton, 1983; Palmore, 1976; Vincente et al., 1979), sex (female) (Davis & Gibbin, 1971; Greenberg & Ginn, 1979; Kraus et al., 1976; Liu & Manton, 1983), and race (white) (Kart & Beckham, 1976; McCoy & Edwards, 1981; Palmore, 1976).

Important social environmental variables associated with long-term care placement included none or few living children (Greenberg & Ginn, 1979; Palmore, 1976; Townsend, 1965; Wan & Weissert, 1981), living arrangements (living alone) (Branch, 1984; Branch & Jette, 1982; Brody, 1977; Brody, Poulshock,& Masciocchi, 1978; Butler & Newacheck, 1981; Kraus et al., 1976; McCoy & Edwards, 1981; Neilson, Blenkner, Bloom, Downs, & Beggs, 1972; Palmore, 1976; Vincente et al., 1979), and lack of available social support (Brody et al., 1978; Greenberg & Ginn, 1979; McCoy & Edwards, 1981; Townsend, 1965).

The group of variables categorized as physical impairment variables for this study have had selected effects on institutionalization. For example, problems with behavior patterns and orientation have sharply delineated elders requiring institutional care from those who can be maintained in the community (Branch & Jette, 1982; Wan & Weissert,

1981). With regard to personal care needs and assistance in daily living, it appears that families seek institutional care for the older adult when care needs become continuous such as incontinence problems (Dunlop, 1980) and feeding and toileting needs (Nash, 1966).

Since approximately one-third of all nursing home admissions are from hospitals (U.S. Department of Health, Education, and Welfare, 1979), gerontologists recently have become interested in examining the characteristics of institutionally vulnerable hospitalized older adults. Few studies have been reported to date on factors influencing care setting recommendations following hospital discharge. Background variables have emerged as the more consistent predictors of nursing home care after hospitalization than either social environmental or physical impairment variables. This was somewhat surprising in view of the fact that hospitalization implies health related, physical impairment problems that should carry over in needs for long-term care.

Background variables influencing recommended long-term care placement following hospital discharge have included advanced age (Kane & Matthias, 1984; Kane, Matthias, & Sampson, 1983; Lamont, Sampson, Mattias, & Kane, 1983; McAuley, Travis, & Taylor, 1984), and sex (female) (Kane, et al., 1983). Of the social environmental variables, only available living space (McAuley, et al., 1984), hospital admission from a nursing home (Kane, et al., 1983), and family's willingness to provide care in the home (Prohaska & McAuley, 1983) have differentiated institutional versus community based care.

Impairment has, for the most part, been a poor predictor for institutional care, with the exception of mental impairment which was common-

ly reported in this sparse literature (Davis, Shapiro, & Kane, 1984; Kane, et al., 1983; Lamont, et al., 1983). Recently, sensory impairment was reported by McAuley, Travis and Taylor (1984) in differentiating recommendations for institutional versus community based care.

Major Hypotheses

This project questioned the appropriateness of ADL counts for explaining recommendations for long-term care settings and sought to explore ADL divergence as a more appropriate explanatory variable. Subsequent exploratory analyses were performed, however, to examine ADL count as an explanatory variable. This is discussed more completely in Chapter IV. To this end, a hierarchical model of long-term care was conceptualized. This model generated four criterion variables: rehabilitative trajectory, ADL divergence, and two recommended care setting variables. Rehabilitative trajectory and ADL divergence were, therefore, conceptualized as both criterion variables and explanatory variables in the hierarchical model.

Rehabilitative trajectory and ADL divergence were both new concepts in the long-term care literature. Discussion of the significance of these variables was somewhat hampered by the lack of prior research and the need to translate existing literature into potentially useful explanatory variables.

Five hypotheses were generated for the project which reflected the hierarchical model of long-term care (rehabilitative trajectory, ADL divergence, and two recommended care setting variables) and concerns regarding the distributions of ADL patterned and ADL divergent cases within and across care settings.

The following hypotheses stated in theoretical form were tested in this research project:

1. There will be an unequal distribution of divergent cases on the original Index of ADL across care settings (as compared with the distribution of the total sample). Specifically, ADL divergent cases which are in nonrehabilitative tracks will be found in greater frequency in intermediate care facilities than in skilled care facilities due to the custodial nature of these types of facilities.
2. There will be an equal distribution of levels of ADL disability for the patterned cases within each care setting (skilled care, intermediate care, community care) reflecting the inconsistent effect ADL disability exerts on decisions to seek institutionalization. However, when ADL is cross-classified by rehabilitative trajectory, individuals with mid-range to high ADL dependency and a rehabilitative track will be more frequently representated in skilled nursing facilities where more aggressive, restorative care is provided.
3. Rehabilitative trajectory as operationalized from the screening data can be partially explained by background, social environmental, and physical impairment variables.
4. Divergence from the original ADL pattern of dependency can be explained by background, social environmental, and physical impairment variables. Moreover, the rehabilitative trajectory variable will increase the percent of explained variance in the divergence variable.

5. Care setting placement decisions are a function of background, social environmental, and physical impairment variables. Rehabilitative trajectory will increase the explained variance in placement recommendations for a) institutional versus community care and b) skilled versus intermediate care. Likewise, divergence from the original ADL pattern will add a significant explanatory contribution in a) institutional versus community care and b) skilled versus intermediate care recommendations.

## Chapter III: Methodology

### Source of the Data

Using data from the Virginia Preadmission Screening Program (PAS), the project used a computer selected random sample of cases drawn from the statewide population of elderly Medicaid eligible applicants for long-term care in Virginia between July 1, 1983 and December 21, 1984. For a description of the Long-Term Care Information System Assessment Process used in Virginia see Appendix C.

The Virginia Tech Center for Gerontology wrote to the Virginia Department of Health on October 5, 1984 to request access to the Long-Term Care Information System data base. We also submitted a brief description of the proposed project to the Department of Health at this time (Appendix F). The investigator met with the Director of Medical Social Services, her staff, and the Director of the Center for Gerontology in Richmond on October 29, 1984 to discuss the proposed project. The Director of Medical Social Services gave preliminary approval to proceed with identifying the desired data and necessary computer tape specifications for producing a SAS data set. The investigator sent the project proposal to Dr. Sidney Katz on October 31, 1984 (Appendix G). Dr. Katz generously provided published information as well as verbal feedback at the Gerontological Society of America meeting in San Antonio in November, 1984.

On December 21, 1984, following telephone approval to access the data base, the Center for Gerontology Director sent a letter of agreement to the Director of Medical Social Services stipulating compliance with conditions for use of the data (Appendix H).

The Sample

The sample received from the Virginia Department of Health included 3993 cases from six authorization categories: intermediate care, skilled care, personal care option, home health, personal care and home health, or none of the above. When fewer than 1200 cases existed in a category, the total number within the category was requested. The investigator expected that only the intermediate care and skilled care categories would have a sufficient number of cases for a sample of 1200. If this should be the case, the categories of personal care option, home health, and personal care and home health, and none of the above care recommendations would be combined for data analysis into a single category of community based care. The category of none of the above represented no formal, state supported care recommendations. However, the investigator defined these individuals as community care recipients by virtue of their implicit need for services in undergoing a screening process for long-term care. In other words, the felt or real need for care did not end simply because certain applicants did not meet eligibility requirements and/or the services they needed were not available.

The sample ensured representation of applicants screened by committees of local health departments (PSLH) and acute care facilities (PSAC) as well as authorization decisions for institutional care and community based care. The sample size was large enough to accurately describe ADL patterned and ADL divergent cases across recommended care settings.

Based on the distribution of cases across care settings reported by the Department of Health as of December 20, 1984, 3993 cases were

eligible for the sample as follows:

| | # of Cases |
|---|---|
| Intermediate Care | 1200 |
| Skilled Care | 1200 |
| Community-Based Care (includes Personal Care, Home Health, Personal Care and Home Health, or None of the Above) | 1593 |
| Total | 3993 |

As requested in the project proposal to the Department of Social Services , this sample included only those cases which represented first-screening assessments for long-term care. In addition, the sampling criteria excluded individuals whose usual living arrangements were in a domiciliary/personal care facility or health care facility. Therefore, the sample represented individuals who were not currently residing in a formal long-term care environment prior to screening.

After deleting cases that were younger than 59 years of age, the final study sample was as follows:

| | # of Cases |
|---|---|
| Intermediate Care | 1133 |
| Skilled Care | 1088 |
| Community-Based Care | 1390 |
| Total | 3611 |

The investigator expected the characteristics of the sample population to differ from the general population of older Virginians in several ways. First, because of the financial criteria for Medicaid eligi-

bility, they had fewer financial resources to secure necessary goods and services for their care. Second, they were institutionally vulnerable by virtue of the fact that they or their significant others had considered placement in a nursing home. Third, their age distribution was influenced by the fact that they must meet Medicaid eligibility requirements. Fourth, it was expected that the sample would include a high proportion of women, persons living alone, and individuals with few available social supports for activities of daily living. Finally, they would differ from the general older population in their decreased status of health and functional ability.

The Study Variables

A total of 104 pieces of information were requested for each case from the Virginia Department of Health. Three categories of explanatory variables were used. The variables and their value labels are as follows:

I. Background Variables

| | |
|---|---|
| a Sex | 0=male, 1=female |
| b. Race | 0=nonwhite, 1=white |
| c. Age/Race Interaction Term | 0=other, 1=young-old/white<br>0=other, 1=old-old/white<br>0=other, 1=young-old/nonwhite<br>0=other, 1=old-old/nonwhite |
| d. Age | 0=59, 1=60-69,<br>2=70-79, 3=80-89<br>4=90 and above |
| e. Location of Patient | 0=preadmission screening acute care<br>1=preadmission screening community |

f. Marital Status

| | |
|---|---|
| Married | 0=not married, 1=married |
| Widowed | 0=not widowed, 1=widowed |
| g. Sex/Marital Status Interaction Term | 0=other, 1=married/male<br>0=other, 1=married/female<br>0=other, 1=widowed/male<br>0=other, 1=widowed/female |

II. Social Environment Variables:

| | |
|---|---|
| a. Available Living Space | 0=not available, 1=available |
| b. Living Arrangement | 0=does not live alone,<br>1=lives alone |
| c. Daughters | number of living daughters<br>count: 0-7 |
| d. Informal Support | count of number of available informal supports for activities of daily living, housekeeping, living space, meal preparation, shopping, transportation, and other support: 0-7 |

III. Physical Impairment Variables:

| | |
|---|---|
| a. Physical Impairments | count of areas of impairment for speech, sight, hearing, joint motion, fractures/dislocations,missing limbs and paralysis/paresis, dentition: 0-8 |
| b. Behavior/Orientation | the highest score on separate behavior and orientation measures with each measure ranging from 0 (appropriate or oriented) to 5 (comatose): 0-5 |
| c. Medication Administration | ranging from 0 (uses no medication) to 4 (some or all medication administered by professional nurse): 0-4 |
| d. Dressings | ranging from 0 (no dressings) to 2 (dressings on two or more sites):0-2 |

| | |
|---|---|
| e. Mobility | count of major restrictions in ability to go outside walking, wheeling, or stair climbing: 0-4 |
| f. Services Receiving | count of number of services currently receiving including inhalation therapy, occupational therapy, speech therapy, reality orientation, social service, physical therapy, other therapies, recreation activities, religious services, visitors, other services: 0-11 |
| g. Nutrition Services Receiving | count of number of nutrition services currently receiving including diet, food/ fluid intake, supplement, and dining location: 0-4 |
| h. Decubitis Ulcers | ranging form 0 (no decubitis ulcers) to 2 (decubitis ulcers two or more sites): 0-2 |
| i. Physical Care Services | count of number of physical care items currently receiving including eye care, oxygen, physical restraints, ostomy care teaching, self injection teaching, other teaching, other nursing procedures,bowel and bladder training, range of motion exercises, other restorative care: 0-10 |
| j. Seriousness of Illness | based on Wyler, Masuda, and Holmes (1968)5 categories: 1=0-999, 2=1,000-1,999, 3=2,000-2,999, 4=3,000-3,999, 5=4,000 |

The four criterion variables for the analyses were:

| | |
|---|---|
| I. Rehabilitative Trajectory | 0=nonrehabilitative/maintenance<br>1=rehabilitative |
| II. ADL Divergence | 1=divergent<br>0=patterned |
| III. Recommended Care Setting | |
| a. Institutional Care vs. Community Care | 0=community care<br>1=institutional care |
| b. Skilled Care vs. Intermediate Care | 0=intermediate care,<br>1=skilled care |

The operationalization of rehabilitative trajectory variable and seriousness of illness warrant further description since the investigator created these variables from the data set. Information and acceptable criteria for the objective measurement of regression and progression of chronic disease have been lacking in the past and current rehabilitation literature (Dyar, 1953; Evans, 1981; Keith, 1984). As discussed earlier, the classification scheme for rehabilitative trajectory for this project was rudimentary. Nevertheless, there were a few guiding principles for operationalizing this variable.

Rehabilitation for the geriatric patient is often directed toward prevention of dysmobility, correction of functional losses, and provision of after-care, resulting in a variety of possible services to match functional deficits without a predictable rehabilitative outcome (Cohen, 1984). The determination of rehabilitative trajectory was, therefore, subjective and based on available rehabilitative methods such as physical therapy, speech, vocational therapy, and so forth. Since muscles which are not stressed will lose strength and result in dysmobility, prevention or at least correction by physical therapy and/or range of motion exercisies are considered minimal geriatric rehabilitative measures (Cohen, 1984).

Fortunately, the investigator did not have to try to determine rehabilitative potential per se, given the nebulous nature of such a judgement. Rather, the discharge planning teams and screening committees composed of physicians, nurses, and social workers had already made assessments about the status of rehabilitative trajectories for the individuals in the Virginia Medical Assistance Program. The investigator

used these data to classify individuals in rehabilitative or non-rehabilitative/maintenance tracks according to the following operational definitions. Individuals who were categorized in a rehabilitative track:

1. had at least one of the following medical status items reflecting "rehabilitation not completed" and onset less than or equal to one year for fractures/dislocations and paralysis/paresis; less than or equal to six months for speech impairments; and unspecified onset for missing limbs

   OR

2. received at least one of the following services or physical care items: speech therapy, physical therapy, bowel and bladder training, range of motion, or other restorative nursing.

All other individuals were categorized in nonrehabilitative maintenance tracks. The procedure used for establishing whether an individual was on a rehabilitative trajectory is diagrammed in Figure 2.

Seriousness of illness measures are an attempt to quantify the multiple problems of illness that beset older adults. Most often researchers have used counts of diagnoses to measure health or have included only a few major disease categories in their analyses.

Although there were many problems with the weighting scheme for seriousness of illness developed by Wyler and his associates (Wyler, Masuda, & Holmes, 1968, 1970), the methodology did begin to represent the cumulative effects of multiple diseases in the same individual. The major criticism with the methodology has been that it was originally developed to encompass a variety of very different dimensions into a

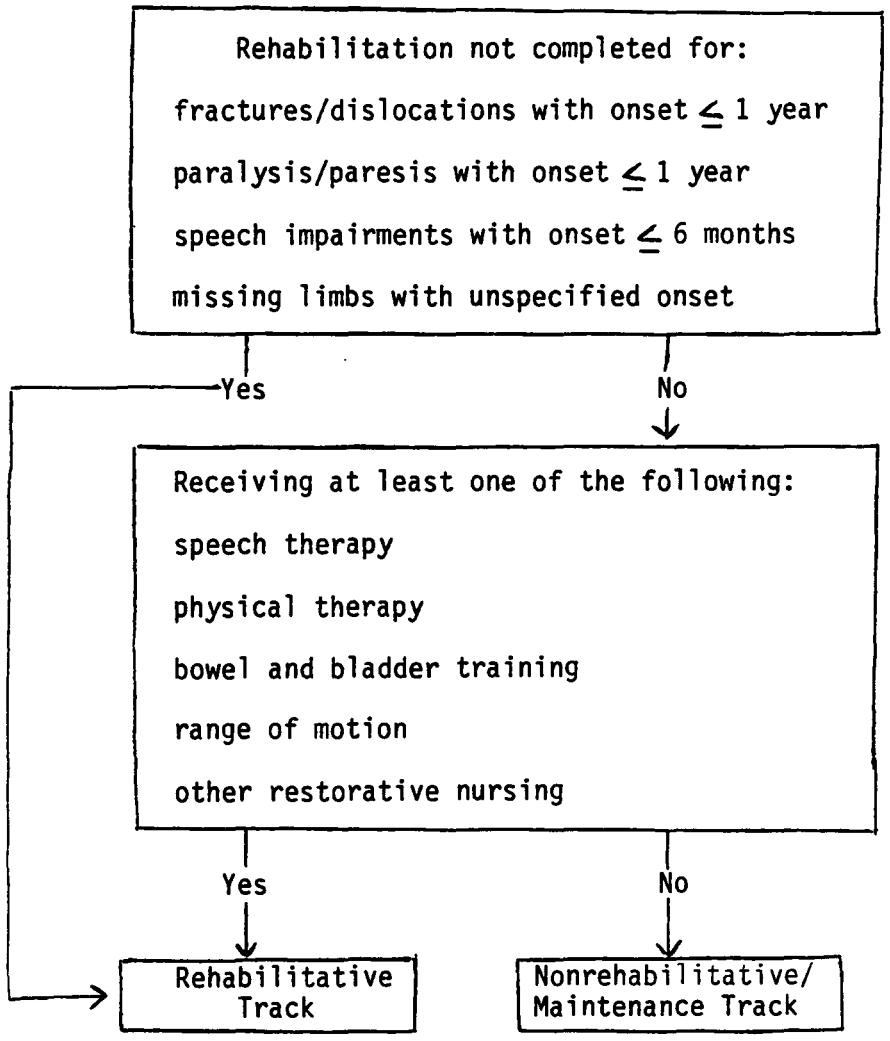


Figure 2

Rehabilitative Trajectory

single magnitude estimation of the seriousness of illness, with the overall interpretation of seriousness of illness left to the respondent (Wyler, Masuda, & Holmes, 1968).

In a recent research project using data from the Virginia Pre-Admission Screening Program, McAuley, Travis and Taylor (1984) used the Seriousness of Illness Index as a determinant of long-term care placement decisions for acute-care screenings. Weights for health problems which were not included in the 126 medical diagnoses of the Wyler methodology were estimated by members of the research team. The investigator used the same method to compute seriousness of illness scores for this project. The medical diagnoses and associated weights used for the project are listed in Appendix E.

Confidentiality

In the original request for data to the Virginia Health Department we explicitly requested that identifying information such as name, address, and social security number be excluded from the data set. However, in order to merge base data including the background variables of age, sex, marital status, and race, with the assessment data, social security numbers had to be retained on the data tapes. To protect the privacy of the clients of the Preadmission Screening Program, we used social security numbers for the merging procedure only and did not access them for any portion of the data analysis. The Virginia Tech Institutional Review Board for research involving human subjects reviewed and approved this process in accordance with Virginia Tech policy and procedure (Appendix I).

Data Analysis

Data analysis began with descriptive statistics to identify the characteristics of the sample and to determine the representativeness of the sample. Comparisons were made with state and national data of non-institutionalized older adults. As discussed earlier, we expected the sample to differ from the general population of elders. However, we expected these comparisons to reflect differences between a general population of noninstitutionalized elders and those about to enter a long-term care system.

The second phase of the data analysis segregated those individuals who fit the original Katz pattern of ADL dependency from those who diverge from the pattern. The investigator classified individuals in each category (ADL patterned and ADL divergent) by rehabilitative/nonrehabilitative tracks. The investigator then determined the distribution of the patterned and divergent cases by rehabilitative/nonrehabilitative tracks and across recommended care settings. We used a Chi-Square test of independence to compare the frequency distributions. Next, we examined the distribution of levels of ADL dependency for the patterned cases across the recommended care settings for rehabilitative and nonrehabilitative individuals in relation to the problems and consequences of this type of case mixing within care settings. We intended this analysis to address the issue of resource allocations in light of the resulting distributions. Here again, we used a Chi-square test of independence to compare the frequency distributions.

The third analysis used Guttman scaling procedures on the full sample and a separate analysis on the ADL divergent cases. We used

these procedures to explore the reliability of counting ADL dependencies for the full sample and to potentially identify a unique ADL pattern for the divergent cases.

The final phase of the data analysis focused on the divergent cases of ADL dependency. We performed a series of multivariate analyses.

One of the most popular analytic techniques for explanation and prediction in the social sciences has been linear regression analysis, commonly known as ordinary least squares (OLS) (Cleary & Angel, 1984) or least squares solution (Pedhazur, 1982). While the general linear model is useful when used with continuous, criterion variables, use of a dichotomous criterion variable violates the assumption that the errors are normally distributed.

Measurement errors in the criterion variable lead to an increase in the standard error of estimate, thus weakening the tests of statistical significance (Pedhazur, 1982). With a dichotomous criterion variable, the variance of the errors is a function of the explanatory variables resulting in inefficient and inconsistent standard error terms (Cleary and Angel, 1984).

Specification error results from errors committed in specifying the model to be tested or in violating any of the assumptions that underlie the model. Whereas linear regression rests on assumptions concerning linearity and the distribution of the error terms in the model, other models, more appropriate for dichotomous criterion variables, assume that a sigmoid model represents the underlying relationship (Cleary & Angel, 1984). Due to the nature of the proposed analyses, a sigmoid

representation is most appropriate in describing the probability of occurrence.

Having decided to estimate the probability of an outcome as a S-shaped function of the explanatory variables, discriminant analysis, logistic models, and probit analysis could estimate essentially identical functions for data that have a multivariate normal distribution. When the data are not distributed multivariate normally, such as when the criterion variables are dichotomous (as in this project), maximum likelihood logistic regression is the statistical procedure of choice (Cleary & Angel, 1984).

Data analysis proceeded in a sequential manner following the hypothesized ordering of criterion variables. The first logistic regression analysis regressed rehabilitative trajectory as the criterion variable on the background, social environmental and physical impairment variables. The second logistic regression analysis used a stage approach to regress divergence from the ADL pattern on a full model of background, social environment, physical impairment variables in the first stage and then entered rehabilitative trajectory in stage two. The final analysis used recommended care setting (a) institutional versus community and (b) skilled care versus intermediate care in two separate equations as the criterion variables with background, social environment, physical impairment, rehabilitative trajectory, and ADL divergence as explanatory variables. A subsample of the study sample was used for the second recommended care setting variable, skilled versus intermediate care. This subsample was, therefore, comprised of only those individuals recommended for institutional care.

