PATTERNS OF IN-HOME CARE SERVICE USE AMONG OLDER ADULTS: A RURAL-URBAN COMPARISON

by

Janette Kaplan Newhouse

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, Chair

Gloria W. Bird

M. Sexton Burkett

Rosemary Blieszner

Joseph W. Maxwell

August, 1985

Blacksburg, Virginia

PATTERNS OF IN-HOME CARE SERVICE USE AMONG OLDER ADULTS: A RURAL-URBAN COMPARISON

by

Janette Kaplan Newhouse

Committee Chair: William J. McAuley
Center for Gerontology

(ABSTRACT)

This study investigated how patterns of in-home care utilization and predictors of service use differ for older adults based on whether they live in a rural or an urban environment and whether the service is provided from an informal, a formal, or a combination informal/formal source. The specific in-home services under consideration were: checking, continuous supervision, homemaker-household, meal preparation, nursing care, and personal care.

Although the study was comparative in nature, the investigator was particularly interested in identifying patterns of service utilization that might be translated into effective and cost-efficient service delivery strategies for rural communities. The rural elderly population was the focus of this research because older people tend to live disproportionately in rural areas. Further, older rural residents seem to have more objective needs than their urban counterparts while they have access to fewer services.

This study was based on data from the Statewide Survey of Older Virginians, a probability sample of 2,146 noninstitutionalized persons 60 years of age and older. The 87% response rate included 8% of the respondents who participated via an informant.

A multiple regression analysis was performed for each of the eight subsamples into which the total sample was divided. The 20 independent variables were categorized according to Andersen's paradigm for conceptualizing service utilization as either predisposing, enabling, or need variables. The need variables were significant ($p < .05$) predictors of service use more often than the other categories, with ADL performance emerging as a significant predictor of service use across all subsamples.

Evidence from existing service utilization literature formed the basis for five hypotheses included to focus the study. Results of the hypothesized relationships confirmed the generalization that this body of literature lacks the necessary precision to accurately profile rural and ubran service users. Further investigation of utilization patterns of in-home care services was indicated by this research.

ACKNOWLEDGMENTS

Sincere appreciation is expressed to Dr. William J. McAuley for the many hours he has unselfishly given to guide this dissertation. The encouragement and intellectual support that Dr. McAuley has provided during every phase of the research process have made an invaluable contribution to this study.

Other committee members enhanced this investigation in unique and complementary ways: Dr. Gloria W. Bird is thanked for her scholarly contributions and the emotional support she so generously offered; Dr. Rosemary Blieszner is recognized for her enviable talent for inspiring excellence as well as expecting it; Dr. M. Sexton Burkett is appreciated for his enduring friendship and the attention given to analytical detail; and Dr. Joseph W. Maxwell will always be held in highest esteem for his academic guidance and his belief in my abilities, not only during this investigation but throughout my doctoral program.

Special gratitude goes to my husband, , for his unyielding support and steadfast understanding; to my precious children, and , for their patience and cooperation; and to my typist, , whose concern for detail and knowledge of format are obvious in this manuscript.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF FIGURES

CHAPTER I

INTRODUCTION

In 1900 only one in 25 Americans was aged 65 or older; however, by 1980 one in nine Americans was in this age category. Projections indicate that by the year 2000 older people are likely to be represented by one American in seven. Census data confirm that the elderly population is the nation's fastest growing age group, a trend that is expected to continue until the year 2050 (U.S. Senate Special Committee on Aging, 1984).

This dramatic change in the age structure of our population, accompanied by the escalating costs of providing health care and social services and the fact that older people are disproportionately high users of these services (Haug, 1981), has intensified interest in developing appropriate and cost-effective strategies to deliver services to older Americans. National policymakers as well as researchers and practitioners regard the service needs of elderly people as a major concern.

Because of this impetus to target services efficiently and to contain costs, long-term care has emerged as an area of political concern. The continued growth of the older population, especially among those over 85 years old, suggests that the number of impaired older people requiring long-term care will increase. Currently, only 5% of the 65 and older population reside in long-term care facilities, however, this figure soars to 23% for individuals over 85 years old (Fowles, 1985). The long-term care population consists of not only institutionalized elderly people but

also frail elders residing in the community. It has been estimated that perhaps twice as many noninstitutionalized frail older people are at risk of institutionalization as those actually residing in long-term care facilities (Shanas, 1979a). Other studies have reported that between one-fourth and one-third of community-based elderly people require home care assistance (Brody, 1973; Shanas, 1974; Stoller, 1983).

Two alternatives seem appropriate to accommodate the anticipated needs of impaired elderly people: expansion of institutional facilities to satisfy long-term care needs or provision of resources to support long-term care arrangements to serve those disabled older people who continue to live in the community (McAuley & Arling, 1984). This study addresses the second alternative as it focuses on the utilization of in-home care services by elderly community residents.

The political climate seems amenable to the exploration of alternatives to institutional long-term care for older Americans. The fact that the cost of nursing home care is the fastest growing component of the federal Medicaid budget (Greene, 1983), while federal legislators are attempting to shift the responsibility of care for older members of society away from the public sector, seems to reflect the current incongruity between policy and practice.

In-Home Care

The search for alternatives has directed attention to an established but still underused substitute (Hayslip, Ritter, Oltman, & McDonnell, 1980) for institutional care--the home, an institution in

its own right (Widmer, Brill, & Schlosser, 1978). Greene (1983) designated in-home care services such as those under consideration in this study as comprehensive community care. He defined this construct as an individualized program delivering an array of social, nutritional, health, and other supportive services to the homes of impaired elderly individuals living in the community. Comprehensive community care is also referred to as community-based long-term care in this study.

The work of Friedman and Kay (1979) identified in-home care services as a vital component of any continuum of care for frail elders, while empirical evaluations resulted in positive correlations between the provision of these community-based services and the deterrence of institutionalization (Barney, 1977; Noelker & Harel, 1978). Further evidence of the importance of in-home care as a viable cost-containment strategy is provided by the conclusion to an investigation of in-home care by Widmer et al. (1978), "Care at home should be considered before all other alternatives. With careful professional assessment regarding functional ability and level of care, chronically ill patients can be cared for at home at lower cost than in institutions" (p. 493). More recent investigations (Curley & Carlson, 1985; Jackson, 1984; Knight, Markson, Crescenzi, Hoffman, & Bissonnette, 1982) have continued to document the cost-efficiency of in-home care as an alternative to institutional long-term care.

Even though in-home care may be less costly than institutional care, the resources for providing such care remain limited. If these scarce resources are to be channeled into programs designed to address

the unique in-home service needs of older people, then research must first identify those patterns of service utilization that indicate who uses how much of what services under what conditions and from what sources. The present study helps to clarify some of these concerns.

This study analyzes selected data from the Statewide Survey of Older Virginians (McAuley, Arling, Nutty, & Bowling, 1980; Appendix A), a probability sample of 2,146 noninstitutionalized older Virginians, in order to determine utilization patterns of in-home care services. The generic services of interest are: checking, continuous supervision, homemaker-household, meal preparation, nursing care, and personal care (see Appendix B for definitions). These six services were selected because they form a core of in-home services with the potential of providing community-based long-term care to defer or preclude institutionalization of frail elders.

Source of In-Home Care

A second concept of interest in this investigation is the source from which the service is provided: informal, formal, or a combination of both (Appendix C). In this study, informal services are provided by family members, friends, and neighbors. Formally provided services are available through agencies, professionals, and organizations in the public sector as specified in the Statewide Survey of Older Virginians (McAuley et al., 1980, Vol. 3, Appendices H and I). Users of services from both informal and formal sources are considered combination informal/formal users (see Appendix C for a more detailed explanation). This focus seems appropriate since the current shift in emphasis from

institutional to community-based long-term care has generated increased interest in the pivotal role of the informal caregiving support network of impaired elderly people (Crossman, London, & Barry, 1981).

It is generally accepted among social gerontologists that the availability and use of informal, mainly familial, support is a key element in the impaired elderly person being able to prevent or delay institutionalization (Brody, Poulshock, & Masciocchi, 1978; Palmore, 1983). Older people perceive the informal network of kin, friends, and neighbors as the appropriate social support in most situations of need (Arling, 1981; Cantor, 1980; Shook, 1980). The literature further points out that only when assistance from the informal system is unavailable do older people and their families turn to formal organizations (Cantor, 1980).

Despite this evidence that the informal family network is strong and responsive to the needs of its older members, many people continue to believe the myth of abandonment of elderly family members. Research during the past several decades has systematically refuted the idea that contemporary families are alienated from their older members and do not take care of them (Brody, 1981). Shanas (1979b) documented, through national survey research, the frequent contact of elderly persons with family members and the high incidence of family supports to disabled elderly members. It is also well-documented that most frail elders living in the community receive the bulk of their supportive personal care from family and friends (Brody et al., 1978; Comptroller General of the United States, 1977; McAuley et al., 1980; &

Treas, 1977). Although the myth lacks empirical support it is persistent and pervasive among the general population and policymakers as well. The tenacity of this belief is evident in the current legislative concern that the provision of formal community-based services will reduce family participation in caregiving by undermining family responsibility and encouraging families to withdraw support from their frail elderly members (Masciocchi, Thomas, & Moeller, 1984).

Previous studies, however, have shown that formal services do not necessarily substitute for family efforts (Greene, 1983; Horowitz & Dobrof, 1982; Shanas, 1979b). That is, families continue to provide care even when formal services are being utilized. This suggests that informal and formal services are often provided simultaneously. Therefore, this study includes services that are provided from a combination of informal and formal sources.

The political issue then becomes one of supplantation versus supplementation of informal sources of care by formal sources of care. From a bureaucratic perspective the demand for fiscal restraint in government spending has shifted the focus of care of elderly people back to the family as the major resource for the provision of long-term care (Sivley & Feigener, 1984).

While federal bureaucrats seem most concerned about fiscal restraint, with regard to the provision of formal services for older people, a different concern is evolving among families, practitioners, and researchers. This concern deals with the hidden personal, social, and economic costs associated with reliance on the informal support

network. The reduction of program spending on community care for elders, then, may not yield a simple equation of financial transfer from the public to the private sector. The implications of having families increase participation in providing care to older members, while reducing services, may lead to undesirable ramifications such as marital conflict and dissolution, problems with children, involuntary withdrawal of a family member from the labor force, and a generally lower quality of life for the entire family (Carrilio & Eisenberg, 1983). The foregoing discussion of sources of service provision to elderly people suggests that the real issue may be determining the appropriate mix of informal and formal sources of service in order to implement a family-oriented service delivery system to support the existing informal support system (Brody, 1981).

By identifying variables that predict the level of use of in-home care services (Appendix D) from informal, formal, and a combination of informal and formal service providers, this study helps to clarify how the source from which the service is provided impacts on the use of community-based long-term care. Level of use of services is the dependent variable in this study and is operationalized as the number of in-home care service used by each subject during the six months prior to data collection (see Appendix D). These results may ultimately help to determine the appropriate mix of informal and formal sources of service so that program administrators and policymakers might target scarce resource to older people in a more efficient manner.

Rural and Urban Service Users

In addition to the level of use of in-home care services and the sources from which those services are provided, this study is concerned with the type of community in which the older survey respondents reside. This construct is operationalized as a rural-urban dichotomy. In this study, rural means that a person resides on a farm or ranch; in the country, but not on a farm or ranch; or in a small town or city of less than 25,000 people. To be considered urban an individual must live in a city between 25,000 and 100,000 people, in the suburb of a large city, or in a city of more than 100,00 people.

The rural elderly population is of particular interest in this study for several reasons. Much scholarly interest in this group has been precipitated by the disproportionate population growth among older people in rural America (Beale, 1982; Longino, Wiseman, Bigger, & Flynn, 1984; Wardwell, 1982; Zuiches & Brown, 1978). In an effort to determine the conditions of rural life that make it unique for older people, researchers have discovered the inadequacy of community services for the older rural population. Because the available comparative literature is replete with data to suggest that rural elderly residents have more objective needs than their urban counterparts (Coward, 1983; Coward and Smith, 1982; Nelson, 1983; Richard, 1981; Youmans, 1977) this is an especially critical issue. Confounding this issue is the condition that rural elders tend to have more objective needs, yet they have access to fewer services.

Not only do rural community-based services seem to be less than adequate in number but also in method of delivery. For instance,

service providers often fail to consider such factors as cultural differences, transportation problems, acceptability of programs, and structure of kinship and friendship networks when designing programs. Furthermore, when services are delivered to rural older people they are likely to be delivered via a modified urban service delivery model that is not compatible with rural life. At the same time that services are inefficiently targeted and delivered to rural elders, the research necessary to provide direction to practitioners is methodologically inadequate and sparse.

Although the design of this study is a rural-urban comparison, the investigator is most interested in understanding patterns of service utilization among older rural residents. Lee and Lassey (1982) pointed out that attempts to study older adults in rural environments by only observing a sample of older rural people are predisposed to failure for two reasons. First, the effects of rural residence on older people can only be identified by comparison across types of communities. Second, not all of the characteristics of older rural Americans are attributable to their age; some are common to rural residents across the lifespan. Thus, both type of community and age must be treated as variables, in order to understand areas in which rural elders are unique. This study considers both place of residence and age as variables.

Research suggests that both the needs of elderly people and the provision of services to meet these needs differ in important ways between rural and urban communities (Moen, 1978; Taietz, 1975). Therefore, the need exists to demonstrate to policymakers and

practitioners how the rural environment impinges on the lives of elderly people to produce a set of circumstances that differs from the conditions of older people in the urban milieu. Through understanding the program implications of these differences, programs intended for rural elderly service users may cease to be "little more than scaled-down versions of urban programs" (Coward, 1979, p. 275). Indeed, the search for appropriate models for providing community services to the older rural population has emerged as an issue of national concern (Coward & Smith, 1982; Lee & Lassey, 1982; Nelson, 1980; Sauer, 1983).

It seems untimely that just when this phenomenon is beginning to receive increased attention we find our nation in an era of retrenchment and retreat from the expansion of social welfare programs (Coward, 1983). In view of this dilemma, it seems likely that studies differentiating rural and urban patterns of in-home service use, such as the study under consideration, have the potential of contributing to the development of more cost-effective models of service delivery based on more efficient redirection of available resources rather than increased allocations.

Independent Variables

A group of sociodemographic variables (Appendix E) suggested by the literature combine with five dimensions of functional impairment (Appendix F) to form the independent variables in this investigation. The independent variables considered in the study are: marital status, living arrangement, age, race, education, sex, income, has a car,

drives a car, has a telephone, has a confidant, network satisfaction, visits to family, visits to friends, distance to family, distance to friend, social resources, economic resources, mental health, physical health, and activities of daily living (ADL) performance. The reader will note that some of these variables are dichotomous categorical variables (see Appendices E and F).

The socio-demographic and level of functional impairment variables have been categorized as predisposing (e.g., race and sex), enabling (e.g., income and distance to family), or need variables (e.g., physical health and ADL performance), to reflect Andersen's (Andersen & Aday, 1978; Andersen & Newman, 1973) paradigm for conceptualizing service use (see Appendix G). The Andersen Model was conceived in order to relate individual characteristics to utilization patterns in a logical manner. The model was designed to serve as a guide to select relevant variables for inclusion in the analysis. Andersen and his associates assumed that a sequence of conditions contributes to the volume of health services that an individual uses. Use is dependent on: the predisposition of the person to use services; the ability of the individual to secure services; and the illnesss level of the person (Andersen & Newman, 1973, pp. 106-107).

The investigator will discuss the results of this study in terms of these variable clusters. Use of Andersen's theoretical framework will permit comparisons with other studies of service utilization among older people which also incorporate this model. (Branch et al., 1981; Evashwick, Rowe, Diehr, & Branch, 1984; Krout, 1983a; Wan & Arling, 1983; Wan & Odell, 1981).

Dependent Variable

A single dependent variable, service use (Appendix D), is the criterion variable used consistently throughout this study. The variable is formulated by assigning the code, one, to each of the six generic in-home care services (Appendix B) that a respondent used; assigning the code, zero, to each of the services not used; and then summing across all six services. This produces a variable with a range of seven categories, from used no services to used six services. The determination to include nonusers of services as a level of service use is based on prior analyses of these data (McAuley et al., 1980) revealing that the sample is highly skewed in the direction of nonuse of services. Thus, the used no service category is retained because data characterizing this group are essential to understanding patterns of service utilization.

To summarize, this study is concerned with identifying some specific rural and urban differences in the utilization patterns of in-home care services among older adults. It is predicated on the contention that future in-home care planning for elderly people will benefit from increased understanding of those factors that predict use and source of in-home services in both rural and urban communities.

CHAPTER II

REVIEW OF THE LITERATURE

Despite a large increase in academic and political interest in the status of older Americans, relatively little is known about the elderly population living outside of metropolitan areas (Krout, 1983b). Even less is known about how nonmetropolitan older people utilize services.

Krout (1983b) identified this concern as one of the most basic issues in need of scholarly attention. He argued that if service providers are to determine, implement, and administer programs that reach target populations and make the most efficient use of limited resources, then a clear understanding of the patterns and correlates of service use of elderly rural residents is mandatory.

This literature review will examine the current state of knowledge relating to this phenomenon by attempting to answer a series of questions in a systematic manner.

What is rural?

Rural and urban are generally regarded as opposite ends of a conceptual continuum, with people and communities falling somewhere between the hypothetical extremes. Thus, rural and urban do not form distinct and separate subgroups. Since there are many overlapping characteristics, meanings given to the extremes are neither simple nor unambiguous (Willits, Bealer, & Crider, 1985). The reader needs to be aware that although rurality is, in reality, a continuous variable it is dichotomized for the purpose of this study.

One frequent scheme for determining the rural-urban dichotomy is on the basis of ecological, occupational, and sociocultural criteria. Ecologically, rural areas are characterized by low population density, small communities, and relatively isolated settlements. Occupationally, rural areas are expected to involve extractive industries such as agriculture, mining, fishing, and forestry. Socioculturally, rural areas exhibit a predominance of personal face-to-face social relationships among similar people and a comparative slowness in altering their cultural heritage (Willits et al., 1985).

A more demographically-oriented way to operationalize rural and urban is the dichotomy used by the U.S. Bureau of the Census. For many years the Standard Metropolitan Statistical Area (SMSA) was used to designate urban areas with a population of 50,000 or more. Although the Office of Management and Budget recently revised this definition by further subdividing metropolitan areas (Beale, 1984), it is useful to continue discussing the SMSA/non-SMSA dichotomy because the overwhelming majority of existing empirical research on rural and urban differences use this definition and because it is the definition accepted by the Administration on Aging.

The SMSA/non-SMSA dichotomy compares people living in metropolitan and nonmetropolitan counties. According to this definition people living on farms are combined with people in small cities under 50,000 and in towns. Also, people living in the core of major cities are combined with those living on farms just beyond the urban fringe, but still within these counties (Ecosometrics Inc., 1982).

Rural and urban are operationalized in this study in a manner similar to the definition recommended to the Administration on Aging by the National Rural Strategy Conference in 1978 (Ambrosius, 1981)

The definition states:

In order to be considered rural, an area of a county must meet one of the following two sets of criteria:

1. For a county or a set of counties comprising a Standard Metropolitan Statistical Area (SMSA), as defined by the U.S. Bureau of the Census, the rural areas comprise all open country, unincorporated areas, and incorporated areas (villages, towns, cities) of less than 25,000 total population except those areas in places of 10,000 or more total population which are adjacent to, contiguous with, or part of the suburban fringe (urbanized area) of a city of 50,000 or more total population.
2. For all counties (non-SMSA) the rural areas comprise all open country, unincorporated areas, and incorporated places (villages, towns, and cities) of less than 25,000 total population. (p. 294)

This definition seems most reflective of the rural-urban configuration of the state of Virginia where rural communities are often adjacent to metropolitan areas.

Because these and many other systems for classifying place of residence are offered; the literature abounds with inconsistencies in the operationalization of this concept. Consequently, this lack of

consistency in defining rural and urban confounds the comparison of studies, making the review of this body of literature a challenge.

What Makes the Rural Elderly Population Unique?

A plethora of data in the field of rural gerontology, documented in bibliographies by Krout (1983c) and Wilkinson (1982), has accumulated since the pioneering work of E. Grant Youmans (1967). Many of these empirical studies provide evidence that social and economic forces afflict rural elderly residents more severely than their urban counterparts. Thus, the existing research on rural older people has been more successful in documenting the disadvantages of rural life for older people than the advantages.

Rural elderly people experience poorer education, lower incomes, less adequate housing, poorer health, and less accessible health services. Despite their relative disadvantage in terms of objective indicators of quality of life, studies have revealed that rural elders scored as high or higher than urban older people on measures of subjective well-being (Lee & Lassey, 1980a). Because of the paradoxical nature of this situation it seems worthy of further exploration.

One widely accepted indicator of quality of life, formal education, suggests the disadvantaged position of rural people. In 1975, the median number of years of formal education completed by males 25 years old and older living in urban areas was 12.5 versus 12.2 for rural nonfarm males and 11.0 for rural farm males. Similar rural-urban differences for females were reported. Additional evidence of the lower

educational attainment of rural people was presented by Tremblay, Walker, and Dillman (1983) in a report that urban people are almost twice as likely as rural to have graduated from college.

Another apparent deficit of rural residents is lower income. Bureau of the Census (1978) data revealed that the median income for the rural family was $12,831 compared to $13,952 in the central city and $17,101 in surburban areas. In 1979, 29% of rural residents above 65 years of age contrasted with 10% of individuals younger than that age lived below the level of poverty (Arnold, 1984). Thus, older adults in rural areas are more likely than younger adults to live below the poverty level.

The housing of elderly rural residents is older, of lower value, and more likely to be substandard than the housing of their urban contemporaries. Atchley and Miller (1975) found that approximately one-fourth of older people in rural environments occupy inadequate housing and that less than adequate housing typifies half of the older black population living in the rural South.

The evidence seems to indicate that rural older people are less physically healthy than elderly urban residents (Lassey & Lassey, 1985). According to Nelson (1980), an inordinate proportion, 87%, of rural older people reported a chronic illness of some type. Additionally, Sotomayor (1981) indicated that 36% more restricted activity days are reported by rural elderly than their urban counterparts. However, Paringer, Bluck, Feder, and Holahan (1979) found that, with the exception of these factors, rural elders are no less healthy than urban older people.

Contributing to the disadvantaged position of older people living in rural communities is the fact that nearly half of all rural Americans live in areas designated as medically underserved (Sotomayor, 1981). In 1975, the number of physicans per 100,000 persons, one indicator of the adequacy of health care, was 71 in rural areas compared to 157 in urban areas (Ahearn, 1979). This disproportionately low number included few highly trained physicians. As might be expected, other health care professionals such as nurses, dentists, and pharmacists were also underrepresented in rural communities according to Tremblay and his associates (1983).

Another indication of being medically underserved is less abundant resources for in-home care (Taietz & Milton, 1979), a condition Greene (1983) suggested may be one cause of earlier entry into skilled nursing facilities by rural elders as compared to urban elders. This further supports Palmore's (1983) argument that while older rural people experience greater health needs than older people in urban communities, they receive fewer services.

Policymakers seem to have accepted the premise that there is a direct relationship between the objective indicators of quality of life just enumerated and subjective well-being (Rowles, 1983). Recent studies, however, revealed that objective conditions of rural residence are not necessarily associated with lower levels of subjective well-being (Lee & Lassey, 1980a).

One explanation for this situation is that measures of objective quality of life may be inappropriate indices of subjective well-being.

For instance, dollar income may not accurately reflect availability of resources, physical characteristics may fail to predict the ability of a house to provide a home (Montgomery, Stubbs, & Day, 1980), and clinical health measures may be less significant predictors of functional status than self-perceived health.

A second explanation is that there are other aspects of rural life that compensate for poorer objective conditions (Lee & Lassey, 1980b; Tremblay et al., 1983). One such aspect of rural life that is often offered as a compensatory factor is the pervasive belief that kinship relations and extended family ties are stronger among rural than urban populations (Lee, 1980).

Lee and Cassidy (1981) reviewed ten studies of the relationship between residence and kinship interaction. Seven of these studies reported that kinship interaction was greater among rural than urban populations, while two studies reported the opposite. Finally, Key's (1961) seminal study of this phenomenon examined four residence categories and reported a curvilinear relationship between degree of rurality and kinship interaction. Perhaps, the most defensible conclusion to this review is that empirical studies do not confirm that urban residence decreases the viability of kinship networks. Conversely, the inconsistency of reported rural-urban differences fails to support that rural residence enhances kinship interaction.

Other scholars have offered such variables as higher levels of social participation, reduced fear of crime, slower pace of life, lower levels of cognitive complexity, more gradual change, and smaller scale

of life as possible explanations of this paradox (Lee & Lassey, 1980a). Whatever the cause of the tendency toward higher subjective well-being for older rural residents when compared to older urban residents, the relationship lacks clarity.

Campbell, Converse, and Rodgers (1976) offered evidence that conditions exist in the rural environment to offset the deficiencies suggested by objective indicators. They developed a composite index of well-being as a measure of overall life satisfaction in connection with a national survey in 1971. Based on an analysis using this measure, they reported that "there is a substantial gradient of increasing sense of well-being with life as one moves from the inhabitants of the nation's twelve largest cities to those of more sparsely settled areas" (p. 51). Rural people, both whites and nonwhites, tended to score higher on this index of well-being than city people. A significant relationship was also found between community satisfaction and size of community, with residents of rural areas indicating the highest level of satisfaction.

To further support the notion that rural residence is a possible indicator of well-being, Miller and Crader (1979) reported that rural residents demonstrated higher levels of interpersonal satisfaction but lower levels of economic satisfaction when compared to urban residents.

Probably the most controversial study to explore the relationship between residential environment and subjective well-being of rural and urban elders was conducted by Hynson (1975). He tested the hypothesis that rural elders are happier than their urban peers. He concluded

that his findings generally supported the notion of the negative effect of urban life on well-being.

Sauer, Shehan, and Boymel (1976) challenged Hynson's results as they took issue with his data analysis technique. They argued that since Hynson's analysis was at the bivariate level, the relationship he found was likely to be spurious. Sauer and his associates employed regression analysis to reanalyze the data and concluded that the relationship between rural residence and satisfaction was reduced to a nonsignificant level in the multivariate analysis.

Lee and Lassey (1980b) challenged the Sauer et al. (1976) finding on the basis that the measures of satisfaction employed were not precisely comparable and that path analysis may yield a total effect while no direct effect existed. Thus, the relationship between rural environment and the subjective well-being of older people remains obscure.

In response to the original question, "What makes the rural elderly population unique?", evidence has been presented to suggest that rural older people have fewer educational opportunities, greater economic impairment, less adequate housing, poorer health, and less abundant social and medical services. This evidence seems to support the argument that a set of circumstances is present in rural environments to make aging a different experience from aging in an urban environment. The research further documents, despite these objective deficits, that older rural residents score at least as well on indices of subjective well-being as older urban residents. This

suggests that conditions exist in rural environments, which compensate for these apparent liabilities, making aging in a rural environment a unique experience.

Why is Service Delivery to Rural Elders an Issue?

The significant demographic shift toward nonmetropolitan residence for older people (Beale, 1982; Clifford, Heaton, Voss, & Fuguitt, 1985; Fuguitt & Tordella, 1980; Wardwell, 1982) has given rise to the burgeoning research on rural elders in recent years. One result of this new interest in the rural elderly population has been the recognition of the critical need to evaluate the appropriateness of urban-designed service programs for older people living in rural areas (Coward, 1979; Coward & Smith, 1982; Rowles, 1983).

Harbert and Ginsberg (1979) identified service delivery as one of the biggest problems of rural elderly people. Specifically, their concern was that programs established to meet the needs of rural people were not designed to fit their way of life. Perhaps, elderly rural residents are, as Ansello (1980) hypothesized, socialized to values different from their urban peers and even different from younger rural cohorts. Or maybe, as Youmans (1977) offered, most social gerontologists are urban dwellers who expect the knowledge generated about urban older people to also apply to rural older people. Whatever the reason, the situation seems to clearly indicate that older persons living in rural areas are underserved by human service programs (Kim, 1981; Nelson, 1983; Taietz & Milton, 1979).

Thus, the literature presents comparative evidence to suggest that elderly Americans reside disproportionately in rural communities and have more objective needs than their urban counterparts while they receive fewer services. At the same time, the emphasis of gerontological research remains urban in focus (Krout, 1983b).

The diversity resulting from the influx of older people into rural areas is worthy of consideration as it relates to the question of why delivery of services to the rural elderly population is an issue. The migration of older Americans to rural areas is important not only because it increases the potential number of users of services but also because it contributes to the diversity of the existing population. These new rural residents from more urban areas are likely to bring with them expectations about community services that differ from older people who have been long-time rural residents (Coward, 1979). Although this increase in size and diversity magnifies the need for accurate data on patterns of service utilization in rural environments, the implication is not that rural communities were homogeneous prior to the influx of former urban dwellers. Studies by Heller and Quesada (1977) and Heller, Quesada, Harvey, and Warner (1981) emphasized the heterogeneity of rural communities.

