INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.
Effects of historical periods on the structure of formal and informal care to noninstitutionalized elderly in an urban area

Diwan, Sadhna, Ph.D.

Case Western Reserve University, 1991

Copyright ©1991 by Diwan, Sadhna. All rights reserved.
EFFECTS OF HISTORICAL PERIODS ON THE STRUCTURE
OF FORMAL AND INFORMAL CARE TO NON-INSTITUTIONALIZED
ELDERLY IN AN URBAN AREA
by
SADHNA DIWAN

Submitted in partial fulfillment of the requirements
for the Degree of Doctor of Philosophy

Thesis Advisor: Claudia Coulton

Mandel School of Applied Social Sciences
CASE WESTERN RESERVE UNIVERSITY

August, 1991
CASE WESTERN RESERVE UNIVERSITY

GRADUATE STUDIES

We hereby approve the thesis of

Sadhna Divan

candidate for the Ph.D. degree. *

Signed: Claudia Laude
(Chairman)

Date 4/26/1991

*We also certify that written approval has been obtained for any proprietary material contained therein.
Copyright © (1991) by Sadhna Diwan
EFFECTS OF HISTORICAL PERIODS ON THE STRUCTURE
OF FORMAL AND INFORMAL CARE TO NON-INSTITUTIONALIZED
ELDERLY IN AN URBAN AREA

Abstract

by

SADHNA DIWAN

This study examined the changes in the structure of formal and informal care of noninstitutionalized urban elderly over a twelve year period. Using the age stratification approach, it argued that caregiving to the elderly was subject to the influence of age, period and cohort effects. The antecedents of the use of care such as functional ability, social network and demographic characteristics were examined as well as the existing models on the use of care. It was noted that extant research did not address the issue of whether the pattern of the use of care is stable across different periods of time.

Several factors that might lead to changes in the structure of care were discussed: increased participation of females in the labor force, implementation of the DRG’s, the growth of formal care agencies, the increasing level of education and income among successive cohorts of elderly and the reported lower fertility rate of the cohort born between 1905 and 1910 that had its main childbearing years during the Depression.

The difficulty in the simultaneous assessment of age, period and cohort effects was explained. The study focused on period effects on the use of formal and informal care due to the factors discussed earlier. Procedures for ruling out rival explanations due to cohort effects were outlined.
The findings showed significant interaction effects between functional status and period, and living arrangements and period on the use of care. Thus, the impact of functional status and living arrangements on the use of care were subject to change over time. There was a small but significant decline in the use of informal care over time. Contrary to the hypothesis, there was no increase in the use of formal care. The implications of this finding, given the low income range of the sample was discussed. There appear to be two divergent groups of elderly: those who need short term acute post-hospital care, and those who need chronic long term care. Future policy research needs to address both long term and short term care needs of the elderly.
ACKNOWLEDGEMENTS

As with all dissertations, this work owes its existence to the efforts many individuals. Notwithstanding my responsibility for the final outcome, there are several people who deserve credit for this work.

To Claudia Coulton, I am grateful for her guidance and encouragement. Inspite of her busy schedule, Claudia was always available to discuss ideas and provide insightful comments that helped shape and greatly improve this work.

To Terry Hokenstad and Sharon Milligan, I am thankful for their support and their probing questions which broadened and enriched this dissertation. Ann Roy was not only a valued committee member but also a friend who kept up a constant supply of references, good cheer and reminders to get on with it.

This study is based on data that was collected as part of a larger research project which was made possible by a grant (No. 5PO1 AG04391) from the National Institute on Aging. I owe a great deal to Dr. Amasa Ford and his colleagues at the Cleveland Study of the Elderly for permission to use their data for this dissertation. The three years spent as a research assistant at the Department of Epidemiology and Biostatistics taught me much of what I know about research and gerontology.

There were many times that I needed clarification on various aspects of this dissertation and I am thankful to Kathy Farkas, Marie Haug, Suchitra Nelson, Isaac Nuamah and Paul Jones who were generous in sharing their knowledge and time to help answer my questions. Thanks also to Bobby Henricks who was always pleasant and helpful in figuring out the intricacies of word processing.