Once again, the computer performed a staged logistic regression analysis. The first stage in each analysis of recommended care setting regressed recommended care setting on the full model of background, social environmental and physical impairment variables. The second stage added rehabilitative trajectory and ADL divergence to the model.

We selected the staged approach for the logistic regression analyses in view of the research hypotheses which sought to increase the explained variance for ADL divergence by adding rehabilitative trajectory and for recommended care setting by adding rehabilitative trajectory and ADL divergence. It was, therefore, necessary to control for all other variables before adding these variables to the regression equations. The data were not amenable to techniques of causal modeling. It was theoretically appealing, however, to build sequential prediction equations in beginning to understand the issue of ADL dependency in long-term care settings.

# Chapter IV: Results

## Introduction

We constructed contingency tables for each criterion variable by each explanatory variable used for hypothesis testing. Due to the large number of variables in this study the results of the tabular analyses are in Appendix J. Only the demographic characteristics and comparisons with state and national data, results of exploratory analysis for Guttman scaling procedures, and the results of the tests of the hypotheses are reported in this chapter.

The analyses used a total of 3611 cases from the Virginia Preadmission Screening Program. Seventy percent of the cases came from acute care facilities, and 30% came from the community. Forty-two percent of the cases were on rehabilitative tracks and 58% were nonrehabilitative/maintenance tracks. Sixty five percent of the sample matched the original Katz pattern of ADL, while 35% were ADL divergent. Finally, 38% of the cases received community care recommendations, 30% received skilled care recommendations, and 32% received intermediate care recommendations.

## Demographic Characteristics of the Sample

The demographic characteristics of the sample reflected the unique nature of a long-term care elderly population (see Table 1). As expected, a large proportion of the sample were female and most were widowed. There was, however, an unexpectedly large percentage (37%) of nonwhite cases in the sample.

The majority of the cases were age 75 years and over. Fully 40% of the total sample were in the 75 to 84 years of age category, while a

Table 1

Frequencies and Percentages of Selected Background Variables

| Variable | Frequency | Percentage |
|---|---|---|
| Sex | | |
| Male | 1128 | 31.3 |
| Female | 2479 | 68.7 |
| Race | | |
| White | 2267 | 62.8 |
| Nonwhite | 1344 | 37.2 |
| Age | | |
| 59-64 | 260 | 7.2 |
| 65-74 | 902 | 25.0 |
| 75-84 | 1428 | 39.5 |
| 85 plus | 1021 | 28.3 |
| Location of Patient | | |
| Community | 1081 | 30.0 |
| Acute care | 2530 | 70.0 |
| Marital Status | | |
| Married | 748 | 20.7 |
| Widowed | 2134 | 59.1 |
| Other | 729 | 20.2 |

Note: Percentages are based on total sample size of 3611.

striking 28% were age 85 years and over. In addition, nearly 72% of the women were 75 years of age and over while only 59% of the men fell into this age group (see Table 2).

Comparisons with Virginia and national population data. Table 3 shows the comparisons of the 1983-1984 sample with 1985 population projections for Virginia and 1982 national population projections of non-institutionalized elders 60 years of age and over. Differences between the sample characteristics and state data could be found in each of the three reported categories. Elderly Virginians in the sample differed from the elderly population of the state most dramatically in the age distributions. The proportion of sample elders in the oldest age category was almost five times greater than the comparable state statistic. Conversely, the proportion of sample elders in the youngest age category was almost one-fifth of the state proportion of the youngest-old. Comparisons of the sample with the national population indicated there were substantial differences in all four demographic categories. Clearly, the individuals in the study population who were entering a long-term care system were a unique subset of the general older adult population. The sample represented higher percentages of females, nonwhites, and the widowed than the general population. These elders were also generally older than the national population.

Guttman Scaling Procedures

We performed two tests of the scalability of the ADL items to examine whether ADL dependencies were cumulative. We performed the first procedure on the total sample and a second Guttman scaling procedure was performed on the ADL divergent subsample. A Guttman scale

Table 2

Percentage of Cases in Age and Gender Categories

| Age | Sex | |
|---|---|---|
| | Male[a] % | Female[b] % |
| 59 - 64 | 8.3 | 6.7 |
| 65 - 74 | 32.7 | 21.5 |
| 75 - 84 | 40.2 | 39.3 |
| 85 plus | 18.8 | 32.5 |

[a] $n$ = 1128. [b] $n$ = 2479.

Table 3

Demographic Characteristics of the Sample Compared to State and National Census Data

| Variables | Comparisons | | |
|---|---|---|---|
| | Sample %[a] | State % | National % |
| Sex | | | |
| Male | 31.3 | 41.9 | 43.5 |
| Female | 68.7 | 58.1 | 56.5 |
| Race | | | |
| White | 62.8 | 83.3 | 90.0 |
| Nonwhite | 37.2 | 16.7 | 10.0 |
| Marital Status | | | |
| Married | 20.7 | - | 54.0 |
| Widowed | 59.1 | - | 36.0 |
| All other | 20.2 | - | 10.0 |
| Age | | | |
| 60 - 64 | 6.2 | 30.0 | 26.4 |
| 65 - 74 | 25.3 | 43.5 | 44.2 |
| 75 - 84 | 40.0 | 21.0 | 22.6 |
| 85 plus | 29.0 | 6.0 | 6.8 |

Note. Percentages are based on the population 60 years of age and older. State data are from Virginia Population Projections, 1985. Virginia Department of Planning and Budget, Research Section, Richmond, Virginia. National data are from Aging America: Trends and Projections (1984). Washington D.C.: American Association of Retired Persons and the U.S. Senate Special Committee on Aging. Marital status data by age was not available for the State, a dash represents the unavailable data.
[a]Due to missing data on 41 cases in the total sample, N = 3570 60 years of age and older.

should be both unidimensional and cumulative. As reported earlier, this notion of patterning behind the original Katz Index of ADL was the justification in later years for a simple count of ADL dependencies.

We used three statistics to aid in evaluating the scalability of the ADL items. The coefficient of reproducibility indicates scale validity. This coefficient should be higher than .9. Another useful measure is the minimum marginal reproducibility, the minimum coefficient of reproducibility that could have occurred given the error rate on each item. Finally, the coefficient of scalability should be well above .6 if the scale is truly unidimensional and cumulative. To aid in identifying items that are not positively related to the other items in the scale, we also examined an inter-item correlation matrix.

ADL Scale for all Cases The results of the Guttman procedure for all cases are shown in Table 4. The total sample size was 3611. Since there was not an hypothesized or assumed pattern for this analysis, the procedure scaled the six ADL items to total dependence.

The resulting ADL scale had an acceptable coefficient of reproducibility (.9371) and an acceptable coefficient of scalability (.653). None of the items were negatively correlated on the inter-item correlation matrix. Of the total sample, 62.3% matched the ADL scale produced by the procedure. The pattern of dependency was as follows: bathing, dressing, toileting, transferring, feeding, and continence. The scale differed from the original Katz pattern in the last two items. Feeding and continence were reversed in the sample. This was of interest in view of the theoretical framework used by Katz which described feeding as the most basic human need and the last activity to be lost in dependency.

Table 4

Results of Guttman Scaling Procedure
For All Cases

| | Correlation Coefficients | | | | | |
|---|---|---|---|---|---|---|
| | Continence | Feed | Transfer | Toilet | Dress | Bathe |
| Continence | 1.000 | .249 | .297 | .326 | .254 | .196 |
| Feed | | 1.000 | .435 | .448 | .464 | .380 |
| Transfer | | | 1.000 | .743 | .545 | .440 |
| Toilet | | | | 1.000 | .613 | .486 |
| Dress | | | | | 1.000 | .681 |
| Bathe | | | | | | 1.000 |

| | Scale | | | | | |
|---|---|---|---|---|---|---|
| | Continence | Feed | Transfer | Toilet | Dress | Bathe |
| | + | + | + | + | + | + |
| | 0 | + | + | + | + | + |
| | 0 | 0 | + | + | + | + |
| | 0 | 0 | 0 | + | + | + |
| | 0 | 0 | 0 | 0 | + | + |
| | 0 | 0 | 0 | 0 | 0 | + |
| | 0 | 0 | 0 | 0 | 0 | 0 |

Note. 0 = independent. + = dependent.

Coefficient of reproducibility = .937
Minimal marginal reproducibility = .819
Coefficient of Scalability = .653
N = 3611.

ADL Scale for divergent cases. The results of the Guttman procedure for the divergent cases are shown in Table 5. The divergent subsample consisted of 1280 cases, constrained to between one and five dependencies in activities of daily living because all totally dependent and totally independent cases were, by definition, ADL patterned.

The resulting ADL divergence scale did have an acceptable coefficient of reproducibility (.907). However, the coefficient of scalability was too low to conclude the scaled items were cumulative. Inspection of the correlation coefficients showed a negative correlation between continence and the other ADL items. This resulted from the inability of the procedure to scale the items to total dependence because of the operationalization of divergence. Total dependence in all six activities of daily living resulted in ADL patterning and were not, included in the divergent subsample.

Summary of Scaling Procedures. The scaling procedure for the total sample produced an acceptable scale of ADL dependency which 62.3% of the cases did fit. The scale was not particularly powerful, but it did demonstrate that a pattern other than the Katz hierarchy may be found in this long-term care population.

The scaling procedure for the ADL divergent subsample did not produce an acceptable scale of ADL dependency. Only 44.1% of the divergent cases matched the pattern of the scaling procedure resulting in a low coefficient of scalability. It appeared that the divergent cases were truly heterogenous and not amenable to scaling procedures.

Table 5

Results of Guttman Scaling Procedure for Divergent ADL Cases

| | Correlation Coefficients | | | | | |
|---|---|---|---|---|---|---|
| | Continence | Transfer | Toilet | Feed | Dress | Bathe |
| Continence | 1.000 | -.570 | -.292 | -.478 | -.211 | -.201 |
| Transfer | | 1.000 | .540 | .309 | .306 | .242 |
| Toilet | | | 1.000 | .316 | .358 | .259 |
| Feed | | | | 1.000 | .470 | .378 |
| Dress | | | | | 1.000 | .474 |
| Bathe | | | | | | 1.000 |

| | Scale | | | | |
|---|---|---|---|---|---|
| Continence | Transfer | Toilet | Feed | Dress | Bathe |
| 0 | + | + | + | + | + |
| 0 | 0 | + | + | + | + |
| 0 | 0 | 0 | + | + | + |
| 0 | 0 | 0 | 0 | + | + |
| 0 | 0 | 0 | 0 | 0 | + |

Note: Divergence was operationalized to have a range of one to five dependencies. 0 = independent. + = dependent.

Coefficient of reproducibility = .907
Minimum marginal reproducibility = .844
Coefficient of scalability = .402
N = 1280.

Analyses of Chi-Square Tests of Significance

Tables 6 and 7 show the results of the analyses for hypothesis number one:

> There will be an unequal distribution of divergent cases on the original Index of ADL across care settings (as compared with the distribution of the total sample). Specifically, ADL divergent cases which are in nonrehabilitative tracks will be found in greater frequency in intermediate care facilities than in skilled care facilities due to the custodial nature of these types of facilities.

As stated in the hypothesis and supported by the data, there was an unequal distribution of divergent cases across recommended care settings (see Table 6). Of the divergent cases, the most likely recommended care setting was institutional care representing 54.3% of the divergent cases. However, community care recommendations were more common for the divergent cases (45.6%) than in the total sample (38.0%) while skilled care was less common for the divergent cases (19.8%) as compared to 30.0% of the total sample.

When ADL was crosstabulated with rehabilitative trajectory (See Table 7), ADL/rehabilitative categories were significantly associated with institutional versus community recommendations. Institutional recommendations occurred more frequently for all groups except the divergent/nonrehabilitative cases who were more likely to be recommended for community care. In the institutional subsample, the overwhelming majority of the divergent/nonrehabilitative cases were recommended for

Table 6

Comparison of the Distribution of Divergent Cases With the Total Sample Across Recommended Care Settings

| Recommended Care Setting | Divergent Cases n = 1280 % | All cases n = 3611 % |
|---|---|---|
| Community Care | 45.6 | 38.0 |
| Skilled Care | 19.8 | 30.0 |
| Intermediate Care | 34.5 | 32.0 |

Table 7

Crosstabulation of Rehabilitative Trajectory Across Recommended Care Setting by ADL Type

| Recommended Care Setting | ADL/Rehabilitative Category: Patterned/[a] Rehabil. % | Patterned/[b] Nonrehabil. % | Divergent/[c] Rehabil. % | Divergent/[d] Nonrehabil. % |
|---|---|---|---|---|
| Institutional Care | 75.1 | 57.3 | 66.3 | 48.0 |
| Community Care | 24.9 | 42.7 | 33.7 | 52.0 |

[a] n = 1058. [b] n = 1273. [c] n = 448. [d] n = 832.

N = 3611.

Chi-square = 161.25 with 3 D.F. P = .001

| Recommended Care Setting | ADL/Rehabilitative Category: Patterned/[a] Rehabil. % | Patterned/[b] Nonrehabil. % | Divergent/[c] Rehabil. % | Divergent/[d] Nonrehabil. % |
|---|---|---|---|---|
| Skilled Care | 68.8 | 39.3 | 60.6 | 18.5 |
| Intermediate Care | 31.2 | 60.7 | 39.4 | 81.5 |

Note. Recommended Care setting for skilled and intermediate care represents the institutional subsample. n = 2221.

[a] n = 795. [b] n = 730. [c] n = 297. [d] n = 399.

Chi-Square = 316.27 with 3 D.F. P = .000.

intermediate care (81.5%). Conversely, the majority of both patterned and divergent/rehabilitative cases were recommended for skilled care.

Approximately 66% of the divergent/rehabilitative cases were recommended for institutional care compared to less than half of the divergent/nonrehabilitative cases. As hypothesized, relatively more of the divergent/nonrehabilitative cases recommended for institutional care received intermediate rather than skilled care recommendations.

Tables 8 and 9 show the results of the analyses for hypothesis number two:

> There will be an equal distribution of levels of ADL disability for the patterned cases within each care setting reflecting the inconsistent effect ADL disability exerts on decisions to seek institutionalization. When level of ADL is cross-classified by rehabilitative trajectory, individuals with mid-range to high ADL dependency and a rehabilitative track will be more frequently represented in skilled nursing facilities where more aggressive, restorative care is provided.

The distribution of levels of ADL dependency across recommended care settings found in Table 8 did not support the first part of this hypothesis. Of the 2331 patterned cases, 87.9% were at level four or higher for ADL dependency. Cases at the less dependent levels were more frequently recommended for community care.

When levels of ADL were cross-classified by rehabilitative trajectory, significant associations with recommended care setting can be found in Table 9. For patterned rehabilitative and nonrehabilitative cases, elders with higher levels of dependency were more likely to be

Table 8

Level of ADL Dependency Across Recommended Care Setting

| Recommended Care Setting | Level of ADL | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | 5[f] % | 6[g] % |
| Institutional Care | 8.3 | 10.5 | 21.1 | 33.3 | 62.8 | 66.0 | 73.8 |
| Community Care | 91.7 | 89.5 | 78.9 | 66.7 | 37.2 | 34.0 | 26.2 |
| | n=120 | n=57 | n=76 | n=30 | n=153 | n=153 | n=1742 |

Note. Total number of patterned cases in the sample = 2331. Chi-square = 383.474 with 6 D.F. p = .000

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Skilled Care | 40.0 | 33.3 | 12.5 | 20.0 | 54.2 | 26.7 | 57.9 |
| Intermediate Care | 60.0 | 66.7 | 87.5 | 80.0 | 45.8 | 73.3 | 42.1 |
| | n=10 | n=6 | n=16 | n=10 | n=96 | n=101 | n=1286 |

Note. Number of patterned cases in the institutional subsample = 1525. Chi-square = 55.646 with 6 D.F. p = .000.

Table 9

Crosstabulation of Levels of Patterned ADL Across Recommended Care Setting

| Recommended Care Setting | ADL Level 0 % | 1 % | 2 % | 3 % | 4 % | 5 % | 6 % | Chi-square | D.F. |
|---|---|---|---|---|---|---|---|---|---|
| Patterned/Rehabilitative | | | | | | | | | |
| Institutional Care | 28.6 | 25.0 | 50.0 | 25.0 | 73.3 | 61.7 | 77.6 | 37.778 | 6** |
| Community Care | 71.4 | 75.0 | 50.0 | 75.0 | 23.7 | 38.3 | 22.4 | | |
| | n=14 | n=4 | n=6 | n=4 | n=75 | n=60 | n=895 | | |
| Patterned/Rehabilitative | | | | | | | | | |
| Skilled Care | 75.0 | 100.0 | 33.3 | 100.0 | 76.4 | 43.2 | 69.6 | 15.667 | 6* |
| Intermediate Care | 25.0 | 0.0 | 66.7 | 0.0 | 23.6 | 56.8 | 30.4 | | |
| | n=4 | n=1 | n=3 | n=1 | n=55 | n=37 | n=694 | | |
| Patterned/Non-rehabilitative | | | | | | | | | |
| Institutional Care | 5.7 | 9.4 | 18.6 | 34.6 | 52.6 | 68.8 | 70.0 | 274.274 | 6** |
| Community Care | 94.3 | 90.6 | 81.4 | 65.4 | 47.4 | 31.2 | 30.0 | | |
| | n=106 | n=53 | n=70 | n=26 | n=78 | n=93 | n=847 | | |
| Patterned/Non-rehabilitative | | | | | | | | | |
| Skilled Care | 16.7 | 20.0 | 7.7 | 11.1 | 24.4 | 17.2 | 44.3 | 33.543 | 6** |
| Intermediate Care | 83.3 | 80.0 | 92.3 | 88.9 | 75.6 | 82.8 | 55.7 | | |
| | n=6 | n=5 | n=13 | n=9 | n=41 | n=64 | n=592 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample. Chi-square tests should be interpreted with caution since over 20% of the cells have expected counts less than 5.

* $p$ .05. ** $p$ .01.

recommended for institutional care. In the institutional subsample, skilled care was associated with higher levels of dependency for rehabilitative cases while the trend for the nonrehabilitative cases was for intermediate care recommendations. The second portion of the hypothesis was, therefore, supported by the data. Although there were small expected cell frequencies in over 20% of the cases, the small degrees of freedom (d.f.=6) used to test for significance did not seem to warrant concern over the validity of the test. Also, the hypothesis was specifically directed at the mid-range to high ADL dependency levels.

Table 10 clarifies the small cell frequencies reported in the chi-square tests for hypothesis number two. Lower levels of patterned ADL dependency occurred infrequently in this long-term care sample. However, when they did occur, they were most often in the nonrehabilitative tracks.

Because the patterned cases were representative of high levels of dependency in the sample, it was possible that the divergent cases might also be highly dependent. If this were the case, the divergent variable would probably not be as useful an explanatory variable for recommended care setting as originally hypothesized. A check of the number of ADL dependencies for the total sample revealed a mean number of dependencies of 4.9 compared to a mean of 4.4 for the divergent cases. Also, almost half of the total sample (48.2%) was totally dependent in all six activities of daily living. This, obviously, reflected a high level of dependency for all cases, patterned and divergent. As discussed earlier, a count of ADL dependencies has not been a useful explanatory variable for recommended care setting in the past. However, the Virginia Medical

Table 10

Rehabilitative Trajectory By Patterned ADL

| ADL Level | Rehabilitative Trajectory | |
|---|---|---|
| | Rehabilitative[a] % | Nonrehabilitative[b] % |
| 0 | 1.3 | 8.3 |
| 1 | .4 | 4.2 |
| 2 | .6 | 5.5 |
| 3 | .4 | 2.0 |
| 4 | 7.1 | 6.1 |
| 5 | 5.7 | 7.3 |
| 6 | 84.6 | 66.5 |

Note. ADL patterned subsample, n = 2331.
[a] n 1058. [b] n = 1273.
Chi-square = 172.823 with 6 D.F. p = .000

Assistance Program (VMAP) utilizes ADL dependency counts as a criterion for long-term care placement. In view of the concern for the usefulness of the divergence variable (due to the similarity in levels of ADL dependency for patterned and divergent cases) and because of the VMAP criterion for placement, it seemed appropriate at this point to include ADL count in the regression procedures as additional exploratory analyses.

Analyses of Logistic Regression Models

This project involved seven logistic regression analyses. The analyses for the divergence variable and the two recommended care setting variables were carried out twice. As orginally proposed, we completed the first analyses without an ADL count variable with divergence and the two recommended care setting criterion variables. The second analysis was identical to the first except for the inclusion of the ADL count variable. The means and standard deviations of the variables used in the regression analyses are shown in Table 11. These analyses tested hypotheses three, four and five. The results are presented in relation to these hypotheses.

General procedures for the regression analyses. We used a sequential approach to test the hypotheses. First, we entered all the background, social environment, and physical impairment variables in the regression model as a set, then we entered the rehabilitative trajectory and divergence variables as indicated by the model in Figure 1 (reproduced on page 67).