Another important reason that service delivery is an issue in rural areas is the existence of conditions which tend to thwart effective program implementation. To address these obstacles, Steinhauer (1980) analyzed the rural service delivery system and concluded that administrative, logistical, and compliance obstacles

block effective implementation. These barriers include: the lack of full-time administrative professionals in rural governments; the inability of rural communities to meet federal match requirements due to inadequate tax bases; the lack of an infrastructure of existing service providers; the cost-inefficiency of traveling great distances over frequently rough terrain to reach clients; paper compliance beyond the skills of the providers; and the regulation that Area Agencies on Aging cannot provide direct services unless no contractors are available.

In conclusion, service delivery to older rural residents is an issue because the needs are great, the resources are limited, and the strategies for providing and maintaining such services are unclear (Jackson, 1983). Current reductions in federal, state, and local budgets will result in curtailment of public support for some existing programs. To achieve a balance between demand for services and the resources to deliver them, efficiency is needed in designing service delivery models that acknowledge that rural elders are unique.

What is Known About Service Utilization Patterns?

In a recent critical review of the literature on service utilization among elderly people, Krout (1983b) concluded that definitive statements concerning the use of services by elderly individuals are difficult to make because of contradictory research findings and methodological problems, including the lack of comparative rural and urban samples and inadequate controls for independent variables (Coward & Rathbone-McCaun, 1985). Nevertheless, Krout (1983b) offered these two generalizations: utilization rates are extremely low, and the correlates of service use

are not well-understood. Thus, no consistent profile of service users emerges from this body of literature.

The question of whether or not use is greater among rural or urban populations is difficult to answer with existing data. Little has been published that presents direct comparisons of service use based on type of community. It is generally assumed that more dispersed population distribution patterns, lack of public transportation (Cottrell, 1978), and deficits of the rural service delivery system result in lower rates of use in rural areas. However, Krout (1981) reported no significant difference in the level of utilization of services among farm, village, and urban residence in a nonmetropolitan New York county.

Much of our "knowledge" about service utilization is based on assumption rather than data. An example is the widely accepted belief that older rural residents are more resistant than older urban residents to accepting services provided by the public sector. Although this has not been sufficiently documented (Coward & Rathbone-McCaun, 1985), Osgood (1977) reported that attitudes of rural people are far more negative and restrictive toward use of social welfare programs than the attitudes of urban people. The fact that the acceptability of a service to rural elders is influenced by both the type of service and the person or group sponsoring the service (Coward, 1979) may contribute to the apparent negativism of rural older people. It has also been documented (Auerbach, 1976; Buxton, 1976) that service provision may be made more difficult because many rural elderly residents are reluctant to accept

publicly provided programs as legitimate. Although these studies may seem to support the resistance of older rural people to utilization of formally provided services, one must be reminded that resistance to use of formal services is not peculiar to rural elderly people. Cantor (1980) reported that formal service utilization is the last resort for most elders.

Resistance to service use is only one example of assumptions about rural older people that are widely accepted without sufficient empirical support. The literature is replete with ideas that are espoused as factual, which have come to serve as the basis for programs and training of service providers, with little verification (Jackson, 1983). Much of the available information about elderly people residing in rural environments, especially information on values (Larson, 1982; White, 1977), is anecdotal in nature. Thus, researchers and practitioners would do well to take the advice of Coward and Rathbone-McCaun (1985) and temper folk wisdom with reality in attempting to assess how and why rural elders utilize services.

What is Known About How Elders Use Informally-Provided and Formally-Provided Services?

As might be expected from the prior discussion of service utilization, little is known about how older people make use of services from informal and formal sources. For the purpose of this discussion it is assumed that informal services are provided by family, friends, and neighbors or an agency, if the service is voluntary and not for pay. Formal services are those paid services provided by

agencies and organizations. The foregoing definitions are the ideal way to operationalize informal and formal services; unfortunately, the data set used in this study does not consistently indicate whether or not a service is performed for pay. Thus, informal and formal services are conceptualized somewhat differently in this analysis (see Appendix C).

One consistency in the literature seems to be that most elderly people draw initially on informal sources of care followed by additional aid from formal sources (Cantor, 1980; O'Brien & Wagner, 1980). It follows that informal and formal care provision can operate simultaneously, particularly for persons who are heavy service users.

Various sources agree that older people who use formally provided services are more infirm than those who do not (Chappell, 1985; Johnson & Catalano, 1983). Greene (1983) found that while ADL performance is the single most significant predictor of level of use of formally provided services, it is also a significant predictor of use of informal services.

A series of studies conducted in the late 1970's by researchers at the University of Pennsylvania provided evidence that despite serious functional impairment the presence of a spouse and living children is a critical condition that allows a person to remain in the community (Masciocchi et al., 1984).

The work of Masciocchi and her associates (1984) suggested the popular argument that the costs of institutional long-term care for elderly people could be controlled if families would accept more

responsibility for the care of their elders. Monk (1983) offered some evidence to reduce the credibility of this assumption: almost half of institutionalized adults have no relatives; families already provide as much as 80% of home health care services for older relatives; generations are becoming more geographically separated with only 18% of elderly Americans living with an offspring; declining fertility rates mean fewer descendants to call on; and the labor force participation of midlife women will reduce their availability to assume the traditional caregiving role.

The evidence suggests that formal services are sought when informal supports cease to be able to provide an appropriate level of care. However, the converse of this does not seem to be true. Sivley and Fiegener (1984) structured a study that failed to support the supposition that families increase assistance when formal services are terminated. Greene (1983) also reported that when formal services are withdrawn they are replaced with fewer hours of informal assistance.

An investigation of the literature concerning use of informal sources of care by older rural residents failed to indicate a clear pattern. Resulting from the analysis of data from three studies, Shook (1980) reported that rural elders receive 90% of all help with activities of daily living from informal sources while urban older people receive only 68%. Although this finding seems to suggest that rural older people have stronger informal networks than their urban contemporaries, Mahoney's (1977) reanalysis of Harris poll data showed that rural and suburban elderly populations are more likely than elders

living in urban locations to receive help from nonfamily sources. Another study that failed to support the idea that rural elderly people have stronger informal networks indicated that level of informal support declines with community size (Stephens, Blau, Oser, & Millar, 1978).

In summary, the literature provides few clues as to how older people residing in rural and urban milieus use services from informal and formal sources differently. The studies cited here indicate a need for further research to clarify this issue.

What Variables Seem Important in Predicting the Use of In-home Services?

While much has been written about the correlates of medical services and senior center programs, the research that specifically examines the use of in-home care services is sparse. The intent of this section is to identify variables that seem related to different patterns of in-home care service use as well as to present a rationale for including in this study the independent variables that have been selected.

The Andersen Model

Since Andersen's model (Andersen & Aday, 1978; Andersen & Newman, 1973) is used to classify independent variables (Appendix G) and to discuss the results of the study, it seems appropriate to use Andersen's predisposing, enabling, and need variables in this discussion of significant predictors of use of in-home care services. Other researchers have used this same format for categorizing independent variables (Branch et al., 1981; Evashwick et al., 1984; Krout, 1983a; Wan

& Arling, 1983; Wan & Odell, 1981) to enhance understanding of service use patterns among older people.

The Andersen model identified three sets of variables that are presumed to account for health service use by elderly individuals: predisposing, enabling, and need. Predisposing variables such as age, sex, race, and marital status are seen as affecting the propensity of an individual to use health services. Enabling factors such as income, transportation, and insurance coverage facilitate or inhibit the use of services even if one is predisposed to use them. Finally, need variables indicate the level of the problem being addressed by the service. Variables reflecting level of functional impairment are examples of need variables according Andersen's framework. Andersen's model has produced conflicting results concerning the relative importance of these three categories of variables as predictors of use of service among older persons primarily because the model has been used to examine a variety of specific services among diverse audiences with no systematic effort to replicate studies. Nevertheless, it offers an improvement over the sociodemographic approach used previously.

Predisposing Variables

The predisposing variables in this study are marital status, living arrangement, age, race, education, and sex. Since place of residence has been previously categorized as a predisposing variable (Wan & Arling, 1983), its ability to predict service use is also discussed here. In this study design, however, place of residence (rural or urban) is one of the variables used to divide the total sample in order to allow for

comparison of the variables which influence service use in each environment.

Marital status is significantly related to the use of services. Evashwick et al. (1984) reported that married people use in-home care less than those who are not married. Consistent with this is Krout's (1983a) finding that unmarried older persons are more likely to use services. In a Norwegian study, Daatland (1983) concluded that marital status has a different effect on the use of in-home services in rural and urban environments. He found that in rural areas married persons use fewer in-home services than those who are not married, however, in urban areas married people over 70 years old use more services.

Whether or not an individual lives alone is frequently selected as a potential predictor of service use; however, it is seldom found to be a significant predictor. In contrast to this norm, Wan and Odell (1981) found that living alone is a significant predictor of the use of social services by elderly people. They speculated that one's living arrangement may be an indicator of available social support.

Age has been found to be a predictor of the use of services in various studies. Branch et al. (1981) and Evashwick et al. (1984) provided evidence that the use of in-home care increases with age; similarly, Krout (1983a) documented that older people are more likely to be users than nonusers of services. In an investigation of the use of formal services by older urban residents, Cantor and Mayer (1978) reported a positive relationship between age and use. However, in a later study Wan and Arling (1983) discovered a more complex relationship between age

and use of health services. They found that age is inversely related to use of social services; however, when level of impairment is taken into account, the age-use association becomes positive. This suggests that physical health status may be a suppressor variable that alters the relationship between age and use of health services.

A final example is Daatland's 1983 study which showed age to be a strong predictor of in-home service use among elderly Norwegians at both the bivariate and multivariate levels of analysis. This may be interpreted as an effect of the need for services because of the correlation between age and functional capacity among older people. Contrary to the results of an earlier investigation by Wan and Odell (1981), Daatland found the effect of age to be stronger in the urban than the rural environment.

To help explain the relationship between race and the utilization of services, Rao and Rao (1983) used stepwise multiple regression analysis to study the use of social services by 240 elderly black urban residents. Health, income, and frequency of interaction with children emerged as significant predictors of use of social services. Those elders who used more social services were those who reported poorer health, talked to their children less frequently, and had higher incomes.

Rosen's (1978) examination of black and white older residents of a high poverty region of Georgia showed some differences in service utilization indicating that race may be an important variable to consider in this study. She concluded that elderly blacks express a greater willingness to approach social agencies, physicians, and other community

helpers than do elderly whites. Rosen also concluded that more blacks than whites receive some type of health or social service, a finding consistent with Evashwick et al. (1984) who identified race as a significant predictor of the use of in-home care services.

Two studies (Branch et al., 1981; Evashwick et al., 1984) reported that older people with more education use fewer in-home care services. Consistent with these data, Krout's 1981 New York study documented that people with the lowest education use the most services. This same study (Krout, 1981), however, indicated that people with the highest education use more services due to a curvilinear relationship between education and service use. Furthermore, McAuley and Arling (1984) used path analysis to reveal that very old people with higher levels of education receive more in-home care. Based on an examination of a wide range of services including in-home care, Fowler (1970) corroborated the finding that older people with more education use more services. Thus, evidence is presented to suggest that level of education significantly predicts utilization of services; however, the direction of this relationship remains unclear.

Krout's 1981 study indicated that females use higher rates of service than males. An analysis by Rao and Rao (1983) identified a different set of predictors for service utilization for men and women suggesting that sex might be a variable of interest.

When place of residence is a predictor variable its relationship to service use is likely not to be significant. McAuley and Arling (1984) documented one exception to this generalization in their conclusion that

the use of formal services is higher among urban very old people than among rural residents of a similar age. Two studies (Krout, 1981; Wan & Arling, 1983) provided evidence that residence and level of use of services are not significantly related. Interestingly enough, Krout (1983a) later used the same sample to report that older urban people showed slightly higher rates of service utilization than elderly rural people. The difference seemed to be in the differential operationalization of service use.

Enabling Variables

The enabling variables included in this study are income (gross annual household income); transportation variables, has a car and drives a car; has a telephone; network satisfaction; availability of informal network variables: visits to family, visits to friends, distance to family, and distance to friend; and has a confidant. The potential value of knowledge of services as an enabling variable will also be discussed. However, it is not included in the study because such a variable could not be extracted from the Statewide Survey of Older Virginians data set.

The relationship between income and use of services is unclear. Evashwick et al. (1984) found that older people with higher incomes use fewer in-home care services while Fowler (1970) reported the opposite to be true. Wan and Odell (1981) agreed with Fowler in their report that less financial dependence is a predictor of social service use.

Krout (1983a) identified car ownership as the strongest predictor of service use among the urban elderly. He also found that lack of transportation is a significant predictor of use of services among the

rural elderly. Both Branch et al. (1981) and Evashwick et al. (1984) asserted that older people who have transportation problems also use more in-home care services. These investigations helped to justify inclusion in this study of the two enabling variables relating to transportation, car ownership and ability to drive. In this study it is assumed that the variable, has a car, is synonymous with car ownership.

Ecosometrics, Inc. (1982) reported that rural areas generally have the highest number of households without telephones. A Pennsylvania study (Bylund, LeRay, & Crawford, 1980) supported this finding. It indicated that nearly twice as many rural as urban elderly households are without a telephone--12.7% compared to 6.9%.

Having a telephone seems to be related to interaction with an individual's informal network and is probably related to how older people gain access to in-home care services (e.g., checking services). Powers, Keith, and Goudy (1981) described the potential meaning of a telephone to rural residents: "Most attention to kinship ties has been limited to investigations of face-to-face contact. Yet, most contact between the aged in rural settings and their children is by telephone" (p. 202). To further support the idea that having a telephone is an important link with one's informal network, an Iowa study (Powers & Liston, 1971) reported more than one-half of interaction with children is by telephone while only a third is face-to-face.

Krout (1981) concluded that measures of the availability and involvement of elders in informal networks indicate little or no impact on the rate of formal service usage. However, the positive

relationship between social resources and use of in-home care services reported by McAuley and Arling (1984) seems to contradict Krout's conclusion. Perhaps, another way to measure one's relationship with the informal network is to ask whether or not more social contact is desired. Krout (1981) found this item to be significantly related to service utilization. A similar variable designated as "network satisfaction" is included in this study.

Youmans (1977) reported that in both rural and urban areas proximity is an important factor in the frequency of visits between older people, their children, and siblings. He found that, although the children and siblings of urban elderly persons are more widely dispersed than those of rural elderly persons, urban elders visit more frequently than their rural counterparts regardless of the greater distance. Furthermore, Youmans reported that older rural people depend more on their children and siblings to initiate visits than elderly urban residents do. These findings are consistent with the results of an earlier study by Bultena (1969) which reported higher interaction levels between urban elders, their adult children, and their siblings. Youmans speculated that these rural-urban differences in visiting patterns reflect the more limited financial resources of rural older people as well as their poorer transportation systems. To further explore this relationship, proximity of kin and proximity of friends are being considered as independent variables in this study.

Having a confidant may be a variable related to use of in-home care, although it has not been documented in the literature. It is included

in the present study because having someone in whom to confide important personal information was reported by Schooler (1975) as a more common occurrence among rural elderly adults than among nonrural elderly adults. Also, Larson (1978) indicated that whether or not an older person has a confidant is considered to be a predictor of subjective well-being, suggesting that this variable may be of interest in the current study.

Studies that have identified knowledge of services as a significant predictor of utilization of services seem to be in agreement on the positive direction of the relationship as well as its strength as a predictor. Fowler (1970), in a relatively comprehensive study of the participation of elderly urban residents in an array of community-based services, reported that the most important factor in nonuse of services is the lack of knowledge about the service system. Similarly, Snider's (1980) Canadian study identified awareness of health services as the primary factor impeding and promoting health service utilization. Further support that knowledge of services is an important predictor of service use is provided by Wan and Odell (1981) who corroborated the significance of this variable by reporting it to be the most important factor affecting the use of social services. The foregoing evidence indicates that future studies of human service utilization by older people should be designed to include a measure of knowledge of services.

Need Variables

The literature seems fairly consistent in identifying level of functional impairment as the strongest predictor of use of in-home

services. Evashwick et al. (1984) identified the need construct, which is comparable to the five dimensions of functional impairment in this study, as the single most important predictor of use of in-home care services. Similarly, Branch et al. (1981) reported that need characteristics account for most of the explained variance in utilization of in-home care services, while Fowler (1970) found that urban older people with more chronic health conditions use more services.

To further support the relationship between functional level and use of services Cantor and Mayer (1978) provided documentation that inner city elderly people with a high degree of physical impairment are likely to use an array of services including in-home care. McAuley and Arling (1984), using path analysis, determined that the ADL performance rating has the largest direct effect on the number of types of in-home care services used, with more impaired persons receiving more forms of care. Consonant with this finding, Wan and Arling (1983) provided additional evidence that older people with greater ADL impairment use more social services.

In a 1984 study, McAuley and Arling concluded that poorer mental health ratings are predictive of use of in-home care. This finding is seemingly contradicted by Wan and Odell (1981) who reported that older people with fewer psychological problems use more services.

It seems evident that there is a lack of consistency in the relationships between use of in-home care services by elderly persons and the independent variables in this study. These relationships become

even more obscure when one attempts to predict patterns of use based on the level of use, sources of service, and residence of the service recipient. In conclusion, there are few clues in the literature on which rural and urban users of in-home care services from informal and formal sources can be profiled. It is the intent of this study to help fill this void in the literature.

What are the Deficiencies in the Existing Literature?

As mentioned previously, the available data are too sketchy to facilitate a clear understanding of rural and urban service utilization patterns. This lack of understanding of differences in service utilization for rural and urban elders can be attributed, in part, to major methodological flaws that limit the contribution of this body of literature to gerontological knowledge. These flaws, as identified by various scholars (Evashwick et al., 1984; Krout, 1981; Krout, 1983a; Krout, 1983b; Taietz, 1985; Taietz & Milton, 1979), are enumerated below:

1. The limited research one finds on service delivery to rural elders is largely descriptive.

2. The construct, rural, is rarely explicitly or consistently operationalized.

3. The wide variety of services studied makes comparison of usage rates risky at best.

4. Most investigators consider service use as an act rather than a continuum ranging from individuals who have never used services (nonuse) to individuals who once used services but no longer use them

(exuse). The typical study compares users with nonusers without dealing with frequency, duration, or intensity of use. The question of why older people stop using services has not been addressed by the literature.

5. Research has neglected careful consideration of the role that existing social networks play in encouraging or discouraging service use.

6. Having uncovered rural-urban differences, many studies fail to ask whether these differences can be explained away by appropriate rigorous controls.

7. Too few studies use a probability sample that includes users and nonusers as well as rural and urban elders. Often comparisons are made through inference and not as the result of statistically meaningful analyses.

8. Most of the studies on service utilization are atheoretical. Few models or theories of use have been developed or tested, and hypotheses are rarely stated explicitly.

The foregoing assessment of the methodological inadequacies in this body of literature help explain Krout's (1983b) rationale for concluding that the literature to promote understanding of the use of services by older adults is severely lacking.

How Does the Current Study Differ From Existing Literature?

Although a substantial number of scholarly works have been generated from the Statewide Survey of Older Virginians, four publications (Arling & McAuley, 1984; McAuley & Arling, 1984; McAuley &

Nutty, 1981; Wan & Arling, 1984) have particular relevance to the current study.

Arling and McAuley

Arling and McAuley (1984) explored the role of the family in providing community long-term care to impaired older persons. They identified a set of five in-home care services as the core services that impaired elders might need in order to remain in the home. This study reaffirmed the now commonly accepted fact that families are the primary providers of in-home care to their older members. One finding relating to the intent of the current study is that involvement of nonfamily sources tends to increase with size of community. This finding seems congruent with results from the McAuley and Arling (1984) study and suggests that older urban dwellers, at least those who are impaired, use more in-home services from formal sources than do rural elderly people. This hypothesis is one to be tested in the study under scrutiny. This research differs from the work of Arling and McAuley because it will involve the full sample and data will be analyzed using multiple regression.

McAuley and Arling

A second relevant study (McAuley & Arling, 1984) examined the use of in-home care among participants in the Statewide Survey who were 75 years old or older. These researchers included five of the six generic in-home services to be considered in the current study as well as the source from which services were provided and the individual's

environmental setting. McAuley and Arling used logistic multiple regression to determine that persons from urban areas, those with more years of schooling, and people with more physical ADL problems and fewer instrumental ADL problems are more likely to use formal services. Another finding of interest is that people with greater ADL impairment, higher education, greater social resources, and poorer mental health ratings use more in-home care services.

The current study should build on this study in two important ways. First, it will identify predictors of informal, formal, and a combination of informal and formal sources of service which will contribute to understanding conceptualizations of the factors influencing use of informal versus use of formal services. McAuley and Arling (1984) indicated that a void exists in the literature because this relationship is not well-developed. Secondly, these researchers stated that future research should be directed toward whether the patterns of in-home care found among this group exist for other ages. The study under consideration will address this concern by identifying predictors of in-home care services for people above 60 years old rather than the age 75 and older subgroup sampled in this investigation.

McAuley and Nutty

In another investigation, McAuley and Nutty (1981) examined differences in older Virginians by categorizing a subsample of low-income, moderately to totally impaired survey respondents as either rural or urban and comparing them to the total sample. They found that impaired older persons with limited financial resources use a similar

number of generic services regardless of place of residence. However, both the rural and the urban low-income subgroups who are functionally impaired use more services than the total sample. The study also investigated the use of informal services and found that family and friends are the most frequent providers of services to frail older people. This study will expand on the McAuley and Nutty analysis by considering formal and combination sources of service provision in addition to the informal sources examined by these researchers. Further, the study will examine patterns of service use in the full sample that can be generalized to the entire state of Virginia rather than just frail, low-income elders.

Wan and Arling

The final study (Wan & Arling, 1983) investigated factors affecting use of services by disabled elderly people. One set of services examined in this study was labeled social services, which included the six generic in-home services examined in the present study. Wan and Arling reported that 18 predictors accounted for 37% of the variance in use of social services. The point of interest in this study is that community type was not a statistically significant predictor of social service use among this frail elderly subsample. The current study will add to the knowledge concerning the relationship between utilization of in-home services and place of residence by determining if older people living in rural environments utilize in-home services differently than elderly people living in urban communities.

In summary, the proposed study differs from related studies in some important ways. It deals with residents of all ages, income levels, and levels of functioning included in the Statewide Survey of Older Virginians sample; it is primarily concerned with differences in patterns of service utilization between rural and urban elders; it examines only 6 of the 24 generic services assessed by the Statewide Survey; it investigates informal, formal, and combination sources of service provision; and most importantly, it draws upon these and other studies of the use of services among the older adults in order to hypothesize relationships.

What Hypotheses are Suggested by the Literature?

While this study is concerned with all patterns of utilization of in-home care services that emanate from the multiple regression analyses performed in this investigation, five hypotheses give the study focus. These hypotheses represent only a small number of the possible relationships between a specific independent variable and use of in-home care services in the various subsamples. The hypothesized relationships emerge from the literature to suggest differing patterns of in-home care utilization among older persons residing in rural and urban environments.

The following hypotheses stated in theoretical form are tested in this study:

Hypothesis I: Car ownership (has a car) is a stronger predictor of the level of use of in-home care services for urban elders than for rural elders when other independent variables are controlled.

Hypothesis II: ADL impairment is a stronger predictor of the level of use of in-home care services for urban elders than for rural elders when other independent variables are controlled.

Hypothesis III: Education is a stronger predictor of the level of use of in-home care services from formal sources for urban elders than for rural elders when other independent variables are controlled.

Hypothesis IV: Economic impairment is a stronger predictor of the level of use of in-home care services from informal sources for rural elders than for urban elders when other independent variables are controlled.

Hypothesis V: Physical impairment is a stronger predictor of the level of use of in-home care services from formal sources for urban elders than for rural elders when other independent variables are controlled.

CHAPTER III

METHODOLOGY

This study was designed to analyze data collected by the Statewide Survey of Older Virginians (McAuley et al., 1980). The Statewide Survey was financed by the Virginia Department of Welfare with funds made available through Title XX of the Social Security Act. The Virginia Office on Aging was the primary contractor for the survey. A subcontract between the Virginia Office on Aging and the Virginia Center on Aging at Virginia Commonwealth University gave the Center primary responsibility for collecting and analyzing data.

The two year project, which began in July, 1978, was intended to be a comprehensive survey to assess the functional dimensions of life of older Virginians and examine the range of services available to them. A probability sample was drawn from the population of Virginia community residents who were at least 60 years old in order to ensure that the findings would be generalizable throughout the state.

Sample

The Statewide Survey of Older Virginians indentified a probability sample of 2,463 noninstitutionalized persons 60 years of age and older. Of those individuals identified, 2,146 were ultimately included in the study after refusal rate was taken into account. This age group was chosen in accordance with the age of eligibility to participate in Title XX services and the Older Americans Act programs.

Each participant was interviewed in his/her home by an interviewer trained by the Virginia Center on Aging. The structured face-to-face interview lasted approximately 45 minutes and was chosen as a data collection technique because it has been found to be the most reliable information gathering technique for older people (McAuley et al., 1980).

Sample Design

The basic sampling plan for the Statewide Survey was to utilize the sample generated for the Virginia Health Survey. In 1978, the Research Triangle Institute of Durham, North Carolina, in a contractual agreement with the Virginia Health Interview Council, designed and selected an area probability sample of 630 household clusters for the Virginia Health Survey. The sample scheme for that study was a three-stage design, with stratification imposed at the first stage.

The first-stage frame was stratified on the basis of geography, urbanization, and socioeconomic status. The 210 units selected in this initial procedure were equally allocated among Virginia's five health systems areas. Three second-stage units, clusters of household units, were randomly selected within each of the 210 first-stage units for a total of 630 household clusters. The third-stage frame was formed by listing all household units within each cluster of households selected in the second stage. Of the 40,960 household units listed in stage-three, 5,991 units were randomly selected for the Virginia Health Survey. The 34,969 household units which were listed but not selected

then became eligible for use in the Statewide Survey of Older Virginians.

An initial equal-probability design sample allocation was computed for each of the Virginia Health Survey segments. For each segment, the computed initial allocation was compared with the listed number of household units remaining available for selection, the segments with less than the allocated number available were identified. The initial allocation results indicated that in 108 segments the desired sample size was greater than the remaining number of household units. The decision not to replace segments, in which the number of available household units represented at least half of the desired sample allocation, reduced this number to 49 segments.

In addition to these 49 segments, which contained fewer than half of the allocated number of household units, 10 other segments had to be replaced either because the original segment contained no housing units or because all housing units in the segment were sampled in the Virginia Health Survey. Research Triangle Institute subsequently determined an equal-probability allocation for these 59 replacement segments.

The household was specified as the final unit of selection; that is, all age eligibles identified in each sample household would be asked to participate. Systematic sampling, with a random start, was used to select 7,650 sample housing units from the housing units listed but not selected in the Virginia Health Survey. A total of 2,463 eligible older people were identified in these sample housing units.

Of those eligible, 2,146 were interviewed yielding a response rate of 87.1%. In 8% of the sample informants were used to provide some or all of the survey information because the target respondents were unable to complete the interview.

To compensate for nonresponse and sampling errors a statistically computed weighting factor was determined and is accessible from the data file system. This weighting factor was added to the raw data file in this study to ensure adequate representation of and generalizability to the population of noninstitutionalized Virginians 60 years old or older.