To my friends, Nandita Verma, Li-yu Song, Shantha Balaswamy and Madhavi Patil, I am thankful for their friendship, laughter, and indulgence especially when I was in a mood to complain. Thanks to them, the Ph.D. became a shared experience. Nandita and Li-yu
were always gracious in helping me with the many frustrations of working with statistical software and I am grateful that they never once said, "Read the manual!"

A special thanks to my parents for their support and always encouraging me to do my best.

And finally, to Huggy Rao, my deepest thanks for being a constant source of support and strength, for helping me with countless tasks, for his insistence that I do what was best for me and for putting up with my absence.
## Table of Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and Historical Overview of Caregiving</td>
<td>1 - 6</td>
</tr>
<tr>
<td>2</td>
<td>Antecedents of Use of Care and Age Stratification Theory</td>
<td>7 - 29</td>
</tr>
<tr>
<td>3</td>
<td>Hypotheses, Research Design, Measurement and Methods</td>
<td>30 - 44</td>
</tr>
<tr>
<td>4</td>
<td>Results - Multiple Regression for Informal Care and Logistic Regression for Formal Care</td>
<td>45 - 57</td>
</tr>
<tr>
<td>5</td>
<td>Discussion of Results</td>
<td>58 - 65</td>
</tr>
<tr>
<td>6</td>
<td>Implications for theory, social policy and service delivery</td>
<td>66 - 71</td>
</tr>
</tbody>
</table>
List of Figures

Figure 1
Model of the proposed study 29

Figure 2
Sample design 34
# List of Tables

<table>
<thead>
<tr>
<th>Table No.</th>
<th>Title</th>
<th>pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Demographics of groups by household composition</td>
<td>37</td>
</tr>
<tr>
<td>3.2</td>
<td>Guttman coefficients for use of care</td>
<td>39</td>
</tr>
<tr>
<td>3.3</td>
<td>Guttman coefficients for Informal care</td>
<td>40</td>
</tr>
<tr>
<td>3.4</td>
<td>Guttman coefficients for Formal care</td>
<td>40</td>
</tr>
<tr>
<td>3.5</td>
<td>Reliability of the Informal care scale</td>
<td>41</td>
</tr>
<tr>
<td>3.6</td>
<td>Reliability of the ADL scale</td>
<td>41</td>
</tr>
<tr>
<td>3.7</td>
<td>Pearson correlations - ADL, Informal care and Age</td>
<td>42</td>
</tr>
<tr>
<td>4.1</td>
<td>Demographic characteristics of the 1975 and 1987 samples ages 77 to 88</td>
<td>45</td>
</tr>
<tr>
<td>4.2</td>
<td>Household composition of the 1975 and 1987 samples</td>
<td>46</td>
</tr>
<tr>
<td>4.3</td>
<td>Hierarchical multiple regression of Informal care</td>
<td>49</td>
</tr>
<tr>
<td>4.4</td>
<td>Regression coefficients for Informal care</td>
<td>50</td>
</tr>
<tr>
<td>4.5</td>
<td>Informal care by Period and by Living with children</td>
<td>51</td>
</tr>
<tr>
<td>4.6</td>
<td>Hierarchical logistic regression of Formal care</td>
<td>54</td>
</tr>
<tr>
<td>4.7</td>
<td>Regression coefficients for formal care</td>
<td>56</td>
</tr>
<tr>
<td>4.8</td>
<td>Interaction effects on formal care</td>
<td>57</td>
</tr>
<tr>
<td>5.1</td>
<td>Pattern of use of Formal care</td>
<td>61</td>
</tr>
<tr>
<td>5.2</td>
<td>Pattern of use of Informal care</td>
<td>62</td>
</tr>
</tbody>
</table>
Chapter 1
INTRODUCTION

The care of the elderly has become an important social issue in the last decade primarily due to an unprecedented increase in the number of people living past the age of 65 years. Although the annual rate of growth in the over 65 population is significant, even more rapid growth is expected in the older age cohorts in this group. The number of persons aged 75 to 84 will increase from 7.7 million to 12.2 million during the next two decades, while the number of persons aged 85 and older will more than double from 2.2 million to 4.9 million in the year 2000 (Koff, 1988).