Because of the large number of variables used in the regression analyses, the regression tables show only those variables that were

Table 11

Means and Standard Deviations of Variables Used in the Regression Analyses

| Variable | Description | Mean | S.D. |
|---|---|---|---|
| **Background Variables** | | | |
| Sex | 0=male, 1=female | .69 | .46 |
| Race | 0=nonwhite, 1=white | .62 | .48 |
| Old-Old Nonwhite | 0=other, 1=old-old nonwhite | .22 | .41 |
| Young-Old White | 0=other, 1=young-old white | .20 | .40 |
| Age | 0=59, 1=60-69, 2=70-79, 3=80-89, 4=90 plus | 2.44 | .94 |
| Location of Patient | 0=acute care, 1=community | .30 | .46 |
| Married | 0=not married, 1=married | .21 | .41 |
| Widowed | 0=not widowed, 1=widowed | .60 | .49 |
| Male/Married | 0=other, 1=male/married | .12 | .33 |
| Female/Widowed | 0=other, 1=female/widowed | .48 | .50 |
| **Social Environment Variables** | | | |
| Available Living Space | 0=not available, 1=available | .72 | .45 |
| Living Arrangement | 0=does not live alone, 1=lives alone | .30 | .46 |
| Daughters | number of living daughters range: 0 to 7 | 1.14 | 1.40 |
| Informal Support | count of available informal supports range: 0 to 7 | 2.34 | 2.38 |
| **Physical Impairment Variables** | | | |
| Physical Impairments | number of impairments range: 0-8 | 1.54 | 1.21 |
| Behavior/Orientation | range: 0 (appropriate/ oriented) to 5 (comatose) | 1.57 | 1.55 |

Table 11 (continued)

| Variable | Description | Mean | S.D. |
|---|---|---|---|
| Medication Administration | range: 0 (no medications) to 4 (by R.N.) | 2.61 | 1.01 |
| Dressings | number of dressings range: 0 to 2 | .15 | .40 |
| Mobility | number of mobility restrictions range: 0 to 4 | 2.42 | 1.43 |
| Services Receiving | number of services currently receiving range: 0 to 11 | 1.54 | 1.36 |
| Nutrition Services | number of nutritional services receiving range: 0 to 4 | 1.11 | 1.10 |
| Decubitis Ulcers | number of decubitis ulcers range: 0 to 2 | .16 | .46 |
| Physical Care Services | number of physical care services receiving range: 0 to 10 | .62 | .85 |
| Seriousness of Illness | based on Wyler seriousness of illness; 1=0 to 999, 2=1000 to 1999, 3=2000 to 2999, 4=3000 to 3999, 5=4000 and above | 2.34 | .99 |
| ADL Count | number of ADL dependencies range: 0 to 6 | 4.91 | 1.53 |
| Rehabilitative Trajectory | 0=nonrehabilitative 1= rehabilitative | .42 | .49 |
| ADL Divergence | 0=patterned, 1=divergent | .35 | .48 |
| Institutional/ Community Care | recommended care setting 0=community, 1=institutional | .62 | .49 |
| Skilled/ Intermediate Care | recommended care setting 0=intermediate, 1=skilled | .49 | .50 |

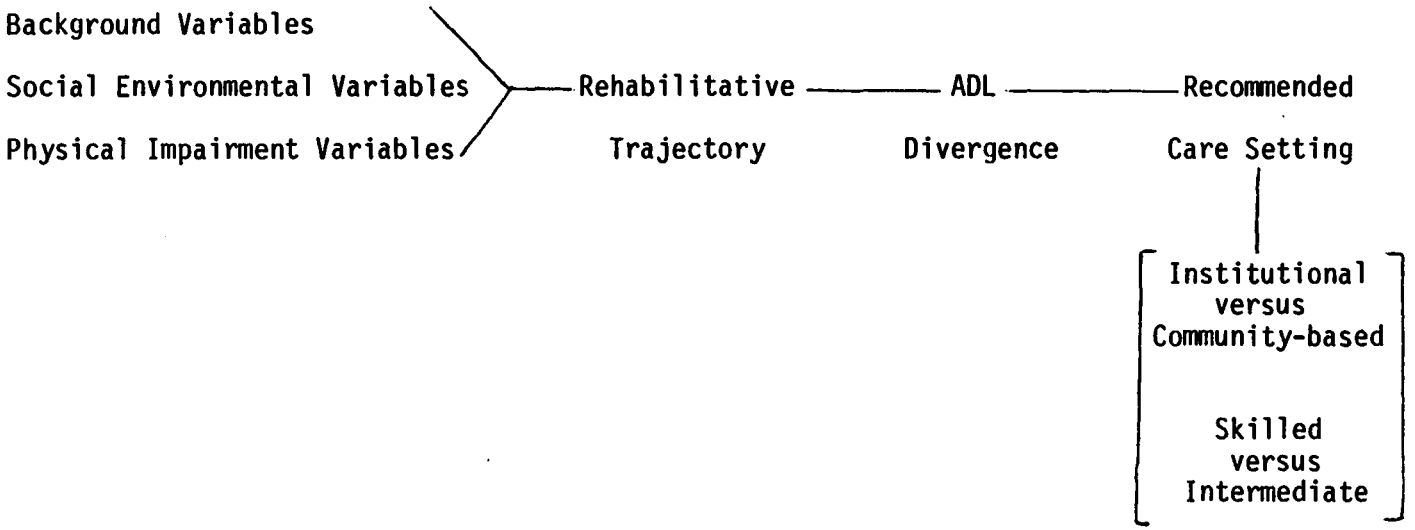


Figure 1

Hierarchical Model For Long-Term Care

significant at the .05 level or below. There are two exceptions to the reporting procedure. Results based on the rehabilitative trajectory and divergence variables were reported regardless of their level of significance as were results based on ADL count. However, the sequential models included all variables.

We originally planned to include four interaction terms for age/race and four terms for sex/marital status for the data analyses. Initial analyses showed, however, that these terms produced redundancy in the model. Based on the past literature and the associations identified in earlier tabular analyses, we selected two variables for each term. We used male/married and female/widowed for the sex/marital status interaction and old-old nonwhite and young-old white for the age/race interaction.

The regression procedures encountered 464 cases with missing data resulting in deletion of these cases from the analyses. The sample size for the multivariate procedures was, therefore, reduced to 3147.

Rehabilitative trajectory model. Rehabilitative trajectory was the first variable to be considered. This analysis tested hypothesis number three which stated:

> Rehabilitative trajectory as derived from the screening data can be partially explained by background, social environmental, and physical impairment variables.

Eleven variables made significant contributions to the regression model (Table 12). A rehabilitative track was more likely for old-old

Table 12

Results of Logistic Regression For Rehabilitative Trajectory

| Variables | Beta | Standard Error | p |
|---|---|---|---|
| Old-Old Nonwhite | .41 | .19 | .027 |
| Age | -.20 | .07 | .006 |
| Location of Patient | -1.30 | .13 | .000 |
| Physical Impairments | .52 | .04 | .000 |
| Behavior/Orientation | -.20 | .03 | .000 |
| Medication Administration | .14 | .05 | .010 |
| Dressings | .31 | .13 | .018 |
| Mobility | .16 | .04 | .000 |
| Services Receiving | .66 | .04 | .000 |
| Physical Care Services | .40 | .06 | .000 |
| Seriousness of Illness | -.09 | .05 | .043 |
| Intercept | -2.19 | | |

Note. Only those variables that were signifiant at .05 level or below are shown, although all variables were included in the model.

Rehabilitative cases = 1338 Nonrehabilitative cases = 1809

N = 3147.

Model Chi-square = 1054.75 with 24 D.F. P = .000 $R^2$ =.282

nonwhites, younger patients and individuals located in acute care facilities as well as those with more physical impairments, less serious behavior/ orientation problems, and persons in need of assistance with medication administration. Rehabilitative track elders were more likely to have one or more dressings, a greater number of mobility restrictions, and to be receiving a greater number of services at the time of screening. These individuals were also more likely to be receiving a greater number of physical care services and to be less seriously ill.

The full set of explanatory variables together explained 28.2% of the variance in rehabilitative trajectory. Three background variables and eight physical impairments were significant contributors to this model. The social environment variables were all nonsignificant. The results did not, therefore, support the third hypothesis that all three categories of explanatory variables would partially explain the variance in rehabilitative trajectory.

Divergence model. ADL divergence was the next variable to be considered. The analysis was designed to test hypothesis number four:

> Divergence from the original ADL pattern of dependency can be explained by background, social environmental, and physical impairment variables. Moreover, the rehabilitative trajectory variable will increase the percent of explained variance in the divergence variable.

Seven variables made significant contributions to this regression model in stage one of the analysis (See Table 13). Individuals who were ADL divergent were more likely to be female, have fewer physical impairments, less serious behavior/orientation problems, and fewer mobility

Table 13

Results of Staged Logistic Regression For Divergence (Without ADL Count)

| | Stage 1 | | |
|---|---|---|---|
| Variables | Beta | Standard Error | p |
| Sex | .37 | .19 | .050 |
| Physical Impairments | -.10 | .04 | .011 |
| Behavior/Orientation | -.25 | .03 | .000 |
| Mobility | -.43 | .03 | .000 |
| Decubitis Ulcers | -.34 | .13 | .008 |
| Physical Care Services | -.32 | .06 | .000 |
| Seriousness of Illness | .16 | .04 | .000 |
| Intercept | .52 | | |

Model Chi-square = 536.91 with 24 D.F. P = .000 $R^2$ = .133

| | Stage 2 | | |
|---|---|---|---|
| | Beta | Standard Error | p |
| Rehabilitative Trajectory | -.01 | .10 | .948 |

Model Chi-square = 536.94 with 25 D.F. p = .000 $R^2$ = .133

Note. Only those variables that were significant at .05 level or below are shown, although all variables were included in the model.
N = 3147 Divergent cases = 1140 Patterned cases = 2007

restrictions. The divergent cases also had fewer decubitis ulcers, were receiving fewer physical care services, and had greater seriousness of illness scores.

The full set of explanatory variables explained 13.3% of the variance in divergence in this first stage. One background variable and six physical impairment variables were the significant contributors to the model. Social environmental variables were again nonsignificant. The results did not support the first part of hypothesis number four that all three categories of explanatory variables would partially explain the variance in divergence.

Stage two of the analysis controlled for all of the variables in the full model while entering the rehabilitative trajectory variable. The variable was nonsignificant and did not increase the total explained variance in divergence. The results did not, therefore, support the second part of the fourth hypothesis.

Table 14 shows the results of the exploratory analysis using ADL count in the regression model for divergence. The ADL count variable was a nonsignificant contributor to the model and the results are almost identical to the regression results without ADL count. Inclusion of ADL count actually reduced the explained variance in stage two of the analysis by one tenth of one percent.

Institutional versus community care models. Hypothesis number five was tested in separate analyses for the two recommended care variables (institutional versus community care and skilled versus intermediate care). This hypothesis stated:

Care setting placement decisions are a function of background,

Table 14

Results of Staged Logistic Regression for Divergence (ADL Count Included

| | Stage 1 | | |
|---|---|---|---|
| Variables | Beta | Standard Error | p |
| Sex | .38 | .19 | .048 |
| Physical Impairments | -.09 | .04 | .014 |
| Behavior/Orientation | -.25 | .03 | .000 |
| Mobility | -.42 | .04 | .000 |
| Decubitis Ulcers | -.34 | .13 | .008 |
| Physical Care Services | -.32 | .06 | .000 |
| Seriousness of Illness | .16 | .04 | .000 |
| ADL Count | -.01 | .03 | .688 |
| Intercept | .56 | | |

Model Chi-square = 538.40 with 25 D.F. P = .000 $R^2$ = .133

| | Stage 2 | | |
|---|---|---|---|
| | Beta | Standard Error | p |
| Rehabilitative Trajectory | -.00 | .10 | .967 |

Model Chi-square = 538.42 with 26 D.F. p = .000 $R^2$ = .132

Note. Only those variables that were significant at .05 level or below are shown, although all variables were included in the model.
N = 3147 Divergent cases = 1140 Patterned cases = 2007

social environmental and physical impairment variables. Rehabilitative trajectory will increase the explained variance in placement recommendations for a) institutional versus community care and b) skilled versus intermediate care. Likewise, divergence from the original ADL pattern will add a significant explanatory contribution in a) insititutional versus community care and b) skilled versus intermediate care recommendations.

When the institutional versus community care recommendation variable was regressed on the background, social environment, and physical impairment variables, ten variables were significant contributors to the regression model (Table 15). Individuals recommended for institutional care were more likely to be white, located in acute care facilities at the time of preadmission screening, have no available community living space, and have fewer available informal social supports. These individuals were also more likely to have more physical impairments, greater degrees of behavior/orientation problems, more need for assistance with medication administration, and more mobility restrictions. Institutional care was also more likely for individuals currently receiving more services and having less nutritional service needs.

The explanatory variables explained 18.7% of the variance in institutional versus community care recommendations. Two background variables, two social environment variables, and six physical impairment variables were significant contributors to the model. The results supported the first part of hypothesis number five that all three categories of explanatory variables would partially explain the variance in institutional versus community care recommendations.

Table 15

Results of Staged Logistic Regression For Institutional Versus Community Care (Without ADL Count)

| | Stage 1 | | |
|---|---|---|---|
| Variables | Beta | Standard Error | p |
| Race | .45 | .16 | .006 |
| Location of Patient | -1.30 | .12 | .000 |
| Available Living Space | -1.14 | .12 | .000 |
| Informal Support | -.12 | .02 | .000 |
| Physical Impairments | .08 | .04 | .028 |
| Behavior/Orientation | .18 | .03 | .000 |
| Medication Administration | .25 | .05 | .000 |
| Mobility | .23 | .03 | .000 |
| Services Receiving | .08 | .04 | .033 |
| Nutrition Services | -.10 | .05 | .026 |
| Intercept | .15 | | |

Model Chi-square = 748.98 with 24 D.F. P = .000 $R^2$ = .187

| | Stage 2 | | |
|---|---|---|---|
| | Beta | Standard Error | p |
| Rehabilitative Trajectory | .35 | .10 | .000 |
| Divergence | .05 | .09 | .561 |

Model Chi-square = 757.73 with 26 D.F. p = .000 $R^2$ = .189

Note. Only those variables that were significant at .05 level or below are shown, although all variables were included in the model.
N =3147 Community cases = 1221 InstitutionalCases= 1926

Stage two of the analysis controlled for all of the variables in the full model while entering the rehabilitative trajectory and divergence variables. Rehabilitative trajectory was significant ($p = .000$) while divergence was not ($p = .561$). The inclusion of these two variables increased the total explained variance slightly from 18.7% to 18.9%. The results supported the second part of hypothesis number five. However, it was clear that rehabilitative trajectory and not divergence was responsible for the slight increase in explained variance.

Table 16 shows the results of the exploratory analysis using ADL count in the regression model. The ADL count variable was a significant contributor ($p = .000$) to the model and the explained variance was increased to 22.2% from 18.7%. In stage two of the analysis, divergence also increased in significance, although it remained nonsignificant ($p = .135$). The other change that occurred in the model with ADL count included was the entry of number of living daughters and the exclusion of mobility as significant contributors to the model. In the model with ADL count, individuals recommended for institutional care had fewer living daughters.

Skilled versus intermediate care models. Skilled versus intermediate care recommendations for the institutional subsample was the final criterion variable to be considered. (Table 17). Ten variables were significant contributors to the model. Individuals recommended for skilled care were more likely to be nonwhite, located in acute care facilities, have more informal social supports, and have greater numbers of physical impairments. The skilled care cases also had less serious

Table 16

Results of Staged Logistic Regression For Institutional Versus Community Care (ADL Count Included)

| | Stage 1 | | |
|---|---|---|---|
| Variables | Beta | Standard Error | p |
| Race | .52 | .17 | .002 |
| Location of Patient | -1.06 | .12 | .000 |
| Available Living Space | -1.24 | .12 | .000 |
| Daughters | -.06 | .03 | .047 |
| Informal Support | -.12 | .02 | .000 |
| Behavior/Orientation | .14 | .03 | .000 |
| Medication Administration | .22 | .05 | .000 |
| Services Receiving | .09 | .04 | .012 |
| Nutrition Services | -.13 | .05 | .006 |
| ADL Count | .48 | .04 | .000 |
| Intercept | -1.32 | | |

Model Chi-square = 862.16 with 25 D.F. P = .000 $R^2$ = .222

| | Stage 2 | | |
|---|---|---|---|
| | Beta | Standard Error | p |
| Rehabilitative Trajectory | .26 | .11 | .014 |
| Divergence | .15 | .10 | .135 |

Model Chi-square = 868.16 with 27 D.F. p = .000 $R^2$ = .223

Note. Only those variables that were significant at .05 level or below are shown, although all variables were included in the model.
N =3147 Community cases = 1221 Institutional Cases= 1926

Table 17

Results of Staged-Stepwise Logistic Regression For Skilled Versus Intermediate Care (Without ADL Count)

| | Stage 1 | | |
|---|---|---|---|
| Variables | Beta | Standard Error | p |
| Race | -.54 | .21 | .012 |
| Location of Patient | -2.01 | .22 | .000 |
| Informal Support | .09 | .03 | .002 |
| Physical Impairments | .26 | .05 | .000 |
| Behavior/Orientation | -.09 | .04 | .010 |
| Medication Administration | .16 | .07 | .017 |
| Dressings | .71 | .17 | .000 |
| Mobility | .45 | .05 | .000 |
| Decubitis Ulcers | .30 | .14 | .030 |
| Physical Care Services | .18 | .07 | .007 |
| Intercept | -1.82 | | |

Model Chi-square = 508.64 with 24 D.F. P = .000 $R^2$ = .212

| | Stage 2 | | |
|---|---|---|---|
| | Beta | Standard Error | p |
| Rehabilitative Trajectory | 1.30 | .13 | .000 |
| Divergence | .10 | .14 | .477 |

Model Chi-square = 589.23 with 26 D.F. p = .000 $R^2$ = .248

Note. Only those variables that were significant at .05 level or below are shown, although all variables were included in the model.
N =1926 Skilled Care = 946 Intermediate Care = 980

behavior/orientation problems, greater need for assistance for medication administration, and a greater number of dressings. In addition, they had greater mobility restrictions, more decubitis ulcers, and were receiving a greater number of physical care services at the time of the preadmission screening.

The explanatory variables explained 21.2% of the variance in skilled versus intermediate care recommendations. Significant contributors to the model included two background variables, one social environment variable, and seven physical impairment variables. The results supported the first part of hypothesis number five that all three categories of explanatory variables would partially explain the variance in skilled versus intermediate care recommendations.

Stage two of the analysis controlled for all of the variables in the full model while entering the rehabilitative trajectory and divergence variables. Rehabilitative trajectory was significant ($p = .000$) while divergence was not (.477). The inclusion of these two variables increased the total explained variance from 21.2% to 24.8%. The results supported the second part of hypothesis number five. However, it was once again clear that rehabilitative trajectory and not divergence was responsible for the increase in explained variance.

Table 18 shows the results of the exploratory analysis using ADL count in the regression model. The ADL count variable was a significant contributor to the model ($p=.034$). However, the explained variance in the analysis only increased one-tenth of one percent. In stage two of the analysis, divergence dropped sharply in significance from .477 to

Table 18

Results of Staged Logistic Regression For Skilled Versus Intermediate Care (ADL Count Included)

| | Stage 1 | | |
|---|---|---|---|
| Variables | Beta | Standard Error | p |
| Race | -.54 | .21 | .012 |
| Location of Patient | -2.07 | .22 | .000 |
| Informal Support | .09 | .03 | .002 |
| Physical Impairments | .27 | .05 | .000 |
| Behavior/Orientation | -.08 | .04 | .025 |
| Medication Administration | .16 | .07 | .018 |
| Dressings | .70 | .17 | .000 |
| Mobility | .50 | .05 | .000 |
| Nutrition Services | .11 | .06 | .045 |
| Decubitis Ulcers | .32 | .14 | .021 |
| Physical Care Services | .19 | .07 | .005 |
| ADL Count | -.15 | .07 | .034 |
| Intercept | -1.20 | | |

Model Chi-square = 512.71 with 25 D.F. P = .000 $R^2$ = .213

| | Stage 2 | | |
|---|---|---|---|
| | Beta | Standard Error | p |
| Rehabilitative Trajectory | 1.31 | .13 | .000 |
| Divergence | -.02 | .15 | .875 |

Model Chi-square = 593.64 with 27 D.F. p = .000 $R^2$ = .249

Note. Only those variables that were significant at .05 level or below are shown, although all variables were included in the model.

N =1926 Skilled Care = 946 Intermediate Care = 980

.875. Once again, the overall model with ADL count differed from the previous model without the ADL count variable. The exploratory model included nutritional services at .045 level of significance. In this model, increased use of nutritional services was more likely among persons with skilled care recommendations.

Summary of regression results. A large number of explanatory variables made significant contributions to each of the regression models. The largest number of significant variables turned out to be in the physical impairment group while the social environment variables were generally nonsignificant.

Total explained variance for each regression analysis was not high. These were not, however, uncommon results for social science research in general and specifically for long-term care issues. The models with the least amount of explained variance were the two divergence models without ADL count (13.3%) and with ADL count (13.2%). Explained variance in the other models ranged from 28.2% for rehabilitative trajectory to a low of 18.9% for institutional versus community care recommendations without the ADL count variable.

The results of the explanatory value of divergence were, indeed, very disappointing. We performed additional analyses following all of the multivariate analyses to determine whether divergence might be significantly associated with the two recommended care setting variables when considered in a model by itself. We regressed community versus intermediate care recommendation on only the divergence variable with a resulting level of significance of .000. Similarly, we regressed skilled versus intermediate care recommendation on divergence resulting in a

level of significance of .000. It appeared that divergence did have some explanatory value, but that prior entry of large numbers of explanatory variables reduced its explanatory power. The explained variance for community versus institutional care recommendation with only divergence was .8%. However, the explained variance for skilled versus intermediate care recommendation with divergence was 2%.

# CHAPTER V: Discussion, Conclusions, and Recommendations

## Discussion

### Purpose of the Study

More than 30 years ago Katz and his associates suggested a hierarchy of ADL dependency. The inherent scaling properties of these six activities of daily living became the justification for a simple count of ADL dependencies to reflect overall level of self-care. The method of counting ADL dependencies has become commonplace in long-term care research and in practice settings.

Since the development of the original Index, a new cohort of the old and very old has entered the long-term care system under the public assistance programs of Medicare and Medicaid. Increased survival of these individuals who would have died without medical advances has resulted in increasing numbers of disabled elders requiring long-term care, a situation referred to by Gruenberg (1977) as the failure of success.

As the costs and scope of long-term care services continue to increase, it has become critical to examine ADL as one of the measures of dependency used for eligibility and placement criteria in long-term care. In addition, several states have been using or have been considering nursing home reimbursement plans based, in part, on number of ADL dependencies for recipients of institutional care.

This research project answered four questions of theoretical and practical concern. First, do ADL divergent individuals represent another

pattern of ADL dependency? Second, for a selected long-term care elderly population, what is the distribution of patterned and divergent cases on the original ADL hierarchy across existing long-term care settings? Third, within recommended care settings, what is the distribution of levels of ADL dependency for cases that match the original pattern? Finally, what factors (background, social environmental, and physical impairment) explain rehabilitative trajectory, divergence from the original ADL hierarchy, and recommended care setting for a long-term elderly population?