Study Design

In order to test the relationships hypothesized in this study and compare rural and urban service use patterns, the total sample was divided into eight different subsamples. To test the first two hypotheses it was necessary to divide the total sample according to community type resulting in a rural and an urban subsample. Examination of the three remaining hypotheses required subdivision of the total sample not only by community type but also by source of service (see Figure 1). When the total sample was divided in this manner the older Virginians in the sample were categorized as follows: rural/informal, rural/formal, rural/combination, urban/informal, urban/formal, and urban/combination. Although this strategy allowed the investigator to examine interaction between community type and source of service and to make comparisons between parallel subsamples (subsamples with the same source of service and different community types or just a different

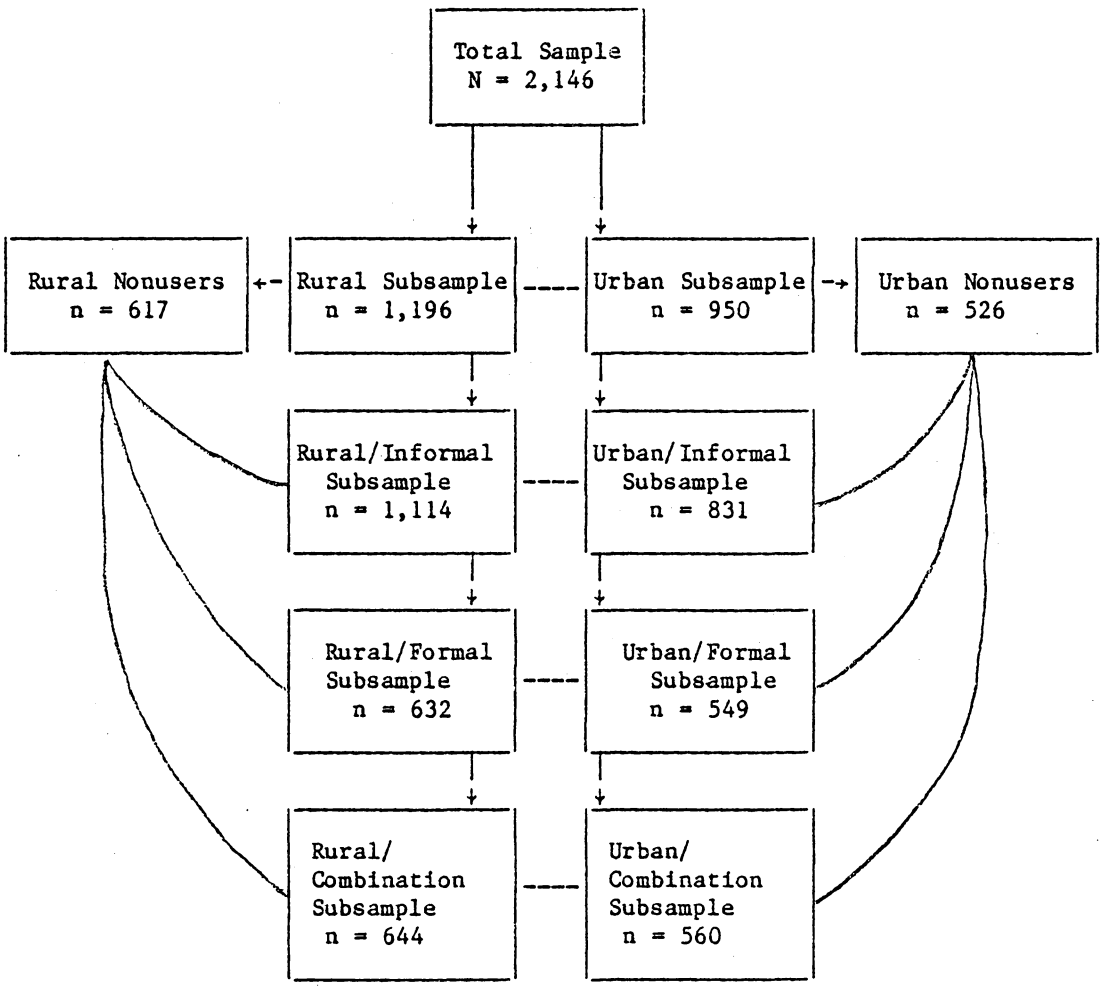

FIGURE 1

Logic for Structuring Subsamples

Note. Broken lines indicate parallel subsamples and curved lines indicate that nonusers are included in each designated subsample.

community type as in the rural and urban subsamples, see Figure 1), a methodological concern became obvious. This concern regarded the logic of categorizing individuals who use no services according to source of service use. One resolution of this situation would be to consider only those repondents who use services; thus, the range of responses for service use, the dependent variable, would become one to six rather than zero to six. Because prior data analyses (McAuley et al., 1980) indicated that the sample is highly skewed in the direction of nonuse, it is evident that the sample size would decrease dramatically if nonusers were deleted. To prevent removing this important group from the study, this alternative was abandoned in favor of including nonusers, thus dealing with the entire sample. The strategy employed to include nonusers was to divide the total sample according to type of community, to determine the nonusers in each subsample, to add all rural nonusers to each rural subsample, and likewise, to add all urban nonusers to each urban subsample. Instead of decreasing the sample size as in the alternative not selected, this strategy inflated the sample size because categories were not mutually exclusive (see Figure 1).

By subdividing the entire sample according to this prescription, the framework was established for comparing rural and urban service users in parallel subsamples. For each subsample the dependent variable was service use (Appendix D) and the independent variables are those enumerated in Appendices E and F.

OARS: The Core Instrument

The OARS (Older Americans Resources and Services) questionnaire, developed in 1975 at Duke University (Duke University Center for the Study of Aging and Human Development, 1978) was selected as the core instrument of the Statewide Survey. OARS was designed as a multidisciplinary approach that attempts to measure overall functioning and service utilization in a manner compatible with both assessment and prediction (Comptroller General of the United States, 1977). It was constructed to be applicable to a broad range of older adults in a wide variety of environmental settings.

Because of its versatility, OARS is currently being used by over 100 agencies and researchers throughout the country for a diversity of purposes such as clinical and institutional intake, client and program evaluation, teaching comprehensive health planning, long-term care placement, and needs assessment (Fillenbaum & Smyer, 1981; Information for OARS Users, 1979).

Although OARS is widely used and highly acclaimed, it has not been frequently used expressely for the purpose of analyzing patterns of service utilization. In a telephone conversation (March 20, 1985) with Dr. Gerda Fillenbaum, Research Associate in Psychiatry at the Center for the Study of Aging and Human Development at Duke University and a member of the OARS staff, the investigator of this study was directed to the work of William Laurie of the U.S. General Accounting Office (Comptroller General of the United States, 1977). In addition to the

work of Laurie, several articles generated by the Statewide Survey of Older Virginians (Arling & McAuley, 1984; McAuley & Arling, 1984; McAuley & Blieszner, 1985; McAuley & Nutty, 1981; Wan & Arling, 1983), have incorporated the OARS methodology as the appropriate strategy to examine service utilization.

The OARS instrument consists of two major components. The first part is designed to assess the functioning of the individual along each of five dimensions: social resources, economic resources, mental health, physical health, and performance of activities of daily living (ADL). These five dimensions are often referred to as SEMPA. The second section looks at 24 generic services in order to explore what services are being received, intensity of service usage, source of provision of services, and respondent's perceived need for services.

A useful feature of the first section is the inclusion of scales to allow the interviewer to summarize the degree of impairment on the five dimensions of functioning. These summary scores make it possible to analyze the sample according to level of impairment on one functional status dimension or on a combination of dimensions.

William Laurie (Comptroller General of the United States, 1977) selected the second strategy in his study of the well-being of older people in Cleveland, Ohio. The variable called well-being is a combined measure of the five areas of human functioning, categorized from unimpaired to extremely impaired according to the total number of deficits on all five dimensions. According to this classification

scheme, an individual who is severely economically impaired and one who is mildly mentally impaired would each be classified as only slightly impaired, providing the level of functioning for each is described as at least good on the remaining four dimensions. This method of operationalizing level of impairment invites too much variability within and between categories. Because of this apparent deficiency the current study will consider each of the levels of functional impairment as a separate independent variable.

Validity

Since validity ratings on Part A of the OARS Multidimensional Functional Assessment Questionnaire (OMFAQ) were expected to emulate professional assessments, these assessments were the standards against which ratings were measured. The exception to this expectation was the economic area, where objective income adequacy seemed a more valid measure (Fillenbaum & Smyer, 1981).

Independent criteria were available for four of the five SEMPA variables. In the area of economic resources, the basis for comparison was a six-item economic scale based on total income and assets. For mental health, OARS ratings were compared with assessments by geropsychiatrists. Ratings by physician's associates and scores on the 10-point Karnofsky Scale (Karnofsky & Burchenal, 1948) were compared with the OARS physical health scores. Assessment by a physical therapist on a therapist-developed 12-point scale administered in the respondent's home was compared with ADL performance ratings on OARS. Since an appropriate external standard could not be identified, the

social resources area was not examined. Several social workers, however, reported that they would evaluate an individual's social resources in exactly the same way as the OARS Multidimensional Functional Assessment Questionnaire (Fillenbaum & Smyer, 1981).

Subjects for this validity study were selected from a pool of 130 patients at the Family Medicine Clinic associated with the Duke University Medical Center. Of the 130, 49 were selected for the study because they were representative of both sexes and all levels of functional impairment. Of the 49, 30 participated in all aspects of the study.

Level of agreement between OARS ratings and criterion ratings were determined by Kendall's tau and Spearman's rank order correlations. On each of the four areas of functional status examined there was statistically significant agreement between OARS ratings and professional assessments. The Kendall's tau correlations ranged from .62 to .83 and the Spearman's rank order correlations ranged slightly higher, from .68 to .89.

Thus the OARS questionnaire, the core instrument of the Statewide Survey of Older Virginians, has not only content and consensual validity as determined previously by Fillenbaum (1978) but, in the four areas examined, criterion validity as well.

In addition to the validity studies of the OARS instrument conducted by Fillenbaum (1978) and Fillenbaum and Smyer (1981), the validity of the Statewide Survey questionnaire was assessed by project supervisors and the Virginia Center on Aging staff. Supervisors were

instructed to recontact via telephone 10% of those individuals interviewed by each interviewer to determine if the interview was actually conducted, to ascertain that the interviewer was courteous and respectful, and to validate selected objective items from the interview. For those respondents without telephones, interviewers revisited 20%. The center staff also conducted a limited number of validations by telephone as well as in the field. The questionnaires validated were randomly stratified according to time of the interview and geographic location of the respondent. Results of the validations were consistently positive, indicating a high level of accuracy on the objective measures readministered.

Reliability

To assess the interrater reliability of the OARS questionnaire, a sample of 11 users of the questionnaire was chosen from all current users to represent both research and clinical perspectives in geographically diverse areas (Fillenbaum & Smyer, 1981). All users agreed to participate by rating each of the five dimensions of functional status on each questionnaire of the 30 full participants in the validity study.

Interrater reliability was assessed using the intraclass correlation coefficient derived from an analysis of variance performed for each of the five OARS scales. The results indicated substantial rating agreement among the 11 users who resided in nine different states and shared no continuing contact. The correlations, all statistically

significant at $p < .001$, were as follows: social, .823; economic, .783; mental health, .803; physical health, .662; and ADL, .865.

While intrarater reliability studies for the OARS questionnaire have not been conducted, it is expected that personal rating style would remain highly consistent over a 12 to 15 month period as was the case for the Community Survey Questionnaire (Fillenbaum, 1978), the precursor to the OARS questionnaire.

No future reliability studies are planned for OARS. Instead, a system of computer-based ratings was developed that ensures rating equivalence between the interviewee's responses to items assessing the SEMPA dimensions and the interviewer's subjective assessment of the individual along these five functional dimensions (George, 1984).

Modification of the OARS Questionnaire

Additions were made to the original OARS instrument based on input from the survey's advisory group, administrators, policymakers, planners, and practitioners throughout the Commonwealth. This input resulted in sections in the Statewide Survey of Older Virginians dealing with dental care, nutrition, housing, and political involvement. Also, the service section was expanded to include questions designed to measure knowledge of available services and services the older person may be providing others.

Pre-tests

The resulting survey instrument was pre-tested with a group of persons 60 years old and older who were chosen to represent rural and

urban, white and nonwhite, high and low functional capacity, and people living in various types of housing. After the questionnaire was revised to address the concerns generated by the initial pre-test, the survey instrument was tested again. The final revision was found to be appropriate for older persons in diverse environmental settings, people representing different demographic backgrounds, and individuals functioning at a variety of levels.

Methodological Basis for Research

In summary, evidence has been presented to indicate that the Statewide Survey of Older Virginians, with OARS as its core instrument, offers a methodologically sound basis for research. It has content, consensual, and criterion validity as well as interrater reliability. The OARS core instrument has been used extensively for research and has well-documented credibility. The Statewide Survey instrument was pre-tested and found to be appropriate for the intended audience. Collectively, these factors form a defensible methodological foundation for research.

Data Analysis

After the variables previously specified for inclusion in this study (Appendices D, E, and F) were accessed from the SAS (Ray, 1982a, 1982b) System File for the Statewide Survey of Older Virginians, variable labels and value labels were modified to reflect the specific operationalization of each variable as it applies to the study.

Multicollinearity

Following the transformation of variables, the SAS Proc Corr procedure (Ray, 1982a) was executed to produce Pearson product-moment correlations among all variables in the total sample and in each of the eight subsamples. Because intercorrelations among independent variables may lead to difficulties in the estimation of regression statistics (Pedhazur, 1982), it was determined that all variables with correlation coefficients of .70 or higher would be suspect of measuring the same construct (Hinkle, Wiersma, & Jurs, 1979, p. 85). When high associations of this nature occurred between two independent variables, combining the two variables into a single variable was considered first. If combining the highly correlated variables failed to produce a measurable and logical variable, then the variable that the literature suggested was the least likely predictor of service use was eliminated and the other retained. This procedure was followed for the correlations resulting from analysis of the total sample only. Problems emanating from intercorrelations among independent variables are generally considered under the rubric of multicollinearity and are best dealt with at this point in the research procedure.

The SAS default method of handling missing values that uses all the nonmissing pairs of values for each pair of variables was used in this procedure. This means that some correlations were computed using more observations than others. This determination was made in order to retain as much information as possible in the computation of correlations.

Descriptive Statistics

The next phase of data analysis was the performance of the Proc Freq procedure for the total sample and the eight subsamples. This procedure produced the frequencies, percentage distributions, means, and standard deviations necessary to characterize the data and reveal inadvertent errors in coding the data.

Again, missing values for Proc Freq were dealt with using the SAS default. According to this procedure when a variable has missing values, the missing value frequencies appear in the tables. However, the frequency statistics do not include missing values.

Multiple Regression

The third set of statistical manipulations used to analyze these data was multiple regression. Multiple regression is a statistical procedure for calculating the dependence of a variable on a combination of other variables (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975); the former is called the dependent or criterion variable and the latter are called independent or predictor variables. A valuable contribution of this data analysis technique is examination of the contributions that independent variables make in accounting for variance in the dependent variable.

The following conditions are assumed for using regression analysis to test the relationships hypothesized in this study (Nie et al., 1975; Kerlinger & Pedhazur, 1973).

1. The variables represent measurement at the interval or ratio level or, as in the case of dichotomous nominal variables, can be treated statistically as though they are measured at the interval level.

2. The relationships among variables are linear. Linearity implies that a straight line can be found that approximates the pattern of points on a scattergram, those points representing the relationships between two or more variables. Furthermore, the line drawn through these points should be the line of "best fit", the line that minimizes the squared distances between actual and predicted scores.

3. The relationships among variables are additive. Because the independent variables are included in a linear combination in the prediction equation the relationships among variables are additive. The multiple regression prediction equation takes the form:

$$\hat{Y} = a + b_1X_1 + b_2X_2 + ... + b_kX_k$$

where $\hat{Y}$ represents the predicted value of the dependent variable, a is the regression constant or intercept, b's are the values of the regression coefficient or the amounts that Y changes with very one unit change in the respective X, and X's are the independent variables.

4. The Y scores have equal variances at each X point and are normally distributed.

Testing the Hypotheses

To examine the relationships suggested by the first two hypotheses the total sample was divided into two mutually exclusive subsamples, rural and urban, representing all cases in the total sample.

A separate multiple regression analysis, using SAS Proc Stepwise (Ray, 1982b) to indicate which independent variables were significant predictors of level of use of in-home care service at $p < .05$, was performed for each subsample. It is important to note that the stepwise procedure was used in a nonstepwise manner. This was accomplished by setting the significance level for entry (SLE) and the significance level to stay (SLS) options in the model statement each at .9999 in order to force all independent variables into the equation and have them remain in the equation. This technique also used the include option to allow all variables to enter into the equation simultaneously. Proc Stepwise was selected as the appropriate procedure because it included Mallows' Cp statistic in the printed output. If the same independent variable significantly predicts service use in parallel subsamples, then Mallows' Cp statistic is required to further analyze subsamples.

While Proc Stepwise included Mallows' Cp in the printed output it did not include standardized regression coefficients (betas), which are useful in comparing the relative magnitudes and the direction of the relationship of the independent variables in the regression equation. Thus, the regression equation was executed again for the full model of each subsample using the SAS Proc Reg procedure (Ray, 1982b) with the STB option requested in order to include the standardized regression coefficient in the printed output.

Missing values were dealt with in both Proc Stepwise and Proc Reg using the same default strategy. According to this procedure observations were omitted from the calculations for a given model if the

observation had a missing value for any of the variables in the model. The observation was included for any models that did not include the variables with missing values.

In Proc Corr, Proc Freq, Proc Stepwise, and Proc Reg the weight statement Finalwt was included to ensure that the data were representative of the elderly noninstitutionalized population of Virginia. One obvious result of the inclusion of the weighting statement was that frequencies were not reported as integers but rather as mixed numbers.

The statement of the hypotheses required the investigator to determine in which parallel subsample a specific independent variable was the stronger predictor of service use. In order to make this determination the following procedure was followed. If the beta coefficient of the independent variable designated in the hypothesis was significant at $p < .05$ in one regression analysis and not in the analysis of the parallel subsample then the stronger predictor was the variable with the significant beta coefficient. In the event that neither beta coefficient was significant, then the relationship was not pursued further. However, when both beta coefficients were significant at $p < .05$, the analysis became more complex because it was necessary to determine which of the two significant beta coefficients was the stronger predictor of level of use of in-home care services.

The Mallows' Cp statistic, a diagnostic technique and not actually a test, was the statistic used to determine this relationship (Daniel & Wood, 1980; Mallows, 1964). The Cp statistic is an estimate of the squared error of the fitted values of the dependent variable taking

into account bias in the fitted value. The following formula is used to compute Mallows' Cp statistic:

$$Cp = p + \frac{S^2 - \hat{\alpha}^2(n-p)}{\hat{\alpha}^2}$$

where:

p = number of parameters in the equation; number of coefficients to fit including the intercept based on the candidate model. The candidate model is the full model that includes the independent variable of interest.

S^2 = mean squared residual from the candidate model.

$\hat{\alpha}^2$ = estimate of α^2, the variation in error term in the candidate model.

The procedure for interpreting the Cp statistic was to first determine the difference in the Cp statistic between the full regression model and the regression equation with all independent variables except the variable of interest for each of the two subsamples under consideration in the hypothesized relationship. This, of course, necessitated the calculation of a second regression equation for each subsample. The resulting differences in the Cp statistics were compared across the two subsamples to determine in which subsample the variable of interest was the stronger predictor. A larger percentage difference between the Cp statistics for the equation with and without the variable of interest indicated that the independent variable in the hypothesized relationship was a stronger predictor than when a smaller percentage difference resulted.

To provide further evidence of the strength of the variable under consideration the percentage $\underline{R}^2$ change for the equations previously analyzed with and without the variable of interest were examined. Greater percentage $\underline{R}^2$ change indicated stronger predictive value of the independent variable in question. This strategy is recommended because the $\underline{R}^2$ change analysis is widely used and has meaning to most researchers. However, its use alone is not recommended.

The remaining three hypotheses were tested in the same manner as the first two, with one exception. Since these hypothesized relationships were concerned with the source of service provision in addition to the community type, it was necessary to further subdivide the rural and urban subsamples according to the source from which the service was provided. As discussed earlier, these six subsamples (see Figure 1) include the entire Statewide Survey sample; but neither the three rural subsamples nor the three urban subsamples were mutually exclusive because the same group of nonusers from each community type was included in each source of service category.

Limitations of the Study

This study would be strengthened by the addition of another independent variable measuring knowledge of services. Studies (Fowler, 1970; Snider, 1980; Wan & Odell, 1981) have repeatedly identified this variable as a significant predictor of service utilization among elderly people. Although the Statewide Survey of Older Virginians does include items to measure knowledge of the availability of services and the potential source of service provision, these data were only collected for respondents who had not used an in-home care service within the past

six months. Therefore, service knowledge was not available for the entire sample.

Another limiting factor of this study is the manner in which informal and formal sources of care are defined. It would be desirable to determine if services are from paid sources or from nonpaid sources. Data to determine whether or not a service is provided for pay are not consistently available across all six services under consideration; only for personal care and nursing care is this information included in the data set. An alternative to being able to determine consistently if services are informally or formally provided, on the basis of whether or not a fee is charged, is to assume that informal services are those provided by spouse, other family member, friend or neighbor and that services provided by agencies, professionals, and others are formal. The other category is defined as a list of organizations, businesses, and groups enumerated in the Statewide Survey of Older Virginians (McAuley et al., 1980, Vol. 3, Appendices H and I). One area of concern with this operationalization is that the church, generally considered to be an important informal provider of services particularly in rural areas (Karcher & Karcher, 1980; Steinitz, 1981), is classfified as an agency, thereby always categorizing it as a formal service provider.

Another limiting factor is that the dependent variable, service use, is highly skewed in a positive direction, with most persons using no services or few services. This condition is suggested by the literature (Krout, 1983b) and confirmed by a previous analysis of these data (McAuley et al., 1980). The skewedness of this variable is important because it prevents the dependent variable from fully

satisfying the criterion of normal distribution desirable for multiple regression analysis (Kerlinger & Pedhazur, 1973). Despite this limitation, multiple regression has the benefit of allowing for the inclusion of a number of independent variables, the ability to control for the effects of independent variables, and ease of interpretation. Further, multiple regression techniques have been used by other researchers (Branch et al., 1981; Cantor & Mayer, 1978; Evashwick et al., 1984; Rao & Rao, 1983; Snider, 1980; Wan & Arling, 1983; Wan & Odell, 1981) who found this approach beneficial in examining the net effects of a variety of independent variables on service use and similar dependent variables.

Related to the previous concern is another problem regarding meeting the basic criteria for multiple regression, the use of categorical variables (e.g., race, sex, marital status). Although the use of categorical variables might be considered a violation of the assumptions of multiple regression, a number of authors suggest that because categorical variables can be treated statistically as interval level data by coding them as dummy variables using the traditional procedure of coding the dichotomous categories as zero and one, the results are valid and interpretable (Cleary, 1968; Dowaliby & Schumer, 1973; Freedman, 1964; Moore, 1966). Similarly, ordinal level independent variables are included in this study since in most scales used in the social sciences ordinal measurements can be treated as interval measurements (Kerlinger, 1973).

One final factor which might also be considered a limitation is that the ultimate determination of retention or rejection of a

hypothesis is not being made within the traditional framework which uses tests of significance. Instead, examination of the results of Mallows' Cp statistic and the R^2 change test will offer insights into the nature of the net effects on the variables under consideration. According to consultants in the Virginia Tech Statistical Counseling Laboratory, no test of statistical significance exists to determine if an independent variable is a statistically stronger predictor of a dependent variable in one subsample than in another.

Ethical Considerations

Immediately prior to each interview potential respondents were informed of the purpose of the survey and invited to participate. They were told that the data collected would be used only in this research project, assured of their right to confidentiality, and given the option to withdraw at any time. A consent form (Appendix H) reflecting these conditions was required to be signed and dated by both the respondent and the interviewer. No interview was accepted without being accompanied by a completed consent form. This procedure was mandated by Virginia Commonwealth University (Virginia Center on Aging) in compliance with policies regarding the conduct of human research.

In compliance with the requirements of the Virginia Tech Institutional Review Board, a certification of exemption of projects involving human subjects was sought. Information on this project was submitted, reviewed, and approved in accordance with Virginia Tech policy and procedure.

CHAPTER IV

RESULTS

The findings of this study reiterate the generalizations concerning service utilization among older people offered by Krout (1983b). That is, utilization rates are extremely low, and the correlates of service use are not well-understood.

Data reflecting these findings are presented to include: determination of the independent variables; characterization of the total sample; comparison of variable distributions in the rural and urban subsamples; examination of the utilization of each generic in-home service; discussion of level of use and source of service; results of the multiple regression analyses; comparisons of the Cp statistic and the R^2 changes; and finally, a discussion of the hypothesized relationships.

The reader is reminded again of the exploratory nature of this study. The emphasis of the investigation is to examine rural and urban differences in the use of in-home care services rather than to corroborate existing knowledge as one might choose to do when dealing with a more fully developed body of literature. Given that the exploration of rural and urban differences in service use is an emerging area of study, the exploratory focus seems appropriate and will be adhered to as the findings of this investigation are presented.

Determination of the Independent Variables

Based on the service use literature 21 independent variables, which could be extracted from the Statewide Survey of Older Virginians

(McAuley et al., 1980), emerged as having the potential to predict the level of use of in-home care services. The a priori decision was made to delete any independent variable from the study whose Pearson r correlation was .70 or higher, a level of association considered to be very high by Hinkle and his colleagues (1979). Only one pair of independent variables exceeded that limit. Drives a car and has a car, both categorized as enabling variables according to Andersen's model for conceptualizing health services utilization (Andersen & Aday, 1978; Andersen & Newman, 1973), exhibited a very high correlation (r = .81).

The investigator first considered combining the two variables but abandoned the idea because has a car was designated as the variable of interest in Hypothesis I. Because of this and the knowledge that the two variables were probably measuring the same construct, the ultimate decision was made to delete drives a car as an independent variable in the study and to retain has a car.

It was not surprising that the two enabling variables relating to transportation were highly correlated. The investigator expected other variables to also be excluded from the study at this point. Specifically, these variable pairs: income and economic resources (r = .51); living arrangement and marital status (r = -.60); and ADL performance and physical health (r = .63) were suspect of measuring the same phenomenon. This analysis was performed in order to identify highly intercorrelated variables because the more highly intercorrelated the independent variables are, the more difficult it is to determine

the relative contribution of each independent variable to the variance of the dependent variable (Kerlinger, 1973).

Table 1 gives the Pearson r correlations, means, and standard deviations for each variable in the study. The correlations among variables ranged from r = -.602 to r = .805.

A table similar to Table 1 for each of the eight subsamples is included in Appendix I. Tables 24 and 25 exhibit data about the rural and urban subsamples. The total number of variables is 22 rather than 24 as in the total sample because drives a car was deleted to decrease multicollinearity and community type ceased to be a variable when the sample was divided according to rural and urban residence. Likewise, Tables 27 through 32 contain data for only 21 variables due to the deletion of drives a car and the further subdivision of the total sample that caused both community type and source of service to no longer be variables. The range of correlations in the subsamples was r = -.667 to r = .655.

Characterization of the Total Sample

The 2,146 noninstitutionalized older people who were represented by the Statewide Survey of Older Virginians closely approximated the characteristics of Virginia's community residents who were 60 years old and older (U.S. Bureau of the Census, 1980). The representativeness of the sample was enhanced by the inclusion of a weight statement to help compensate for sampling error and nonresponse rate. Tables 2, 3, and 4

TABLE 1

Pearson r Correlations, Means, and Standard Deviations for Variables in Total Sample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.94	0.24	1.000											
2. Age	69.74	7.50	-.032	1.000										
3. Sex	0.41	0.49	-.051	-.092	1.000									
4. Race	0.81	0.39	.110	-.011	-.036	1.000								
5. Education	3.43	1.94	.154	-.130	-.028	.264	1.000							
6. Marital status	0.55	0.50	.116	-.354	.351	.101	.115	1.000						
7. Living arrangement	0.23	0.42	-.098	.158	-.198	.043	.012	-.602	1.000					
8. Visits to family	2.33	1.08	.018	-.024	-.063	.057	-.048	-.023	.060	1.000				
9. Visits to friends	2.53	1.06	.003	-.070	.025	.105	.141	.011	.120	.207	1.000			
10. Has a condidant	0.96	0.20	.071	.021	-.007	.050	.045	.076	-.058	.124	.110	1.000		
11. Network satisfaction	0.73	0.45	.034	-.043	.048	-.067	.001	.029	-.020	.111	.092	.024	1.000	
12. Income	6.82	2.95	.121	-.308	.268	.195	.464	.381	-.132	-.007	.086	.052	.070	1.000
13. Drives a car	1.57	0.49	.151	-.319	.333	.220	.333	.320	-.043	.058	.041	.036	.123	.340
14. Distance to family	4.73	1.36	-.021	.007	.010	-.098	-.271	-.071	.028	.423	-.018	.071	.114	-.144
15. Distance to friend	5.70	0.87	.009	-.085	.029	.011	.021	.094	.045	.159	.242	.140	.062	.055
16. Has a car	0.66	0.47	.162	-.356	.289	.239	.315	.439	-.119	.477	.133	.032	.100	.426
17. Social resources	2.01	0.99	-.163	.137	-.035	-.108	-.252	-.192	.125	-.219	-.281	-.278	-.178	-.265
18. Economic resources	3.35	1.10	-.181	.129	-.063	-.277	-.512	-.210	.058	-.032	-.164	-.134	-.122	-.521
19. Mental health	2.09	0.92	-.100	.192	-.029	-.118	-.323	-.158	-.016	-.083	-.251	-.136	-.185	-.302
20. Physical health	2.78	1.01	-.042	.173	-.009	-.065	-.208	-.085	-.039	-.044	-.147	-.074	-.123	-.213
21. ADL performance	2.10	1.15	-.061	.375	-.054	-.081	-.252	-.196	-.049	-.087	-.162	-.070	-.166	-.313
22. Community type	0.56	0.50	.062	.003	.017	.139	-.127	-.063	-.019	.043	-.033	-.006	-.059	-.161
23. Source of service	2.05	0.60	.052	.119	.060	-.041	-.131	-.068	-.223	.021	-.131	-.015	-.044	-.085
24. Service use	0.75	1.17	-.016	.244	-.107	-.078	-.136	-.169	.038	.025	-.046	-.008	-.081	.214

TABLE 1 (Continued)

Variable	13	14	15	16	17	18	19	20	21	22	23	24
1. Has a telephone												
2. Age												
3. Sex												
4. Race												
5. Education												
6. Marital status												
7. Living arrangement												
8. Visits to family												
9. Visits to friends												
10. Has a confidant												
11. Network satisfaction												
12. Income												
13. Drives a car	1.000											
14. Distance to family	-.071	1.000										
15. Distance to friend	.149	.174	1.000									
16. Has a car	.810	-.063	.166	1.000								
17. Social resources	-.239	-.036	-.213	.228	1.000							
18. Economic resources	-.376	.147	-.069	-.393	.472	1.000						
19. Mental health	-.344	-.037	-.239	-.325	.458	.455	1.000					
20. Physical health	-.264	.022	-.101	-.228	.283	.353	.497	1.000				
21. ADL performance	-.425	-.010	-.221	-.393	.316	.391	.617	.629	1.000			
22. Community type	.018	.132	-.098	.043	.052	.164	.075	.088	.058	1.000		
23. Source of service	-.181	.073	-.145	-.163	.005	.179	.337	.340	.464	.058	1.000	
24. Service use	-.297	.058	-.115	-.283	.112	.180	.359	.411	.638	.043	.544	1.000

TABLE 2

Frequencies and Percentage Distributions of Predisposing Variables in Total Sample, Rural Subsample, and Urban Subsample

Predisposing Variables	Total		Rural		Urban	
	N	%	n	%	n	%
Marital Status						
Married	1,186	55.4	693	58.0	492	48.1
Not married	954	44.6	498	42.0	456	51.9
Living Arrangement						
Lives alone	496	23.2	268	22.0	228	24.1
Doesn't live alone	1,645	76.8	926	78.0	719	75.9
Age						
60-64	628	29.2	351	29.4	276	29.1
65-74	1,008	47.1	556	46.4	452	47.8
75-84	398	18.6	227	19.0	172	18.2
85+	108	5.0	62	5.2	46	4.8
Race						
White	1,740	81.3	1,028	86.2	712	75.2
Nonwhite	400	18.7	165	13.8	235	24.8
Education						
0-4 years	241	11.3	155	13.1	85	9.0
5-8 years	670	31.5	430	36.2	241	25.5
High school incomplete	374	17.6	196	16.5	178	18.9
High school complete	342	16.1	169	14.3	172	18.2
Post high school business or trade school	108	5.1	43	3.6	65	6.9
1-3 years college	177	8.3	89	7.5	89	9.4
4 years college completed	120	5.6	59	5.0	60	6.4
Post graduate	98	4.6	45	3.8	53	5.6
Sex						
Male	886	41.3	502	42.0	383	40.4
Female	1,260	58.7	694	58.0	566	59.6

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 3

Frequencies and Percentage Distributions of Enabling Variables in Total Sample, Rural Subsample, and Urban Subsample

Enabling Variables	Total		Rural		Urban	
	N	%	n	%	n	%
Income						
Less than $5,000	868	45.2	541	49.8	327	39.2
$5,000-$9,999	495	25.7	297	27.3	198	23.7
$10,000-$19,999	336	17.5	168	15.4	169	20.2
$20,000-$29,999	122	6.3	48	4.4	74	8.9
$30,000-$39,999	43	2.2	19	1.7	24	2.9
More than $40,000	59	3.0	16	1.4	43	5.7
Has a Car						
Yes	1,407	65.9	808	68.0	600	63.7
No	728	34.1	385	32.0	342	36.3
Has a Telephone						
Yes	2,008	94.0	1,106	92.7	902	95.6
No	129	6.0	88	7.3	41	4.4
Has a Confidant						
Yes	1,959	95.7	1,097	95.6	862	95.8
No	88	4.3	51	4.4	38	4.2
Network Satisfaction						
Yes	1,476	72.6	803	70.2	673	75.5
No	558	27.4	340	29.8	218	24.5
Visits to Family						
None	638	31.0	340	29.4	299	33.0
One	430	20.9	249	21.6	181	20.0
Two-six	655	31.8	359	31.1	296	32.8
Seven or more	335	16.3	207	17.9	128	14.2
Visits to Friends						
None	511	24.8	286	24.8	225	24.8
One	338	16.4	219	19.0	119	13.1
Two-six	816	39.6	433	37.5	383	42.3
Seven or more	395	19.2	215	18.7	180	19.8

TABLE 3 (Continued)

Enabling Variables	Total		Rural		Urban	
	N	%	n	%	n	%
Distance to Family						
No relatives	25	1.2	8	0.6	17	1.8
More than 135 miles	201	9.4	94	7.9	107	11.3
Between 35 and 135 miles	154	7.2	101	8.4	53	5.7
Between 5 and 35 miles	426	20.0	200	16.8	226	24.0
Between 1 and 5 miles	458	21.4	202	16.9	255	27.1
Less than 1 mile	871	40.8	589	49.3	282	30.0
Distance to Friend						
No friends	40	1.9	11	1.0	28	3.0
More than 135 miles	13	0.6	6	0.5	7	0.8
Between 35 and 135 miles	14	0.6	5	0.4	9	0.9
Between 5 and 35 miles	74	3.5	35	2.9	40	4.2
Between 1 and 5 miles	199	9.3	102	8.5	97	10.3
Less than 1 mile	1,797	84.1	1,034	86.7	764	80.8

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 4

Frequencies and Percentage Distributions of Need Variables in Total Sample, Rural Subsample, and Urban Subsample

Need Variables	Total		Rural		Urban	
	N	%	n	%	n	%
Social Resources						
Excellent	683	31.9	348	29.1	336	35.4
Good	996	46.5	567	48.1	420	44.4
Mildly impaired	296	13.8	171	14.3	126	13.3
Moderately impaired	100	4.7	65	5.5	34	3.6
Severely impaired	54	2.5	31	2.6	23	2.4
Totally impaired	14	0.6	6	0.5	8	0.8
Economic Resources						
Excellent	549	25.6	214	17.9	335	35.4
Good	734	34.3	449	37.6	285	30.1
Mildly impaired	496	23.1	292	24.4	204	21.6
Moderately impaired	297	13.9	198	16.5	100	10.5
Severely impaired	63	3.0	41	3.4	23	2.4
Totally impaired	3	0.1	3	0.2	0	0.0
Mental Health						
Excellent	500	23.4	226	18.9	274	28.9
Good	1,182	55.2	686	57.4	496	52.5
Mildly impaired	306	14.3	193	16.2	113	12.0
Moderately impaired	92	4.3	62	5.1	30	3.2
Severely impaired	45	2.1	25	2.1	20	2.1
Totally impaired	16	0.7	3	0.3	13	1.3
Physical Health						
Excellent	109	5.0	59	4.9	49	5.2
Good	903	42.1	457	38.2	446	47.1
Mildly impaired	626	29.2	361	30.2	264	27.9
Moderately impaired	373	17.4	237	19.8	136	14.4
Severely impaired	122	5.7	75	6.3	47	4.9
Totally impaired	12	0.6	8	0.6	5	0.5
ADL Performance						
Excellent	719	33.5	335	29.7	363	38.4
Good	883	41.2	513	42.9	370	39.0
Mildly impaired	322	15.0	207	17.3	116	12.2
Moderately impaired	100	4.7	53	4.4	47	5.0
Severely impaired	66	3.1	39	3.3	27	2.9
Totally impaired	52	2.4	29	2.4	23	2.5

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

present data to characterizes variable clusters in the total sample divided according to Andersen's Model (Andersen & Aday, 1978; Andersen & Newman, 1973).

Twenty-nine percent of the respondents were 60 to 64 years of age, 47% were 65 years old to 74 years old, 19% were 75 to 84 years of age, and 5% were at least 85 years old. Nearly one-fifth (19%) were nonwhite and nearly three-fifths (59%) were female. Most respondents (56%) were designated as rural residents. Forty-three percent had no more than a grade school education, 34% had some high school education, and 23% had some education beyond high school. A large proportion of the sample (45%) had an annual household income below $5,000; 26% had between $5,000 and $9,999; and only 29% of the older people interviewed had more than $10,000 per year to support their households.

The majority (55%) of the respondents were married and fewer than one-fourth lived alone. Other indications of strong kinship and friendship networks were: the overwhelming majority (96%) had someone in whom they could confide personal information; more than two-thirds had visited a family member within the past week; more than three-fourths of the older people had visited a friend during the week prior to the interview. Only 1% reported having no relatives and less than 2% said they had no friends. Further, 73% indicated satisfaction with their informal networks.

Table 4 characterizes the sample according to level of functional impairment, which represents Andersen's category of need variables in this study. Nearly 80% of the sample reported excellent or good social

resources while only 3% were considered severely or totally impaired. The majority (60%) were described as having excellent or good economic resources with only 3% considered severely or totally impaired. Similarly, mental health was rated at the upper end of the scale for 70% and at the lower end for only 3%. Participants were rated somewhat lower for physical health with 47% being ranked at either the excellent or good level of physical health and 6% being considered severely or totally impaired. For ADL performance, three-fourths of the respondents were at the upper end of the continuum while only 5% were rated as highly impaired.

Comparison of Variables in the Rural and Urban Subsamples

Frequencies and percentage distributions for the rural and urban subsamples are also given in Tables 2, 3, and 4 to allow for comparison of the rural and urban subsamples with one another as well as with the entire sample. Selected comparisons will be cited to reflect differences in the rural and urban subgroups which are suggested by these data.

Rural and urban residents differed according to marital status with fewer than half (48%) of the urban older people in the married category and more than half (58%) of the rural dwellers in this category. The racial composition of the two subgroups was also different with 25% of the urban dwellers belonging to the nonwhite group compared to 14% of the rural residents.

In addition to differences in the two predisposing variables previously mentioned, rural and urban differences were evident in the

predisposing variable, education. Urban residents were in a more advantaged position educationally. The rural subsample was characterized by 49% of its members with less than eight years of school compared to 35% for the urban elders. Further, 28% of the urban older people reported having some education past high school while only 20% of the rural residents had any formal education beyond high school.

The rural subsample tended to be in the disadvantaged position with regard to income, another predisposing variable. Half of the rural respondents reported having an annual household income of less than $5,000 while only 39% of the urban survey participants were in this category. At the other end of the continuum 18% of older urban people reported incomes above $20,000 while only 8% of the rural elders reported that level of income.

While rural older people reported greater deficits than urban elders in terms of education and income, they seemed to have stronger kinship and friendship networks. Older people residing in urban environments were three times as likely to report having no relatives (0.6% for rural, 1.8% for urban) and no friends (1% for rural, 3% for urban) as rural elders. Rural older people also reported living closer to their friends and relatives; 87% of rural older people lived within one mile of a friend compared to 80% of the urban subsample. Nearly half (49%) of the rural residents lived within one mile of a family member while only 30% of the urban elderly subsample had a relative living within one mile.

The rural and urban subsamples seemed to differ very little on social resources and physical health, two of the need variables. There

were, however, more obvious differences on the remaining need variables in this study: economic resources, mental health, and ADL performance. All of these differences were in favor of the urban subgroup. Nearly twice as many urban residents (35%) as rural residents (18%) were considered to have excellent economic resources. Twenty-nine percent of the urban dwellers were classified as having excellent mental health while only 19% of the rural subsample was at this level. Finally, 38% of the urban elders reported an excellent ADL performance rating compared to 30% for the rural older people in the sample.

Similar tables exhibiting frequencies and percentage distributions for the remaining parallel subsamples are included in Appendix J. Due to the large number of variables as well as the confusion that might result from a discussion of six additional subsamples, the decision was made to present Tables 33 through 41 in Appendix J to allow the reader to make comparisons among the subsamples that have been formulated on the basis of community type and source of service.

Level of Use of Each Generic In-home Care Service

Having examined the characteristics of the independent variables in this study, the focus now turns to the dependent variable, service use. This is accomplished by a discussion of the utilization of the six generic in-home care services that are combined to form the dependent variable.

The use of checking services is presented in Table 5. Thirty-seven percent of the total sample used this service. Slightly more rural (38%) than urban (34%) respondents used checking services. A higher

TABLE 5

Frequencies and Percentage Distributions of Use of Checking Service and Source of Service for Total Sample, Rural Subsample, and Urban Subsample

	Total		Rural		Urban	
	N	%	n	%	n	%
Use of Checking Service						
Yes	756	36.9	441	38.2	315	35.2
No	1,292	63.1	714	61.8	578	64.8
Total	2,048	100.0	1,155	100.0	893	100.0
Source (if yes)						
Informal	742	98.6	439	100.0	303	96.7
Formal	10	1.4	0	0.0	10	3.3
Total	752	100.0	439	100.0	313	100.0

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

proportion of the older people in the total sample and the rural and urban subsamples as well used checking services than any of the five other services examined. The overwhelming majority of elderly service users in the total sample, rural subsample, and urban subsample (99, 100, and 97%, respectively) used checking services from an informal source.

Table 6 summarizes the use of continuous supervision. Only 8% of the total sample and a similar proportion of the rural and urban subsamples reported being under the continuous supervision of another individual. Again, the majority of respondents, more than 90% in each subsample, used the service from an informal source.

In Table 7 the frequencies and percentage distributions for use of homemaker-household services are reported. Eighteen percent of the total subsample used the homemaker-household services. Although most service users depended upon informal sources of service provision, it is interesting to note that a substantially larger percentage of urban users (22%) had services provided from formal sources compared to rural service users (12%) receiving formally provided services. A slightly higher proportion of rural (20%) than urban (17%) elders used homemaker-household services.

Table 8 reveals that 13% of older people in the total sample, in the rural subsample, and in the urban subsample used the meal preparation service. Seventeen percent of the service users in the urban subsample compared to 13% of the rural service users received formal sources of service.

TABLE 6

Frequencies and Percentage Distributions of Use of Continuous Supervision Service and Source of Service for Total Sample, Rural Subsample, and Urban Subsample

	Total		Rural		Urban	
	N	%	n	%	n	%
Use of Continuous Supervision						
Yes	168	7.8	96	8.0	71	7.6
No	1,973	92.2	1,100	92.0	873	92.4
Total	2,141	100.0	1,196	100.0	944	100.0
Source (if yes)						
Informal	153	91.7	89	92.7	64	90.2
Formal	14	8.3	7	7.3	7	9.8
Total	167	100.0	96	100.0	71	100.0

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 7

Frequencies and Percentage Distributions of Use of Homemaker-Household Service and Source of Service for Total Sample, Rural Subsample, and Urban Subsample

	Total		Rural		Urban	
	N	%	n	%	n	%
Use of Homemaker-household Service						
Yes	392	18.3	235	19.7	157	16.7
No	1,745	81.7	961	80.3	784	83.3
Total	2,137	100.0	1,196	100.0	941	100.0
Source (if yes)						
Informal	328	83.9	207	87.8	121	77.9
Formal	63	16.1	29	12.2	34	22.1
Total	391	100.0	236	100.0	155	100.0

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 8

Frequencies and Percentage Distributions of Use of Meal Preparation Service and Source of Service of Total Sample, Rural Subsample, and Urban Subsample

	Total		Rural		Urban	
	N	%	n	%	n	%
Use of Meal Preparation Service						
Yes	268	12.5	150	12.6	117	12.5
No	1,870	87.5	1,046	87.4	824	87.5
Total	2,138	100.0	1,196	100.0	941	100.0
Source (if yes)						
Informal	238	88.9	140	87.4	98	83.2
Formal	30	11.1	10	12.6	20	16.8
Total	268	100.0	150	100.0	118	100.0

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

Very few members of the total sample or the subsamples under consideration (7% in each instance) received nursing care. However, when nursing care was used it was the most likely of the six generic services to be formally provided. Thirty-two percent of the total sample who used this service received it from a formal source. Again, urban survey participants were more likely to use this service from a formal provider; 41% of urban users were provided nursing care from a formal source while only 25% of users in the rural subsample reported using this service from a formal source (see Table 9).

The final service, personal care, also exhibited a low rate of utilization with 8% of each group under consideration using this service. Eighteen percent of the total sample and a similar percentage of the rural and urban subsamples used personal care from formal care-givers (see Table 10).

Level of Use of Services and Source of Service

By merging the six generic in-home care services into one variable, the number of services each respondent used can be examined (see Table 11). More than half (56%) of the total sample used no services. Ninety-two percent of the subjects in the total sample used zero, one, or two of the services causing the sample to be highly skewed in a positive direction. For the total sample, 4% of the service users received services only from formal sources. Twice as many urban (6%) as rural (3%) older persons who used services were provided services only from formal sources. Eighty-eight percent of service users in the

TABLE 9

Frequencies and Percentage Distributions of Use of Nursing Care Service and Source of Service for Total Sample, Rural Subsample, and Urban Subsample

	Total		Rural		Urban	
	N	%	n	%	n	%
Use of Nursing Care Service						
Yes	140	6.5	78	6.5	62	6.6
No	2,000	93.5	1,118	93.5	882	93.4
Total	2,140	100.0	1,196	100.0	944	100.0
Source (if yes)						
Informal	95	67.8	58	75.2	37	58.7
Formal	45	32.2	19	24.8	26	41.3
Total	140	100.0	77	100.0	63	100.0

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 10

Frequencies and Percentage Distributions of Use of Personal Care Service and Source of Service for Total Sample, Rural Subsample, and Urban Subsample

	Total		Rural		Urban	
	N	%	n	%	n	%
Use of Personal Care Service						
Yes	161	7.5	90	7.5	71	7.5
No	1,980	92.5	1,107	92.5	873	92.5
Total	2,141	100.0	1,197	100.0	944	100.0
Source (if yes)						
Informal	132	82.0	75	83.3	57	80.2
Formal	29	18.0	15	16.7	14	19.8
Total	161	100.0	90	100.0	71	100.0

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 11

Frequencies and Percentage Distributions of Use of In-home Care Services and Source of Services for Total Sample, Rural Subsample, and Urban Subsample

	Total		Rural		Urban	
	N	%	n	%	n	%
Level of Service Use						
No services	1,144	55.9	617	53.4	526	59.1
One service	603	29.5	358	31.0	245	27.6
Two services	139	6.8	90	7.8	49	5.5
Three services	61	3.0	32	2.7	29	3.2
Four services	47	2.3	27	2.3	20	2.3
Five services	35	1.7	18	1.5	17	1.9
Six services	17	0.8	14	1.2	3	0.3
Total	2,046	100.0	1,156	99.9	889	99.9
Source of Service						
Formal only	41	4.2	16	2.8	25	6.1
Informal only	873	88.0	531	91.8	341	82.7
Combination	77	7.8	32	5.4	46	11.2
Total	991	100.0	579	100.0	412	100.0

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

entire sample received services only from informal sources while a higher percentage of rural users (92%) received only informal services and a lower percentage of urban residents who used in-home care services (83%) used only informal services. More urban service participants (11%) used informal and formal services in combination than service users in either the total sample (8%) or the rural sample (5%). In summary, Table 11 indicates low service utilization. It also reveals that when older people do use in-home care services they receive those services primarily from an informal source of service provision such as family, friends, and neighbors.

When the six subsamples that emerge when the total sample was divided according to community type and source of service (see Figure 1) are examined in terms of frequencies and percentage distributions, patterns to corroborate previous findings become evident (see Table 12). In each subsample the level of service use indicated most frequently was nonuse. In the rural/informal subsample 55% of the sample were in this category while at the other extreme 98% of the rural/formal subsample used no services. Individuals who did use services received informally provided services most often and services from a combination of informal and formal sources more frequently than services only from a formal source. Very few individuals used more than two services, especially services from formal or combination sources.

The data clearly confirm that the dependent variable in this study, service use, is not normally distributed, thus violating one of the

TABLE 12

Frequencies and Percentage Distributions of Use of In-home Care Services for Parallel Subsamples

Level of service use	Rural/Informal n	Rural/Informal %	Urban/Informal n	Urban/Informal %
No services	617	55.4	526	63.2
One service	346	31.1	226	27.2
Two services	76	6.8	38	4.6
Three services	27	2.4	21	2.5
Four services	22	2.0	9	1.1
Five services	15	1.3	10	1.2
Six services	11	1.0	1	0.1
Total	1,114	100.0	831	99.9

	Rural/Formal n	Rural/Formal %	Urban/Formal n	Urban/Formal %
No services	617	97.8	526	95.8
One service	12	1.8	19	3.4
Two services	2	0.3	2	0.3
Three services	0	0.0	0	0.0
Four services	1	0.1	2	0.4
Five services	0	0.0	0	0.0
Six services	0	0.0	0	0.0
Total	632	100.0	549	99.9

	Rural/Combination n	Rural/Combination %	Urban/Combination n	Urban/Combination %
No services	617	95.8	526	93.9
One service	0	0.0	0	0.0
Two services	12	1.8	9	1.6
Three services	5	0.8	8	1.4
Four services	4	0.6	8	1.5
Five services	3	0.5	7	1.2
Six services	3	0.5	2	0.3
Total	644	100.0	560	99.9

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

assumptions of multiple regression analysis. Kerlinger and Pedhazur (1973) offered this justification:

> It has been convincingly shown that the F and t tests are "strong" and "robust" statistics, which means that they resist violation of the assumptions. In general, it is safe to say that we can ordinarily go ahead with...multiple regression analysis without worrying too much about assumptions. (pp. 47-48)

Results of the Multiple Regression Analyses

Evidence is provided in the multiple regression analyses results to support differential predictors of service use in rural and in urban environments. The results are presented for each set of parallel subsamples to allow the reader to compare the impact of community type and source of service on service utilization.

Rural and Urban Subsamples

Of the 20 independent variables entered into the multiple regression model in the rural subsample (see Table 13), seven emerged as significant predictors, five variables were significant at $p < .05$ and two at $p < .01$. These variables included one predisposing variable, race; three enabling variables: distance to family, distance to friend, and has a car; and three need variables: economic resources, physical health, and ADL performance.

The same independent variables were entered into the regression equation for the urban subsample (see Table 14) where five variables

TABLE 13

Multiple Regression of Level of Use of In-home Care Services on Independent Variables in Rural Subsample

Variable	Beta	Standard Error	F
Has a telephone	.002	.111	0.00
Age	-.029	.005	1.06
Sex	-.008	.067	0.08
Race	.058	.090	4.71*
Education	.039	.019	1.58
Marital status	-.067	.090	2.94
Living arrangement	.050	.093	2.04
Visits to family	.016	.032	0.27
Visits to friends	.009	.030	0.10
Has a confidant	.001	.147	0.00
Network satisfaction	.029	.065	1.22
Income	-.047	.013	2.03
Distance to family	.066	.026	4.81*
Distance to friend	-.055	.046	4.51*
Has a car	-.066	.078	4.41*
Social resources	.051	.037	2.53
Economic resources	-.103	.037	8.52**
Mental health	.001	.049	0.13
Physical health	.065	.037	4.18*
ADL performance	.544	.042	242.13**
Intercept	.000	.513	

Model statistics: $df = 20$ $p = .000$ $R^2 = .350$ $n = 1,196$

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

TABLE 14

Multiple Regression of Level of Use of In-home Care Services on Independent Variables in Urban Subsample

Variable	Beta	Standard Error	F
Has a telephone	.083	.159	7.09**
Age	-.006	.006	0.03
Sex	-.030	.075	0.80
Race	-.120	.084	12.89**
Education	.021	.021	0.31
Marital status	.038	-.97	0.75
Living arrangement	.040	.098	1.11
Visits to family	.020	.035	0.34
Visits to friends	.019	.035	0.36
Has a confidant	.021	.178	0.48
Network satisfaction	-.040	.079	1.69
Income	-.012	.016	0.08
Distance to family	.056	.028	2.84
Distance to friend	.001	.040	1.00
Has a car	-.046	.092	1.35
Social resources	-.106	.045	7.37**
Economic resources	-.077	.044	3.25
Mental health	.036	.057	0.87
Physical health	.117	.048	9.50**
ADL performance	.599	.050	207.39**
Intercept	.000	.558	

Model statistics: $df = 20$ $p = .000$ $R^2 = .456$ $n = 950$

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

were significant predictors of service use, all at the $p < .01$ level of significance. These predictors included: race, the same predisposing variable that was a significant predictor in the rural sample; one enabling variable, has a telephone; and three need variables: social resources, physical health, and ADL performance. Two of the need variables (physical health and ADL performance) that were significant predictors of service use in the rural model were also significant predictors of service utilization in the urban model.

These independent variables explained 35% of the variance in service use in the rural subsample. A larger proportion of variance (46%) was explained by the same set of predictors in the urban subsample.

Rural/Informal and Urban/Informal Subsamples

Tables 15 and 16 provide the results of the multiple regression analyses of the rural/informal and urban/informal subsamples. There were five significant predictors of service use for the rural/informal subsample. Two of these variables, distance to family and distance to friend, are categorized as enabling variables according to the Andersen and Newman (1973) paradigm. The three other significant variables: economic resources, physical health, and ADL performance are all in the need category. The 20 independent variables accounted for 33% of the variance in service use among rural older people using services only from informal sources.

The results of the urban/informal subsample are presented in Table 16. Here, there were seven significant predictors of service use and the

TABLE 15

Multiple Regression of Level of Use of In-home Care Services on Independent Variables in Rural/Informal Subsample

Variable	Beta	Standard Error	F
Has a telephone	-.008	.106	0.09
Age	-.006	.004	0.04
Sex	-.003	.065	0.01
Race	.050	.085	3.19
Education	.024	.019	0.51
Marital status	-.071	.087	3.06
Living arrangement	.049	.091	1.82
Visits to family	.029	.030	0.85
Visits to friends	.006	.029	0.04
Has a confidant	.011	.143	0.06
Network satisfaction	.041	.063	2.25
Income	-.038	.013	1.21
Distance to family	.058	.025	3.43
Distance to friend	-.059	.045	4.82*
Has a car	-.079	.075	5.87*
Social resources	-.058	.036	3.03
Economic resources	-.102	.036	7.75**
Mental health	.019	.047	0.33
Physical health	.071	.036	4.77*
ADL performance	.050	.043	192.31**
Intercept	.000	.498	

Model statistics: $df = 20$ $p = .000$ $R^2 = .326$ $n = 1,114$

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

TABLE 16

Multiple Regression of Level of Use of In-home Care Services on Independent Variables in Urban/Informal Subsample

Variable	Beta	Standard Error	F
Has a telephone	.083	.147	6.02*
Age	.011	.005	0.07
Sex	-.048	.070	1.79
Race	-.172	.078	22.32**
Education	.003	.020	0.01
Marital status	.022	.092	0.21
Living arrangement	.048	.092	1.34
Visits to family	.026	.033	0.49
Visits to friends	.025	.033	0.50
Has a confidant	.008	.169	0.06
Network satisfaction	-.054	.074	2.60
Income	.015	.015	0.11
Distance to family	.092	.026	6.26*
Distance to friend	.001	.040	0.00
Has a car	-.031	.087	0.52
Social resources	-.131	.043	9.60**
Economic resources	-.050	.042	1.14
Mental health	.083	.053	4.01*
Physical health	.086	.045	4.40*
ADL performance	.511	.050	131.63**
Intercept	.000	.528	

Model statistics: $df = 20$ $p = .000$ $R^2 = .390$ $n = 831$

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

R^2 for the model was .39. The significant variables included race, has a telephone, distance to family, and all of the five need variables except economic resources.

Rural/Formal and Urban/Formal Subsamples

The next set of multiple regression analyses to be discussed represents the rural and the urban older people who use services exclusively from formal sources.

Table 17 exhibits the results of the multiple regression analysis of the rural/formal subsample. Only two independent variables emerged as significant. They were income, an enabling variable, and ADL performance, a need variable. This model was able to explain less than 6% of the total variance in service use, suggesting that some important variables have not been included in this multiple regression equation.

The results of the regression of service use on the 20 independent variables in this study are displayed in Table 18. Again, a low R^2 (.11) resulted from this analysis. The two significant variables that emerged, economic resources and ADL performance, are both considered need variables according to the Andersen scheme.

Rural/Combination and Urban/Combination Subsamples

The final set of subsamples to be presented for comparison examine service use among those rural and urban older people who use in-home care services from both informal and formal sources. These data are shown in Tables 19 and 20.