## Procedures

Data Source. The sample consisted of 3611 cases from the Virginia Preadmission Screening Program for long-term care. We drew a computer selected random sample from the statewide population of elderly Medicaid eligible applicants to nursing homes between July 1, 1983 and December 21, 1984. The sample included cases from each of three recommended care settings: community care = 1390, intermediate care = 1133, and skilled care = 1088. All applicants in the sample were 59 years of age or older.

The sample ensured representation of community and hospitalized applicants. The sample size was large enough to accurately describe the characteristics of a statewide population of Medicaid eligible, long-term care elders.

Analysis of the data. The data analysis began with Guttman scaling procedures for the full sample and the divergent subsample. We utilized tabular analyses with Chi-square tests of independence and staged logistic regression analyses to test the research hypotheses. In addi-

tion to the four planned regression analyses, we conducted exploratory analyses with the inclusion of an ADL count variable. The actual number of cases used in the regression analyses was generally about 460 cases lower than the original sample size of 3611 due to the list-wise deletion of cases with missing data.

Two of the research hypotheses sought to examine increases in explained variance in three of the criterion variables. Therefore, we used a staged logistic regression approach. This approach allowed all of the variables to enter the regression model in stage one and controlled for this full model in stage two while entering the variable or variables of interest. We compared the explained variance ($R^2$) in stage one with the results in stage two in order to determine any increases in explained variance.

## Results

Introduction. The results of this study indicated that most of the long-term elders screened had major ADL dependencies. In addition, a large portion of the sample did not match the pattern of the original Index of ADL with the precision that has been previously reported. Analyses of a relatively large number of explanatory variables derived from the screening data provided information regarding the factors that were related to rehabilitative trajectory, ADL divergence, and the two recommended care setting variables.

Study hypotheses. This study tested five hypotheses. The data supported hypothesis number one. In comparison with the distribution of the full sample, there was an unequal distribution of divergent cases across recommended care settings. Of the 1280 divergent cases, 45.6%

were recommended for community care, 19.8% for skilled care, and 34.5% for intermediate care. This represented higher proportions of divergent cases recommended for community care and a smaller proportion recommended for skilled care than in the total sample. After cross-classifying divergence with rehabilitative trajectory, we found approximately two-thirds of the divergent/rehabilitative cases received institutional care recommendations compared to slightly less than one-half of the divergent/nonrehabilitative cases. However, in the institutional subsample, divergent/rehabilitative cases were most likely to receive skilled care recommendations while the overwhelming majority (81.5%) of the divergent/nonrehabilitative cases received intermediate care recommendations. It appeared, as hypothesized, that an association did exist between an individual's divergent/ nonrehabilitative status and a recommendation for the more custodial type of institutional care found in an intermediate care environment.

The data partially supported hypothesis number two. There was an unequal distribution (rather than the hypothesized equal distribution) of levels of ADL disability within community, skilled, and intermediate care recommendations. The vast majority of the patterned cases addressed by this hypothesis were at high levels of ADL dependency (mean = 4.9) and received institutional care recommendations. The second portion of the hypothesis (cases with mid-range to high ADL dependency and a rehabilitative track will be more frequently recommended for skilled care) was supported in the analysis of the institutional subsample. There did appear to be an hypothesized association between an individual's pat-

terned/rehabilitative track status and subsequent recommendations for the more aggressive skilled care environment.

The data did not support the third hypothesis. All three categories of explanatory variables did not partially explain rehabilitative trajectory. Rather, all of the social environmental variables proved to be nonsignificant contributors to the model. We operationalized rehabilitative trajectory in part by selected care and service needs the elders were currently receiving. In view of the items used in the operationalization, it was not surprising that an abundance of physical impairment variables were found to be statistically significant.

The data also did not support hypothesis number four. All three categories of explanatory variables did not partially explain ADL divergence. As with rehabilitative trajectory, all of the social environment variables were nonsignificant. In addition, rehabilitative trajectory was nonsignificant in stage two of the regression analysis and did not increase the total explained variance in ADL divergence. The results of testing hypothesis number four lead to the conclusion that the social environmental variables reflecting environmental artifact were of little value in explaining divergence. Also, rehabilitative trajectory, representing selected medical conditions and the provision of rehabilitative care and services, had no value in explaining divergence. In fact, the divergence regression model was the weakest model in the analyses in terms of number of significant explanatory variables and total explained variance.

The fifth and final hypothesis examined the two recommended care setting variables. The data supported the hypothesis with qualifica-

tions. All three categories of explanatory variables did contribute to explaining the variance in institutional versus community and skilled versus intermediate care recommendations. In addition, the total explained variance in the models did increase with the inclusion of the rehabilitative trajectory and divergence variables. However, the increases were very small and it was, clearly, rehabilitative trajectory and not divergence that significantly increased the explained variance.

Findings of ADL scaling procedures. Thirty-five percent of the individuals were ADL divergent and represented a much higher proportion of the sample than the 14% suggested previously by Katz and his associates. This indicated that, for a large number of those screened, a count of ADL dependencies was probably not an accurate basis for interpreting level of self-care dependency. Since almost one-half of the sample was totally dependent in all six ADL's (and therefore patterned by definition), individuals were generally either totally ADL dependent or ADL divergent. Moreover, this suggested that the ADL divergent cases were probably the group responsible for the reversal of two specific ADL items in the scaling procedures.

The Guttman scaling procedure for the entire sample produced a marginally acceptable scale in the order of: bathing, dressing, toileting, transferring, feeding, and continence. This scale was identical to the original Index of ADL except for the reversed order of the last two items of feeding and continence. These results seemed to indicate that for many individuals, specifically in a long-term care population, the parallel of an ADL hierarchy with childhood growth and development

simply may not be easily translated to adult growth and development where a higher level of psycho-social maturity is found in later years.

The Guttman scale for the ADL divergent cases was neither reliable nor valid. These individuals obviously represented a variety of patterns of self-care dependency. Feeding and continence probably played important roles in ADL divergence since these two items appeared out of sequence in both scales, but this was only speculative. At any rate, the results of the scaling procedures demonstrated that some factor or factors were altering the ADL hierarchy in this long-term care population. It was hoped that the analysis of ADL divergence would identify these factors.

ADL divergence. Seven variables had a significant net effect on ADL divergence. We found that interpretation of these results produced more questions than answers regarding the explanation of ADL divergence. The inclusion of background and social environmental variables as measures of the environmental artifact construct were all nonsignificant. However, these variables (age, widowhood, living arrangement, available social support, and number of living daughters) may have represented a statistical or an operationalization issue or both. In this long-term care sample, individuals were more likely to be older, female, widowed, live alone, have few available social supports, and few living daughters. It may have been that, because of the high interrelationship among these variables, only one variable, being female, was statistically significant. It could also have been the case that the measurements of the social environmental variables were not adequate for representing environmental artifact. For example, there may have been

issues of time requirements, frequency of care, and family care giving skills that were more important than marital status, number of available social supports or number of living daughters.

ADL divergent individuals were also more likely to have higher seriousness of illness scores. Since ADL divergence appeared to represent the reversal of dependency in two specific ADL items (feeding and continence) it seemed possible that different types of illness or combinations of illnesses were contributing to high levels of dependency in which continence could be retained as the last independent function. The questions, which could not be answered in this analysis, were what specific illnesses or combinations of illnesses explained this association with divergence? Also, was seriousness of illness a reflection of acute or chronic medical conditions that were alterating patterns of self-care dependency?

Finally, as indicated in the analysis, ADL divergent individuals were more likely to have fewer physical impairments and mobility problems, receive fewer physical care services, have lower levels of behavior/orientation problems, and less likelihood of decubitis ulcers. Relative to patterned ADL cases, the ADL divergent cases appeared to be less debilitated. Here again, this may have been a statistical issue rather than one of theoretical significance since it was known that, in comparison, the overwhelming majority of the patterned cases were totally ADL dependent.

It appeared from the results that the principle variable of interest in this project, ADL divergence, remained a variable in need of additional research or, perhaps, was not the most valuable theoretical

concept for understanding variations in self-care dependency in this particular long-term care population. Slightly more than one-third of this sample was ADL divergent. Yet, very little had been explained about the factors that related to ADL divergence.

Other results. In the analysis of rehabilitative trajectory, there seemed to be two types of factors associated with a rehabilitative track. First, the individuals on a rehabilitative track were generally younger and less seriously ill with less behavior/orientation problems. Since they were most likely to be screened in acute care facilities, it appeared that a medical crisis may have precipitated the need for screening for continued care beyond the period of hospitalization. Second, the significant physical impairment variables were consistent with post hospital recovery and not long-term decline. Individuals in rehabilitative tracks may have represented higher levels of care requirements in the short term in order to achieve greater levels of independence in ADL for the long term.

We expected race, by virtue of the higher levels of chronicity of illness and shorter life expectancy for nonwhites, to provide significant explanatory effects for rehabilitative trajectory. We did not expect either old age or being nonwhite to be positively associated with rehabilitative tracks. In fact, the results of the tabular analyses of the age/race interaction terms (See Appendix J, Table 22) indicated the opposite association. The significance of the old-old nonwhite variable in the regression model may be the result of redundancy in the model from the age, race, and two age/race interaction terms. The effect of this redundancy between variables and their interaction terms was lack

of statistical significance for all but one of these background variables and an apparent reversal of the direction of the beta coefficient. Future research should examine these variables more cautiously and selectively to reduce issues of model redundancy and high interrelationships.

A relatively large number of explanatory variables had a significant net effect on recommendations for care in an institutional setting. Furthermore, these variables were consistent with a need for supervision and frequent amounts of care. The findings suggested that many of those screened, generally from acute care, did not have the informal supports that could have provided the required post-hospital care for increased physical impairments, supervision for more serious behavior/orientation problems, assistance with medication administration and assistance for mobility restrictions. In addition, these individuals did not have a living space in the community and were probably recommended for institutional care where they could be maintained permanently.

Individuals in rehabilitative tracks were probably recommended for institutional care for the straightforward reason that rehabilitative care and services were not easily accessible or available in the community. This interpretation was further clarified in the analysis of the institutional care subsample.

In the analysis of skilled versus intermediate care, several variables were indicative of the need, usually post-hospitalization, for rehabilitative care and services and recuperation in skilled care. Six statistically significant variables (increased physical impairments,

need for physical care, assistance with medication administration, dressings, decubitis ulcers, and mobility restrictions) indicated that individuals were more likely to be recommended for skilled care with specific nursing care needs and increased mobility restrictions. They most likely represented the new "heavy care" patients discharged from hospitals under the Medicare system of prospective payment based upon diagnostic related groups (DRG's).

Individuals who were mentally competent and had informal supports also appeared to be likely candidates for skilled care with the implication that they could return to the community following aggressive skilled care. On the other hand, individuals who were not mentally competent or had no one to provide infomal support were probably authorized for intermediate care where they would receive permanent, custodial care.

Elders in rehabilitative tracks were, as expected, most likely to be recommended for skilled care. This probably reflected the association with post-hospitalization discussed previously. Individuals screened in a hospital benefited from the availability of rehabilitative care and services which carried over into recommendations for skilled care where the care and services could continue.

The lack of statistical significance of ADL divergence while ADL count was statistically significant in explaining the two recommended care setting variables was probably indicative, in part, of the eligibility criteria for institutional care of the study population. However, ADL count explained only .1% additional variance in skilled versus intermediate care. This is statistically significant but of negligable

importance. Although it was not known at the onset of this project, the mean ADL count for the entire sample was almost five. For this reason alone, the overwhelming majority of the sample was eligible for institutional care. Screening policy was, in a sense, in conflict with ADL divergence playing a significant explanatory role in care setting recommendations for such a highly self-care dependent population. From a policy and quality assurance perspective, ADL count should have been, and was, statistically significant.

Another perspective regarding the statistical significance of ADL divergence was the subsequent entry of the variable as the sole explanatory variable in the two care setting regression models. These analyses indicated that under those circumstances ADL divergence was statistically significant in predicting both care setting variables. It could have been that the explanatory value of the ADL divergence variable was a statistical issue of repetitiveness. In other words, information provided by some of the variables in the full model had an adverse effect on the statistical significance of ADL divergence in stage two of the analysis (Pedhazur, 1982, p.242).

## Applications of Findings

Introduction. Despite the fact that the data did not support all of the research hypotheses, several findings did suggest theoretical and practical applications. For example, what did the high percentage of ADL divergence mean with regard to the theory of biological organization of patterns of ADL dependency? What did this imply about the utility of counting number of ADL dependencies as a reflection of underlying patterns of self-care dependency? Did the finding of high ADL dependency

in the sample suggest any need to modify eligibility and placement criteria of the Preadmission Screening Program? Finally, did the operationalization of rehabilitative trajectory provide any indication of the feasibility or impact of a classification scheme which included rehabilitative versus nonrehabilitative/maintenance tracks?

Theoretical applications. When Katz defined the six ADL items, he addressed two classes of functions. The first class, vegetative functions, included the activities of feeding, continence, and transferring. He noted that these functions tend to be independent of complex cultural and learned characteristics of behavior, are the least complex human functions, are acquired first in human growth and development, and are retained the longest of all the ADL items. The second class of functions Katz termed cultural/learned functions. This class included the activities of bathing, dressing, and toileting. In contrast to vegetative functions, these items are the most complex ADL functions, are acquired last in human growth and development and are the first functions to result in self-care dependency.

The Guttman scaling procedure for the full sample reflected a pattern of ADL in which feeding and continence were reversed in order of dependency from the original Index of ADL. It was noteworthy, however, that the ADL mismatch appeared to be confined to the same class of (basic) vegetative functions. This implied that there was merit to the theory of biological organization of ADL for class distinctions of dependency, but questionable value for retention of a rigid hierarchy of ADL.

Practical applications. Current screening procedures, by design, have not made explicit interpretations of an individual's self-care needs other than in terms of number of ADL dependencies for care setting placement. Recently, however, the Joint Subcommittee Monitoring Long-Term Care for the Virginia General Assembly (1985) has been questioning the rationale for retaining separate skilled and intermediate facility certification under a new reimbursement plan based on patient need. All facilities would be certified under some new designation such as "comprehensive care" which is the designation used in the State of Maryland. With this growing emphasis on care requirements and not necessarily on care setting, screening, placement, and reimbursement procedures will probably be modified in the near future to be more explicit in terms of expected care requirements.

The reimbursement plan under consideration in Virginia has been based, in large part, on number of ADL dependencies to designate individuals in one of three categories: light care, moderate care, and heavy care. In view of the high proportion of ADL divergent cases in the sample, counts of ADL dependencies may not be accurate reflections of level of care for many of those screened for long-term care.

Following approval by the Virginia Department of Health, a pratical and timely application of the study findings would be the dissemination of the results of this project to Delegate Mary Marshall, Chairperson of the Joint Subcommittee Monitoring Long-Term Care. In consort with time and motion studies (to determine type, frequency, and time requirements for care) already proposed by the subcommittee, a new system for screening, placement, and reimbursement could be forthcoming. This system

could easily move long-term care out of the mind set that self-care needs are a simple translation of number of ADL dependencies. In the final analysis, if this study of self-care dependency has achieved only one practical outcome, it has been to place doubt in the minds of policy-makers, researchers, and practitioners regarding the value of relying exclusively on ADL counts to reflect an individual's self-care dependency.

Although ADL divergence did not fare very well in explaining the two recommended care setting variables, there were some useful findings regarding the other new variable, rehabilitative trajectory. Prior research has frequently demonstrated that Medicaid coverage is limited or nonexistent for services needed by the impaired elderly in the community. Conversely, nursing home coverage has been extensive and available to individuals who would not qualify for Medicaid coverage outside of the institution (Liu & Mossey, 1980). The overwhelming emphasis in community care has been on maintenance activities to sustain elders in the community for as long as possible . The philosophy of long-term care has promoted a uni-directional path beginning with some specified level of need and expecting increases in need until death. There has been very little attention to a concept such as rehabilitative trajectory. The entry into the Medicaid long-term care system, by virtue of the eligibility requirements, has had virtually no exit except death.

If new reimbursement systems for long-term care are to be based on need for care, there should also be some measure of the direction of the care (improving, static, or declining) that could potentially be derived from a more refined and improved measure of rehabilitative trajectory

than was used in this study. In addition, there should be efforts to develop provisions for rehabilitative care and services outside of institutional settings. How would an elder benefit from a care-intensive program of rehabilitation in an institutional setting if there were inadequate follow-up services in the community?

Adult day care is one type of service that could provide a source of post-institutional recuperation and resocialization while promoting independence and self-esteem for the individual. Although this type of program has proven to be marginally effective in reducing the number of days spent in a nursing home and, at best, has prolonged life for a few individuals (Skellie, Mobley, & Coan, 1982; Weissert, Wan, Livieratos, & Katz, 1980), adult day care has not been fully explored as an aggressive adjunct to institutional rehabilitative care.

Limitations of the Study

There were several major limitations of this study. The first and most critical limitation was the high levels of ADL dependency represented by both ADL patterned and ADL divergent individuals. As both groups approached total dependency, the ability to identify factors associated with divergence was diminished. ADL divergence might have been a more useful explanatory variable in long-term care populations that did not include such highly dependent individuals. The narrow range of high ADL dependency in this study severely limited the operationalization of ADL divergence.

Second, the use of a secondary data set provided data that were not always in the form that best suited the research project. Certain portions of the data were abundantly detailed while other portions were

not. Data transformation procedures had to be considered in view of the existing data and not solely from a theoretical perspective. Also, it was not possible to be sure of the absolute accuracy of the assessment data, although each screener has been required to complete a training program. The converse of these limitations was, of course, the benefit of accessing a large statewide sample. A data set of the magnitude of the one used in this study would have been difficult if not impossible to obtain in a reasonable time frame and cost efficient manner.

The third limitation was the rehabilitative trajectory variable. This variable remained an indirect measure of rehabilitation. Although it was significant in most of the multivariate analyses, there was still a subjective nature to the data used in the operationalization of rehabilitative trajectory. It was clear that availability of rehabilitative services might have influenced an individual's categorization in rehabilitative or nonrehabilitative tracks. The better method of determining the rehabilitative trajectory of an individual would have been a longitudinal design with more data on progression and regression of physical disabilities and dependency in activities of daily living derived from actual plans of care and ongoing status evaluations.

Finally, generalization of the results to other long-term care elders was limited. The individuals in this study, by virtue of the Medicaid-eligibility criteria, were less financially advantaged than the general older adult population in the state. Similarly, it was not possible to generalize to populations of elders in other states due to the state to state variability in long-term care eligibility and types of services provided.

## Conclusions

The results of this study demonstrated that a large proportion of those screened did not match the original Index of ADL. Therefore, the justification for counting ADL dependencies, based on an underlying hierarchy of ADL, was not upheld.

The long-term care system from which the study sample was drawn appeared to be a system of care that was responsive to high ADL dependent individuals. The concept of ADL divergence was not as useful in explaining care setting recommendations as it might have been in a system that did not consider such high dependency cases. Classes of dependency in conjunction with levels of care for each class appeared to potentially be a more useful theoretical concept for this long-term care system than ADL pattern, ADL divergence, or ADL count.

The policy trends in long-term care have been moving toward simplistic, streamlined administrative methods for categorizing care, formulating reimbursement schedules, and determining resource allocations. This study suggested that the needs of long-term care elders were probably not amenable to simplistic categories of care requirements. It appeared that a more detailed rather than a more simplistic method for determining self-care needs may be necessary in order to differentiate among individuals whose needs could erroneously appear to be similar, when only the number of ADL dependencies is considered. Further research was indicated for improving eligibility and placement criteria that would reflect a fluid rather than a static system of long-term care. For example, rehabilitative trajectory, although an extremely

crude and rudimentary measurement in this study, could serve as indication of projected changes in assistance for self-care.

## Recommendations

Based on the results of this study, further research is indicated to provide information about the care requirements of the large proportion of highly dependent, ADL divergent individuals in the study population. In addition, further inquiry was indicated for rehabilitative trajectory as a means of projecting increasing, static, or decreasing self-care needs.

Since counts of ADL dependencies were shown to be inadequate indicators of self-care needs for ADL divergent individuals, more information is needed regarding specific care requirements for each ADL item. In this way, a system of weights could be applied to each care activity, totaled for each ADL item, and summed across all ADL dependencies to reflect total ADL care requirements.

Information regarding care activities for each ADL item should include three categories of care (physical care, psycho-social care, and nursing intervention.) First, the actual 'hands on care' in the physical care category would include frequency, type, and length of time for a specific care activity. For example, feeding dependency usually requires intervention three times a day. The objective measurements of this care activity would include preparation and feeding of the individual and cleanup and removal of the dietary material. Psycho-social care requires attention to the human components of each ADL item. Continuing with the example of feeding dependency, measurements may include the provision of

a social climate and social contact while being fed. A measure of the individual's degree of satisfaction and level of comfort at the completion of the activity would also be appropriate.

Finally, care activities for each ADL item should include a category of nursing intervention. Each ADL dependency requires more than simply doing something to or for an individual. For example the basic ADL of feeding requires professional nursing assessments regarding adequate nutritional intake, hydration, and elimination.

A weighting scheme for care requirements resulting from ADL dependency would resolve the dilemma of the interpretation of ADL counts for ADL divergent individuals. It would also be more descriptive of care requirements than a simple dichotomous classification of "dependent" or "independent" for each ADL item for all individuals in need of ADL assistance.

Inquiry regarding the concept of rehabilitative trajectory would necessitate a longitudinal study design of at least a three-year duration. A stratified sample of individuals with medical conditions (hip fracture, stroke, and so forth) and times of onset that were appropriate for rehabilitative strategies would be required. These individuals could be studied during the rehabilitative period (not to exceed one year of rehabilitative care and services) and two years post-rehabilitation. This time period should reflect increasing, static, or decreasing care needs relative to rehabilitative trajectory. The study would be extremely complex and require numerous controls for variables identified in this research project such as cumulative seriousness of illness, and age.

In conclusion, these recommendations for future research were intended to emphasize that simple counts of ADL dependencies are the "horse and buggy" measurements of self-care dependency in long-term care. While ADL divergence did not perform well as a criterion or an explanatory variable, it did, in the process of the study, move the entire hierarchical model of long-term care toward additional avenues of inquiry more appropriate for a highly ADL dependent long-term care population. Additional research could ultimately provide the basis for a patient classsification scheme based on Care Related Groups (C.R.G.s) similar to the Diagnostic Related Groups (D.R.G.s) currently utilized for Medicare reimbursement.