TABLE 17

Multiple Regression of Level of Use of In-home Care Services on Independent Variables in Rural/Formal Subsample

Variable	Beta	Standard Error	F
Has a telephone	.021	.042	0.23
Age	.013	.002	0.08
Sex	-.060	.023	1.53
Race	.010	.032	0.05
Education	.059	.007	1.14
Marital status	.069	.033	1.13
Living arrangement	.100	.037	2.73
Visits to family	.017	.011	0.11
Visits to friends	.026	.011	0.31
Has a confidant	.040	.052	0.79
Network satisfaction	-.014	.023	0.11
Income	-.141	.004	6.31*
Distance to family	.000	.009	0.00
Distance to friend	-.048	.017	1.21
Has a car	.084	.030	2.63
Social resources	-.001	.013	0.00
Economic resources	-.124	.014	3.71
Mental health	.038	.019	0.45
Physical health	.001	.013	0.00
ADL performance	.137	.019	6.08*
Intercept	.000	.183	

Model statistics: $df = 20$ $p = .051$ $R^2 = .055$ $n = 632$

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

TABLE 18

Multiple Regression of Level of Use of In-home Services on Independent Variables in Urban/Formal Subsample

Variable	Beta	Standard Error	F
Has a telephone	.023	.042	0.18
Age	.087	.002	2.14
Sex	.005	.020	0.01
Race	.056	.026	0.97
Education	-.024	-.006	0.14
Marital status	-.015	.028	0.04
Living arrangement	-.026	.030	0.16
Visits to family	.008	.010	0.02
Visits to friends	.032	.010	0.34
Has a confidant	-.094	.051	3.10
Network satisfaction	-.009	.022	0.03
Income	-.017	.004	0.07
Distance to family	.040	.008	0.50
Distance to friend	-.045	.011	0.72
Has a car	.075	.028	1.32
Social resources	.041	.013	0.35
Economic resources	-.145	.013	4.21*
Mental health	-.082	.018	1.62
Physical health	.093	.014	2.61
ADL performance	.239	.019	14.14**
Intercept	.000	.155	

Model statistic: $df = 20$ $p = .000$ $R^2 = .108$ $n = 549$

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

TABLE 19

Multiple Regression of Level of Use of In-home Care Services on Independent Variables in Rural/Combination Subsample

Variable	Beta	Standard Error	F
Has a telephone	.025	.115	0.41
Age	-.075	.004	3.49
Sex	.026	.062	0.37
Race	.060	.086	2.22
Education	.101	.018	4.43*
Marital status	-.045	.087	0.66
Living arrangement	.055	.098	1.15
Visits to family	-.028	.030	0.38
Visits to friends	-.012	.029	0.08
Has a confidant	-.025	.136	0.41
Network satisfaction	-.021	.062	0.30
Income	-.043	.012	0.75
Distance to family	.055	.024	1.45
Distance to friend	-.044	.044	1.34
Has a car	-.064	.079	1.99
Social resources	-.019	.036	0.15
Economic resources	-.108	.037	3.79
Mental health	-.059	.049	1.45
Physical health	.036	.036	0.63
ADL performance	.516	.044	109.32**
Intercept	.000	.494	

Model statistic: $df = 20$ $p = .000$ $R^2 = .264$ $n = 644$

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

TABLE 20

Multiple Regression of Level of Use of In-home Care Services on Independent Variables in Urban/Combination Subsample

Variable	Beta	Standard Error	F
Has a telephone	.045	.155	1.20
Age	-.106	.006	5.38*
Sex	.020	.074	0.23
Race	.038	.095	0.76
Education	.052	.021	1.11
Marital status	.005	.101	0.01
Living arrangement	-.067	.108	1.84
Visits to family	.052	.036	1.42
Visits to friends	-.026	.036	0.37
Has a confidant	.068	.196	2.84
Network satisfaction	-.033	.081	0.75
Income	-.029	.015	0.33
Distance to family	-.080	.028	3.46
Distance to friend	.015	.041	0.14
Has a car	-.079	.098	2.52
Social resources	-.072	.048	1.84
Economic resources	-.064	.046	1.40
Mental health	-.076	.063	2.23
Physical health	.112	.049	5.69*
ADL performance	.689	.056	185.46**
Intercept	.000	.573	

Model statistics: $df = 20$ $p = .000$ $R^2 = .453$ $n = 560$

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

Two significant predictors of service use for older individuals in the rural/combination group were education, an enabling variable, and ADL performance, a need variable. The 20 independent variables accounted for more than one-fourth (26%) of the variance in utilization of the six generic in-home care services considered in this study. The model for the urban/combination subsample resulted in three variables that significantly predicted service use: age, a predisposing variable, and physical health and ADL performance, two need variables. The variables in the equation for urban older people who select in-home care services from both informal and formal sources explained considerably more variance, 45%, than in the rural/combination regression model.

It becomes obvious at this point that ADL performance is an important predictor of use of in-home care services because it consistently predicted service use in all eight subsamples. As a group, the need variables appeared be most important based on a count of 19 significant need variables in all eight subsamples compared to 7 significant enabling variables and 5 significant predisposing variables.

Comparsion of R^2 and CP Changes

When the same independent variable emerges as a significant predictor of service use in parallel subsamples, further analysis is indicated to determine in which sample the variable in question is the stronger predictor. When the same variable significantly predicts service use in parallel subsamples in this study the relationship will be pursued only as prescribed by the hypotheses.

Because ADL performance is a significant predictor of service use in both the rural and urban subsamples (Tables 13 and 14) and because it is necessary to determine in which subsample ADL performance is a stronger predictor in order to either support or refute one of the hypothesized relationships, the Cp and R^2 changes are analyzed. Table 21 presents evidence that ADL performance is a stronger predictor of service use for the rural than the urban subsample because the Cp change for the rural subsample is 1,144% compared to 978% for the urban subsample and the respective percentage changes in R^2 are 43% and 38%. This indicates that when ADL is removed from the regression equation it makes more difference in the rural subsample than the urban subsample.

Results of Hypothesized Relationships

The results of the foregoing multiple regression analyses and the subsequent Cp and R^2 comparisons provide data to either support or reject the hypotheses. In most cases the multiple regression analyses will provide the necessary information.

Hypothesis I: Car ownership (has a car) is a stronger predictor of the level of use of in-home care services for urban elders than for rural elders when other independent variables are controlled.

The data fail to support Hypothesis I. Car ownership is not a stronger predictor of service use for urban older people than for elderly rural residents. The opposite is, in fact, true. The variable, has a car, is significant at $p < .05$ in the multiple regression analysis for the rural subsample (Table 13) and does not significantly predict service use in the urban subsample.

TABLE 21

$\underline{R}^2$ and $\underline{Cp}$ Change in Regression Models With and Without ADL Performance in Rural and Urban Subsamples

	Full Model	Model Without ADL	Change	% Change
[a]Rural				
$\underline{Cp}$	21.0000	261.1350	240.1350	1143.5
$\underline{R}^2$	.3499	.1191	.1508	43.1
Urban				
$\underline{Cp}$	21.0000	226.3941	105.3941	978.1
$\underline{R}^2$	.4560	.2824	.1736	38.1

[a]Subsample where variable of interest is the stronger predictor of service use.

Hypothesis II: ADL impairment is a stronger predictor of the level of use of in-home care services for urban elders than for rural elders when other independent variables are controlled.

Tables 13 and 14 indicate that ADL performance is a significant predictor ($p < .01$) of service use in both the rural and urban subsamples. In this situation it becomes necessary to look at the Cp and R^2 change analyses to determine in which sample ADL performance is the stronger predictor of service use. Table 21 indicates that ADL performance is a stronger predictor of rural than urban service use. Thus, Hypothesis II is not supported by these data.

Hypothesis III: Education is a stronger predictor of the level of use of in-home care services from formal sources for urban elders than for rural elders when other independent variables are controlled.

Tables 17 and 18 indicate that education is not a significant predictor of service use in either the rural/formal or the urban/formal subsamples. Consequently, the hypothesized relationship that education is a stronger predictor of use of in-home care for urban older people is not supported.

Hypothesis IV: Economic impairment is a stronger predictor of the level of use of in-home care services from informal sources for rural elders than for urban elders when other independent variables are controlled.

In Table 15, the data indicate that the variable, economic resources, is a predictor of in-home care service use at the $p < .01$ level for rural

older people using services exclusively from informal sources. The variable, economic resources, does not emerge as a significant predictor of service use for the urban/informal subsample (Table 16). Thus, Hypothesis IV is supported by these data.

Hypothessis V: Physical impairment is a stronger predictor of the level of use of in-home care services from formal sources for urban elders than for rural elders when other independent variables are controlled.

The final hypothesis is not supported by the multiple regression analyses for the rural/formal (Table 17) and the urban/formal subsamples (Table 18). In neither analysis is the variable, physical health, a significant predictor of service use. However, when the subsamples of older people who use informal and formal sources of in-home care services simultaneously are examined physical health is a predictor of service use in the urban/combination subsample and not in the rural/combination subsample.

In summary, these results confirm that utilization rates are low; that when older people use in-home care services they most often use services from informal sources; that the need variables, especially ADL performance, are strong predictors of service use; and that investigators need to continue to explore factors that contibute to the differential use of services in rural and urban environments. The next chapter will address these observations in more depth.

CHAPTER V

DISCUSSION AND CONCLUSIONS

Summary of the Study

Americans are living longer than ever before, a trend that is expected to continue well into the next century. With longevity comes the increasing tendency toward functional impairment that often requires long-term care. The high cost of institutional long-term care and the federal mandate to shift the responsibility of care for older family members away from the public sector and toward the family are two factors contributing to the interest in community-based long-term care as an alternative to institutionalization.

This research project was designed to explore patterns and predictors of use of a core of six generic in-home care services. These services, when taken collectively, potentially have the ability to provide community-based long-term care, thus, delaying or avoiding institutionalization. This investigation identified patterns of service utilization based on rural or urban residence and whether services were provided from informal, formal, or combination informal and formal sources.

Although the study was comparative in nature, attention was focused on rural older people via comparison with their urban counterparts. The rural elderly population is of particular interest because there has been a turnaround in rural to urban migration that has caused older people to live disproportionately in rural areas. Furthermore, the comparative literature indicated that older rural residents are in

a disadvantaged position with regard to housing, income, education, transportation, and access to medical care. While the needs of rural older people seem great, the resources to address these needs are limited. These resources include funding, gerontological research, and appropriate service delivery models.

With restraint in federal spending on health care and social services for older people will come fewer formally provided services. Thus, the role of informally provided services will become even more critical in helping older family members to maintain their optimal quality of life. The interaction between community type and source of service as it influences service use was examined in this study to gain a clearer understanding of what variables predict various patterns of in-home care use. The knowledge gained here will contribute to determining the desirable mix of services from informal and formal sources necessary to effectively target community-based long-term care services to older people living in rural and urban environments. Thus, the specific intent of this investigation was to generate knowledge about service use patterns to be translated into practical knowledge to enhance the service delivery system for older people in the rural milieu.

Information for this study was extracted from the Statewide Survey of Older Virginians (McAuley et al., 1980), which used an instrument based on the OARS multidimensional functional assessment questionnaire (Duke University Center for the Study of Aging and Human Development, 1978). The Statewide Survey is a household survey of 2,146 people 60

years of age or older who were selected by means of a multi-stage area probability technique designed to produce a representative sample of noninstitutionalized older people. The sample size represents an 87% response rate of the sample initially identified.

In order to form the framework for making comparisons, the sample was divided into eight subsamples representing older people residing in rural and urban communities and using services from informal, formal, and combination informal and formal sources. Multiple regression analysis was executed to study the effects of 20 independent variables on the dependent variable, service use, in each subsample. The independent variables were categorized as predisposing, enabling, or need variables according to Andersen's conceptualization of factors influencing health services utilization (Andersen & Aday, 1978; Andersen & Newman, 1973).

Although the study was designed as an exploratory analysis of an emerging area of study, five hypotheses were formulated from the existing literature to focus the study. Only one of the five hypotheses was supported by the data, corroborating the lack of clarity of the literature in consistently differentiating rural and urban service users. The lack of support for the hypothesized relationships was likely to be a consequence of the fact that the hypotheses were derived from previous studies that operationalized and measured variables in a manner dissimilar to this study.

This investigation was in agreement with previous service use research in its reaffirmation of low service utilization rates and the emergence of need variables, especially ADL performance, as predictors

of service use. The disadvantaged position of rural elders as evidenced by lower incomes, less education, and greater functional impairment and the importance of the informal network manifested in the overwhelming use of services provided by family, friends, and neighbors provide further support for the existing literature.

Comparison with Existing Literature

Sociodemographic Variables

When the rural and urban distributions of predisposing and enabling variables are compared with previous research, certain themes in the literature are repeated. For instance, these data reiterate the unfavorable position of rural older people in terms of education by classifying more rural than urban older people at the lower end of the continuum and more urban than rural elders at the higher end of the scale. The same pattern emerges for income with more rural older people having low incomes and fewer having high incomes when compared with their urban contemporaries.

Several variables suggesting that rural older people have stronger informal networks than urban elders are cited here. More rural than urban elderly people are married, thus, creating an informal support likely to delay institutionalization (Masciocchi et al., 1984). It is interesting to note that despite the higher proportion of married rural older people, urban elders are only slightly more likely to live alone. Perhaps, this is the result of greater flexibility in living arrangements in urban areas. Urban dwellers are more likely not to have visited a family member during the week prior to the interview while rural elders more frequently reported daily visits to family

members. Other factors that seem to describe a stronger informal network for rural elders are: older rural dwellers tend to live closer to friends, urban residents are more likely to report having no family and no friends, and rural older people are considerably more likely to to report living within one mile of a relative. Lee and Cassidy (1981) concluded that although evidence tends to support a stronger kinship network among rural people, the results are not conclusive.

Although the older rural people in this study show evidence of having stronger informal support systems, more urban people report satisfaction with the informal network. One explanation of this phenomenon may be that satisfaction is perceived according to a different set of expectations for rural and urban older people.

Several variables in the study show more similarity than difference when their rural and urban distributions are compared. Rural and urban subsamples are similar in terms of age, living arrangement, sex, and availability of a confidant.

Need Variables

A closer look at the distribution of need variables gives a sense of what the rural and urban populations are like in terms of level of functional impairment. The difference between these two populations with regard to economic resources is not great; however, the urban elderly population exhibits a slight advantage. Urban elders are clearly in a more favorable position concerning economic resources. This is not surprising in view of the rural-urban profile of income distribution in this study, the documenation that rural older persons

are less affluent (Bureau of the Census, 1978; Arnold, 1984), and the moderate correlation of income and economic resources ($r = -.52$).

The need variables, mental health and ADL performance, show distinct rural-urban difference in the distribution of older people classified as having an excellent level of functioning. Urban survey respondents are more likely to be categorized as having excellent mental health and excellent ADL performance than the rural participants.

The literature suggests that on some health indicators, rural older people experience greater health impairment (Nelson, 1980, Stomomayor, 1981) than urban people. This study supports that finding in that the rural elderly respondents are less likely than than urban respondents to be categorized as having excellent or good physical health. The rural subsample is also consistently classified as having a greater deficit than the urban subsample in each response category describing a physical health impairment.

Service Use

Rural-urban service use differences are not clearly understood. A number of arguments lead to prediction of lower rates of service utilization among older rural people. Arguments include lack of public transportation and dispersed population patterns (Krout, 1981); less available, accessible, and lower quality services in rural areas (Taietz & Simon, 1977); and an unwillingness to accept public service programs as legitimate (Auerbach, 1976; Kracher & Kracher, 1980).

Regardless of the arguments offered by other investigators, the results of this study indicate that for each of the six services

examined rural elders are at least as likely as urban older people to use the service. One exception, nursing care, indicates a .1% higher usage frequency for urban than rural service users. Although rural elders tend to use more services, use of in-home care is uniformly low across community types.

It seems curious that if services are more available in urban areas, as Taietz and Milton (1979) and Nelson (1980) reported, that this is not reflected in usage rates. Few studies have examined the relationship between community type and rates of service use. However, when Krout (1983) investigated this phenomenon, he found slightly higher rates of formal service use among urban residents. Given the results of this study, further exploration of the relationship between community type and service use is indicated.

The low use of in-home care services by both the rural and urban older people may be related to the fact that the kinds of assistance provided by in-home care services usually occur late in life when patterns of independence have already been established. At this time in life people may be less amenable to accepting help with such tasks as meal preparation and personal care, especially from formal sources. This may account for the fact that regardless of place of residence, very few community-based older adults use formal caregivers to provide in-home care.

Although older adults in all subsamples tend to use more informally than formally provided services, rural elders exhibit a greater likelihood than urban older people to receive services from family,

friends, and neighbors. Rural residents, across all six service categories, consistently select informal service providers more often than urban residents. This finding is not surprising when one considers that the sociodemographic variables relating to kinship-friendship relations in this study suggest that a stronger informal network exists among rural people. This finding is in harmony with a similar result identified by Arling and McAuley (1984) indicating that involvement of nonfamily sources tends to increase with community size. Also consistent with this finding is the tendency of urban respondents to use services from formal and combination sources more than twice as often as rural elders. There is extremely limited empirical data to determine whether rural or urban elderly residents are more likely to use informally or formally provided services. Regardless of the lack of research, much speculation exist about this relationship. Most speculation is in the direction of the results of this study, with urban people using formal services more frequently and rural people more often using informal services.

Another observation of interest seems to support the generalization that informal and formal sources of care tend to complement rather than substitute for one another. Specifically, the pattern of usage showing that older people in both the rural and urban subsamples choose services from combination informal and formal sources more frequently than formal sources only. This suggests informal caregivers are the predominant choice followed by informal and formal sources used simultaneously with services provided exclusively by formal caregivers being the last resort.

Interpretation of Multiple Regression Analyses

As the results of multiple regression analyses for all rural and all urban subsamples are compared, the predictors of service utilization seem different enough to support the basic assumption of this investigation. That is, the predictors of use of in-home services are not the same for older people residing in rural and urban environments, although some similarities do exist. Some of the more thought-provoking of these relationships will be discussed in subsequent sections.

Rural and Urban Subsamples

The research design in this study permits examination of factors that predict overall service use from all sources for each type of residence. Thus, the investigator is able to compare indicators of service utilization across all rural and urban subsamples.

In the rural and urban subsamples a curious relationship emerges between service use and race. For rural older people being white predicts greater service use while being nonwhite is associated with a higher rate of service use in urban environments. Perhaps, nonwhites in urban areas use more services because they are more willing to approach social agencies and community helpers as Rosen (1978) suggested; or maybe because nonwhites are more concentrated in certain parts of urban areas, the urban service delivery system is more adept at meeting their needs.

These data also indicate that being nonwhite is a correlate of use of more services from informal sources among urban elders. This relationship may reflect the tendency of nonwhites in urban areas to reside in racial and ethnic enclaves where they are enmeshed in a strong

informal social network, thereby having informal caregivers readily available.

Informal Subsamples

In the urban/informal subsample it is interesting that distance to family and social resources both significantly predict service use and they are not statistically significant in the parallel rural subsample. This may suggest that the distance one lives from the closest family member and the strength of one's social network play more of a role in use of informal services in urban than in rural areas where informal assistance is more available and older people are likely to receive help without regard to these issues.

Formal Subsamples

A relationship worth mentioning manifests itself in the results of multiple regression analyses for the rural/formal and urban/formal subsamples. Older people with lower incomes use more services in rural areas while urban dwellers with better economic resources use more services. Although income and economic impairment represent two different constructs, they are moderately correlated in both subsamples (rural/formal, $r = -.58$; urban/formal, $r = -.51$) which makes them somewhat comparable. This seemingly paradoxical situation may reflect that older rural people tend to use more publicly provided formal in-home care while urban elders are more likely to have access to and to use proprietary in-home care services. This difference in service use is no doubt related to the more limited financial resources of older

rural residents. Even when private sources of formal in-home care are available to older rural people the cost of such services is likely to prohibit use. This suggests the need to investigate differential use of publicly and privately provided fomal services among rural and urban elders.

Combination Informal/Formal Subsamples

ADL performance is a significant ($p < .01$) predictor of service use for both rural and urban older people using services from informal and formal sources simultaneously. This important need variable accounts for the largest proportion of variance in service use in both subsamples under consideration. When ADL performance is removed from the rural/combination subsample the R^2 decreases from .2643 to .1199. Similarly, the R^2 for the urban/combination subsample declines from .4533 to .1999 when ADL performance is no longer in the equation. It is interesting to note that the independent variables in this investigation were able to explain 45% of the total variance in service use for the urban/combination subsample. The only subsample where the explained variance is greater is the total urban subsample ($R^2 = .46$).

Education is a predictor of service use for rural combination users. This is, perhaps, an indication that older rural people who are better educated are more aware of available services, thus, enabling them to combine appropriate services from both informal and formal sources to meet their needs.

Predictors of service use for urban elders using both informal and formal sources of service form an unlikely combination. Respondents who

are younger, in worse physical health, and have greater ADL impairment use more services from combination sources. Because physical health and ADL performance are related need variables (rural/combination, r = .56; urban/combination, r = .56) and need is often indicative of service use, it seems logical that greater functional impairment resulting in use of more services is the expected direction of effect. The relationship that seems more difficult to explain is why younger age is more predictive of service use given the fact that other researchers have often found older age to be a correlate of service use. One explanation might be that older people who use services from a combination of sources are, as a group, more frail than those who do not. Perhaps, this subsample is younger because older community-based residents who might have been combination users of in-home services no longer need such services because they have become institutionalized. The data indicate that the mean age ($\bar{X}$ = 68.38) of the urban/combination subgroup is lower than either the total sample ($\bar{X}$ = 69.74) or the urban subsample ($\bar{X}$ = 69.72), thus, giving this explanation more credibility.

Andersen's Paradigm

One obvious consistency across all multiple regression analyses is that the need variables are strong predictors of service use for all subsamples. ADL performance, in particular, is uniformly a significant predictor with worse ADL performance always predicting more service use. This finding is not surprising with regard to the results of other research (Branch et al., 1981; Greene, 1983; McAuley & Arling, 1984). Given the fact that the need variables seem to be the optimum predictors of in-home care utilization, it seems critical that strategies be

designed to enable practitioners to maintain an ongoing dialogue with impaired older people and their caregivers about the services that are available and how to access them.

When considering predisposing variables as a group, race seems to be the variable that has the greatest ability to discriminate rural-urban service use patterns. Race significantly predicts service use in three subsamples while age and education are both predictors of service use for older people using in-home care services from the informal and formal combination source.

The enabling variables in this study seem to have greater ability to predict service use than the predisposing variables. Having a telephone seems to make a difference in the urban and urban/informal subsamples while having a car is a significant predictor for the rural and rural/informal subgroups. Income, distance to family, and distance to friends also emerge as significant enabling variables.

With regard to Andersen's model, the results of this study seem to suggest that the variables least related to need are less predictive of service use. Although this information is important it fails to suggest causal patterns that might provide increased understanding about relationships among variables. An approach such as path analysis that allows for examination of the relationships among the three categories of variables as well as their effect on the dependent variable seems appropriate. Perhaps, a more sophisticated analytical technique would suggest how to specify the regression equation in order to yield a higher proportion of explained variance.

Hypotheses

Hypothesis I: Car ownership (has a car) is a stronger predictor of the level of use of in-home care services for urban elders than for rural elders when other independent variables are controlled.

Because Krout (1983a) reported that car ownership was the strongest correlate of service utilization for older urban New York residents, the foregoing hypothesis was formulated. In the current study has a car is not a predictor of service use for urban elders. However, having a car does prove to be a significant predictor of less service use for elderly rural people. Having a car is probably related to level of functional impairment; and level of impairment is a strong indicator of service utilization. Thus, less impaired older people, perhaps the same group who have cars, may require fewer services. An alternative explanation is that having a car may reduce the need for in-home services, especially among rural older people who might have to travel long distances to obtain services.

Hypothesis II: ADL impairment is a stronger predictor of the level of use of in-home services for urban elders than for rural elders when other independent variables are controlled.

This hypothesis was based on a finding by McAuley and Arling (1984) who reported that formal services are more likely to be used by older people living in urban areas who have more ADL problems. In this study ADL impairment is a strong predictor of service use in both the rural and urban subsamples, however, it is a slightly stronger predictor in

the rural subsamples as determined by the examination of $\underline{R}^2$ and Cp changes. Age may be the factor preventing this hypothesis from being supported. McAuley and Arling used the same data set and ADL performance and community type were operationalized in a similar manner; however, they studied only individuals who were 75 years of age or older. Furthermore, because McAuley and Arling examined use of formal services only among people who were service users the results of this hypothesized relationship appear incongruent with their finding.

When the $\underline{R}^2$ and Cp changes are analyzed for ADL performance in the subsamples with individuals using services exclusively from formal sources, ADL emerges as a stronger predictor of service use in the urban/formal group than in the rural/formal group. This suggests that while ADL performance may not be a stronger predictor of service use for all older urban residents it may be for certain subgroups.

Hypothesis III: Education is a stronger predictor of the level of use of in-home care services from formal sources for urban elders than for rural elders when other independent variables are controlled.

Again, the inclusion of Hypothesis III is predicated on the work of John Krout (1983a) who reported education to be a significant correlate of service utilization among urban elderly people but not among rural elders. Also contributing to the presence of this hypothesis is McAuley and Arling's (1984) finding that education is a significant predictor of formal care. Although descriptive data analysis in this study indicate that older urban residents are better educated than rural elders, this hypothesis is not supported. Education is not a predictor of service

use for either rural or urban older people who use only formal services. A factor that may have impacted on the results of multiple regression analyses for the formal subsamples is the skewedness of the dependent variable, service use. Very few older people in the total sample are users of in-home care services only from formal sources. The divergence of the dependent variable from a normal distribution, especially in the formal samples, probably also helps to account for the low explained variance (R^2 = .06; R^2 = .11) in the rural/formal and urban/formal subsamples.

Hypothesis IV: Economic impairment is a stronger predictor of the level of use of in-home care services from informal sources for rural elders than for urban elders when other independent variables are controlled.

Because the rural-urban literature emphasizes the economic inadequacy of rural elderly people (Lee & Lassey, 1985) and because most studies report that rural older people have stronger informal networks (Lee and Cassidy, 1985), Hypothesis IV was proposed. Although the data support this hypothesis, the direction of the relationship differs from what was expected. The investigator expected rural older people with greater economic impairment to use more informally provided in-home care services. Instead, older rural residents with better economic resources use more services from informal sources. One explanation for this might be that older rural people who are less economically impaired also have larger social networks and are, thus, able to access more services. This rationale seems congruent with the conclusions of previous researchers (McAuley & Nutty, 1981; Comptroller General of the United States, 1977),

who found that economic impairment tends to be associated with impairment in non-economic areas.

Hypothesis V: Physical impairment is a stronger predictor of the level of use of in-home care services from formal sources for urban elders than for rural elders when other independent variables are controlled.

The relationship expressed in Hypothesis V seems probable because physical health has been repeatedly identified as a correlate of service use; Paringer and his associates (1979) reported that rural elders are no more likely to be physically impaired than urban elders; and formal sources of service tend to be more available in urban areas. The inclusion of this hypothesis was also influenced by Cantor and Mayer's (1978) assertion that state of health is a significant predictor of use of formal services among inner-city elderly people.

Physical health is not a predictor of service use in either the rural/formal or urban/formal subsamples, thus, the hypothesis is not supported. It is interesting to note that a related need variable, ADL performance, (rural/formal, r = .52; urban/formal, r = .48) is a significant predictor of service utilization in both subamples and is a stronger predictor in the urban subsample as the hypothesis prescribed.

The reader is again reminded of the preliminary nature of this investigation. The foregoing discussion of hypotheses makes the lack of empirical research on issues related to this study quite apparent. The failure of the data to support most of the hypotheses indicates that the research base from which the hypotheses were conceived is sparse and immature.

Other possible causes for lack of support of these hypotheses include: differential operationalization of such key constructs as rural and urban community types, informal and formal sources of service, and level of service use; services other than in-home care being considered; and comparison with samples targeting specific elderly audiences such only older people who use services, very old people, low-income elders, samples that do not compare rural and urban elders; and functionally impaired older people. Despite the liabilities of this and previous research, service use among older rural and urban residents is an area of inquiry deserving additional investigation.

Contributions to the Literature

This study adds to the expanding body of gerontological research that debunks the myth that families do not provide care for their elders. The overwhelming majority of older people in this study who use in-home care are receiving it from informal sources: family, friends, or neighbors.

In the past an important strategy used to plan services for older people consisted of decisions made on the basis of demographic projections. Census data were likely to determine the number and types of services to be delivered and which communities would receive services. This study reinforces an important finding of other investigations of in-home care that should be heeded when targeting services to elderly people. That is, the utilization of in-home care services is more closely related to an older person's level of functional impairment than to sociodemographic status. Thus, service

delivery systems based on population projections are too simplistic to predict accurate service delivery models.

This research project is one of the few systematic studies emphasizing patterns and correlates of in-home care services among rural elders that compares rural and urban people while also considering the source of service provision. This investigation confirms the theoretical assumption that the predictors of use of service in rural and urban environments are not the same, suggesting that service delivery strategies ought to be commensurate with the usage patterns in different environments. Neither are the predictors of service use the same for in-home care provided from informal, formal, and combination informal and formal sources with a different service delivery strategy being indicated for each source of service.

The results of the hypothesized relationships which contradict previous studies contribute to the literature by reiterating the need to continue the study of service utilization patterns among older people. It is clear that professionals delivering services to elderly clientele will be handicapped in their efforts without a clear understanding of the factors associated with service use. It seems critical to ensure that existing programs operate on the basis of accurate and sufficient information during this time of dwindling resources for public services. Thus, practitioners need a credible research-base in order to design, implement, and administer programs to efficiently use limited resources.

Practical Implications

The dramatic changes in the age structure in American society make planning and providing services for the elderly segment of society one

of the major challenges of this decade. An often neglected participant in this planning process is the informal caregiver who provides in-home care.

The results of this study emphasize the importance of informal caregivers. Clearly, informal caregivers are an invaluable resource for older people; and the development and support of programs designed to complement informal caregiving in both rural and urban communities are indicated by this study.

According to Arling (1981) the critical factor that determines nursing home admission seems to be the capacity of informal caregivers to provide the comprehensive set of in-home services that are needed by impaired older persons. Given the essential role that informal caregivers perform for older people, policy initiatives designed to encourage and foster the informal care system seem justified.

Utilization of in-home care services is very low in both rural and urban environments. The need to strengthen existing referral networks between physicians and formal providers of in-home care is implied by this research. This seems logical because level of functional impairment is an important predictor of use of in-home care, individuals who use or need in-home care are likely to also use the services of the medical profession.