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## APPENDIX A

## ORIGINAL KATZ HIERARCHY OF ACTIVITIES OF DAILY LIVING

IMPROVEMENT/INDEPENDENCE

| | |
|---|---|
| Functional Level (0) | --Independent |
| Functional Level (1) | --Dependent bathing |
| Functional Level (2) | --Dependent bathing and dressing |
| Functional Level (3) | --Dependent bathing, dressing, and toileting |
| Functional Level (4) | --Dependent bathing, dressing toileting, and transferring |
| Functional Level (5) | --Dependent bathing, dressing, toileting, transferring, and continence |
| Functional Level (6) | --Dependent bathing, dressing toileting, transferring, continence, and feeding |

DETERIORATION/DEPENDENCE

Katz, S., Ford, A. B., Moskowitz, R. W., Jackson, B. A. & Jaffe, M. W. (1963). Studies of illness in the aged: The index of ADL. Journal of the American Medical Association, 183 (12), 914-919.

## APPENDIX B

## MODIFIED KATZ HIERARCHY OF ACTIVITIES OF DAILY LIVING

IMPROVEMENT/INDEPENDENCE

| | |
|---|---|
| Functional Level (0) | --Independent feeding, continence, transferring, going to toilet, dressing and bathing |
| Functional Level (1) | --Dependent in one function |
| Functional Level (2) | --Dependent bathing and one other function |
| Functional Level (3) | --Dependent bathing, dressing, and one other function |
| Functional Level (4) | --Dependent bathing, dressing, toileting, and one other function |
| Functional Level (5) | --Dependent bathing, dressing toileting, transferring, and one other function |
| Functional Level (6) | --Dependent bathing, dressing, toileting, trnasferring, continence, and feeding |

DETERIORATION/DEPENDENCE

Katz, S. & Akpom, A. (1976b). A measure of primary sociobiological functions. International Journal of Health Services, 6, 493-508.

## APPENDIX C

## THE LONG-TERM CARE INFORMATION SYSTEM ASSESSMENT PROCESS

The Long-Term Care Information System (LTCIS) assessment process was developed in 1979 at Cornell University through a grant from the Kellogg Foundation in response to the need for appropriate placement of long-term care applicants. In addition, the process was seen as a communication link among programs and agencies concerned with long-term care (Falcone, 1981; 1984).

The initial assessment information was first defined and tested for reliability, reproducibility, and feasibility for long-term care by four research groups supported by a research grant from the Department of Health, Education, and Welfare (Densen & Jones, 1976; Jones, 1974). The four groups, located at Case-Western Reserve University, Harvard University, Johns Hopkins University, and Syracuse University Research Corporation, utilized field tests for feasibility of collecting assessment data in different types of service programs, using both medical records and interviews with staff and patients as sources of information. Tests for reliability compared results of classification of identical patient information by classifiers with varying types of professional training, and in different geographic locations (Densen & Jones, 1976; Jones, 1974). Densen and his colleagues (1976) reported agreement ratios in the range of .95 or better for sociodemographic items, .64 to .98 for functional-status items, and .80 to 1.0 for impairment items. The agreement ratio for visitors and other social contacts was .52 to .86. A test of predictive validity was applied by using survival rates for patients according to their status at the time

of initial assessment for age, ADL status, number of medically defined conditions, and the presence of a diagnosis of cancer. These four variables contributed to the overall prediction of mortality in the anticipated direction.

The resulting Patient Classification for Long-Term Care included information on sociodemographic status, medical status, functioning status, and current services received at the time of the assessment. With minor additions, the core of the assessment information for the LTCIS remains in the original Patient Classification format. All of the information is defined in objective terms so that different assessors record the assessment data using the same standard terminology (Falcone, 1981; 1984). Falcone carried out tests of reproducibility comparing independent recordings for eleven individuals assessed at the time of referral for LTC from three acute care hospitals. She found high levels of agreement between two raters, generally of .9 or better (Falcone, 1979).

Although the VMAP has had a state-wide Nursing Home Pre-Admission Screening Program for persons in the community since May 15, 1977, the LTCIS assessment process has been used statewide since May 1, 1983. Assessment data are currently gathered for community residing nursing home applicants by a social worker from the local department of social services and a registered nurse from the local health department. This assessment is conducted in the applicant's place of residence. The application is then reviewed by a local screening committee composed of at least a physician, a registered nurse, and an adult services social worker. Acute care facilities are eligible for the delegated

responsibility of preadmission screening, providing they have a department with a medical social worker with a master's degree or who is supervised by a master's degree social worker or have a contract with a medical social worker consultant. The hospital medical social worker is generally the principal member of a coordinated discharge planning team for nursing home applicants. Assessment data from acute care facilities emphasize interviews with the patient, the nursing and medical staff, and significant others if available. Home visits are rarely a component of the information gathering procedures in acute care facilities.

Time required for completion of the assessment process is not specified and does vary according to the source of the screening (local health department or acute care facility), the screener, the condition of the applicant, and the availability of information. The process may, for example, include extensive medical status data in the acute care setting whereas this information would not be readily available in the community setting.

The second part of the assessment process, Translation to Service Needs, uses the initial assessment data of 20 items of information to project whether any of the following services are needed: audiology, dental service, emotional and social assessment or treatment, housekeeping, meal preparation, noninstitutional living space, nursing, opthalmology/optometry service, physical therapy, shopping, and speech therapy (Falcone, 1979; 1981).

Data from the initial phase of the assessment process are transferred to code sheets (Appendix D) by staff at the Virginia Department of

Health and entered in a computerized file system for the VMAP which oversees the Medicaid program in Virginia. The VMAP utilizes the data from the LTCIS to establish eligibility for Medicaid payment for either institutional or noninstitutional long-term care. Both the functional capacity and nursing needs of the individual are considered in determining eligibility for nursing home placement. Four separate eligibility categories are currently used as follows.

1. rated dependent in two to four of the Activities of Daily Living, and also rated semi-dependent or dependent in Behavior Pattern and Orientation, and semi-dependent in Medication Administration.

2. rated dependent in two to four of the Activities of Daily Living, and also rated semi-dependent or dependent in Behavior Pattern and Orientation, and semi-dependent in Joint Motion.

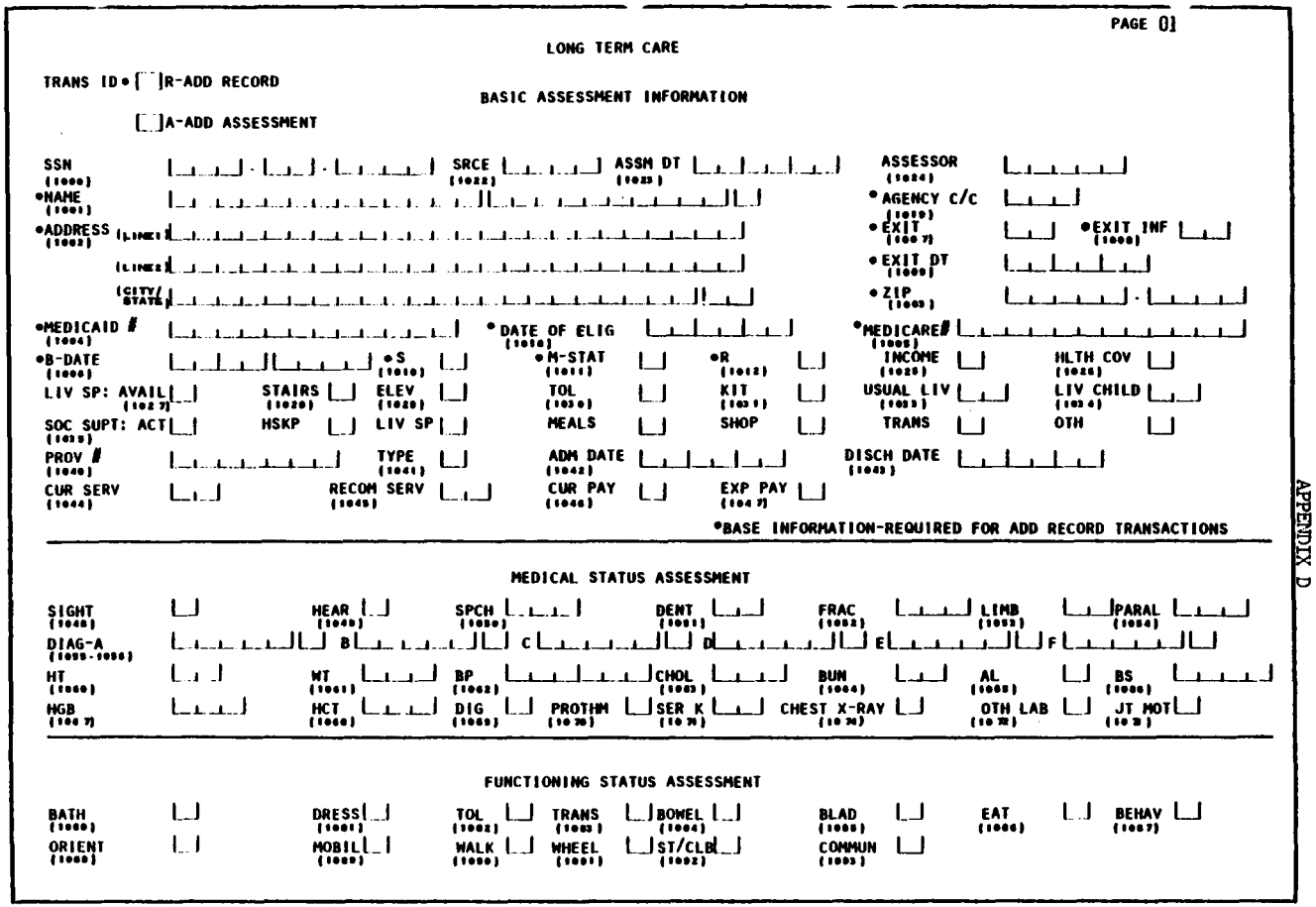
3. rated dependent in five to seven of the Activities of Daily Living, and also rated dependent in Mobility.

4. rated semi-dependent in two to seven of the Activities of Daily Living, and also rated dependent in Mobility and Behavior Pattern and Orientation, and has a medical condition requiring treatment or observation by a nurse.

Even when the eligibility criteria are met, placement in a non-institutional setting is preferred over nursing home placement under current VMAP goals for alternatives to institutionalization. The eligibility criteria are recognized as guidelines and professional judgement continues to be a major component of the decision-making process to assure appropriateness of care setting.

In June, 1982, the VMAP obtained a waiver of Medicaid eligibility from the Health Care Financing Administration (HCFA) to offer personal care as a means of diverting certain members of the long-term care population from nursing home admissions. These supportive services are

offered when there are no other formal or informal resources available to provide the personal care functions. An individual can receive this service only if he or she meets the admission criteria for intermediate or skilled care in a nursing home.



PAGE 01

LONG TERM CARE

TRANS ID • [ ] R-ADD RECORD

[ ] A-ADD ASSESSMENT

BASIC ASSESSMENT INFORMATION

SSN (1000) ___-___-____ SRCE (1022) ____ ASSM DT (1023) ____

•NAME (1001) ____

•ADDRESS (1002) (LINE1) ____

(LINE2) ____

(CITY/STATE) ____

•MEDICAID # (1004) ____

•B-DATE (1006) ____ •S (1010) _ •M-STAT (1011) _ •R (1012) _

LIV SP: AVAIL (1027) _ STAIRS (1020) _ ELEV (1020) _

SOC SUPT: ACT (1019) _ HSKP _ LIV SP _

PROV # (1040) ____ TYPE (1041) _

CUR SERV (1044) __ RECOM SERV (1045) __

•DATE OF ELIG (1058) ____

TOL (1030) _ KIT (1031) _

MEALS _ SHOP _

ADM DATE (1042) ____

CUR PAY (1046) _ EXP PAY (1047) _

ASSESSOR (1024) ____

•AGENCY C/C (1019) ____

•EXIT (1007) __ •EXIT INF (1008) __

•EXIT DT (1009) ____

•ZIP (1005) _____-____

•MEDICARE# (1005) ____

INCOME (1025) _ HLTH COV (1026) _

USUAL LIV (1023) __ LIV CHILD (1024) __

TRANS _ OTH _

DISCH DATE (1043) ____

•BASE INFORMATION-REQUIRED FOR ADD RECORD TRANSACTIONS

MEDICAL STATUS ASSESSMENT

SIGHT (1048) _ HEAR (1049) _ SPCH (1050) ____ DENT (1051) _ FRAC (1052) ____ LIMB (1053) _ PARAL (1054) ____

DIAG-A (1055-1056) ____ _ B ____ _ C ____ _ D ____ _ E ____ _ F ____ _

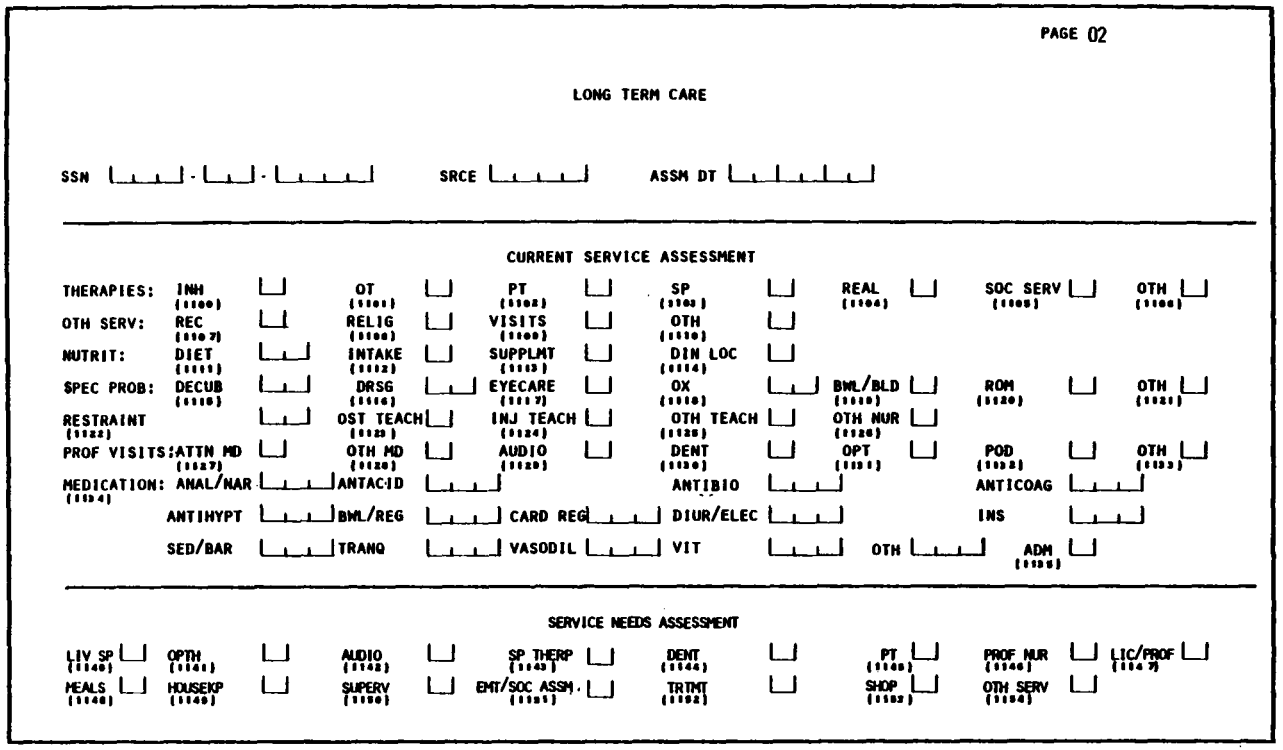
HT (1060) __ WT (1061) ____ BP (1062) ____ CHOL (1063) ____ BUN (1064) ____ AL (1065) _ BS (1066) ____

HGB (1067) ____ HCT (1068) ____ DIG (1069) _ PROTHM (1070) _ SER K (1071) __ CHEST X-RAY (1072) _ OTH LAB (1073) _ JT MOT (1074) _

FUNCTIONING STATUS ASSESSMENT

BATH (1080) _ DRESS (1081) _ TOL (1082) _ TRANS (1083) _ BOWEL (1084) _ BLAD (1085) _ EAT (1086) _ BEHAV (1087) _

ORIENT (1088) _ MOBIL (1089) _ WALK (1090) _ WHEEL (1091) _ ST/CLB (1092) _ COMMUN (1093) _



PAGE 02

LONG TERM CARE

SSN [ ][ ]-[ ][ ]-[ ][ ][ ][ ] SRCE [ ][ ][ ][ ] ASSM DT [ ][ ][ ][ ]

CURRENT SERVICE ASSESSMENT

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| THERAPIES: | INH (1100) | [ ] | OT (1101) | [ ] | PT (1102) | [ ] | SP (1103) | [ ] | REAL (1104) | [ ] | SOC SERV (1105) | [ ] | OTH (1106) | [ ] | |
| OTH SERV: | REC (0107) | [ ] | RELIG (1108) | [ ] | VISITS (1109) | [ ] | OTH (1110) | [ ] | | | | | | | |
| NUTRIT: | DIET (1111) | [ ][ ] | INTAKE (1112) | [ ] | SUPPLMT (1113) | [ ] | DIN LOC (1114) | [ ] | | | | | | | |
| SPEC PROB: | DECUB (1115) | [ ][ ] | DRSG (1116) | [ ][ ] | EYECARE (1117) | [ ] | OX (1118) | [ ][ ] | BWL/BLD (1119) | [ ] | ROM (1120) | [ ] | OTH (1121) | [ ] | |
| RESTRAINT (1122) | | [ ][ ] | OST TEACH (1123) | [ ] | INJ TEACH (1124) | [ ] | OTH TEACH (1125) | [ ] | OTH NUR (1126) | [ ] | | | | | |
| PROF VISITS: | ATTN MD (1127) | [ ] | OTH MD (1128) | [ ] | AUDIO (1129) | [ ] | DENT (1130) | [ ] | OPT (1131) | [ ] | POD (1132) | [ ] | OTH (1133) | [ ] | |
| MEDICATION: (1134) | ANAL/NAR | [ ][ ][ ] | ANTAC-ID | [ ][ ][ ] | | | ANTIBIO | [ ][ ][ ] | | | ANTICOAG | [ ][ ][ ] | | | |
| | ANTIHYPT | [ ][ ][ ] | BWL/REG | [ ][ ][ ] | CARD REG | [ ][ ][ ] | DIUR/ELEC | [ ][ ][ ] | | | INS | [ ][ ][ ] | | | |
| | SED/BAR | [ ][ ][ ] | TRANQ | [ ][ ][ ] | VASODIL | [ ][ ][ ] | VIT | [ ][ ][ ] | OTH | [ ][ ][ ] | ADM (1135) | [ ] | | | |

SERVICE NEEDS ASSESSMENT

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LIV SP (1140) | [ ] | OPTH (1141) | [ ] | AUDIO (1142) | [ ] | SP THERP (1143) | [ ] | DENT (1144) | [ ] | PT (1145) | [ ] | PROF NUR (1146) | [ ] | LIC/PROF (1147) | [ ] |
| MEALS (1148) | [ ] | HOUSEKP (1149) | [ ] | SUPERV (1150) | [ ] | EMT/SOC ASSM (1151) | [ ] | TRTMT (1152) | [ ] | SHOP (1153) | [ ] | OTH SERV (1154) | [ ] | | |

LONG TERM CARE

SSN [ ]-[ ]-[ ] SRCE [ ] ASSM DT [ ]

PRE-ADMISSION SCREENING PLAN

NH APPL [ ] (1156) XIX AUTH LEVEL [ ] (1157) LENGTH STAY [ ] (1158) RECOM REASSM DT [ ] (1159)
XIX ELIG [ ] (1160) FUTURE XIX ELIG [ ] (1161)
ASSM TIME [ ] (1162) HOSP PROV # [ ] (1163) AGENCY C/C [ ] (1164)

MD/OTHER DOCUMENTATION
COMPLIANCE/NON-COMPLIANCE

PROGRESS NOTES [ ] (1171) MEDICATION ORDERS [ ] (1172) RECERTIFICATION [ ] (1173)
NONCOMP DATES [ ] (1174)
[ ]
ADMISSION PHYS/HIST [ ] (1175)

OTHER DOCUMENTATION

MEDICAT ADM/DOCUM [ ] (1176) TRTMTS ADM/DOCUM [ ] (1177) RN MEDIC REV [ ] (1178)
CARE PLANS ADQ: [ ] (1179) NUR [ ] SW [ ] ACT [ ] DIET [ ] PT [ ] DISCHARGE PLANS [ ]
PATIENT OBSERVATION: CLEAN [ ] (1180) SKIN COND [ ] (1181) HYDRAT [ ] (1182) APPROP DRESS [ ] (1183)

PERSONAL CARE UTILIZATION REVIEW

DOCUMENTS [ ] (1186) AIDES LOG [ ] (1187) LOG ADQ [ ] (1188) NUR NOTES [ ] (1189)
RN NONCOMP DATES [ ] (1191)
[ ]

NUR DOCUM: EVAL PAT CON [ ] (1192) EVAL SERVICE [ ] (1193) OUTSIDE CONTACTS [ ] (1194)
RN RECOM [ ] (1195) HR CHG NOTIF [ ] (1196)

# APPENDIX E

## DIAGNOSES AND WEIGHTS FOR SERIOUSNESS OF ILLNESS INDEX

* original weight
** translated weight
\+ negotiated weight

| | Diagnosis | Rank | | Diagnosis | Rank |
|---|---|---|---|---|---|
| * | Vincent's Angina | 049 | ** | Endometriosis | 163 |
| ** | Skin lesions | 085 | * | Infection of middle ear | 164 |
| * | Constipation | 081 | * | Psoriasis | 174 |
| * | Boils | 096 | ** | Keloid/Keratosis | 174 |
| * | Heartburn | 098 | * | No menstrual period | 175 |
| * | Abscessed Tooth | 108 | * | Hemorrhoids | 177 |
| ** | Diseases of teeth/gums | 108 | * | Hay fever | 185 |
| * | Diarrhea | 118 | * | Low blood pressure | 189 |
| * | Carbuncle | 122 | * | Eczema | 204 |
| ** | Finger/toe abcess | 122 | * | Drug allergy | 206 |
| ** | Benign neoplasm | 124 | ** | Erythema | 206 |
| ** | Benign lipoma | 124 | * | Bronchitis | 210 |
| ** | Hemangioma | 124 | * | Hyperventilation | 211 |
| + | Cellulitis/abcess | 124 | + | Leptosporisis | 211 |
| + | Food poisoning | 134 | * | Shingles | 212 |
| * | Menopause | 140 | * | Infected eye | 220 |
| * | Dizziness | 149 | ** | Corneal ulcer | 220 |
| * | Bed sores | 153 | ** | Shoulder sprains | 222 |
| * | Increased menstrual flow | 154 | ** | Strep/Scarlet Fever | 230 |
| * | Fainting | 155 | ** | Lumbago | 231 |
| * | Painful menstruation | 163 | ** | Benign mammary dysplasia | 234 |

| | Diagnosis | Rank |
|---|---|---|
| * | Hernia | 244 |
| * | Goiter | 283 |
| * | Gonorrhea | 296 |
| * | Irregular heart beats | 302 |
| ** | Cholera | 312 |
| * | Anemia | 312 |
| + | Skull fracture | 315 |
| + | Concussion | 315 |
| * | Anxiety reaction | 315 |
| * | Gout | 322 |
| * | Pneumonia | 338 |
| * | Depression | 344 |
| ** | Eye burns | 348 |
| * | Burns | 348 |
| * | Kidney infection | 374 |
| ** | Cystitis | 374 |
| * | Hyperthyroid | 393 |
| * | Asthma | 413 |
| * | Glaucoma | 426 |
| ** | Corneal foreign body | 426 |
| ** | Neuromyelitis optica | 426 |
| ** | Trigeminal nerve disorder | 426 |
| + | Hyperplasia of prostate | 441 |
| * | Gallstones | 454 |
| ** | Rheumatoid arthritis | 468 |
| * | Arthritis | 468 |
| ** | Joint derangement | 468 |
| * | Starvation | 473 |
| ** | Kwashiorkor | 473 |
| * | Syphilis | 474 |
| * | Accidental poisoning | 480 |
| ** | Poisoning by drugs | 480 |
| ** | Toxic effects of lead | 480 |
| ** | Osteomyelitis | 484 |
| ** | Fractures | 484 |
| + | Slipped disk | 487 |
| ** | Ankylosing Spondylitis | 487 |
| ** | Injury head/neck nerves | 487 |
| * | Hepatitis | 488 |
| * | Kidney stones | 499 |
| * | Peptic ulcer | 500 |
| ** | Gastric ulcer w/bleeding | 500 |
| + | Diverticula of intestine | 501 |
| * | Pancreatitis | 514 |
| * | High blood pressure | 520 |
| + | Other respiratory disease | 529 |
| * | Small pox | 530 |
| * | Deafness | 533 |

| | Diagnosis | Rank |
|---|---|---|
| * | Collapsed lung | 536 |
| ** | Lung involvement | 536 |
| * | Epilepsy | 582 |
| * | Chest pain | 609 |
| ** | Pericarditis | 609 |
| ** | Mitral valve disorder | 609 |
| * | Nervous breakdown | 610 |
| * | Diabetes | 621 |
| + | Lupus erythematosis | 628 |
| * | Blood clot in vessel | 631 |
| ** | Peripheral vasc. disease | 631 |
| ** | Trans. cerebral ischemia | 635 |
| * | Hardening of the arteries | 635 |
| ** | Ill-defined cerebral vascular disease | 635 |
| ** | Injury carotid artery | 635 |
| ** | Senility w/o psychosis | 635 |
| * | Emphysema | 636 |
| * | Tuberculosis | 645 |
| * | Alcoholism | 688 |
| + | Amputation | 688 |
| * | Drug addiction | 722 |
| * | Coma | 725 |
| ** | Coma and stupor | 725 |
| * | Cirrhosis of the liver | 733 |
| * | Parkinson's disease | 734 |
| + | Nonpsychotic organic brain damage | 734 |
| * | Blindness | 737 |
| ** | Cataract | 737 |
| * | Mental retardation | 745 |
| + | Coagulation defects | 749 |
| * | Blood clot in the lung | 753 |
| * | Manic depressive psych. | 766 |
| ** | Affective psychosis | 766 |
| * | Stroke | 774 |
| ** | Occlusion of cerebral Arteries | 774 |
| ** | Drug psychoses | 776 |
| ** | Nonorganic psychoses | 776 |
| ** | Personality disorders | 776 |
| ** | Alzheimers disease | 776 |
| * | Schizophrenia | 776 |
| * | Muscular dystrophy | 785 |
| ** | Polio | 785 |
| + | Other paralytic syndromes | 794 |
| * | Cerebral palsy | 805 |
| * | Heart failure | 824 |
| ** | Complications of heart disease | 824 |
| ** | Aortic aneurysm | 824 |

| | Diagnosis | Rank | | Diagnosis | Rank |
|---|---|---|---|---|---|
| * | Heart attack | 855 | * | Cancer | 1020 |
| * | Brain infection | 872 | ** | Mouth neoplasm | 1020 |
| * | Multiple sclerosis | 875 | ** | Intestine neoplasm | 1020 |
| + | Quadriplegia | 885 | ** | Breast neoplasm | 1020 |
| * | Bleeding in brain | 913 | ** | Testis neoplasm | 1020 |
| ** | Subdural hemorrhage | 913 | ** | Nervous system neoplasm | 1020 |
| * | Uremia | 963 | * | Leukemia | 1080 |
| ** | Renal failure | 963 | | | |

APPENDIX F

Project Proposal to the Virginia Dept. of Health

A LAND-GRANT UNIVERSITY

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

*Blacksburg, Virginia* 24061

CENTER FOR GERONTOLOGY OFFICE OF THE DIRECTOR
215 WALLACE HALL

October 5, 1984

Ms. Ann Cook, Director
Medical Social Services
Virginia Department of Health
Madison Building - 8th Floor
Richmond, VA 23219

Dear Ann:

I am writing to request that data from the Long Term Care Information System be made available to one of my Ph.D. candidates for her dissertation research. Ms. Shirley Travis would like to have a portion of the data to carry out a study that focuses on patterns of ADL impairment among persons screened by the PAS program. Attached is a brief description, written by Shirley, of the proposed project.

I am sure that the Medicaid program receives many requests for the data and that, because of this, there may be restrictions on access. But I do hope you will give serious consideration to Shirley's proposal.

I have known Shirley since I came to Blacksburg. She is currently working for me as a graduate assistant. I can personally vouch for her professional integrity and her capacity as a researcher. I also want to assure you that I will carefully supervise Shirley in all aspects of her research.

Shirley is willing to come to Richmond to discuss the project with you and your staff. I will phone you in the near future to see if we can set up an appointment at a time that will be convenient with you.

In the meantime, if you have any questions or concerns, please do not hesitate to contact me or Shirley.

Sincerely,

William J. McAuley, Ph.D.
Director

eaw

Enclosure

cc: Charlotte Carnes

## FUNCTIONAL IMPAIRMENTS AMONG ELDERLY IN LONG-TERM CARE SETTINGS

There is a growing body of literature in recent years which has attempted to identify elderly at risk of institutionalization. This literature has enabled gerontologists to draw the conclusion that physical impairment in the absence of a social support system is predictive of institutionalization. In part because of this conclusion but also because of rising costs of institutional care and the intrinsic desire for non-institutional living by the impaired elderly, there has been a trend toward community-based long-term care services in the United States.

Long-term care of the elderly is most often conceptualized as an array of services that address the health, social, and personal care needs of individuals who have a reduced capacity for self care. These services may be continuous or intermittent, but a feature of the services is that they will be delivered for the long-term to individuals who have a demonstrated need. This need is usually determined by some measure of functional status which includes activities of daily living (ADL) as a major determinant of service needs.

Long-term care services, with the inclusion of the newer community-based care, range from complex skilled nursing care in an institutional setting to care that informal support systems (friends and family) could provide if such individuals were available. One of the striking features of the long-term care literature is, however, that differential levels of functional impairment (for example, mildly impaired to severely impaired) are found in all care settings. In other words, while we know that diminished functional capacity places an individual at risk, we have a system of long-term care that includes the early admission to nursing care

facilities for some individuals while supporting other individuals in the community who represent the severely impaired elderly.

The apparent variability in functional capacity among recipients of long-term care services makes long range planning for resource allocation and identification of target populations extremely difficult. House Joint Resolution 162 passed by the Virginia General Assembly in 1980 began to address this need to identify the types of functional impairment and subsequent needs of Virginia's elderly recipients of community-based care. The concern over the role of functional capacity in determining level of care and care setting has escalated in direct proportion to the rising cost of community-based services. This issue has become more important since the advent of personal care options for Medicaid eligible elderly applying to nursing homes through the Virginia Medical Assistance Program.

A search of the literature for a rational and theoretical basis for interpreting functional impairment revealed that a pattern of functional impairment does, in fact, exist in a large number of individuals. This pattern, described by Katz and his associates, follows an identifiable course of regression and recovery which parallels human development in childhood. This parallel has given rise to the theory that biological organization of neurological and locomoter responses produces a pattern of decline and recovery of ADL in chronically ill and elderly individuals (see Appendix I). When deviation from this pattern does occur, it usually occurs in recovery and not in decline.

General acceptance of a pattern of impairment has led to use of an additive method of determining ADL impairment and need for care. That is, number of ADL deficits is counted without considering the specific types of ADL problems a person may have. This traditional method of determining ADL impairment of an individual is convenient, and it is practical to the extent

that individuals fit the underlying pattern of impairment presented in Appendix I. However, prior research has failed to carefully examine the nature or extent of deviance from this generally accepted pattern of functional impairment. One of the outcomes of this project will be to determine whether an additive measure of impairment for an individual does reflect a hierarchy of impairment. And, for those individuals who deviate from the pattern, the project will examine factors that may explain the deviance.

Using data from the Virginia Pre-Admission Screening Program, the project is designed to answer the following three questions. First, what percent of the cases fit the pattern within each care setting? Second, within each care setting, what is the distribution of levels of impairment for cases that fit the pattern and for deviant cases? Third, what factors predict deviance from the pattern of impairment across care settings?

The first phase of the analysis will identify a category and level of functional impairment for each individual which reflects either a recovering or a debilitating course. The data from the pre-screening process is sufficiently detailed to enable categorizing individuals into either a rehabilitating or a non-rehabilitating/maintenance category of care. The separation by categories for individuals applying to nursing homes is necessary to determine which direction on the functional scale the client is expected to follow. In other words, clients who are rehabilitating would be expected to have reached their highest level of functional dependence and to require gradually decreasing levels of care. On the other hand, clients who are receiving non-rehabilitative or maintenance care would be expected to require the same or increasing levels of care across time. Data analysis will then proceed to identify the percent of the patterned cases within each

care setting by category (rehabilitating/non-rehabilitating) and current level of functional impairment.

It is expected that both categories and several levels of functional impairment will be represented in each care setting. As stated earlier, a mixture of levels of impairment is known to exist across care settings. However, it is also expected that the majority of the most severely impaired clients will be found in care settings which can provide the most intensive service packages. Likewise, those individuals with the least amount of functional impairment are expected to be placed in community-based care settings.

Phase two of this project will examine the deviant cases that do not fit the pattern of functional impairment. The analysis will explore the factors that potentially explain the deviation from the expected patterns of functional impairment across care settings. Among the variables to be considered are age, sex, type of illness, seriousness of illness, rehabilitative versus non-rehabilitative course, mental status, and informal support available. The last two variables, mental status and informal support, reflect the assumption that biological determinants of functioning are not free from the influence of social, cultural, and psychological factors.

We believe that the proposed study and its findings may be of interest to the Virginia Department of Health for a number of reasons. First of all, the Pre-Admission Screening Program bases a portion of its eligibility criteria for intermediate care on number of ADL impairments. An in-depth analysis of how ADL impairments are patterned and distributed across various placement categories may provide insights that would lead to improvements in screener training and in eligibility criteria.

Secondly, a number of states are considering the development of new categories of care within the traditional long-term care settings (ICF's, SCF's). As these are developed, ADL impairment will probably play a major role in determining how patients are placed in these new categories. Since this study will examine patterns of ADL in each placement category, the Health Department staff may find the results helpful in deciding whether/how new categories of care might be implemented.

Thirdly, the study will examine individuals who are on rehabilitating courses versus those on non-rehabilitating courses. In any care setting, patients who are rehabilitating are likely to differ from those who are not in terms of patterns and levels of impairment, amount and types of care needed, and likelihood of experiencing changes in level of care. As Medicaid programs seek new ways to ensure cost-effective health care, one approach may be to categorize patients into rehabilitative versus non-rehabilitative tracks. The results of this study may serve as an indication of the feasibility and impact of such an approach.

The project would use a random sample of cases drawn from the population of elderly Medicaid eligible applicants to nursing homes in Virginia since July 1, 1983. The sample would include 1200 cases from each of the six authorization categories: Intermediate Care, Skilled Care, Personal Care Option, Home Health, Personal Care and Home Health, and Other or none of the above. When fewer than 1200 cases currently exist in a category, the total number within the category will be used. The sample would insure representation of applicants screened by committees in local health departments and acute care facilities as well as all authorization decisions. The sample size would be large enough to accurately describe cases of expected and deviant patterns of impairment across all placement settings.

The principal investigator, Shirley S. Travis is a doctoral candidate at Virginia Polytechnic Institute and State University. Ms. Travis will assure the Virginia Department of Health of absolute confidentiality of client information. The identifying information (names, social security numbers, etc.) of the clients is not needed or requested for the project. Therefore, this information should be removed prior to release of the data.

Upon completion of the analysis and no later than July 31, 1985 the principal investigator will provide a copy of the written summary to the Virginia Department of Health. At this time, return of the data set or disposal of the data in accordance with the stipulations of access by the Health Department will be completed. Resumes of the principal investigator and her Graduate Committee Chairman, Dr. William J. McAuley, are attached.

APPENDIX G
Correspondence With Dr. Sidney Katz

A LAND-GRANT UNIVERSITY
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

*Blacksburg, Virginia* 24061

CENTER FOR GERONTOLOGY OFFICE OF THE DIRECTOR
215 WALLACE HALL

October 31, 1984

Dr. Sidney Katz, M.D.
Long Term Care Gerontology Center
University of Rhode Island
Kingston, RI 02881

Dear Dr. Katz:

I am a doctoral candidate in Gerontology at Virginia Polytechnic Institute and State University. I am currently in the proposal stage of my dissertation process. I am writing to you because your research has been a major influence in my selection of my research problem and subsequent proposal activity.

The enclosed material "Functional Impairments Among Elderly in Long-Term Care Settings" is the proposal I recently submited to the Virginia Department of Health in order to obtain access to their large state-wide data set. On Monday, October 29, 1984 I received preliminary approval to access that data base. My next step is, of course, to submit my dissertation prospectus to my advisory committee. However, I felt an overwhelming desire to have some feedback from the authority on the subject. I can imagine that you must be extremely busy but I would gratefully appreciate any comments or suggestions you might offer.

I believe that I have read everything that you have published since 1963. The references attached to the proposal are representative and not exhaustive of your publication credits. I am wondering, however, if you have presented any papers on the subject of the Index of ADL which were not published.

During the past year I have served as the student representative to the Public Policy Committee of the Gerontological Society of America. I will be in San Antonio for the annual meeting in November. Dr. Jim McAuley, Director of the Center for Gerontology at Virginia Tech (and also my committee chairman) and I will be presenting a poster session "Long-Term Care Patients in Acute Care Facilities: Determining Discharge Arrangements" on Saturday. I am delighted to see that you are also a participant on Monday in the symposium dealing with your concept of active life expectancy. I will be at your symposium and look forward to the opportunity to meet you.

Sincerely,

Shirley S. Travis

APPENDIX H

Letter of Agreement to Virginia Dept. of Health

A LAND-GRANT UNIVERSITY
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

*Blacksburg, Virginia* 24061

CENTER FOR GERONTOLOGY OFFICE OF THE DIRECTOR
215 WALLACE HALL

December 21, 1984

Ms. Ann Cook, Director
Medical Social Services
Virginia Department of Health
Madison Building - 8th Floor
Richmond, VA 23219

Dear Ann:

I understand that we have received approval for use of selected data from the VMAP Long Term Care Information System. Both Shirley Travis and I are most appreciative of the opportunity to use the information.

I also understand that our use of the data is based upon the following conditions:

1. Ownership of the data set remains with VMAP. We will offer to return the data tape when the analysis is completed (no later than July 31, 1985).

2. The data set is not to be used for any purpose other than the analysis described in the letter and proposal dated October 5, 1984 (copy attached) without prior permission from VMAP.

3. Access to the data set will be limited to Shirley Travis and myself.

4. VMAP will be given credit for their part in making the data available in any and all oral and written presentations that result from the study.

You have my assurance that we will abide by these conditions and that Shirley and I are both committed to serving VMAP through this project.

Thank you again for your help and support.

Sincerely,

William J. McAuley, Ph.D.
Director

eaw

Enclosure

cc: Charlotte Carnes

# APPENDIX I

CERTIFICATION OF EXEMPTION OF PROJECTS
INVOLVING HUMAN SUBJECTS

Principal Investigator(s) SHIRLEY S. TRAVIS

Department(s) FAMILY AND CHILD DEVELOPMENT COLLEGE OF HUMAN RESOURCES

Project Title "SELF-CARE DEPENDENCY AMONG ELDERS IN LONG-TERM CARE SETTINGS"

Source of Support: Departmental Research X Sponsored Research __ Proposal No. _____

1. The criteria for "exemption" from review by the IRB for a project involving the use of human subjects and with no risk to the subject is listed below. Please initial all applicable conditions and provide the substantiating statement of protocol.

☐ a. The research will be conducted in established or commonly established educational settings, involving normal education practices. For example:

a) Research on regular and special education instructional strategies;
b) Research on effectiveness of instructional techniques, curricula or classroom management techniques.

☐ b. The research involves use of education tests (☐ cognitive, ☐ diagnostic, ☐ aptitude, ☐ achievement), and the subject cannot be identified directly or through identifiers with the information.

☐ c. The research involves survey or interview procedures, in which:

☐ a) Subjects cannot be identified directly or through identifiers with the information;
☐ b) Subject's responses, if known, will not place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing or employability;
☐ c) The research does not deal with sensitive aspects of subject's own behavior (illegal conduct, drug use, sexual behavior or alcohol use);
☐ d) The research involves survey or interview procedures with elected or appointed public officials, or candidates for public office.

☐ d. The research involves the observation of public behavior, in which:

☐ a) The subjects cannot be identified directly or through identifiers;
☐ b) The observations recorded about an individual could not put the subject at risk of criminal or civil liability or be damaging to the subject's financial standing or employability;
☐ c) The research does not deal with sensitive aspects of the subject's behavior (illegal conduct, drug use, sexual behavior or use of alcohol).

☒ e. The research involves collection or study of existing data, documents, records, pathological specimens or diagnostic specimens, or which:

☐ a) The sources are publicly available; or
☒ b) The information is recorded such that the subject cannot be identified directly or indirectly through identifiers. Two data sets supplied by the Virginia Health Dept. are merged by Social Security Numbers which will not be used in the analysis

2. I further certify that the project will not be changed to increase the risk or exceed the exempt condition(s) without filing an additional certification or application for approval by the Human Subjects Review Board.

Note: If children are in any way at risk while this project is underway, the chairman of the IRB should be notified immediately in order to take corrective action.

Signature: Principal Investigator(s) Date Signature: Principal Investigator(s) Date

(Optional Approval) Signature: Board Chairman/Authorized Reviewer

# APPENDIX J

## Results of Tabular Analyses of Study Criterion Variables By the Explanatory Variables

The results of the tabular analyses of the four study criterion variables (rehabilitative trajectory, divergence, institutional versus community care, and skilled versus intermediate care) are presented in this appendix. These analyses are organized by the three groups of explanatory variables (background, social environment, and physical impairment).

### Background Variables

Seven background variables were used in the analyses including two interaction terms for age and race and two interaction terms for sex and marital status. Each variable was crosstabulated with the four criterion variables: rehabilitative trajectory, divergence, and recommended care setting (institutional versus community care and skilled versus intermediate care.) The divergence variable was gvien the table heading 'ADL Type' to avoid a confusing repetition of the term in the tables.

Only results of Chi-square tests of independence significant at .05 level or below indicative of significant group associations are discussed. If two variables are associated, knowledge of one is helpful in prediciting the value the other one is likely to assume. These variable associations can be discussed, therefore, in terms of trends represented by the data.

As may be seen in Table 19, there was a significant association between sex and ADL type. Almost three-fourths of the males were ADL patterned compared to less than 60% of the females.

Table 20 shows that age of the applicant was related to three of the four criterion variables. Older age is in general, associated with a higher percentage of nonrehabilitative/maintenance track cases, recommendations for institutional care and recommendations for intermediate care.

Table 21 summarizes the results of Chi-square tests for race by each criterion variable. Both white and nonwhite individuals had high percentages of patterned ADL. However, nonwhite individuals were somewhat more likely to be patterned (67.6%) compared to of the white cases (62.8%). White elders were more likely than nonwhite elders to be recommended for institutional care; however, the majority of white elders who received institutional recommendations were recommended for intermediate care, while most nonwhite elders in this subsample received skilled care recommendations.

Four age/race interaction terms were used in the tabular analyses summarized in Table 22. Subsequent multivariate analyses made it necessary to reduce these terms to two due to redundency in the regression models. When all four groups were used, old-old nonwhite individuals were most likely to be on nonrehabilitative/maintenance tracks. The greatest association with patterned ADL type was the old-old nonwhite group. The old-old white elders were most often recommended for intermediate care, while skilled case was the most likely recommendation for the other three age/race groups.