Further, the need to strengthen ties between the informal caregiver and formal providers of in-home care seems appropriate. If, in fact, older people are willing to accept some combination of informal and formal community-based long-term care (McAuley & Blieszner, 1985) in order to avoid institutionalization, then older people who now use

in-home care exclusively from informal sources may need to supplement that care with formal service provision in the future.

In summary, this study suggests that the informal caregiver functions in the critical role of providing in-home care to community elders. The results of the study imply that the informal caregiver ought to be the focus of efforts to develop strategies to support and enhance caregiving activities. These efforts might include involvement of caregivers in program determination, implementation, and evaluation; formal recognition of the value of the caregiver to society; strengthening the communication network between the medical profession and in-home care practitioners as well as the network of formal and informal care providers; and finally, translating research about the significance of the informal care system into a form that has meaning to both informal and formal care providers.

Recommendations for Future Research

As the investigator reviews the structure of this study, several areas of concern are identified and offered to strengthen future research on related topics. Most of these concerns are methodological in nature.

There is a need to consider carefully the operationalization of three key concepts in this study: community type, source of service, and service use. The first concept, rural and urban, has been defined many ways in the gerontological literature. It is problematic to dichotomize a continuum such as rurality; however, this is necessary in order to make rural and urban comparisons. Rather than using size of

place as a rural-urban index as in this study, future researchers can probably measure this concept more accurately with some assessment technique that takes into account such considerations as length of residence, childhood environment, location of employment or former employment, and time spent in an urban center.

Secondly, the informal and formal categories in this study would more precisely reflect the commonly accepted distinction between the two sources of service provision if the investigator had been able to determine whether or not services were performed for pay. Future researchers will want to make this determination in order to properly categorize care given by institutions such as churches and charitable organizations that might be classified as either informal or formal. The conceptualization of informal and formal suggests a related topic that promises to be a fertile research area. The topic in need of study is the investigation of differences between users of publicly and privately provided formal services.

The third operational definition of concern is the dependent variable, service use. This variable is defined as a combination of six generic in-home care services. The only dimension of service use explored in this study is the number of the services the respondent has received within the past six months. Future studies might consider examining the length of each episode of care, the length of time during which care is provided, how often the care is provided, or the level of skill required to provide the service. The service utilization literature reflects a void in information about the intensity, duration, frequency, and required skill-level of service use.

Related to this variable is an issue of greater concern. Because few older community residents use in-home care services, the dependent variable in this study is highly skewed, an undesirable condition in multiple regression analysis. Future researchers may choose to sacrifice having a probability sample in order to have a more normally distributed dependent variable. Some ways to accomplish this are to study only service users, to oversample service users, or to randomly select the desired number of nonusers for the research sample.

Previous research has found that an important predictor of service use is knowledge of services. Perhaps, if a variable measuring knowledge of services had been included in this study the explained variance of the multiple regression analyses would have been higher. It is recommended that knowledge of services be measured not by asking older people if they know about the service but rather by having the interviewer explore what is known about the service and making a determination about knowledge of the service. Future service utilization studies should include a measure of this variable that has been found to be an important correlate of service use.

Another important area of concern relates to the Andersen theoretical framework. The evidence that application of Andersen's model for conceptualizing utilization of health services explains only 6% of the variance in service use for rural older people using only formal services suggests that a problem exists. A modest contribution of this level leads a researcher to conclude that there are factors that explain service use among older people that are not included in Andersen's paradigm, or at least in this application of Andersen's

model. Perhaps what is needed is more sophisticated use of Andersen's conceptual framework similar to the causal model advanced by Wright, Creecy, and Berg (1979) in their investigation of utilization of physicians' services by older black people. Or maybe the solution is to develop specific theories of service use for different elderly populations as Lee and Lassey (1980a) suggest. Regardless of the most viable strategy, the abundance of atheoretical service utilization studies and studies based on a single framework indicate a need for theory development.

A final direction suggested by this investigation is future exploration of the interface between informal and formal sources of care. When researchers determine the appropriate mix of informal and formal services for older people in rural and urban environments then strategies to target services more precisely can be enhanced. The current study does not permit this concern to be addressed beyond the present discussion, but it is an issue that future research should explore more intensely.

REFERENCES

Ahearn, M. C. (1979). Health care in rural America. Washington, D.C.: U. S. Department of Agriculture.

Ambrosius, G. R. (1981). To dream the impossible dream--delivering coordinated services to the rural elderly. In P. K. H. Kim & C. P. Wilson (Eds.), Toward mental health of the rural elderly (pp. 289-316). Washington, D.C.: University Press of America.

Andersen, R., & Aday, L. A. (1978). Access to medical care in the U.S.: Realized and potential. Medical Care, 16, 533-546.

Andersen, R., & Newman, J. F. (1973). Societal and individual determinants of medical care utilization in the United States. The Milbank Memorial Fund Quarterly, 51, 95-124.

Ansello, E. F. (1980). Special considerations in rural aging. Educational Gerontology, 5, 343-354.

Arling, G. (1981, July). Public policy and informal caregiving: Findings from the Statewide Survey of Older Virginians. Report prepared for delegates to the 1981 White House Conference on Aging. Richmond.

Arling, G., & McAuley, W. J. (1984). The family, public policy, and long-term care. In W. H. Quinn & G. A. Hughston (Eds.), Independent aging (pp. 133-148). Rockville, Maryland: Aspen.

Arnold, G. D. (1984, July). Housing of the rural elderly (Report No. RDRR-42). Washington, D.C.: Economic Development Division, U. S. Department of Agriculture.

Atchley, R. C., & Miller, S. J. (1975). Housing and the rural aged. In R. C. Atchley (Ed.), Rural environments and aging (pp. 94-144). Washington, D.C.: Gerontological Society of America.

Auerbach, A. J. (1976). The elderly in rural areas: Implications for practice. In L. H. Ginsberg (Ed.), Social work in rural communities. New York: Council on Social Work Education.

Barney, J. L. (1977). The perogative of choice in long-term care. The Gerontologist, 17, 309-314.

Beale, C. L. (1982, May). Older rural Americans: Demographic situations and trends. Statement presented before Senate Special Committee on Aging, Washington, D.C.

Beale, C. L. (1984). New definitions for metropolitan areas. Rural Development Perspectives, 1(1), 19-20.

Branch, L., Jette, A., Evashwick, C., Polansky, M., Rowe, G., & Diehr, P. (1981). Toward understanding elders' health service utilization. Journal of Community Health, 7(2), 80-92.

Brody. E. M. (1973). Comprehensive health care of the elderly: An analysis. The Gerontologist, 13, 412-418.

Brody, E. M. (1981). Women in the middle and family help to older people. The Gerontologist, 21, 471-480.

Brody, S. J., Poulshock, W., & Masciocchi, C. F. (1978). The family caring unit: A major consideration in the long-term support system. The Gerontologist, 18, 556-561.

Bultena, G. L. (1969). Rural-urban differences in the familial interaction of the aged. Rural Sociology, 34, 5-15.

Buxton, E. B. (1976). Delivering social services in rural areas. In L. H. Ginsberg (Ed.), Social work in rural communities. New York: Council on Social Work Education.

Bylund, R. A., LeRay, N. L., & Crawford, C. O. (1980). Older American households and their housing, 1975: A metro-nonmetro comparison. University Park: The Pennsylvania State University Agricultural Experiment Station.

Campbell, A., Converse, P. E., & Rodgers, W. L. (1976). The quality of American life: Perceptions, evaluations, and satisfactions. New York: Russell Sage.

Cantor, M. H. (1980). The informal support system: Its relevance to the lives of the elderly. In E. F. Borgatta & N. G. McCluskey (Eds.), Aging and society: Current research and policy perspectives (pp. 133-144).

Cantor, M. H., & Mayer, M. J. (1978). Factors in differential utilization of services by urban elderly. Journal of Gerontological Social Work, 1(1), 47-62.

Carrilio, T. E., & Eisenberg, D. M. (1983). Informal resources for the elderly: Panacea or empty promises. Journal of Gerontological Social Work, 6(1), 39-47.

Chappell, N. L. (1985). Social support and the receipt of home care services. The Gerontologist, 25, 47-54.

Cleary, T. A. (1968). Test bias: Prediction of grades of Negro and white students in integrated colleges. Journal of Educational Measurement. 5, 115-124.

Clifford, W. B., Heaton, T. B., Voss, P. R., & Fuguitt, G. V. (1985). The rural elderly in demographic perspective. In R. T. Coward & G. R. Lee (Eds.), The elderly in rural society (pp. 25-55). New York: Springer Publishing Company.

Comptroller General of the United States. (1977). The well-being of the elderly in Cleveland, Ohio. Washington, D.C.: U. S. General Accounting Office.

Cottrell, F. (1978). Transportation of older people in a rural community. In M. M. Smeltzer, S. L. Corbett, & R. C. Atchley (Eds.), Social problems of the aging: Readings (pp. 237-245). Belmont, CA: Wadsworth Publishing Company, Inc.

Coward, R. T. (1979). Planning community services for the rural elderly: Implications from research. The Gerontologist, 19, 275-282.

Coward, R. T. (1983). Serving families in contemporary rural America: Definitions, importance, and future. In R. T. Coward & W. M. Smith (Eds.), Family services: Issues and opportunities in contemporary rural America (pp. 3-25). Lincoln: University of Nebraska Press.

Coward, R. T., & Rathbone-McCaun, E. (1985). Delivering health and human services to the elderly in rural society. In R. T. Coward & G. R. Lee (Eds.), The elderly in rural society (pp. 197-222). New York: Springer Publishing Company.

Coward, R. T., & Smith, R. T. (1982). Families in rural society. In D. A. Dillman & D. J. Hobbs (Eds.), Rural society in the U. S.: Issues for the 1980s (pp. 77-84). Boulder, CO: Westview Press.

Crossman, L., London, C., & Barry, C. (1981). Older women caring for disabled spouses: A model for supportive services. The Gerontologist, 21, 464-470.

Curley, A., & Carlson, E. (1985). Home health care--Great but elusive. Modern Maturity. 28(2), 32.36.

Daatland, S. O. (1983). Use of public services for the aged and the role of the family. The Gerontologist, 23, 650-656.

Daniel, C., & Wood, F. S. (1980). Fitting equations to data (2nd ed.). New York: John Wiley and Sons, Inc.

Dowaliby, F. J., & Schumer, H. (1973). Teacher-centered versus student-centered mode of classroom instruction as related to manifest anxiety. Journal of Educational Psychology, 64, 125-132.

Duke University Center for the Study of Aging and Human Development. (1978). Multidimensional Functional Assessment: The OARS Methodology (2nd ed.). Durham, NC: Author.

Ecosometrics, Inc. (1982). Review of reported differences between the rural and urban elderly: Status, needs, services, and service cost. Washington, D.C.: Administration on Aging (Contract No. 105-80-C-065).

Evashwick, C., Rowe, G, Diehr, P., & Branch L. (1984). Factors explaining the use of health services by the elderly. Health Services Research, 19, 357-382.

Fillenbaum, G. G. (1978). Validity and reliability of the multidimensional functional assessment questionnaire. In Multidimensional Functional Assessment: The OARS Methodology (2nd ed.). Durham NC: Duke University Center for the Study of Aging and Human Development, 25-35.

Fillenbaum, G. G., & Smyer, M. A. (1981). The development, validity, and reliability of the OARS multidimensional functional assessment questionnaire. Journal of Gerontology, 36, 428-434.

Fowler, J. (1970). Knowledge, need, and use of services among the aged. In C. Osterbind (Ed.), Health care services for the aged. Gainesville, FL: University of Florida Press, pp. 139-156.

Fowles, D. G. (1985). Profile of older Americans: 1984. Administration on Aging (PF30491184). Washington, D.C.: U.S. Department of Health and Human Services.

Freedman, J. L. (1964). Involvement, discrepancy, and change. Journal of Abnormal and Social Psychology, 69, 290-295.

Friedman, S. R., & Kaye, L. W. (1979). Homecare for the frail elderly: Implications for an interactional relationship. Journal of Gerontological Social Work, 2(2), 109-123.

Fuguitt, G. V., & Tordella, S. J. (1980). Elderly net migration: The new trend of nonmetropolitan population change. Research on Aging, 2, 191-204.

George, L. K. (1984, November). The OARS methodology: Background refinements and applications. Paper presented at the Gerontological Society of America 37th Annual Scientific Meeting, San Antonio, TX.

Greene, V. L. (1983). Substitution between formally and informally provided care for the impaired elderly in the community. Medical Care, 21, 609-619.

Harbert, A. S., & Ginsberg, L. H. (1979). Human services for older adults: Concepts and skills. Belmont, CA: Wadsworth Publishing Company.

Haug, M. R. (1981). Age and medical care utilization patterns. Journal of Gerontology, 36, 103-111.

Hayslip, B., Ritter, M. L., Oltman, R. M., & McDonnell, C. (1980). Home care services and the rural elderly. The Gerontologist, 20, 192-199.

Heller, P. L., & Quesada, G. M. (1977). Rural familism: An interregional analysis. Rural Sociology, 42, 220-240.

Heller, P. L., Quesada, G. M., Harvey, D. L., & Warner, L. G. (1981). Rural familism: Interregional analysis. In R. T. Coward & W. M. Smith (Eds.), The family in rural society (pp. 73-85). Boulder, CO: Westview Press.

Hinkle, D. E., Wiersma, W., & Jurs, S. G. (1979). Applied statistics for the behavioral sciences. Hopewell, NJ: Houghton Mifflin Company.

Horowitz, A., & Dobrof, R. (1982). The role of families in providing care to the frail and chronically ill elderly living in the community. New York: Brookdale Center on Aging of Hunter College.

Hynson, L. M. (1975). Rural-urban differences in satisfaction among the elderly. Rural Sociology, 40, 64-66.

Information for OARS Users. (1979, August). Center for the Study of Aging and Human Development. Durham, NC:

Jackson, B. N. (1984). Home health care and the elderly in the 1980s. The American Journal of Occupational Therapy, 38, 717-712.

Jackson, R. W. (1983). Delivering services to families in rural American: An analysis of the logistics and uniquenesses. In R. T. Coward & W. M. Smith (Eds.), Family services: Issues and opportunities in contemporary rural America (pp. 69-86). Lincoln: University of Nebraska Press.

Johnson, C. L., & Catalano, D. J. (1983). A longitudinal study of family supports to impaired elderly. The Gerontologist, 23, 612-618.

Karcher, C. J., & Karcher, B. C. (1980). Higher education and religion: Potential partners in service to the rural elderly. Educational Gerontology, 5, 409-421.

Karnofsky, D. A., & Burchenal, J. H. (1948). The clinical evaluation of chemotherapeutic agents in cancer. In C. M. McLeon (Ed.), Evaluation of chemotherapeutic agents. New York: Columbia University Press.

Kerlinger, F. N. (1973). Foundations of behavioral research (2nd ed.). New York: Holt, Rinehart, and Winston, Inc.

Kerlinger, F. N., & Pedhazur, E. J. (1973). Multiple regression in behavioral research. New York: Holt, Rinehart, and Winston, Inc.

Key, W. H. (1961). Rural-urban differences and the family. Sociological Quarterly, 2, 49-56.

Kim, P. K. H. (1981). The low income rural elderly: Underserved victims of public inequity. In P. K. H. Kim & C. P. Wilson (Eds.), Toward mental health of the rural elderly (pp. 15-27). Washington, D.C.: University Press of America.

Knight, S., Markson, E., Crescenzi, C., Hoffman, S., & Bissonnette, A. (1982). An analysis of types and costs of health care services provided to an elderly inner-city population. Medical Care, 20, 1090-1100.

Krout, J. A. (1981). Service utilization patterns of the rural elderly: Final report (AOA Grant No. 90-AR-2057). Washington, D.C.: Administration on Aging.

Krout, J. A. (1983a). Correlates of service utilization among the rural elderly. The Gerontologist, 23, 500-504.

Krout, J. A. (1983b). Knowledge and use of services by the elderly: A critical review of the literature. International Journal of Aging and Human Development, 17, 153-167.

Krout, J. A. (1983c). The rural elderly: An annotated bibliography of social science research. Westport CN: Greenwood Press.

Larson, O. F. (1982). Values and beliefs of rural people. In T. R. Ford (Ed.), Rural U.S.A.: Persistence and change (pp. 91-112). Ames: Iowa State University Press.

Larson, R. (1978). Thirty years of research on the subjective well-being of older Americans. Journal of Gerontology, 33, 109-129.

Lassey, W. R., & Lassey, M. L. (1985). The physical health status of the rural elderly. In R. T. Coward & G. R. Lee, (Eds.), The elderly in rural society (pp. 83-104). New York: Springer Pubishing Company.

Lee, G. R. (1980). Kinship in the seventies: A decade review of research and theory. Journal of Marriage and the Family, 42, 923-934.

Lee, G. R., & Cassidy, M. L. (1981). Kinship systems and extended family ties. In R. T. Coward & W. M. Smith (Eds.), The family in rural society (pp. 57-71). Boulder CO: Westview Press.

Lee, G. R., & Cassidy, M. L. (1985). Family and kin relations of the rural elderly. In R. T. Coward & G. R. Lee (Eds.), The elderly in rural society (pp. 151-169). New York: Springer Publishing Company.

Lee, G. R., & Lassey, M. L. (1980a). Rural-urban differences among elderly: Economic, social, and subjective factors. Journal of Social Issues, 36, 62-74.

Lee, G. R., & Lassey, M. L. (1980b). Rural-urban residence and aging: Directions for future research. In W. R. Lassey, M. L. Lassey, G. R. Lee & N. Lee (Eds.), Research and public service with the rural elderly (pp. 77-88). Corvallis, OR: Western Rural Development Center.

Lee, G. R., & Lassey, M. L. (1982). The elderly. In D. A. Dillman & D. J. Hobbs (Eds.), Rural society in the U.S.: Issues for the 1980s (pp. 85-93). Boulder, CO: Westview Press.

Longino, C. F., Wiseman, R. F., Biggar, J. C., & Flynn, C. B. (1984). Aged metropolitan-nonmetropolitan migration streams over three census decades. Journal of Gerontology, 39, 721-729.

Mahoney, K. J. (1977). A national perspective on community differences in the interaction of the aged with their adult children. Madison, WS: Fay McBeath Institute.

Mallows, C. L. (1964). Some comments on Cp. Technometrics, 15, 661-675.

Masciocchi, C., Thomas, A., & Moeller, T. (1984). Support for the impaired elderly: A challenge for family caregivers. In W. H. Quinn & G. A. Hughston (Eds.), Independent aging (pp. 115-132). Rockville, MD: Aspen.

McAuley, W. J., & Arling, G. (1984). Use of in-home care by very old people. Journal of Health and Social Behavior, 25, 54-64.

McAuley, W. J., Arling, G., Nutty, C., & Bowling, C. (1980). Final report of the Statewide Survey of Older Virginians (Research Series No. 8). Richmond, VA: Virginia Commonwealth University, Virginia Center on Aging.

McAuley, W. J., & Blieszner, R. (1985). Selection of long-term care arrangements by older community residents. The Gerontologist, 25, 188-193.

McAuley, W. J., & Nutty, C. (1981). Resources, service use, and sources of support: A comparison of rural and urban elderly. In Policy issues for the elderly poor. Washington, D.C.: Community Services Administration.

Miller, M. K., & Crader, D. C. (1979). Rural-urban differences in two dimensions of community satisfaction. Rural Sociology, 44, 489-504.

Moen, E. (1978). The reluctance of the elderly to accept help. Social Problems, 25, 293-303.

Monk, A. (1983). Family supports in old age. In R. Perlman (Ed.), Family home care: Critical issues for services and policies (pp. 101-110). New York: Hayworth Press.

Montgomery, J. E., Stubbs, A. C., & Day, S. S. (1980). The housing environment of the rural elderly. The Gerontologist, 20, 444-451.

Moore, A. (1966). Aggression themes in a binocular rivalry situation. Journal of Personality and Social Psychology, 3, 685-688.

Nelson, G. M. (1980). Social services to the urban and rural aged: The experience of area agencies on aging. The Gerontologist, 20, 200-207.

Nelson, G. M. (1983). A comparison of Title XX services to the urban and rural elderly. Journal of Gerontological Social Work, 6, 3-23.

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. H. (1975). SPSS: Statistical package for the social sciences. New York: McGraw-Hill.

Noelker, L., & Harel, Z. (1978). Aged excluded from home health care: An interorganizational solution. The Gerontologist, 18, 37-41.

O'Brien, J. E., & Wagner, D. L. (1980). Help seeking by the frail elderly: Problems in network analysis. The Gerontologist, 20, 78-83.

Osgood, M. H. (1977). Rural and urban attitudes toward welfare. Social Work, 22, 41-47.

Palmore, E. (1983). Health care needs of the rural elderly. International Journal of Aging and Human Development, 18, 39-45.

Paringer, L., Bluck, J., Feder, J., & Holahan, J. (1979). Health status and use of medical services: Evidence on the poor, the black, and the rural elderly. Washington, D.C.: The Urban Institute.

Pedhazur, E J. (1982). Multiple regression in behavioral research: Explanation and prediction (2nd ed.). New York: Holt, Rinehart, and Winston.

Powers, E. A., Keith, P. M., & Goudy, W. J. (1981). Family networks of the rural aged. In R. T. Coward & W. M. Smith (Eds.), The family in rural society (pp. 199-217). Boulder, CO: Westview Press.

Powers, R., & Liston, M. (1971). A study of patterns of living of the elderly in Iowa non-urban population centers (No. 65). Ames, IO: Home Economics Research Institute.

Rao, V. V. P., & Rao, V. N. (1983). Factors related to the knowledge and use of social services among the black elderly. Journal of Minority Aging, 8, 26-35.

Ray, A. A. (Ed.). (1982a). SAS user's guide: Basics. Cary, NC: Statistical Analysis System Institute.

Ray, A. A. (Ed.). (1982b) SAS user's guide: Statistics. Cary, NC: Statistical Analysis System Institute.

Richard, T. T. (1981). A comparison of differential needs among rural and urban elderly in two southeast Arkansas counties. In P. K. H. Kim and C. P. Wilson (Eds.), Toward mental health of the rural elderly (pp. 187-194). Washington, D.C.: University Press of America.

Rosen, C. E. (1978). A comparison of black and white rural elderly. Black Aging, 3(3), 60-65.

Rowles, G. D. (1983). Geographical dimensions of social support in rural Appalachia. In G. D. Rowles & R. J. Ohta (Eds.), Aging and milieu (pp. 111-130). New York: Academic Press.

Sauer, W. J. (1983). The elderly: Challenges for the rural community. In R. J. Coward & W. M. Smith (Eds.), Family services: Issues and opportunities in contemporary rural America (pp. 186-201). Lincoln: University of Nebraska Press.

Sauer, W. J., Shehan, C., & Boymel, C. (1976). Rural-urban differences in satisfaction among the elderly: A reconsideration. Rural Sociology, 41, 269-275.

Schooler, K. K. (1975). A comparison of rural and non-rural elderly on selected variables. In R. C. Atchley & T. O. Byerts (Eds.), Rural environments and aging (pp. 27-42). Washington, D.C.: Gerontological Society of America.

Shanas, E. (1974). Health status of older people: Cross national implications. American Journal of Public Health, 64, 261-264.

Shanas, E. (1979a). Social myth as hyothesis: The case of family relations of old people. The Gerontologist, 19, 3-9.

Shanas, E. (1979b). The family as a social support system in old age. Gerontologist, 19, 169-174.

Shook, W. M. (1980, November). Urban and rural older people: Their well-being and needs. Paper presented at 33rd annual meeting of the Gerontological Society of America, San Diego, CA.

Silvey, J. P., & Fiegener, J. J. (1984). Family caregivers of the elderly: Assistance provided after termination of chore services. Journal of Gerontological Social Work, 8, 23-34.

Snider, E. L. (1980). Awareness and use of health services by the elderly: A Canadian study. Medical Care, 18, 1177-1182.

Sotomayor, M. (1981). The rural elderly. In P. K. H. Kim & C. P. Wilson (Eds.), Toward mental health of the rural elderly (pp. 31-51). Washington, D.C.: University Press of America.

Steinhauer, M. B. (1980). Obstacles to the mobilization and provision of services to the rural elderly. Educational Gerontology, 5, 399-407.

Steinitz, L. Y. (1981). The local church as support for the elderly. Journal of Gerontological Social Work, 4(2), 43-53.

Stephens, R. C., Blau, Z. S., Oser, G. T., & Millar, M. D. (1978). Aging, social support and social policy. Journal of Gerontological Social Work, 1(1), 33-45.

Stoller, E. P. (1983, November). Parental caregiving by adult children. Journal of Marriage and the Family, 851-858.

Taietz, P. (1975). Community complexity and knowledge of facilities. Journal of Gerontology, 30, 357-362.

Taietz, P. (1985). Epilogue. In R. T. Coward & G. R. Lee (Eds.), The elderly in rural society (pp. 243-251). New York: Springer Publishing Company.

Taietz, P., & Milton, S. (1979). Rural-urban differences in the structure of services for the elderly in upstate New York counties. Journal of Gerontology, 34, 429-437.

Taietz, P. & Simon, S. (1977). Rural-urban differences in the structure of services for the elderly in upstate New York. Ithaca, NY: Cornell University.

Treas, J. (1977). Family support systems for the aged: Some social and demographic considerations. The Gerontologist, 17, 486-491.

Tremblay, K. R., Walker, F. S., & Dillman, D. A. (1983). The quality of life experienced by rural families. In R. T. Coward & W. M. Smith (Eds.), Family services: Issues and opportunities in contemporary rural America (pp. 26-40). Lincoln: University of Nebraska Press.

U.S. Bureau of the Census. (1980). General population characteristics: Virginia (U.S. Bureau of Commerce PC 80-1-B48 VA). Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of the Census. (1978). Social and economic characteristics of the metropolitan and nonmetropolitan population, 1976 and 1977. Current Population Reports, Special Studies P-25, No. 75. Washington, D.C.: U.S. Government Printing Office.

U. S. Senate Special Committee on Aging. (1984). Aging in America: Trends and projections (PL3377-584). Washington, D.C: Author.

Wan, T. T. H., & Arling, G. (1983). Differential use of health services among disabled elderly. Research on Aging, 5, 411-431.

Wan, T. T. H., & Odell, B. G. (1981). Factors affecting the use of social and health services among the elderly. Ageing and Society, 1, 95-115.

Wardwell, J. M. (1982). The reversal of nonmetropolitan migration loss. In D. A. Dillman & D. J. Hobbs (Eds.), Rural society in the U.S.: Issues for the 1980s (pp. 23-33). Boulder, CO: Westview Press.

White, M. A. (1977, Fall). Values of elderly differ in rural setting. Western Gerontological Society Generations, 6-7.

Widmer, G., Brill, R., & Schlosser, A. (1978). Home health care: Services and cost. Nursing Outlook, 35, 488-493.

Wilkinson, C. W. (1982). Aging in rural America: A comprehensive, annotated bibliography, 1975-1981. Morgantown: Gerontology Center, West Virginia University.

Willits, F. K., Bealer, R. C., & Crider, D. M. (1985). Persistence of rural/urban differences. In R. T. Coward & G. R. Lee (Eds.), The elderly in rural Society (pp. 69-76). New York: Springer Publishing Company.

Wright, R., Creecy, R. F., & Berg, W. E. (1979). The black elderly and their use of health care services: A causal analysis. Journal of Gerontological Social Work, 2, 11-28.

Youmans, E. G. (Ed.). (1967). Older rural Americans. Lexington: University of Kentucky Press.

Youmans, E. G. (1977). The rural aged. Annals of the American Academy of Political and Social Science, 429, 81-90.

Zuiches, J. J., & Brown, D. L. (1978). The changing character of the nonmetropolitan population, 1950-1975. In T. R. Ford (Ed.), Rural U.S.A.: Persistence and change (pp. 55-72). Ames: Iowa State University.

APPENDIX A

SELECTED ITEMS FROM THE STATEWIDE SURVEY OF OLDER VIRGINIANS

Selected Items[a] from the Statewide Survey of Older Virginians

1. Marital Status:

   What is your marital status now?

   1. Never married
   2. Married
   3. Widowed
   4. Divorced
   5. Separated

2. Living arrangement:

   Who lives here with you? (Check "Yes" or "No" for each of the following.)

		Yes	No
1.	Lives alone	_____	_____
2.	Husband or wife	_____	_____
3.	Children	_____	_____
4.	Grandchildren	_____	_____
5.	Parents, parent-in-law	_____	_____
6.	Grandparents	_____	_____
7.	Brothers and sisters (brothers and sisters-in-law)	_____	_____
8.	Other relatives (does not include in-laws covered in the above categories	_____	_____
9.	Friends	_____	_____
10.	Non-related paid* helper (*includes free room)	_____	_____
11.	Others: Specify	_____	_____

   _____

   _____

3. Age:

   How old is subject? _____
   (Code 99, if 99 or more.)

---

[a]Selected items include only those items used in this study.

4. Race:

Race of subject

1. White
2. Black
3. Other (specify) _____

5. Education:

How far did you go (have you gone) in school?

1. 0-4 years
2. 5-8 years
3. High school incomplete
4. High school complete
5. Post high school or business or trade school
6. 1-3 years of college
7. 4 years college completed
8. Post graduate college

6. Sex:

Sex of subject (Observe and code sex.)