Table 19

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Sex

| | Sex | | | | |
|---|---|---|---|---|---|
| | Male[a] % | Female[b] % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | |
| Rehabilitative | 42.5 | 41.4 | .370 | 1 | .543 |
| Nonrehabilitative | 57.5 | 58.6 | | | |
| ADL Type | | | | | |
| Patterned | 71.3 | 61.5 | 32.535 | 1 | .000 |
| Divergent | 28.7 | 38.5 | | | |
| Recommended Care Setting | | | | | |
| Institutional Care | 63.3 | 60.6 | 2.331 | 1 | .127 |
| Community Care | 36.7 | 39.4 | | | |
| Recommended Care Setting | n=714 | n=1503 | | | |
| Skilled Care | 47.9 | 49.5 | .497 | 1 | .481 |
| Intermediate Care | 52.1 | 50.5 | | | |

Note. Due to missing data on 4 cases in the total sample, N = 3607. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=1128. [b] n=2479.

Table 20

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting By Age

| | Age | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 59[a] % | 60-69[b] % | 70-79[c] % | 80-89[d] % | 90+[e] % | Chi-Square | D.F. | p |
| Rehabilitative Trajectory | | | | | | | | |
| Rehabilitative | 62.2 | 45.0 | 43.3 | 39.9 | 36.8 | 16.635 | 4 | .002 |
| Nonrehabilitative | 37.8 | 55.0 | 56.7 | 60.1 | 63.2 | | | |
| ADL Type | | | | | | | | |
| Patterned | 56.8 | 65.0 | 64.5 | 64.2 | 65.9 | 1.473 | 4 | .831 |
| Divergent | 43.2 | 35.1 | 35.5 | 35.8 | 34.1 | | | |
| Recommended Care Setting | | | | | | | | |
| Institutional Care | 51.3 | 55.1 | 62.6 | 63.9 | 60.4 | 15.536 | 4 | .004 |
| Community Care | 48.6 | 44.9 | 37.4 | 36.1 | 39.6 | | | |
| Recommended Care Setting | n=19 | n=316 | n=769 | n=830 | n=287 | | | |
| Skilled Care | 68.4 | 57.6 | 50.1 | 46.1 | 43.6 | 18.672 | 4 | .001 |
| Intermediate Care | 31.6 | 42.4 | 49.9 | 53.9 | 56.4 | | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a]n=37. [b]n=573. [c]n=1228. [d]n=1298. [e]n=475.

N=3611.

Table 21

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Race

| | Sex | | | | |
|---|---|---|---|---|---|
| | White[a] % | Nonwhite[b] % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | |
| Rehabilitative | 42.5 | 40.3 | 1.673 | 1 | .196 |
| Nonrehabilitative | 57.5 | 59.7 | | | |
| ADL Type | | | | | |
| Patterned | 62.8 | 67.6 | 8.458 | 1 | .004 |
| Divergent | 37.2 | 32.4 | | | |
| Recommended Care Setting | | | | | |
| Institutional Care | 63.7 | 57.8 | 12.841 | 1 | .000 |
| Community Care | 36.3 | 42.2 | | | |
| Recommended Care Setting | n=1445 | n=776 | | | |
| Skilled Care | 46.0 | 54.5 | 14.561 | 1 | .000 |
| Intermediate Care | 54.0 | 45.5 | | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a]n=2267. [b]n=1344.

N=3611.

Table 22

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting By Age/Race

| | Age/Race | | | | | | |
|---|---|---|---|---|---|---|---|
| | Old-Old[a] Nonwhite % | Young-Old[b] Nonwhite % | Old-Old[c] White % | Young-Old[d] White % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | | | |
| Rehabilitative | 38.0 | 43.6 | 41.1 | 45.6 | 10.064 | 3 | .018 |
| Nonrehabilitative | 62.0 | 56.4 | 58.9 | 54.4 | | | |
| ADL Type | | | | | | | |
| Patterned | 69.8 | 64.4 | 62.0 | 64.3 | 13.654 | 3 | .003 |
| Divergent | 30.2 | 35.6 | 38.0 | 35.7 | | | |
| Recommended Care Setting | | | | | | | |
| Institutional Care | 60.4 | 54.1 | 64.1 | 63.0 | 18.504 | 3 | .000 |
| Community Care | 39.6 | 45.9 | 35.9 | 37.0 | | | |
| Recommended Care Setting | n=472 | n=304 | n=992 | n=453 | | | |
| Skilled Care | 51.9 | 58.6 | 43.4 | 51.7 | 26.213 | 3 | .000 |
| Intermediate Care | 48.1 | 41.4 | 56.6 | 48.3 | | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a]n=782. [b]n=562. [c]n=1548. [d]n=719.

N=3611.

Results of the analyses of the two marital status variables, married versus not married and widowed versus not widowed are presented in Tables 23 and 24 respectively.

Almost 73% of the married cases were ADL patterned compared to 62.3% of the not married cases. Married elders were more often recommended for skilled care while not married elders were more often recommended for intermedicate care.

Relatively more not widowed elders were ADL patterned than widowed. Similar to the married elders, the not widowed elders were more likely to be recommended for skilled care while the widowed elders were more likely to be recommended for intermediate care.

Four sex/marital status interaction terms were incorporated into a tabular analyses which are summarized in Table 25. Subsequent multivariate analyses made it necessary to reduce these terms to two due to redundency in the regression models. Widowed females generally represented ADL divergence while married males generally followed the pattern of the Index of ADL. In the institutional subsample, widowed males were most often recommended for intermediate care compared with married females who were most often recommended for skilled care.

Significant associations for location of patient (community and acute care) were found in all four comparisons reported in Table 26. Approximately 85% of the community cases were nonrehabilitative compared to less than one-half of the acute care cases. Community cases were also more likely than acute care cases to be ADL divergent. Acute care cases were most often recommended for institutional care while the

Table 23

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Marital Status (Married)

| | Marital Status | | | | |
|---|---|---|---|---|---|
| | Married[a] % | Not Married[b] % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | |
| Rehabilitative | 44.8 | 41.0 | 3.440 | 1 | .064 |
| Nonrehabilitative | 55.2 | 59.0 | | | |
| ADL Type | | | | | |
| Patterned | 72.6 | 62.3 | 27.312 | 1 | .000 |
| Divergent | 27.4 | 37.7 | | | |
| Recommended Care Setting | | | | | |
| Institutional Care | 61.8 | 61.5 | .020 | 1 | .886 |
| Community Care | 38.2 | 38.5 | | | |
| Recommended Care Setting | n=462 | n=1722 | | | |
| Skilled Care | 56.9 | 46.9 | 14.588 | 1 | .000 |
| Intermediate Care | 43.1 | 53.1 | | | |

Note. Due to missing data on 62 cases in the total sample, N = 3549. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2184.

[a]n=748. [b]n=2801.

Table 24

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Marital Status (Widowed)

| | Marital Status | | | | |
|---|---|---|---|---|---|
| | Widowed[a] % | Not Widowed[b] % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | |
| Rehabilitative | 41.1 | 42.8 | .969 | 1 | .325 |
| Nonrehabilitative | 58.9 | 57.2 | | | |
| ADL Type | | | | | |
| Patterned | 62.5 | 67.5 | 9.516 | 1 | .002 |
| Divergent | 37.5 | 32.5 | | | |
| Recommended Care Setting | | | | | |
| Institutional Care | 61.7 | 61.3 | .062 | 1 | .803 |
| Community Care | 38.3 | 38.7 | | | |
| Recommended Care Setting | n=1318 | n=866 | | | |
| Skilled Care | 46.7 | 52.7 | 7.514 | 1 | .006 |
| Intermediate Care | 53.3 | 47.3 | | | |

Note. Due to missing data on 62 cases in the total sample, N = 3549. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2184.

[a] n=2136. [b] n=1413.

Table 25

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting By Sex/Marital Status

| | Sex/Marital Status | | | | | | |
|---|---|---|---|---|---|---|---|
| | Male/[a] Married % | Male/[b] Widowed % | Female/[c] Married % | Female/[d] Widowed % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | | | |
| Rehabilitative | 45.0 | 40.4 | 44.5 | 41.3 | 3.138 | 3 | .371 |
| Nonrehabilitative | 55.0 | 59.6 | 55.5 | 58.7 | | | |
| ADL Type | | | | | | | |
| Patterned | 76.4 | 69.7 | 67.2 | 60.8 | 42.869 | 3 | .000 |
| Divergent | 23.6 | 30.3 | 32.8 | 39.2 | | | |
| Recommended Care Setting | | | | | | | |
| Institutional Care | 61.8 | 64.0 | 61.7 | 61.2 | 1.078 | 3 | .782 |
| Community Care | 38.2 | 36.0 | 38.3 | 38.8 | | | |
| Recommended Care Setting | n=272 | n=247 | n=190 | n=1069 | | | |
| Skilled Care | 52.6 | 41.7 | 63.2 | 47.8 | 22.431 | 3 | .000 |
| Intermediate Care | 47.4 | 58.3 | 36.8 | 52.2 | | | |

Note. Due to the other categories of marital status, N=2882.

Recommended care setting for skilled and intermediate care represents the institutional subsample, n=1778.

[a] n=440. [b] n=386. [c] n=308. [d] n=1748.

Table 26

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Location of Patient

| | Location of Patient | | | |
|---|---|---|---|---|
| | Community[a] % | Acute Care[b] % | Chi-square | D.F. |
| Rehabilitative Trajectory | | | | |
| Rehabilitative | 14.9 | 53.2 | 456.224 | 1* |
| Nonrehabilitative | 85.1 | 46.8 | | |
| ADL Type | | | | |
| Patterned | 53.6 | 69.2 | 81.457 | 1* |
| Divergent | 46.4 | 30.8 | | |
| Recommended Care Setting | | | | |
| Institutional Care | 35.0 | 72.9 | 458.976 | 1* |
| Community Care | 65.0 | 27.1 | | |
| Recommended Care Setting | n=378 | n=1843 | | |
| Skilled Care | 9.0 | 57.2 | 291.544 | 1* |
| Intermediate Care | 91.0 | 42.8 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=1081. [b] n=2530d.

N=3611.

* p .001

community cases remained in the community. In the institutional subsample, an impressive 91% of the community cases were recommended for intermediate care while less than half of the acute care cases were recommended for an intermediate care setting.

Social Environmental Variables

Table 27 summarizes the frequencies and percentages of the social environmental variables. The majority of those screened had an available community living space and did not live alone. Well over one-half of the sample had only one living daughter or no living daughters. Almost 50% of the elders had only one available social support or no available social supports.

As may be seen in Table 28, community living space was significantly associated with institutional versus community care recommendations and with skilled versus intermediate care. Approximately 81% of the elders without available living space were recommended for institutional care versus slightly over one-half of those with available living space. Within the institutional subsample, a majority of the cases with available living spaces were recommended for skilled care while the majority of the cases without living spaces were recommended for intermediate care.

Table 29 shows that elders who did not live alone were more likely to be in nonrehabilitative tracks than elders who lived alone. ADL divergence, on the other hand, occurred most frequently among elders who lived alone.

There was an inconsistent trend in the association between number of living daughters and institutional versus community care recommenda-

Table 27

Frequencies and Percentages of Selected Social Environmental Variables

| Variable | Frequency | Percentage |
|---|---|---|
| Community Living Space[a] | | |
| Available | 2506 | 71.9 |
| Not Available | 980 | 28.1 |
| Lives Alone | | |
| Yes | 1075 | 29.8 |
| No | 2536 | 70.2 |
| Number of Living Daughters[b] | | |
| 0 | 1414 | 43.0 |
| 1 | 909 | 27.6 |
| 2 | 483 | 14.7 |
| 3 | 254 | 7.7 |
| 4 | 113 | 3.4 |
| 5 | 66 | 2.0 |
| 6 | 28 | .9 |
| 7 | 23 | .7 |
| Number of Available[c] Social Supports | | |
| 0 | 1411 | 39.1 |
| 1 | 367 | 10.2 |
| 2 | 279 | 7.7 |
| 3 | 267 | 7.4 |
| 4 | 354 | 9.8 |
| 5 | 382 | 10.6 |
| 6 | 446 | 12.4 |
| 7 | 105 | 2.9 |

Note. Categories may not total to sample size of 3611 due to missing data. [a] $n$=3486. [b] $n$=3611. [c] $n$=3290. $N$=3611.

Table 28

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Community Living Space

| | Living Space | | | | |
|---|---|---|---|---|---|
| | Available[a] % | Not Available[b] % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | |
| Rehabilitative | 42.9 | 40.8 | 1.202 | 1 | .273 |
| Nonrehabilitative | 57.1 | 59.2 | | | |
| ADL Type | | | | | |
| Patterned | 63.9 | 65.3 | .618 | 1 | .432 |
| Divergent | 36.1 | 34.7 | | | |
| Recommended Care Setting | | | | | |
| Institutional Care | 54.3 | 80.9 | 211.267 | 1 | .000 |
| Community Care | 45.7 | 19.1 | | | |
| Recommended Care Setting | n=1361 | n=793 | | | |
| Skilled Care | 52.7 | 42.9 | 19.281 | 1 | .000 |
| Intermediate Care | 47.3 | 57.1 | | | |

Note. Due to missing data on 125 cases in the total sample, N=3486. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2154.

[a]n=2506. [b]n=980.

Table 29

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Living Arrangement

| | Living Arrangement | | | | |
|---|---|---|---|---|---|
| | Lives Alone[a] % | Does Not Live Alone[b] % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | |
| Rehabilitative | 44.4 | 40.6 | 4.476 | 1 | .034 |
| Nonrehabilitative | 55.6 | 59.4 | | | |
| ADL Type | | | | | |
| Patterned | 58.5 | 67.1 | 24.413 | 1 | .000 |
| Divergent | 41.5 | 32.9 | | | |
| Recommended Care Setting | | | | | |
| Institutional Care | 60.7 | 61.8 | .376 | 1 | .540 |
| Community Care | 39.3 | 38.2 | | | |
| Recommended Care Setting | n=653 | n=1568 | | | |
| Skilled Care | 47.6 | 49.6 | .685 | 1 | .408 |
| Intermediate Care | 52.4 | 50.4 | | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=1075. [b] n=2536.

N=3611.

tions (See Table 30). Elders with fewer than three or more than six living daughters were most often recommended for institutional care while elders with five or six living daughters were likely to be recommended for community care.

Number of available informal supports by the criterion variables were reported in Table 31. Again, there was an inconsistent trend between number of informal supports and the criterion variables. Elders who reported four informal supports were the least likely group to be ADL divergent while elders who reported seven informal supports were most likely to be ADL divergent. Those with no informal supports were most likely recommended for instituional care. Conversely, elders with seven informal supports were recommended for community care. For the institutional subsample, the majority of persons with two or less informal supports were recommended for intermediate care while those with three or more received skilled care recommendations.

Physical Impairment Variables

Ten physical impairment variables were used in the analyses. Each variable was crosstabulated with the four criterion variables. Only results of chi-square tests of independence significant at .05 or below indicative of significant group differences are discussed.

Table 32 summarizes the frequencies and percentages of the physical impairment variables. The sample represented a low to moderately ill group with 59.5% of the elders placed at the two lower categories of seriousness of illness. Over half of the sample had none or only one specific physical impairment. Almost two-thirds of the sample had

Table 30

Rehabilitative Trajectory, ADL Type, and

Recommended Care Setting By Number of Living Daughters

| | Daughters | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | 5[f] % | 6[g] % | 7[h] % | Chi-Square | D.F. | p |
| Rehabilitative Trajectory | | | | | | | | | | | |
| Rehabilitative | 42.4 | 41.8 | 43.1 | 39.4 | 43.4 | 37.9 | 28.6 | 56.6 | 5.646 | 7 | .582 |
| Nonrehabilitative | 57.6 | 58.2 | 56.9 | 60.6 | 56.6 | 62.1 | 71.4 | 43.5 | | | |
| ADL Type | | | | | | | | | | | |
| Patterned | 62.1 | 63.1 | 69.4 | 65.7 | 65.5 | 56.1 | 71.4 | 78.3 | 13.467 | 7 | .062 |
| Divergent | 37.9 | 36.9 | 30.6 | 34.3 | 34.5 | 43.9 | 28.6 | 21.7 | | | |
| Recommended Care Setting | | | | | | | | | | | |
| Institutional Care | 62.2 | 62.6 | 57.1 | 62.2 | 56.6 | 47.0 | 42.9 | 60.9 | 15.272 | 7 | .0327 |
| Community Care | 37.8 | 37.4 | 42.9 | 37.8 | 43.4 | 53.0 | 57.1 | 39.1 | | | |
| Recommended Care Setting | n=880 | n=569 | n=276 | n=158 | n=64 | n=31 | n=12 | n=14 | | | |
| Skilled Care | 48.8 | 48.5 | 50.7 | 51.9 | 40.6 | 54.8 | 33.3 | 64.3 | 5.642 | 7 | .582 |
| Intermediate Care | 51.2 | 51.5 | 49.3 | 48.1 | 59.4 | 45.2 | 66.7 | 35.7 | | | |

Note. Due to missing data on 321 cases in the total sample, N=3290.

Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2004.

[a] n=1414. [b] n=909. [c] n=483. [d] n=254. [e] n=113. [f] n=66. [g] n=28. [h] n=23.

Table 31

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting By Number of Available Informal Supports

| | Informal Supports | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | 5[f] % | 6[g] % | 7[h] % | Chi-Square | D.F. | p |
| Rehabilitative Trajectory | | | | | | | | | | | |
| Rehabilitative | 41.1 | 40.9 | 35.5 | 43.8 | 48.0 | 43.2 | 41.3 | 39.1 | 11.748 | 7 | .109 |
| Nonrehabilitative | 58.9 | 59.1 | 64.5 | 56.2 | 52.0 | 56.8 | 58.7 | 60.9 | | | |
| ADL Type | | | | | | | | | | | |
| Patterned | 66.0 | 60.8 | 62.7 | 58.8 | 70.9 | 63.6 | 65.7 | 56.2 | 17.559 | 7 | .014 |
| Divergent | 34.0 | 39.2 | 37.3 | 41.2 | 29.1 | 36.4 | 34.3 | 43.8 | | | |
| Recommended Care Setting | | | | | | | | | | | |
| Institutional Care | 73.1 | 63.8 | 49.8 | 47.9 | 63.3 | 55.2 | 48.4 | 35.2 | 187.910 | 7 | .000 |
| Community Care | 26.9 | 36.2 | 50.2 | 52.1 | 36.7 | 44.8 | 51.6 | 64.8 | | | |
| Recommended Care Setting | n=1032 | n=234 | n=139 | n=128 | n=224 | n=211 | n=216 | n=37 | | | |
| Skilled Care | 44.7 | 41.5 | 42.4 | 53.9 | 59.4 | 55.5 | 61.1 | 54.1 | 42.914 | 7 | .000 |
| Intermediate Care | 55.3 | 58.5 | 57.6 | 46.1 | 40.6 | 44.5 | 38.9 | 45.9 | | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=1411. [b] n=367. [c] n=279. [d] n=267. [e] n=354. [f] n=382. [g] n=446. [h] n=105. N=3611.

Table 32

Frequencies and Percentages of Physical Impairment Variables

| Variable | Frequency | Percentage |
|---|---|---|
| Seriousness of Illness | | |
| 1-low | 768 | 21.3 |
| 2 | 1379 | 38.2 |
| 3 | 989 | 27.4 |
| 4 | 417 | 11.5 |
| 5-high | 58 | 1.6 |
| Number of Physical Impairments | | |
| 0 | 777 | 21.5 |
| 1 | 1162 | 32.2 |
| 2 | 929 | 25.7 |
| 3 | 505 | 14.0 |
| 4 | 184 | 5.1 |
| 5 | 48 | 1.3 |
| 6 | 6 | .2 |
| Behavior/Orientation | | |
| 0-appropriate/oriented | 1313 | 36.4 |
| 1-wandering/disoriented less than weekly | 620 | 17.2 |
| 2-wandering/disoriented weekly or more | 706 | 19.6 |
| 3-abusive/aggressive less than weekly | 410 | 11.4 |
| 4-abusive/aggressive weekly or more | 403 | 11.2 |
| 5-comatose | 159 | 4.4 |

Table 32 (continued)

| Variable | Frequency | Percentage |
|---|---|---|
| Number of Mobility Restrictions | | |
| 0 | 529 | 14.7 |
| 1 | 516 | 14.3 |
| 2 | 624 | 17.3 |
| 3 | 782 | 21.7 |
| 4 | 1160 | 32.1 |
| Number of Services Receiving | | |
| 0 | 1071 | 29.7 |
| 1 | 766 | 21.2 |
| 2 | 942 | 26.1 |
| 3 | 536 | 14.8 |
| 4 | 208 | 5.8 |
| 5 | 67 | 1.9 |
| 6 | 17 | .5 |
| 7 | 3 | .1 |
| 8 | 0 | .0 |
| 9 | 1 | .0 |
| Number of Nutritional Services Receiving | | |
| 0 | 1290 | 35.7 |
| 1 | 1129 | 31.3 |
| 2 | 791 | 21.9 |
| 3 | 305 | 8.4 |
| 4 | 96 | 2.7 |

Table 32 (continued)

| Variable | Frequency | Percentage |
|---|---|---|
| Decubitis Ulcers | | |
| 0 | 3173 | 87.9 |
| 1 | 296 | 8.2 |
| 2 or more | 142 | 3.9 |
| Dressings | | |
| 0 | 3118 | 86.3 |
| 1 | 433 | 12.0 |
| 2 or more | 60 | 1.7 |
| Number of Physical Care Receiving Services | | |
| 0 | 2050 | 56.8 |
| 1 | 1026 | 28.4 |
| 2 | 416 | 11.5 |
| 3 | 94 | 2.6 |
| 4 | 21 | .6 |
| 5 | 3 | .1 |
| 6 | 0 | .0 |
| 7 | 1 | .0 |
| Medication Administration | | |
| 0-no medications | 165 | 4.6 |
| 1-self administered | 226 | 6.3 |
| 2-by nonlicensed person | 1161 | 32.2 |
| 3-by licensed person | 1354 | 37.5 |
| 4-by Registered Nurse | 705 | 19.5 |

Note. Percentages are based on total sample size of 3611.

behavior or orientation problems. Three or more mobility problems were reported in over 50% of the sample. Current service use was low with approximately one-half of the sample reporting receipt of none or one service. Receipt of nutrituional services was also low with over two-thirds of the elders receiving no services or only one nutritional service. The majority of the cases had no decubitis ulcers or dressings. Physical care services were remarkably underutilized with 85.2% of the elders receiving only one service or no service at all. The majority of the cases needed assistance with medication administration by a licensed person or a Registered Nurse.

Seriousness of illness (see Table 33) was associated with only one of the criterion variables, rehabilitative trajectory. Although the trend was inconsistent, individuals in the most serious category were most likely to be in nonrehabilitative/maintenance tracks.

Table 34 summarizes the results of the Chi-square tests for number of physical impairments by each criterion variable. Surprisingly, the vast majority of the individuals with none or only one physical impairment were in nonrehabilitating/maintenance tracks. The elders with higher numbers of physical impairments were more likely to be ADL patterned while ADL divergence was associated with only one physical impairment or no physical impairments. There was a 50-50 chance of institutional care recommendations for the low and high numbers of physical impairments and an increasing likelihood of institutional care for elders with one to five impairments. In the institutional subsample, the likelihood of skilled care recommendations increased with number of physical impairments.

Table 33

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting By Seriousness of Illness

| | Seriousness of Illness | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1[a] % | 2[b] % | 3[c] % | 4[d] % | 5[e] % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | | | | |
| Rehabilitative | 44.9 | 38.9 | 41.6 | 45.8 | 37.9 | 10.831 | 4 | .029 |
| Nonrehabilitative | 55.1 | 61.1 | 58.4 | 54.2 | 62.1 | | | |
| ADL Type | | | | | | | | |
| Patterned | 65.9 | 64.2 | 63.9 | 66.9 | 56.9 | 2.704 | 4 | .609 |
| Divergent | 34.1 | 35.8 | 36.1 | 34.1 | 43.1 | | | |
| Recommended Care Setting | | | | | | | | |
| Institutional Care | 60.6 | 61.5 | 62.2 | 62.0 | 58.6 | .642 | 4 | .958 |
| Community Care | 39.4 | 38.5 | 37.8 | 38.0 | 41.4 | | | |
| Recommended Care Setting | n=466 | n=848 | n=615 | n=258 | n=34 | | | |
| Skilled Care | 50.0 | 47.4 | 48.8 | 51.6 | 58.9 | 3.045 | 4 | .550 |
| Intermediate Care | 50.0 | 52.6 | 51.2 | 48.4 | 41.1 | | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a]n=768. [b]n=1379. [c]n=989. [d]n=417. [e]n=58.

N=3611.

Table 34

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting By Number of Physical Impairments

| | Physical Impairments | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | 5[f] % | 6[g] % | Chi-Square | D.F. |
| Rehabilitative Trajectory | | | | | | | | | |
| Rehabilitative | 22.1 | 39.6 | 48.8 | 57.8 | 54.3 | 54.2 | 50.0 | 212.844 | 6* |
| Nonrehabilitative | 77.9 | 60.4 | 51.2 | 42.2 | 45.7 | 45.8 | 50.0 | | |
| ADL Type | | | | | | | | | |
| Patterned | 58.3 | 59.7 | 66.4 | 73.7 | 82.1 | 81.3 | 83.3 | 76.270 | 6* |
| Divergent | 41.7 | 40.3 | 33.6 | 26.3 | 17.9 | 18.7 | 16.7 | | |
| Recommended Care Setting | | | | | | | | | |
| Institutional Care | 52.8 | 62.6 | 63.7 | 65.9 | 66.3 | 70.8 | 50.0 | 187.910 | 6* |
| Community Care | 47.2 | 37.4 | 36.3 | 34.1 | 33.7 | 29.2 | 50.0 | | |
| Recommended Care Setting | n=410 | n=727 | n=592 | n=333 | n=122 | n=34 | n=3 | | |
| Skilled Care | 34.1 | 47.9 | 53.0 | 57.7 | 59.0 | 58.8 | 66.7 | 57.012 | 6* |
| Intermediate Care | 65.9 | 52.1 | 47.0 | 42.3 | 41.0 | 41.2 | 33.3 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=777. [b] n=1162. [c] n=929. [d] n=505. [e] n=184. [f] n=48. [g] n=6.

N=3611.

* $p < .001$

The more serious the behavior/orientation problems (see Table 35) the more likely the individuals were to be in nonrehabilitative/maintenance tracks. The exception was for the comatose group where the majority of those elders were in rehabilitative tracks. Somewhat surprisingly, increased levels of behavior/orientation problems were most often associated with patterned ADL. Individuals with more severe behavior/orientation problems were most often recommended for institutional care. In addition, there was a general tendency for persons having greater behavior/orientation problems to receive intermediate care recommendations. The exception is, again, in the comatose category where 96% of the cases were recommended for skilled care.

Significant associations for number of mobility restrictions were found in all four comparisons reported in Table 36. Generally the trend was that more mobility restrictions were associated with a greater likelihood of a rehabilitative track. Lower levels of mobility restriction were most often asociated with ADL divergence while higher levels of restriction were associated with patterned ADL. Persons with greater numbers of mobility restrictions were more likely to receive recommendation for institutional care, and those with lower mobility levels tended to be recommended for intermediate care.

The fewer the number of services an individual was receiving (See Table 37) the more likely the individual would be in a nonrehabilitative/maintenance track. Conversely, higher numbers of services were associated with increased frequency of patterned ADL. Increasing numbers of services received were most often associated with institutional care.

Table 35

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting By Behavior/Orientation

| | Behavior/Orientation | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | 5[f] % | Chi-Square | D.F. |
| Rehabilitative Trajectory | | | | | | | | |
| Rehabilitative | 46.5 | 46.1 | 36.0 | 34.4 | 30.8 | 56.6 | 70.479 | 5* |
| Nonrehabilitative | 53.5 | 53.9 | 64.0 | 65.6 | 69.2 | 43.4 | | |
| ADL Type | | | | | | | | |
| Patterned | 52.1 | 70.5 | 68.4 | 69.5 | 71.0 | 98.1 | 193.109 | 5* |
| Divergent | 47.9 | 29.5 | 31.6 | 30.5 | 29.0 | 1.9 | | |
| Recommended Care Setting | | | | | | | | |
| Institutional Care | 53.0 | 60.7 | 67.6 | 63.9 | 70.5 | 79.3 | 86.991 | 5* |
| Community Care | 47.0 | 39.3 | 32.4 | 36.1 | 29.5 | 20.7 | | |
| Recommended Care Setting | n=696 | n=376 | n=477 | n=262 | n=284 | n=126 | | |
| Skilled Care | 55.6 | 51.9 | 39.8 | 35.9 | 35.6 | 96.0 | 179.520 | 5* |
| Intermediate Care | 44.4 | 48.1 | 60.2 | 64.1 | 64.4 | 4.0 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=1313. [b] n=620. [c] n=706. [d] n=410. [e] n=403. [f] n=159.

N=3611.

* $p < .001$.

Table 36

Rehabilitative Trajectory, ADL Type, and

Recommended Care Setting By Number of Mobility Restrictions

| | Mobility Restrictions | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | Chi-square | D.F. |
| Rehabilitative Trajectory | | | | | | | |
| Rehabilitative | 16.8 | 26.2 | 42.0 | 53.8 | 51.6 | 280.400 | 4* |
| Nonrehabilitative | 83.2 | 73.8 | 58.0 | 46.2 | 48.4 | | |
| ADL Type | | | | | | | |
| Patterned | 46.1 | 42.8 | 55.9 | 63.2 | 88.2 | 489.085 | 4* |
| Divergent | 53.9 | 57.2 | 44.1 | 36.8 | 11.8 | | |
| Recommended Care Setting | | | | | | | |
| Institutional Care | 34.4 | 51.0 | 58.3 | 72.6 | 72.8 | 293.901 | 4* |
| Community Care | 65.6 | 49.0 | 41.7 | 27.4 | 27.2 | | |
| Recommended Care Setting | n=182 | n=263 | n=364 | n=568 | n=844 | | |
| Skilled Care | 16.0 | 20.9 | 38.7 | 51.6 | 67.4 | 291.451 | 4* |
| Intermediate Care | 83.5 | 79.1 | 61.3 | 48.4 | 32.6 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a]n=529. [b]n=516. [c]n=624. [d]n=782. [e]n=1160.

N=3611.

* $p < .001$

Table 37

Rehabilitative Trajectory, ADL Type, and

Recommended Care Setting By Number of Services Receiving

| | Number of Services | | | | | | | | | | Chi-square | D.F. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | 5[f] % | 6[g] % | 7[h] % | 8[i] % | 9[j] % | | |
| Rehabilitative Trajectory | | | | | | | | | | | | |
| Rehabilitative | 15.1 | 35.3 | 47.9 | 68.8 | 84.1 | 86.6 | 100.0 | 100.0 | 0.0 | 100.0 | 740.307 | 8* |
| Nonrehabilitative | 84.9 | 64.7 | 52.1 | 31.2 | 15.9 | 13.4 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| ADL Type | | | | | | | | | | | | |
| Patterned | 64.9 | 60.2 | 62.9 | 69.4 | 70.2 | 73.1 | 70.6 | 100.0 | 0.0 | 100.0 | 20.672 | 8* |
| Divergent | 35.1 | 39.8 | 37.2 | 30.6 | 29.8 | 26.9 | 29.4 | 0.0 | 0.0 | 0.0 | | |
| Recommended Care Setting | | | | | | | | | | | | |
| Institutional Care | 54.2 | 61.0 | 64.0 | 67.0 | 71.2 | 65.7 | 94.1 | 100.0 | 0.0 | 100.0 | 52.625 | 8* |
| Community Care | 45.8 | 39.0 | 36.0 | 33.0 | 28.8 | 34.3 | 5.6 | 0.0 | 0.0 | 0.0 | | |
| Recommended Care Setting | n=580 | n=467 | n=603 | n=359 | n=148 | n=44 | n=16 | n=3 | n=0 | n=1 | | |
| Skilled Care | 42.4 | 44.8 | 50.4 | 57.9 | 56.8 | 52.3 | 68.8 | 100.0 | 0.0 | 0.0 | 35.731 | 8* |
| Intermediate Care | 57.6 | 55.2 | 49.6 | 42.1 | 43.2 | 47.7 | 31.3 | 0.0 | 0.0 | 100.0 | | |

Note. Chi-square tests should be interpreted with caution since over 20% of the cells have expected counts less than 5. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a]n=1071. [b]n=766. [c]n=942. [d]n=536. [e]n=208. [f]n=67. [g]n=17. [h]n=3. [i]n=0. [j]n=1.

N=3611.

*$p < .001$.

However, in the institutional subsample, low service users were most often recommended for intermediate care and high service users for skilled care.

As may be seen in Table 38, increased use of nutritional services was associated with rehabilitative tracks and patterned ADL. Elders with increased use of nutritional services were most often recommended for institutional care. In the institutional subsample, high service users were recommended for skilled care and low service users recommended for intermediate care.

Individuals with one or more decubitis ulcers (See Table 39) were most frequently in rehabilitative tracks and ADL patterned. The presence of one or more decubitis ulcers increased recommendations for institutional care with the majority of the institutional recommendations resulting in skilled care.

Table 40 shows that elders with one or more dressings were most often in rehabilitative tracks. These elders were also more often ADL patterned. The presence of one dressing was associated with the highest proportion of institutional care recommendations with skilled care as the recommended institutional setting.

Number of physical care services (See Table 41) was significantly associated with all four criterion variables. Greater number of physical care services was more likely with a rehabilitative track status. Likewise, greater physical care services were most frequently associated with patterned ADL. Institutional care recommendations occurred with increasing physical care services, with skilled care recommendations being the most likely institutional setting.

Table 38

Rehabilitative Trajectory, ADL Type, and

Recommended Care Setting By Number of Nutritional Services Receiving

| | Nutritional Services | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | Chi-square | D.F. |
| Rehabilitative Trajectory | | | | | | | |
| Rehabilitative | 23.6 | 46.7 | 55.6 | 56.4 | 65.6 | 298.77 | 4* |
| Nonrehabilitative | 76.4 | 53.3 | 44.4 | 43.6 | 34.4 | | |
| ADL Type | | | | | | | |
| Patterned | 41.0 | 62.2 | 69.5 | 76.1 | 89.6 | 72.735 | 4* |
| Divergent | 59.0 | 37.8 | 30.5 | 23.9 | 10.4 | | |
| Recommended Care Setting | | | | | | | |
| Institutional Care | 54.9 | 62.4 | 66.9 | 68.5 | 72.9 | 45.579 | 4* |
| Community Care | 45.1 | 37.6 | 33.1 | 31.5 | 27.1 | | |
| Recommended Care Setting | n=708 | n=705 | n=529 | n=209 | n=70 | | |
| Skilled Care | 39.7 | 46.5 | 53.5 | 65.1 | 85.7 | 89.931 | 4* |
| Intermediate Care | 60.3 | 53.5 | 46.5 | 34.9 | 14.3 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=1290. [b] n=1129. [c] n=791. [d] n=305. [e] n=96.

N=3611.

*p < .001.

Table 39

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Number of Decubitis Ulcers

| | Decubitis Ulcers | | | | | |
|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2 or more[c] % | Chi-square | D.F. | p |
| Rehabilitative Trajectory | | | | | | |
| Rehabilitative | 39.3 | 58.8 | 60.6 | 64.030 | 2 | .000 |
| Nonrehabilitative | 60.7 | 41.2 | 39.4 | | | |
| ADL Type | | | | | | |
| Patterned | 62.0 | 82.1 | 85.9 | 77.446 | 2 | .000 |
| Divergent | 38.0 | 17.9 | 14.1 | | | |
| Recommended Care Setting | | | | | | |
| Institutional | 60.5 | 67.6 | 72.5 | 13.391 | 2 | .001 |
| Community Care | 39.5 | 32.4 | 27.5 | | | |
| Recommended Care Setting | n=1918 | n=200 | n=103 | | | |
| Skilled Care | 45.0 | 72.5 | 77.7 | 90.389 | 2 | .000 |
| Intermediate Care | 55.0 | 27.5 | 22.3 | | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a]n=3173. [b]n=296. [c]n142.

N=3611.

Table 40

Rehabilitative Trajectory, ADL Type, and Recommended Care Setting by Number of Dressings

| | Dressings | | | | |
|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2 or more[c] % | Chi-square | D.F. |
| Rehabilitative Trajectory | | | | | |
| Rehabilitative | 38.2 | 64.2 | 61.7 | 115.761 | 2* |
| Nonrehabilitative | 61.8 | 35.8 | 38.3 | | |
| ADL Type | | | | | |
| Patterned | 62.7 | 74.6 | 90.0 | 40.905 | 2* |
| Divergent | 37.3 | 25.4 | 10.0 | | |
| Recommended Care Setting | | | | | |
| Institutional | 60.2 | 71.4 | 60.0 | 20.187 | 2* |
| Community Care | 39.8 | 28.6 | 40.0 | | |
| Recommended Care Setting | n=1876 | n=309 | n=36 | | |
| Skilled Care | 44.0 | 75.4 | 83.3 | 122.135 | 2* |
| Intermediate Care | 56.0 | 24.6 | 10.7 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=3118. [b] n=433. [c] n=60.

N=3611.

* $p < .001$

Table 41

Rehabilitative Trajectory, ADL Type, and

Recommended Care Setting By Number of Physical Care Services Received

| | Physical Care Services | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | 5[f] % | 6[g] % | 7[h] % | Chi-Square | D.F. |
| Rehabilitative Trajectory | | | | | | | | | | |
| Rehabilitative | 29.5 | 51.8 | 64.9 | 79.8 | 100.0 | 100.0 | 0.0 | 100.0 | 351.079 | 6* |
| Nonrehabilitative | 70.5 | 48.2 | 35.1 | 20.2 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| ADL Type | | | | | | | | | | |
| Patterned | 57.8 | 68.8 | 79.8 | 90.4 | 95.2 | 100.0 | 0.0 | 100.0 | 130.160 | 6* |
| Divergent | 42.2 | 31.2 | 20.1 | 9.6 | 4.8 | 0.0 | 0.0 | 0.0 | | |
| Recommended Care Setting | | | | | | | | | | |
| Institutional Care | 54.7 | 67.9 | 73.3 | 83.0 | 81.0 | 66.7 | 0.0 | 100.0 | 105.045 | 6* |
| Community Care | 45.3 | 32.1 | 26.7 | 17.0 | 19.0 | 33.3 | 0.0 | 0.0 | | |
| Recommended Care Setting | n=1121 | n=697 | n=305 | n=78 | n=17 | n=2 | n=0 | n=1 | | |
| Skilled Care | 39.9 | 54.4 | 62.0 | 71.8 | 88.5 | 50.0 | 0.0 | 100.0 | 93.666 | 6* |
| Intermediate Care | 60.1 | 45.6 | 38.0 | 28.2 | 11.5 | 50.0 | 0.0 | 0.0 | | |

Note. Chi-square tests should be interpreted with caution since over 20% of the cells have expected counts of less than 5. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=2050. [b] n=1026. [c] n=416. [d] n=94. [e] n=21. [f] n=3. [g] n=0. [h] n=1.

N=3611.

*p < .001

Medication administration by the criterion variables is reported in Table 42. Increased need for assistance was associated with rehabilitative tracks, while elders with no medications or self-administered medications were more often in nonrehabilitative/maintenance tracks. Higher assistance categories were most often associated with ADL divergence. Individuals reporting self-administration of medications were most often recommended for community care while need for assistance from a licensed person was associated with institutional care recommendations. For the institutional care subsample, lower levels of needed assistance were found with intermediate care and higher levels of assistance were found with the skilled care recommendations.

Since number of dependencies in the divergent cases and the patterned cases was high, number of ADL dependencies was used in a tabular analysis with the four criterion variables in Table 43. Significant associations were found in all four analyses.

Lower levels of ADL dependency were most common among individuals in nonrehabilitative/maintenance tracks. In addition, totally dependent individuals were most likely to be in a rehabilitative track. Individuals who were ADL divergent were most often either moderately or severely dependent in ADL.

Elders with lower levels of dependency received recommendations for community care while those with high to total dependency received institutional care recommendations. This was not totally surprising in view of the admission criteria used for institutional care of the study population. Of interest was the trend in the institutional subsample for skilled versus intermediate care recommendations. Individuals with

Table 42

Rehabilitative Trajectory, ADL Type, and

Recommended Care Setting By Medication Administration

| | Medication Administration | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | Chi-square | D.F. |
| Rehabilitative Trajectory | | | | | | | |
| Rehabilitative | 17.0 | 12.8 | 31.4 | 51.8 | 54.2 | 271.791 | 4* |
| Nonrehabilitative | 83.0 | 87.2 | 68.6 | 48.2 | 45.8 | | |
| ADL Type | | | | | | | |
| Patterned | 64.2 | 52.2 | 42.3 | 31.8 | 27.1 | 68.056 | 4* |
| Divergent | 35.8 | 47.8 | 57.7 | 68.2 | 72.9 | | |
| Recommended Care Setting | | | | | | | |
| Institutional Care | 47.2 | 19.5 | 49.5 | 71.4 | 79.0 | 400.563 | 4* |
| Community Care | 52.7 | 80.5 | 50.5 | 28.6 | 21.0 | | |
| Recommended Care Setting | n=78 | n=44 | n=575 | n=967 | n=557 | | |
| Skilled Care | 27.9 | 25.0 | 32.5 | 50.3 | 67.5 | 154.913 | 4* |
| Intermediate Care | 64.1 | 75.0 | 67.5 | 49.7 | 32.5 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

[a] n=165. [b] n=226 [c] n=1161 [d] n=1354. [e] n=705.

N=3611.

* $p < .001$

Table 43

Rehabilitative Trajectory, ADL Type, and

Recommended Care Setting By Number of ADL Dependencies

| | Number of ADL Dependencies | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0[a] % | 1[b] % | 2[c] % | 3[d] % | 4[e] % | 5[f] % | 6[g] % | Chi-Square | D.F. |
| Rehabilitative Trajectory | | | | | | | | | |
| Rehabilitative | 11.7 | 8.0 | 10.9 | 17.3 | 31.0 | 43.5 | 51.4 | 268.589 | 6* |
| Nonrehabilitative | 88.3 | 92.0 | 89.1 | 82.7 | 69.0 | 56.5 | 48.6 | | |
| ADL Type | | | | | | | | | |
| Patterned | 100.0 | 57.0 | 58.7 | 16.8 | 49.4 | 14.8 | 100.0 | 2350.242 | 6* |
| Divergent | 0.0 | 43.0 | 41.1 | 83.2 | 50.6 | 85.2 | 0.0 | | |
| Recommended Care Setting | | | | | | | | | |
| Institutional Care | 8.3 | 12.0 | 20.2 | 38.5 | 53.9 | 63.1 | 73.8 | 500.257 | 6* |
| Community Care | 91.7 | 88.0 | 79.8 | 61.5 | 46.1 | 36.9 | 26.2 | | |
| Recommended Care Setting | n=10 | n=12 | n=26 | n=69 | n=167 | n=651 | n=1286 | | |
| Skilled Care | 40.0 | 33.3 | 15.4 | 27.5 | 35.7 | 38.7 | 57.9 | 106.036 | 6* |
| Intermediate Care | 60.0 | 66.7 | 84.6 | 72.5 | 64.1 | 61.3 | 42.1 | | |

Note. Recommended care setting for skilled and intermediate care represents the institutional subsample, n=2221.

ADL divergence was operationalized to have a range of 1 to 5 ADL dependencies.

[a]n=120. [b]n=100. [c]n=129. [d]n=179. [e]n=310. [f]n=1031. [g]n=1742.

N=3611.

*$p < .001$

five or fewer ADL dependencies were generally recommended for intermediate care while those with total dependency in all six activities of daily living received skilled care recommendations.

Criterion Variables

Rehabilitative trajectory and ADL divergence were both explanatory and criterion variables in this study. This section relates to their distributions as explanatory variables and the associations with recommended care setting. As reported earlier, 42% of the cases were on rehabilitative tracks and 58% were on nonrehabilitative/maintenance tracks. Sixty-five percent of the sample matched the orginal Katz pattern of ADL, while 35% were ADL divergent. Finally, of the total sample, 38% of the cases were recommended for community care, 30% for skilled care, and 32% for intermediate care.

When divergence was cross-classified with rehabilitative trajectory, 29.3% of the cases were patterned and on rehabilitative tracks, 35.3% patterned and nonrehabilitative/maintenance, 12.4% divergent and rehabilitative and 23.0% divergent and nonrehabilitative/maintenance tracks. This cross-classification of ADL type with rehabilitative trajectory was used to test the first study hypothesis relating to the association between ADL type/rehabilitative trajectory and recommended care setting.

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