1. Male
2. Female

7. Income:

How much income do you (and your husband/wife) have a year before taxes? (Show annual income ladder and circle the number which identifies either yearly or monthly income category.)

		YEARLY	MONTHLY
01	A	0-$499	(0-$41)
02	B	$500-$999	($42-$83)
03	C	$1,000-$1,999	($84-$166)
04	D	$2,000-$2,999	($167-$249)
05	E	$3,000-$3,999	($250-$333)
06	F	$4,000-$4,999	($334-$416)
07	G	$5,000-$6,999	($417-$583)
08	H	$7,000-$9,999	($584-$833)
09	I	$10,000-$14,999	($834-$1,249)
10	J	$15,000-$19,999	($1,250-$1,666)
11	K	$20,000-$29,999	($1,667-$2,499)
12	L	$30,000-$39,999	($2,500-$3,333)
13	M	$40,000 or more	($3,334 or more)

8. Has a car:

   Do you have a car?

   1. No
   2. Yes

9. Drives a car:

   Can you drive your car both day and night, only in the daytime, or not at all?

   1. Not at all
   2. Only in the daytime
   3. Both day and night

10. Has a telephone:

    Telephone number _____

    1. Has telephone
    2. No telephone

11. Has a confidant:

    Do you have someone you can trust and confide in?

    1. No
    2. Yes

12. Network satisfaction:

    Do you see your relatives, friends, and neighbors as often as you want to or are you somewhat unhappy about how little you see them?

    1. Somewhat unhappy about how little
    2. As often as wants to

13. Visits to Family:

    How many times during the past week did you spend some time with family who does not live with you, that is you went to see them or they came to visit you, or you went out to do things together?

    1. Not at all
    2. Once
    3. Two to six times
    4. Once a day or more

14. Visits to Friends:

How many times during the past week did you spend some time with friends or neighbors who do not live with you, that is you went to see them or they came to visit you, or you went out to do things together?

1. Not at all
2. Once
3. Two to six times
4. Once a day or more

15. Distance to family:

Approximately how far (i.e., 1 mile, 2 miles, etc.) from your home is the home of your nearest family member?

1. No relatives
2. More than 135 miles
3. More than 35 miles, within 135 miles
4. More than 5 miles, within 35 mile
5. More than 1 mile, within 5 miles
6. Within 1 mile

16. Distance to friends:

Approximately how far from your home is the home of your nearest friend?

1. No friends
2. More than 135 miles
3. More than 35 miles, within 135 miles
4. More than 5 miles, within 35 mile
5. More than 1 mile, within 5 miles
6. Within 1 mile

17. Social resources:

Rate the current social resources of the person being evaluated along the six-point scale presented below. Circle the one number which best describes the person's present circumstances.

1. Excellent social resources: Social relationships are very satisfying and extensive; at least one person would take care of him/her indefinitely.

2. Good social resources: Social relationships are fairly satisfying and adequate and at least one person would take care of him/her indefinitely.
   OR
   Social relationships are very satisfying and extensive; and only short-term help is available.

3. Mildly socially impaired: Social relationships are unsatisfactory, of poor quality, few; but at least one person would take care of him/her indefinitely.
   OR
   Social relationships are fairly satisfactory, adequate and only short-term help is available.

4. Moderately socially impaired: Social relationships are unsatisfactory, of poor quality, few; and only short-term care is available.
   OR
   Social relationships are at least adequate or satisfactory; but help would only be available now and then.

5. Severely socially impaired: Social relationships are unsatisfactory, of poor quality, few; and help would only be available now and then.
   OR
   Social relationships are at least satisfactory or adequate; but help is not even available now and then.

6. Totally socially impaired: Social relationships are unsatisfactory, of poor quality, few; and help is not even available now and then.

18. Economic Resources:

Rate the current economic resources of the person being evaluated along the six-point scale presented below. Circle the one number which best describes the person's present circumstances. (Income is considered to be adequate if all the subject's needs are being met.)

1. Economic resources are excellent: Income is ample; subject has reserves.

2. Economic resources are satisfactory: Income is ample; subject has no reserves.
   OR
   income is adequate, subject has reserves.

3. Economic resources are mildly impaired: Income is adequate; subject has no reserves.
   OR
   Income is somewhat inadequate; subject has reserves.

4. Economic resources are moderately impaired: Income is somewhat inadequate; subject has no reserves.

5. Economic resources are severely impaired: Income is totally inadequate; subject may or may not have reserves.

6. Economic resources are completely impaired: Subject is destitute, completely without income or reserves.

19. Mental Health:

Rate the current mental functioning of the person being evaluated along the six-point scale presented below. Circle the one number which best describes the person's present functioning.

1. Outstanding mental health: Intellectually alert and clearly enjoying life. Manages routine and major problems in his life with ease and is free from any psychiatric symptoms.

2. Good mental health: Handles both routine and major problems in his life satisfactorily and is intellectually intact and free of psychiatric symptoms.

3. Mildly mentally impaired: Has mild psychiatric symptoms and/or mild intellectual impairment. Continues to handle routine, though not major, problems in his life satisfactorily.

4. Moderately mentally impaired: Has definite psychiatric symptoms, and/or moderate intellectual impairment. Able to make routine, common-sense decisions, but unable to handle major problems in his life.

5. Severely mentally impaired: Has severe psychiatric symptoms and/or severe intellectual impairment, which interferes with routine judgments and decision-making in every day life.

6. Completely mentally impaired: Grossly psychotic or completely impaired intellectually. Requires either intermittent or constant supervision because of clearly abnormal or potentially harmful behavior.

20. Physical Health:

Rate the current physical functioning of the person being evaluated along the six-point scale presented below. Circle the one number which best describes the person's present functioning.

1. In excellent physical health: Engages in vigorous physical activity, either regularly or at least from time to time.

2. In good physical health: No significant illnesses or disabilities. Only routine medical care such as annual check ups required.

3. Mildly physically impaired: Has only minor illnesses and/or disabilities which might benefit from medical treatment or corrective measures.

4. Moderately physically impaired: Has one or more diseases or disabilities which are either painful or which require substantial medical treatment.

5. Severely physically impaired: Has one or more illnesses or disabilities which are either severely painful or life threatening, or which require extensive medical treatment.

6. Totally physically impaired: Confined to bed and requiring full time medical assistance or nursing care to maintain vital bodily functions.

21. ADL Performance:

Rate the current performance of the person being evaluated on the six-point scale presented below. Circle the one number which best describes the person's present functioning.

1. Excellent ADL capacity: Can perform all of the activities of daily living without assistance and with ease.

2. Good ADL capacity: Can perform all of the activities of daily living without assistance.

3. Mildly impaired ADL capacity: Can perform all but one to three of the activities of daily living. Some help is required with one to three, but not necessarily every day. Can get through any single day without help. Is able to prepare his own meals.

4. Moderately impaired ADL capacity: Regularly requires assistance with at least four activities of daily living but is able to get through any single day without help. Or regularly requires help with meal preparation.

5. Severely impaired ADL capacity: Needs help each day but not necessarily throughout the day or night with many of the activities of daily living.

6. Completely impaired ADL capacity: Needs help throughout the day and/or night to carry out the activities of daily living.

22. Community Type:

In which type of community do you reside?

1. A farm or ranch
2. The country, but not a farm or ranch
3. A town or small city (less than 25,000 or more people)
4. A city (25,000 or more people, but less than 100,000)
5. A suburb of a large city
6. A large city (100,000 or more people)

Items From Which Service Use and Source of Service are Constructed:

Checking Service

During the past 6 months have you had someone regularly (at least five times a week) check on you by phone or in person to make sure you were all right? (Checking can be done by either persons living with subject or by any others.)

1. No
2. Yes

If yes, who checked on you?

1. Other (specify) _____
2. Agency (specify) _____
3. Friend/neighbor
4. Other family member
5. Spouse

Continuous Supervision Service

During the past 6 months was there any period when someone had to be with you all the time to look after you?

1. No
2. Yes

If yes, who helped?

1. Other (specify) _____
2. Agency (specify) _____
3. Friend/neighbor
4. Other family member
5. Spouse

Homemaker-Household Service

During the past 6 months did someone have to help you regularly with routine household chores such as cleaning, washing clothes, etc.? That is, did your wife/husband or someone else have to do them because you were unable to?

1. No
2. Yes

If yes, who helped you the most with household chores?

1. Other (specify) _____
2. Agency (specify) _____
3. Friend/neighbor
4. Other family member
5. Spouse

Meal Preparation Service

During the past 6 months, did someone regularly have to prepare meals for you? That is, did your wife/husband or someone else regularly cook because you were unable to or did you have to go out for meals?

1. No
2. Yes

If yes, who usually prepared meals for you?

1. Other (specify) _____
2. Agency (specify) _____
3. Friend/neighbor
4. Other family member
5. Spouse

Nursing Care Service

During the past 6 months have you had nursing care, in other words did a nurse, nurse's aid, family member or someone else give you treatments or medications prescribed by a doctor? (Includes administration of medications--either oral or injection, intervaneous or intra-muscular therapy, changing dressings, catheter care, and taking blood pressure or temperature but excludes nursing care while in the hospital.)

1. No
2. Yes

Nursing Care Service (Continued)

If yes, who helped?

1. Agency (specify) _____
2. Professional (specify) _____
3. Relative
4. Friend/neighbor
5. Other (specify) _____

Personal Care Service

In the past 6 months has someone helped you with your personal care, for example, helping you to bathe or dress, feeding you, or helping you with toilet care? (Exclude weekly trip to hair dresser.)

1. No
2. Yes

If yes, who helped?

1. Agency (specify) _____
2. Professional (specify) _____
3. Relative
4. Friend/neighbor
5. Other (specify) _____

APPENDIX B

IN-HOME CARE SERVICES

Definition of In-Home Care Services

Checking Service: having someone to check on another individual by telephone or in person at least five times a week to make sure the other individual is all right.

Continuous Supervision Service: having someone present at all times to look after another individual.

Homemaker-Household Service: regular help with routine household chores such as cleaning and washing clothes because the individual was unable to perform the task.

Meal Preparation Service: regular preparation of meals by someone else because individual was unable to prepare own meals.

Nursing Care Service: administration of treatments or medications prescribed by a doctor (includes administration of medication, intraveneous or intra-muscular therapy, changing dressings, catheter care, monitoring blood pressure and temperature but excludes nursing care while in the hospital).

Personal Care Service: help with bathing, dressing, feeding and toileting (excluded services of a hairdresser).

APPENDIX C

SOURCES OF IN-HOME CARE SERVICE

Sources of In-home Care Service[a]

1. Informal: in-home service provided by spouse, other family members, or friends/neighbor.

2. Formal: in-home services provided by agencies, professionals, or other (a list of organizations, businesses, and groups enumerated in the Statewide Survey of Older Virginians).

3. Combination (informal/formal): in-home services provided from both informal and formal sources. That is, all individuals who use any services who do not qualify as users of only formal or only informal services.

---

[a]For a respondent to qualify as either an informal, formal, or combination service user he or she must use all services from the designated source and none from another source. Missing values, however, do not preclude the inclusion of an individual respondent in a designated category providing the service user meets the other criteria for inclusion.

APPENDIX D

SERVICE USE

Service Use

Variable	Variable Labels
Service use	(0) Used no in-home care service in the past six months.
	(1) Used one in-home care service in the past six months.
	(2) Used two in-home care services in the past six months.
	(3) Used three in-home care services in the past six months.
	(4) Used four in-home care services in the past six months.
	(5) Used five in-home care services in the past six months.
	(6) Used six in-home care services in the past six months.

APPENDIX E

SOCIODEMOGRAPHIC VARIABLES

Sociodemographic Variables

Variable	Value Labels[a]
Marital status	(1) Married (0) Not married
Living arrangement	(1) Lives alone (0) Doesn't live alone
Age	(60) 60 years old Continuous variable (60-99) (99) 99 years old or older
Race	(1) White (0) Nonwhite
Education	(1) 0-4 years (2) 5-8 years (3) High school incomplete (4) High school complete (5) Post high school, business or trade school (6) 1-3 years college (7) 4 years college completed (8) Post graduate college
Sex	(1) Male (0) Female
Income	(1) Less than $5,000 (2) $5,000-$9,999 (3) $10,000-$19,999 (4) $20,000-$29,999 (5) $30,000-$39,999 (6) More than $40,000
Has a car	(1) Yes (0) No
Drives a car	(1) Yes (0) No
Has a telephone	(1) Yes (0) No

Sociodemographic Variables (Continued)

Variable	Value Labels[a]	
Has a confidant	(1)	Yes
	(0)	No
Network satisfaction	(1)	Satisfied
	(0)	Dissatisfied
Visits to family	(1)	Not at all
	(2)	Once
	(3)	Two-six times
	(4)	Once a day or more
Visits to friends	(1)	Not at all
	(2)	Once
	(3)	Two-six times
	(4)	Once a day or more
Distance to family	(1)	No relatives
	(2)	More than 135 miles
	(3)	More than 35 miles; within 135 miles
	(4)	More than 5 miles; within 35 miles
	(5)	More than 1 mile; within 5 miles
	(6)	Within 1 mile
Distance to friend	(1)	No friends
	(2)	More than 135 miles
	(3)	More than 35 miles; within 135 miles
	(4)	More than 5 miles; within 35 miles
	(5)	More than 1 mile; within 5 miles
	(6)	Within 1 mile

[a]Value labels reflect the manner in which the items presented in Appendix A have been recoded to represent the independent variables in this study.

APPENDIX F

FUNCTIONAL IMPAIRMENT VARIABLES

Functional Impairment Variables

Variable	Value	Labels
Social resources	(1)	Excellent social resources
	(2)	Good social resources
	(3)	Mildly socially impaired
	(4)	Moderately socially impaired
	(5)	Severely socially impaired
	(6)	Totally socially impaired
Economic resources	(1)	Economic resources are excellent
	(2)	Economic resources are satisfactory
	(3)	Economic resources are mildly impaired
	(4)	Economic resources are moderately impaired
	(5)	Economic resources are severely impaired
	(6)	Economic resources are completely impaired
Mental health	(1)	Outstanding mental health
	(2)	Good mental health
	(3)	Mildly mentally impaired
	(4)	Moderately mentally impaired
	(5)	Severely mentally impaired
	(6)	Completely mentally impaired
Physical health	(1)	In excellent physical health
	(2)	In good physical health
	(3)	Mildly physically impaired
	(4)	Moderately physically impaired
	(5)	Severely physically impaired
	(6)	Totally physically impaired
Activities of daily living (ADL) performance	(1)	Excellent ADL capacity
	(2)	Good ADL capacity
	(3)	Mildly impaired ADL capacity
	(4)	Moderately impaired ADL capacity
	(5)	Severely impaired ADL capacity
	(6)	Completely impaired ADL capacity

APPENDIX G

CATEGORIZATION OF INDEPENDENT VARIABLES ACCORDING TO ANDERSEN'S MODEL OF HEALTH SERVICES UTILIZATION

Categorization of Independent Variables According to Andersen's Model of Health Services Utilization

Predisposing Variables

Marital status
Living arrangement
Age
Race
Education
Sex

Enabling Variables

Income
Has a car
[a]Drives a car
Has a telephone
Has a confidant
Network satisfaction
Visits to family
Visits to friends
Distance to family
Distance to friend

Need Variables

Social resources
Economic resources
Mental health
Physical health
ADL performance

---

[a]Drives a car was deleted from the list of independent variables subsequent to the execution of the SAS Proc Corr procedure because it was highly correlated (r = .81) with has a car.

APPENDIX H

RESPONDENT CONSENT FORM

Respondent Consent Form

Statewide Survey of Older Virginians

Investigator: William J. McAuley

I, , agree to participate in an interview about one hour in length in which I will be asked questions concerning my opinions about services and my ability to do things and take care of myself.

I have been told that all the information I give will be held strictly confidential. I understand that none of the information will be used for any other purpose than this research project. I realize that I may withdraw at any time.

The interviewer will be happy to answer any questions you may have.

Respondent's Signature Date

Interviewer's Signature Date

APPENDIX I

PEARSON r CORRELATIONS, MEANS, AND STANDARD DEVIATIONS FOR VARIABLES IN SUBSAMPLES

TABLE 22

Pearson r Correlations, Means, and Standard Deviations of Variables in Rural Subsample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.93	0.25	1.000											
2. Age	69.76	7.23	-.044	1.000										
3. Sex	0.42	0.48	-.049	-.072	1.000									
4. Race	0.86	0.33	.149	-.035	-.044	1.000								
5. Education	3.21	1.82	.172	-.125	-.067	.227	1.000							
6. Marital status	0.58	0.48	.101	-.320	.370	.069	.084	1.000						
7. Living arrangement	0.22	0.40	-.091	.142	-.214	.045	.008	-.623	1.000					
8. Visits to family	2.38	1.05	-.021	-.008	-.091	.058	-.078	-.055	.151	1.000				
9. Visits to friends	2.50	1.02	-.016	-.075	.033	.104	.149	-.016	.124	.204	1.000			
10. Has a confidant	0.96	0.20	.044	.028	.032	.044	.048	.079	-.047	.095	.074	1.000		
11. Network satisfaction	0.70	0.44	.021	-.035	.046	-.037	.066	.018	-.004	.132	.076	.020	1.000	
12. Income	6.41	2.72	.120	-.312	.260	.183	.411	.372	-.139	.010	.132	.042	.060	1.000
13. Distance to family	4.89	1.30	-.022	.034	-.006	-.117	-.324	-.003	.025	.437	-.041	.035	.114	-.158
14. Distance to friend	5.78	0.69	.018	-.077	.039	.002	-.031	.074	.043	.108	.160	.103	.048	.050
15. Has a car	0.68	0.45	.172	-.316	.296	.192	.297	.432	-.105	-.013	.113	.016	.109	.398
16. Social resources	2.06	0.95	-.108	.118	-.022	-.105	-.228	-.166	.117	-.184	-.249	-.270	-.172	.241
17. Economic resources	2.51	1.05	-.197	.127	-.059	-.266	-.475	-.211	.068	-.037	-.187	-.129	-.117	-.487
18. Mental health	2.15	0.85	-.094	.238	-.010	-.105	-.322	-.181	.005	-.038	-.253	-.086	-.188	-.292
19. Physical health	2.86	1.00	-.059	.179	-.003	-.023	-.178	-.070	-.049	-.012	-.124	-.083	-.092	-.167
20. ADL performance	2.16	1.10	-.072	.379	-.050	-.069	-.245	-.205	-.070	-.051	-.152	-.065	-.171	-.300
21. Source of service	2.08	0.53	.016	.170	.045	-.029	-.138	.002	-.196	-.033	-.069	-.032	-.044	-.089
22. Service use	0.79	1.16	-.039	.213	-.103	-.004	-.108	-.194	.051	.051	-.045	-.017	-.017	.193

TABLE 22 (Continued)

Variable	13	14	15	16	17	18	19	20	21	22
1. Has a telephone										
2. Age										
3. Sex										
4. Race										
5. Education										
6. Marital status										
7. Living arrangement										
8. Visit to family										
9. Visit to friends										
10. Has a confidant										
11. Network satisfaction										
12. Income										
13. Distance to family	1.000									
14. Distance to friend	.155	1.000								
15. Has a car	-.093	.102	1.000							
16. Social resources	-.024	-.149	-.167	1.000						
17. Economic resources	.174	-.018	-.392	.465	1.000					
18. Mental health	.062	-.168	-.340	.406	.406	1.000				
19. Physical health	.063	-.040	-.216	.270	.325	.487	1.000			
20. ADL performance	.043	-.131	-.412	.292	.354	.599	.619	1.000		
21. Source of service	.043	-.141	.213	.010	.121	.365	.293	.472	1.000	
22. Service use	.085	-.138	-.281	.109	.139	.334	.376	.626	.576	1.000

TABLE 23

Pearson r Correlations, Means, and Standard Deviations of Variables in Urban Subsample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.96	0.21	1.000											
2. Age	69.72	7.89	-.012	1.000										
3. Sex	0.40	0.51	-.053	-.118	1.000									
4. Race	0.75	0.45	.089	.013	-.033	1.000								
5. Education	3.70	2.06	.114	-.139	.023	.348	1.000							
6. Marital status	0.52	0.52	.152	-.398	.327	.118	.172	1.000						
7. Living arrangement	0.24	0.45	-.114	.179	-.178	.048	.013	-.576	1.000					
8. Visits to family	2.28	1.12	.093	-.045	-.029	.044	.001	.012	.060	1.000				
9. Visits to friends	2.57	1.12	.028	-.064	.016	.120	.124	.051	.113	.213	1.000			
10. Has a confidant	0.96	0.21	.115	.011	-.058	.061	.038	.075	-.071	.162	.157	1.000		
11. Network satisfaction	0.76	0.45	.047	-.054	.053	-.085	.065	.054	-.044	.088	.109	.028	1.000	
12. Income	7.36	3.17	.108	-.315	.286	.269	.501	.428	-.132	-.007	-.027	.064	.067	1.000
13. Distance to family	4.53	1.43	-.001	-.028	-.021	-.123	-.182	-.053	-.038	.402	.019	.121	.134	-.081
14. Distance to friend	5.60	1.09	.014	-.095	-.018	-.006	-.089	.104	.051	.201	.327	.181	.089	.095
15. Has a car	0.64	0.50	.158	-.407	.279	.280	.354	.444	-.135	.120	.162	.052	.094	.489
16. Social resources	1.96	1.03	-.246	.161	-.054	-.129	-.272	-.234	-.139	-.272	-.318	-.289	-.179	-.289
17. Economic resources	2.14	1.14	-.138	.134	-.007	-.353	-.534	-.240	.056	-.046	-.128	-.143	-.110	-.535
18. Mental health	2.01	1.01	-.101	.140	-.053	-.153	-.313	-.143	-.036	-.145	-.248	-.198	-.170	-.300
19. Physical health	2.68	1.03	.003	.167	-.019	-.141	-.226	-.120	-.022	-.100	-.174	-.061	-.056	-.251
20. ADL performance	2.02	1.22	-.035	.372	-.060	-.113	-.248	-.194	-.022	-.140	-.170	-.076	-.149	-.321
21. Source of service	2.01	0.70	.142	.065	.075	-.080	-.113	-.140	-.255	-.054	-.207	.003	.042	.072
22. Service use	0.69	1.17	.030	.263	-.115	-.175	-.165	-.143	.020	-.015	-.044	.006	-.090	-.232

TABLE 23 (Continued)

Variable	13	14	15	16	17	18	19	20	21	22
1. Has a telephone										
2. Age										
3. Sex										
4. Race										
5. Education										
6. Marital status										
7. Living arrangement										
8. Visits to family										
9. Visits to friends										
10. Has a confidant										
11. Network satisfaction										
12. Income										
13. Distance to family	1.000									
14. Distance to friend	.176	1.000								
15. Has a car	-.042	.219	1.000							
16. Social resources	-.068	-.278	-.310	1.000						
17. Economic resources	.072	-.148	-.422	.476	1.000					
18. Mental health	-.012	-.314	-.318	.514	.501	1.000				
19. Physical health	-.060	-.179	-.255	.292	.371	.505	1.000			
20. ADL performance	-.091	-.316	-.379	.339	.427	.634	.640	1.000		
21. Source of service	.089	-.166	-.117	.003	.231	.309	.394	.456	1.000	
22. Service use	.007	-.098	-.292	.135	.226	.387	.458	.655	.515	1.000

TABLE 24

Pearson r Correlations, Means, and Standard Deviations of Variables in Rural/Informal Subsample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.92	0.26	1.000											
2. Age	69.62	7.12	.052	1.000										
3. Sex	0.42	0.48	.045	-.076	1.000									
4. Race	0.86	0.34	.140	-.042	.042	1.000								
5. Education	3.18	1.81	.172	-.134	-.063	.228	1.000							
6. Marital status	0.59	0.48	.104	-.314	.376	.071	.089	1.000						
7. Living arrangement	0.22	0.40	-.098	.141	-.214	.040	.006	-.625	1.000					
8. Visits to family	2.37	1.05	-.022	-.010	-.093	.062	-.072	-.052	.157	1.000				
9. Visits to friends	2.51	1.02	-.014	-.066	.039	.107	.148	-.016	.119	.204	1.000			
10. Has a confidant	0.98	0.20	.048	.037	.025	.049	.052	.070	-.048	.094	.067	1.000		
11. Network satisfaction	0.71	0.44	.025	-.034	.053	-.031	.082	.019	-.002	.126	.075	.004	1.000	
12. Income	6.42	2.70	.122	-.314	.260	.187	.427	.373	-.135	.013	.138	.034	.066	1.000
13. Distance to family	4.90	1.30	-.024	.034	-.009	-.119	-.318	-.011	.037	.431	-.032	.021	.117	-.164
14. Distance to friend	5.79	0.67	.024	-.050	-.390	.009	-.021	.084	.037	.104	.154	.071	.040	.040
15. Has a car	0.68	0.45	.175	-.311	.313	.194	.297	.435	-.111	-.015	.104	.004	.102	.405
16. Social resources	2.05	0.95	-.115	.118	-.026	-.112	-.228	-.164	-.117	-.177	-.249	-.259	-.173	-.249
17. Economic resources	2.51	1.05	-.197	.134	-.067	-.266	-.482	-.217	.069	-.026	-.181	-.139	-.117	-.498
18. Mental health	2.13	0.84	-.098	.220	-.023	-.115	-.338	-.185	.015	-.034	-.241	-.078	-.187	-.300
19. Physical health	2.83	0.98	-.067	.178	-.015	-.031	-.193	-.068	-.042	-.001	-.119	-.090	-.081	-.183
20. ADL performance	2.11	1.06	-.082	.377	-.065	-.080	-.284	-.199	-.075	-.037	-.142	-.039	-.154	-.318
21. Service use	0.72	1.09	-.059	.245	-.105	-.029	-.141	-.201	.050	.072	-.048	.002	-.039	-.208

TABLE 24 (Continued)

Variable	13	14	15	16	17	18	19	20	21
1. Has a telephone									
2. Age									
3. Sex									
4. Race									
5. Education									
6. Marital status									
7. Living arrangement									
8. Visits to family									
9. Visits to friends									
10. Has a confidant									
11. Network satisfaction									
12. Income									
13. Distance to family	1.000								
14. Distance to friend	.158	1.000							
15. Has a car	-.091	.099	1.000						
16. Social resources	-.019	-.147	-.158	1.000					
17. Economic resources	.175	-.019	-.391	.470	1.000				
18. Mental health	.060	-.143	-.331	.414	.413	1.000			
19. Physical health	.066	-.030	-.204	.271	.327	.478	1.000		
20. ADL performance	.058	-.111	-.401	.293	.367	.597	.609	1.000	
21. Service use	.092	-.139	-.291	.102	.144	.341	.362	.617	1.000

TABLE 25

Pearson r Correlations, Means, and Standard Deviations of Variables in Urban/Informal Subsample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.96	0.21	1.000											
2. Age	69.44	7.79	-.015	1.000										
3. Sex	0.41	0.51	-.075	-.124	1.000									
4. Race	0.75	0.45	.067	.009	-.036	1.000								
5. Education	3.70	2.06	.115	-.164	.029	.361	1.000							
6. Marital status	0.53	0.52	.146	-.400	.326	.114	.197	1.000						
7. Living arrangement	0.24	0.44	-.126	.167	-.171	.028	-.011	-.582	1.000					
8. Visits to family	2.31	1.10	.085	-.049	-.039	.060	-.005	.021	.058	1.000				
9. Visits to friends	2.58	1.11	.017	-.068	.025	.132	.119	.054	.113	.196	1.000			
10. Has a confidant	0.96	0.20	.102	.015	-.063	.085	.029	.056	-.069	.146	.125	1.000		
11. Network satisfaction	0.76	0.45	.040	-.067	.061	-.079	.051	.049	-.042	.075	.089	.006	1.000	
12. Income	7.41	3.19	.090	-.317	.299	.266	.510	.436	.148	-.134	-.001	.035	.062	1.000
13. Distance to family	4.57	1.41	.008	-.011	-.023	-.108	-.192	-.048	.029	.393	-.009	.129	.148	-.096
14. Distance to friend	5.66	0.94	.008	-.069	.035	.018	.067	.103	.070	.189	.286	.113	.056	.078
15. Has a car	0.66	0.50	.152	-.421	.274	.301	.369	.451	-.138	.109	.147	.018	.083	.488
16. Social resources	1.92	0.98	-.226	.159	-.069	-.145	-.290	-.240	.141	-.271	-.293	-.246	-.154	-.288
17. Economic resources	2.13	1.11	-.097	.153	-.090	-.351	-.550	-.253	.086	-.041	-.092	-.103	-.099	.538
18. Mental health	1.95	0.92	-.052	.132	-.047	-.154	.340	-.128	-.035	-.118	-.210	-.141	-.172	-.292
19. Physical health	2.62	0.99	-.003	.139	-.020	-.168	-.249	-.109	-.036	-.076	-.161	-.045	-.162	-.263
20. ADL performance	1.90	1.08	-.016	.365	-.068	-.122	-.281	-.192	-.017	-.112	-.145	-.025	-.162	-.335
21. Service use	0.55	0.99	.070	.236	-.112	-.223	-.211	-.154	.032	.038	-.027	.021	-.094	-.235

TABLE 25 (Continued)

Variable	13	14	15	16	17	18	19	20	21
1. Has a telephone									
2. Age									
3. Sex									
4. Race									
5. Education									
6. Marital status									
7. Living arrangement									
8. Visits to family									
9. Visits to friends									
10. Has a confidant									
11. Network satisfaction									
12. Income									
13. Distance to family	1.000								
14. Distance to friend	.161	1.000							
15. Has a car	-.071	-.174	1.000						
16. Social resources	.072	-.189	-.283	1.000					
17. Economic resources	.075	.087	-.423	.450	1.000				
18. Mental health	-.004	-.201	-.272	.460	.466	1.000			
19. Physical health	-.019	-.112	-.229	.282	.392	.517	1.000		
20. ADL performance	-.067	-.199	-.354	.296	.434	.603	.613	1.000	
21. Service use	.074	-.051	-.262	.090	.240	.358	.395	.575	1.000

TABLE 26

Pearson r Correlations, Means, and Standard Deviations of Variables in Rural/Formal Subsample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.94	0.24	1.000											
2. Age	68.32	6.66	-.055	1.000										
3. Sex	0.48	0.49	-.027	-.035	1.000									
4. Race	0.85	0.34	.138	-.107	-.055	1.000								
5. Education	3.53	1.95	.190	-.151	-.105	.301	1.000							
6. Marital status	0.68	0.46	.119	-.305	.315	.100	.054	1.000						
7. Living arrangement	0.19	0.38	-.135	.198	-.192	-.010	.009	-.684	1.000					
8. Visits to family	2.27	1.07	-.012	-.058	-.083	.055	-.063	.019	.058	1.000				
9. Visits to friends	2.55	1.00	-.044	-.101	.013	.136	.154	-.045	.169	.266	1.000			
10. Has a confidant	0.95	0.20	-.046	.001	-.004	.042	.090	.095	-.092	.098	.051	1.000		
11. Network satisfaction	0.72	0.44	.011	-.004	.049	-.059	.069	-.005	-.035	.119	.037	.053	1.000	
12. Income	6.95	2.98	.127	-.294	.243	.240	.451	.315	-.143	.044	.146	.051	.037	1.000
13. Distance to family	4.73	1.40	-.011	.005	-.002	-.121	-.339	.065	-.042	.481	.018	.162	.097	-.157
14. Distance to friend	5.81	0.63	-.024	-.045	.030	.080	-.024	.070	.038	.133	.175	.105	-.026	.009
15. Has a car	0.79	0.39	.155	-.206	.266	.277	.285	.351	-.091	.043	.153	.009	.057	.362
16. Social resources	1.97	1.00	-.150	.121	-.045	-.185	-.271	-.205	.216	-.205	-.267	-.286	-.127	-.284
17. Economic resources	2.35	1.07	-.254	.184	-.081	-.319	-.532	-.242	.126	-.031	-.190	-.115	-.079	-.559
18. Mental health	1.92	0.73	-.164	.195	-.021	-.118	-.329	-.151	.091	-.059	-.276	-.160	-.129	-.332
19. Physical health	2.54	0.87	-.098	.130	.000	.012	-.159	-.010	.032	.004	-.117	-.078	-.032	-.134
20. ADL performance	1.68	0.70	-.065	.319	-.029	-.066	-.243	.094	-.006	-.032	-.172	-.138	-.112	-.265
21. Service use	0.03	0.22	.034	.037	-.077	.054	-.054	.007	.052	.029	.030	.028	-.027	-.058

TABLE 26 (Continued)

Variable	13	14	15	16	17	18	19	20	21
1. Has a telephone									
2. Age									
3. Sex									
4. Race									
5. Education									
6. Marital status									
7. Living arrangement									
8. Vists to family									
9. Visits to friends									
10. Has a confidant									
11. Network satisfaction									
12. Income									
13. Distance to family	1.000								
14. Distance to friend	.148	1.000							
15. Has a car	-.071	.134	1.000						
16. Social resources	-.033	-.160	-.186	1.000					
17. Economic resources	.187	.005	-.436	.490	1.000				
18. Mental health	.071	-.089	-.268	.474	.464	1.000			
19. Physical health	.056	-.020	-.046	.229	.243	.416	1.000		
20. ADL performance	-.085	-.059	-.213	.306	.377	.522	.502	1.000	
21. Service use	.003	-.014	.066	-.011	-.048	.034	.055	.109	1.000

TABLE 27

Pearson r Correlations, Means, and Standard Deviations of Variables in Urban/Formal Subsample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.94	0.24	1.000											
2. Age	68.12	7.15	-.065	1.000										
3. Sex	0.46	0.53	-.038	-.093	1.000									
4. Race	0.82	0.41	.124	.063	.005	1.000								
5. Education	4.07	2.17	.169	-.112	.047	.361	1.000							
6. Marital status	0.61	0.52	.231	-.350	.294	.166	.179	1.000						
7. Living arrangement	0.22	0.43	.191	.278	-.168	-.011	.055	-.639	1.000					
8. Visits to family	2.27	1.14	.088	-.071	-.026	.026	.031	.037	-.014	1.000				
9. Visits to friends	2.65	1.14	.057	-.049	-.011	.213	.126	.102	.026	.242	1.000			
10. Has a confidant	0.96	0.21	.179	-.011	-.058	.130	.110	.125	-.095	.188	.109	1.000		
11. Network satisfaction	0.79	0.43	.128	-.078	-.016	-.039	.076	.036	-.050	.047	.114	.023	1.000	
12. Income	7.98	3.36	.135	-.257	.325	.236	.471	.401	-.188	-.009	.009	.136	.055	1.000
13. Distance to family	4.45	1.43	.003	-.045	-.007	.086	-.200	-.076	.020	.392	.017	.203	.076	-.019
14. Distance to friend	5.71	0.87	.091	-.035	.062	.022	.058	.091	.004	.131	.294	.198	.077	.063
15. Has a car	0.75	0.46	.235	-.325	.303	.271	.339	.448	-.164	.100	.141	.080	.068	.466
16. Social resources	1.84	1.06	-.371	.183	-.049	-.197	-.278	-.275	.186	.239	-.326	-.308	-.146	-.309
17. Economic resources	1.93	1.09	-.241	.105	-.107	-.422	-.531	-.303	.147	.005	-.118	-.177	-.035	-.508
18. Mental health	1.75	0.78	-.250	.135	-.099	-.245	-.266	-.230	.088	-.131	-.174	-.185	-.124	.275
19. Physical health	2.39	0.86	-.072	.065	-.028	-.221	-.203	-.138	.098	-.062	-.132	-.055	-.045	.223
20. ADL performance	1.57	0.73	-.191	.382	-.099	-.084	-.177	-.258	.187	-.132	-.088	-.130	-.053	-.257
21. Service use	0.06	0.35	-.133	.109	-.078	-.006	.035	-.080	.048	-.072	.026	-.053	.007	-.075

TABLE 27 (Continued)

Variable	13	14	15	16	17	18	19	20	21
1. Has a telephone									
2. Age									
3. Sex									
4. Race									
5. Education									
6. Marital status									
7. Living arrangement									
8. Visits to family									
9. Visits to friends									
10. Has a confidant									
11. Network satisfaction									
12. Income									
13. Distance to family	1.000								
14. Distance to friend	.109	1.000							
15. Has a car	-.048	.129	1.000						
16. Social resources	-.032	.225	.293	1.000					
17. Economic resources	.117	-.082	-.411	.462	1.000				
18. Mental health	.012	-.119	-.233	.556	.466	1.000			
19. Physical health	.029	-.061	-.167	.297	.291	.408	1.000		
20. ADL performance	-.003	-.143	-.260	.381	.343	.478	.417	1.000	
21. Service use	.001	-.006	-.126	.134	.055	.225	.131	.362	1.000

TABLE 28

Pearson r Correlations, Means, and Standard Deviations of Variables in Rural/Combination Subsample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.94	0.24	1.000											
2. Age	68.39	6.66	-.052	1.000										
3. Sex	0.49	0.49	-.028	-.001	1.000									
4. Race	0.86	0.34	.151	-.107	-.047	1.000								
5. Education	3.50	1.95	.186	-.189	.083	.293	1.000							
6. Marital status	0.67	0.46	.119	-.294	.302	.102	.083	1.000						
7. Living arrangement	0.19	0.38	-.130	.178	-.179	-.008	-.028	-.667	1.000					
8. Visits to family	2.27	1.07	-.010	-.020	-.091	.051	-.075	-.009	.075	1.000				
9. Visits to friends	2.54	1.01	-.046	-.104	.003	.136	.156	-.028	.145	.269	1.000			
10. Has a confidant	0.95	0.21	.043	.043	.005	.036	.102	.099	-.106	.086	.048	1.000		
11. Network satisfaction	0.71	0.44	.005	-.000	.036	-.070	.063	-.002	-.035	.126	.045	.076	1.000	
12. Income	6.93	2.95	.130	-.292	.247	.244	.473	.334	-.166	.020	.141	.033	.014	1.000
13. Distance to family	4.76	1.38	-.003	.064	-.016	-.113	-.340	.031	-.012	.478	.009	.057	.095	-.179
14. Distance to friend	5.81	0.62	-.026	-.015	.017	.076	-.014	.038	.040	.141	.172	.063	-.003	-.001
15. Has a car	0.78	0.41	.146	-.236	.255	.260	.289	.369	-.111	.036	.158	.005	.088	.366
16. Social resources	1.98	1.01	-.136	.119	-.044	-.171	-.280	-.215	.226	-.209	-.262	-.299	-.291	-.145
17. Economic resources	2.38	1.08	-.249	.197	-.086	-.331	-.525	-.242	.128	-.041	-.208	-.122	-.100	-.579
18. Mental health	1.95	0.75	-.163	.210	.014	-.108	-.331	-.164	.106	-.056	-.265	-.123	-.169	-.320
19. Physical health	2.59	0.91	-.086	.151	.026	.020	-.113	-.044	.034	-.013	-.111	-.073	-.096	-.128
20. ADL performance	1.75	0.82	-.057	.289	.023	-.054	-.205	-.131	.020	-.050	-.164	-.122	-.194	-.207
21. Service use	0.14	0.70	.049	.086	-.043	.078	.029	-.092	.049	-.020	-.030	-.059	-.117	-.039

TABLE 28 (Continued)

Variable	13	14	15	16	17	18	19	20	21
1. Has a telephone									
2. Age									
3. Sex									
4. Race									
5. Education									
6. Marital status									
7. Living arrangement									
8. Visits to family									
9. Visits to friends									
10. Has a confidant									
11. Network satisfaction									
12. Income									
13. Distance to family	1.000								
14. Distance to friend	.125	1.000							
15. Has a car	-.083	.117	1.000						
16. Social resources	-.031	-.155	-.203	1.000					
17. Economic resources	.194	.035	-.444	.485	1.000				
18. Mental health	.086	-.082	-.296	.454	.477	1.000			
19. Physical health	.049	-.037	-.113	.233	.258	.448	1.000		
20. ADL performance	.069	-.032	-.287	.300	.376	.512	.562	1.000	
21. Service use	.030	-.064	-.129	.072	.053	.147	.260	.461	1.000

TABLE 29

Pearson r Correlations, Means, and Standard Deviations of Variables in Urban/Combination Subsample

Variable	$\bar{X}$	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Has a telephone	0.95	0.23	1.000											
2. Age	68.38	7.21	-.043	1.000										
3. Sex	0.46	0.53	-.055	-.104	1.000									
4. Race	0.81	0.42	.105	.032	.007	1.000								
5. Education	4.04	2.17	.168	-.123	.036	.367	1.000							
6. Marital status	0.59	0.52	.206	-.326	.299	.168	.178	1.000						
7. Living arrangement	0.21	0.43	-.187	.222	-.166	.005	-.035	-.611	1.000					
8. Visits to family	2.26	1.14	.077	-.072	-.059	.019	-.012	.038	-.010	1.000				
9. Visits to friends	2.62	1.15	.053	-.037	-.017	.214	.137	.089	.049	.269	1.000			
10. Has a confidant	0.96	0.21	.142	.031	-.086	.114	.103	.116	-.090	.193	.115	1.000		
11. Network satisfaction	0.78	0.44	.105	-.048	-.022	-.056	.083	.030	-.052	.090	.114	-.020	1.000	
12. Income	7.90	3.31	.106	-.269	.300	.247	.477	.382	.154	-.121	.002	.095	.030	1.000
13. Distance to family	4.42	1.44	-.001	-.093	-.014	-.100	-.202	-.047	.022	.376	.038	.198	.077	-.091
14. Distance to friend	5.61	1.07	.019	-.074	.024	.004	.080	.089	.044	.190	.336	.237	.072	.084
15. Has a car	0.72	0.47	.188	-.371	.288	.250	.350	.454	-.159	.095	.160	.079	.069	.458
16. Social resources	1.89	1.08	-.311	.143	-.046	-.167	-.310	-.244	.153	-.283	-.362	-.337	-.156	-.298
17. Economic resources	1.98	1.11	-.172	.108	-.090	-.396	-.554	-.272	.107	-.019	-.145	-.198	-.010	-.501
18. Mental health	1.84	0.91	-.135	.155	-.081	-.171	-.320	-.194	.041	-.150	-.254	-.269	-.127	-.280
19. Physical health	2.49	0.97	-.049	.119	-.041	-.202	-.241	-.160	.067	-.089	-.158	-.094	-.065	-.246
20. ADL performance	1.73	1.04	-.067	.370	-.071	-.102	-.233	-.203	.060	-.157	-.143	-.159	-.049	-.274
21. Service use	0.22	0.95	.006	.216	-.074	-.025	-.048	-.068	.002	-.075	-.057	-.011	-.046	-.123

TABLE 29 (Continued)

Variable	13	14	15	16	17	18	19	20	21
1. Has a telephone									
2. Age									
3. Sex									
4. Race									
5. Education									
6. Marital status									
7. Living arrangement									
8. Visits to family									
9. Visits to friends									
10. Has a confidant									
11. Network satisfaction									
12. Income									
13. Distance to family	1.000								
14. Distance to friend	.145	1.000							
15. Has a car	-.042	.225	1.000						
16. Social resources	-.030	-.326	-.337	1.000					
17. Economic resources	.104	-.153	-.421	.482	1.000				
18. Mental health	-.029	-.393	-.334	.602	.497	1.000			
19. Physical health	-.033	-.219	-.274	.326	.334	.472	1.000		
20. ADL performance	-.089	-.404	-.379	.394	.371	.599	.560	1.000	
21. Service use	-.100	-.147	-.235	.128	.102	.478	.383	.640	1.000

APPENDIX J

FREQUENCIES AND PERCENTAGE DISTRIBUTIONS OF INDEPENDENT VARIABLES IN SUBSAMPLES

TABLE 30

Frequencies and Percentage Distributions of Predisposing Variables in Rural/Informal and Urban/Informal Subsamples

Predisposing Variables	Rural/Informal		Urban/Informal	
	n	%	n	%
Marital Status				
Married	673	58.8	463	52.7
Not married	471	41.2	415	47.3
Living Arrangement				
Lives alone	253	22.1	208	23.8
Doesn't live alone	892	77.9	668	76.2
Age				
60-64	341	29.7	265	30.3
65-74	536	46.7	425	48.4
75-84	213	18.6	144	16.5
85+	57	5.0	42	4.8
Race				
White	982	85.7	654	74.7
Nonwhite	163	14.3	222	25.3
Education				
0-4 years	151	13.3	82	9.3
5-8 years	415	36.4	222	25.5
High school incomplete	190	16.6	166	19.0
High school complete	163	14.3	153	17.5
Post high school business or trade school	42	3.7	62	7.1
1-3 years college	83	7.3	84	9.6
4 years college completed	54	4.7	54	6.2
Post graduate	42	3.7	51	5.9
Sex				
Male	486	42.3	361	41.1
Female	663	57.7	517	58.9

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 31

Frequencies and Percentage Distributions of Enabling Variables in Rural/Informal and Urban/Informal Subsamples

Enabling Variables	Rural/Informal		Urban/Informal	
	n	%	n	%
Income				
Less than $5,000	523	50.1	300	38.7
$5,000-$9,999	280	26.8	181	23.5
$10,000-$19,999	163	15.6	157	20.3
$20,000-$29,999	46	4.4	68	8.8
$30,000-$39,999	19	1.8	24	3.1
More than $40,000	14	1.3	43	5.6
Has a Car				
Yes	779	68.1	572	65.7
No	366	31.9	299	34.3
Has a Telephone				
Yes	1059	92.4	836	95.8
No	87	7.6	37	4.2
Has a Confidant				
Yes	1056	95.7	806	96.2
No	47	4.3	32	3.8
Network Satisfaction				
Yes	780	70.8	635	75.8
No	321	29.2	202	24.2
Visits to Family				
None	325	29.2	262	31.2
One	244	22.0	173	20.6
Two-six	345	31.1	284	33.9
Seven or more	197	17.8	120	14.3
Visits to Friends				
None	269	24.2	203	24.1
One	214	19.3	114	13.6
Two-six	421	38.0	356	42.3
Seven or more	206	18.5	169	20.0

TABLE 31 (Continued)

Enabling Variables	Rural/Informal n	Rural/Informal %	Urban/Informal n	Urban/Informal %
Distance to Family				
No relatives	8	0.7	17	1.9
More than 135 miles	90	7.9	90	10.3
Between 35 and 135 miles	96	8.4	50	5.8
Between 5 and 35 miles	193	16.8	206	23.6
Between 1 and 5 miles	194	16.9	242	27.8
Less than 1 mile	566	49.4	266	30.6
Distance to Friend				
No friends	10	0.9	16	1.8
More than 135 miles	6	0.5	7	0.8
Between 35 and 135 miles	5	0.4	9	1.0
Between 5 and 35 miles	31	2.7	35	4.0
Between 1 and 5 miles	96	8.4	91	10.4
Less than 1 mile	997	87.1	717	82.1

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 32

Frequencies and Percentage Distributions of Need Variables in Rural/Informal and Urban/Informal Subsamples

Need Variables	Rural/Informal		Urban/Informal	
	n	%	n	%
Social Resources				
Excellent	340	29.6	315	36.0
Good	547	47.6	397	45.3
Mildly impaired	163	14.2	114	13.0
Moderately impaired	64	5.6	29	3.3
Severely impaired	29	2.5	14	1.6
Totally impaired	6	0.5	7	0.7
Economic Resources				
Excellent	207	18.0	307	35.1
Good	428	37.3	366	30.4
Mildly impaired	281	24.5	194	22.2
Moderately impaired	191	16.6	91	10.4
Severely impaired	39	3.4	16	1.9
Totally impaired	3	0.3	0	0.0
Mental Health				
Excellent	223	19.4	259	29.7
Good	663	57.7	471	53.9
Mildly impaired	182	15.8	96	10.9
Moderately impaired	55	4.8	27	3.1
Severely impaired	22	1.9	17	1.9
Totally impaired	3	0.3	5	0.5
Physical Health				
Excellent	58	5.0	49	5.6
Good	447	38.9	433	49.5
Mildly impaired	354	30.8	240	27.4
Moderately impaired	219	19.1	113	13.0
Severely impaired	64	5.6	38	4.4
Totally impaired	7	0.6	2	0.2
ADL Performance				
Excellent	351	30.6	353	40.3
Good	502	43.7	359	41.0
Mildly impaired	192	16.7	99	11.3
Moderately impaired	48	4.2	37	4.2
Severely impaired	32	2.8	14	1.6
Totally impaired	24	2.1	14	1.6

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 33

Frequencies and Percentage Distributions of Predisposing Variables in Rural/Formal and Urban/Formal Subsamples

Predisposing Variables	Rural/Formal n	Rural/Formal %	Urban/Formal n	Urban/Formal %
Marital Status				
Married	426	67.5	341	60.7
Not married	205	32.5	221	39.3
Living Arrangement				
Lives alone	120	19.0	121	21.5
Doesn't live alone	513	81.0	439	78.5
Age				
60-64	224	35.4	198	35.4
65-74	302	47.7	275	49.1
75-84	86	13.5	73	13.0
85+	22	3.4	14	2.5
Race				
White	541	85.5	458	81.8
Nonwhite	92	14.5	102	18.2
Education				
0-4 years	72	11.5	38	6.9
5-8 years	186	29.6	121	21.7
High school incomplete	106	16.8	95	17.0
High school complete	108	17.1	104	18.6
Post high school business or trade school	26	4.1	41	7.4
1-3 years college	60	9.6	71	12.6
4 years college completed	37	5.9	43	7.7
Post graduate	35	5.5	45	8.1
Sex				
Male	306	48.4	260	46.2
Female	327	51.6	303	53.8

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 34

Frequencies and Percentage Distributions of Enabling Variables in Rural/Formal and Urban/Formal Subsamples

Enabling Variables	Rural/Formal		Urban/Formal	
	n	%	n	%
Income				
Less than $5,000	234	41.6	148	30.4
$5,000-$9,999	142	25.5	103	21.2
$10,000-$19,999	114	20.2	117	24.0
$20,000-$29,999	38	6.9	61	12.5
$30,000-$39,999	19	3.3	20	4.2
More than $40,000	14	2.5	38	7.7
Has a Car				
Yes	502	79.4	419	75.2
No	130	20.6	138	24.8
Has a Telephone				
Yes	594	93.8	528	94.5
No	39	6.2	31	5.5
Has a Confidant				
Yes	593	95.4	525	95.8
No	28	4.6	23	4.2
Network Satisfaction				
Yes	445	71.7	429	78.5
No	176	28.3	117	21.5
Visits to Family				
None	213	33.9	183	33.4
One	140	22.3	117	21.4
Two-six	171	27.3	164	30.0
Seven or more	103	16.6	83	15.1
Visits to Friends				
None	141	22.5	124	22.5
One	113	18.0	77	14.1
Two-six	260	41.5	217	39.5
Seven or more	113	18.0	131	23.9

TABLE 34 (Continued)

Enabling Variables	Rural/Formal n	Rural/Formal %	Urban/Formal n	Urban/Formal %
Distance to Family				
No relatives	6	0.9	11	2.0
More than 135 miles	64	10.1	66	11.9
Between 35 and 135 miles	70	11.1	33	6.0
Between 5 and 35 miles	104	16.4	144	26.0
Between 1 and 5 miles	100	15.8	156	28.1
Less than 1 mile	289	45.7	145	26.1
Distance to Friend				
No friends	4	0.7	8	1.5
More than 135 miles	4	0.6	3	0.5
Between 35 and 135 miles	1	0.1	3	0.6
Between 5 and 35 miles	13	2.0	23	4.1
Between 1 and 5 miles	54	8.1	56	10.0
Less than 1 mile	557	88.4	465	83.3

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 35

Frequencies and Percentage Distributions of Need Variables in Rural/Formal and Urban/Formal Subsamples

Need Variables	Rural/Formal n	Rural/Formal %	Urban/Formal n	Urban/Formal %
Social Resources				
Excellent	231	36.5	243	43.4
Good	276	43.6	228	40.7
Mildly impaired	68	10.7	49	8.7
Moderately impaired	37	5.9	23	4.1
Severely impaired	17	2.7	11	1.9
Totally impaired	4	0.7	6	1.1
Economic Resources				
Excellent	149	23.5	249	44.5
Good	246	38.8	161	28.8
Mildly impaired	129	20.3	103	18.4
Moderately impaired	91	14.3	35	6.2
Severely impaired	17	2.7	12	2.2
Totally impaired	3	0.5	0	0.0
Mental Health				
Excellent	171	26.9	210	37.6
Good	367	57.8	297	53.1
Mildly impaired	75	11.9	41	7.4
Moderately impaired	16	2.5	5	0.9
Severely impaired	5	0.8	4	0.7
Totally impaired	0	0.0	2	0.4
Physical Health				
Excellent	53	8.3	44	7.8
Good	295	46.5	316	56.6
Mildly impaired	191	30.2	146	26.1
Moderately impaired	83	13.1	43	7.6
Severely impaired	12	1.9	11	2.0
Totally impaired	0	0.0	0	0.0
ADL Performance				
Excellent	277	43.7	287	51.4
Good	298	47.1	235	42.0
Mildly impaired	51	8.1	30	5.3
Moderately impaired	3	0.5	3	0.5
Severely impaired	2	0.4	3	0.6
Totally impaired	2	0.3	1	0.2

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 36

Frequencies and Percentage Distributions of Predisposing Variables in Rural/Combination and Urban/Combination Subsamples

Predisposing Variables	Rural/Combination		Urban/Combination	
	n	%	n	%
Marital Status				
Married	431	66.6	345	59.3
Not married	216	33.4	237	40.7
Living Arrangement				
Lives alone	122	18.8	123	21.2
Doesn't live alone	526	81.2	458	78.8
Age				
60-64	227	35.0	194	33.6
65-74	311	47.9	287	49.3
75-84	89	13.6	83	14.5
85+	22	3.5	15	2.6
Race				
White	554	85.5	471	80.9
Nonwhite	94	14.5	111	19.1
Education				
0-4 years	74	11.4	40	6.9
5-8 years	196	30.4	132	22.7
High school incomplete	110	17.0	94	16.2
High school complete	107	16.6	110	19.0
Post high school business or trade school	27	4.2	42	7.2
1-3 years college	58	9.0	73	12.6
4 years college completed	36	5.5	44	7.6
Post graduate	38	5.9	45	7.8
Sex				
Male	320	49.3	267	45.8
Female	329	50.7	316	54.2

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 37

Frequencies and Percentage Distributions of Enabling Variables in Rural/Combination and Urban/Combination Subsamples

Enabling Variables	Rural/Combination		Urban/Combination	
	n	%	n	%
Income				
Less than $5,000	240	41.5	162	31.7
$5,000-$9,999	151	26.2	110	21.6
$10,000-$19,999	114	19.7	123	24.2
$20,000-$29,999	40	7.0	57	11.2
$30,000-$39,999	19	3.2	20	4.0
More than $40,000	14	2.4	38	7.4
Has a Car				
Yes	502	77.6	418	72.3
No	145	22.4	160	27.7
Has a Telephone				
Yes	609	93.8	550	95.0
No	40	6.2	29	5.0
Has a Confidant				
Yes	604	95.3	540	95.7
No	30	4.7	24	4.3
Network Satisfaction				
Yes	447	70.6	432	77.6
No	186	29.4	125	22.4
Visits to Family				
None	147	33.8	190	33.6
One	116	22.0	123	21.6
Two-six	261	27.3	168	29.6
Seven or more	108	16.9	86	15.1
Visits to Friends				
None	147	23.0	137	24.1
One	116	18.1	78	13.7
Two-six	261	40.8	219	38.5
Seven or more	116	18.2	135	23.7

TABLE 37 (Continued)

Enabling Variables	Rural/Combination n	Rural/Combination %	Urban/Combination n	Urban/Combination %
Distance to Family				
No relatives	6	0.9	12	2.0
More than 135 miles	64	9.8	71	12.4
Between 35 and 135 miles	68	10.6	34	5.8
Between 5 and 35 miles	107	16.5	152	26.5
Between 1 and 5 miles	103	15.9	161	28.0
Less than 1 mile	301	46.4	145	25.2
Distance to Friend				
No friends	4	0.6	17	2.9
More than 135 miles	4	0.6	4	0.7
Between 35 and 135 miles	1	0.1	3	0.5
Between 5 and 35 miles	17	2.6	28	4.8
Between 1 and 5 miles	50	7.7	59	10.2
Less than 1 mile	571	88.4	469	80.9

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

TABLE 38

Frequencies and Percentage Distributions of Need Variables in Rural/Combination and Urban/Combination Subsamples

Need Variables	Rural/Combination		Urban/Combination	
	n	%	n	%
Social Resources				
Excellent	234	36.0	237	40.9
Good	284	43.8	242	41.7
Mildly impaired	69	10.7	59	10.1
Moderately impaired	39	6.0	19	3.3
Severely impaired	19	2.9	17	3.0
Totally impaired	4	0.6	5	0.9
Economic Resources				
Excellent	149	23.0	244	42.0
Good	250	38.5	170	29.3
Mildly impaired	131	20.2	111	19.2
Moderately impaired	98	15.1	43	7.5
Severely impaired	18	2.8	12	2.1
Totally impaired	3	0.4	0	0.0
Mental Health				
Excellent	168	25.9	207	35.6
Good	376	57.9	302	52.1
Mildly impaired	78	12.1	50	8.6
Moderately impaired	21	3.2	8	1.4
Severely impaired	6	0.9	7	1.3
Totally impaired	0	0.0	6	1.0
Physical Health				
Excellent	52	8.0	44	7.5
Good	297	45.8	309	53.3
Mildly impaired	189	29.1	149	25.7
Moderately impaired	90	13.9	58	10.0
Severely impaired	21	3.2	17	2.9
Totally impaired	0	0.0	3	0.5
ADL Performance				
Excellent	277	42.7	282	48.7
Good	296	45.6	229	39.5
Mildly impaired	55	8.5	38	6.6
Moderately impaired	8	1.3	11	1.9
Severely impaired	10	1.5	10	1.8
Totally impaired	3	0.5	9	1.5

Note. Frequency totals may vary because of missing values and some percentage distribution totals do not equal exactly 100% because of rounding.

The vita has been removed from the scanned document