Since the need for care increases with age due to declining functional capacity, the provision of care to the elderly becomes an important resource allocation issue. The issue of whether caring for the elderly is a matter of filial responsibility, (provision of care through informal sources), or a matter of governmental responsibility (providing care through formal sources) has been the subject of great debate in social policy.

Most of the elderly in need of social care live in the community rather than in institutions. About 10 percent of the total elderly population in the U.S. could be classified as 'extremely impaired' and dependent on the help of others to carry out the basic activities of daily living such as bathing, dressing, eating and toileting (U.S. General Accounting Office, 1977). 63 percent of these 'extremely impaired' people lived in the community, representing about 7 percent of all noninstitutionalized elderly. In another large health survey, Shanas (1979) found that there were twice as many bedfast or homebound elderly living at home as in institutions. Thus, caregiving to noninstitutionalized elderly has become an important issue on the research agenda in gerontology.

The literature on caregiving to noninstitutionalized elderly can be classified into two broad categories. One is concerned with the burden of caregiving on the informal providers of care. The second area, which is the focus of this research, is the patterns of caregiving
by both formal and informal sources.

Research on patterns of caregiving can be divided into two areas. The first focuses on the sources of care both formal and informal. Formal providers include agency based services as well as other paid help, while informal providers are family, friends, neighbors and church members. The second area of research provides descriptive data on user characteristics that are the antecedents of care. User characteristics that are associated with the utilization of informal and formal care are an individual's functional ability, health status, social network characteristics, and demographic characteristics such as race, gender, age, education, and socioeconomic status (Cantor and Little, 1985; Shanas, 1979; Sussman, 1977; Branch and Jette, 1983; McAuley and Arling, 1984; Scott and Roberto, 1985).

Much of the research on the patterns of formal and informal care has been conducted with cross-sectional designs which examine the use of care by different age groups at only one point in time. The assumption has been that differences across age groups represent the effects of aging and that these effects are constant over time. Consequently, extant research does not throw light on whether the use of care is stable across several points in time and obscures the differential effects of aging, cohort membership, and time of measurement on the use of care.

This study focuses on whether the use of care is stable across time. It draws on age stratification theory which identifies three forces that cause the use of care to vary: age effects, period effects and cohort effects. Age effects pertain to the impact of chronological age on the use of care. Period effects refer to the influence of social conditions on the behavior or characteristics of respondents at the time of measurement on the use of care. Cohort effects are those characteristics that are tied to a birth cohort that continue to influence its behavior such as the use of care over time (Oppenheimer, 1981; Riley, Johnson, and Foner, 1972).

The primary aim of the study is to determine whether there are period effects on the use of care. It asks several interrelated questions: 1) Are there differences in the use
of formal and informal care over time? 2) Are such differences robust? Do they persist after controlling for other determinants of care such as functional ability, social network and demographic characteristics? 3) Do factors such as age and functional status have the same effects on the use of care at two points in time?

The answers to these questions are meaningful because they can extend existing theories on the use of care by taking into account the effects of period. Thus, the social structure of care can be viewed as the result of environmental processes as well as individual characteristics and, more importantly, interactions between environmental and individual level variables. In turn, such a temporally contingent view of care can profitably inform public policy. For example, it is possible for the demand for formal care to increase with an increase in female employment because there would be a shortage of informal care providers. Furthermore, such work force changes might weaken the correlation between social resources and the use of care.

This dissertation is organized in the following manner: Chapter 1 provides the introduction to the research problem and the historical context of the issue of formal versus informal care. Chapter 2 reviews the literature on the antecedents of the use of care and highlights the lack of research on the changing nature of care for similar age groups at different periods. This chapter also discusses age stratification theory to develop a model of the use of care over time. Chapter 3 presents the hypotheses, methods, research design, sample, operational definitions and the validity and reliability of measurement. Results and interpretation of data analysis are discussed in chapter 4. Chapter 5 contains a discussion of the results. Implications and suggestions for future research are discussed in chapter 6.

HISTORICAL OVERVIEW ON CAREGIVING

Human beings are by nature interdependent; their functional capacities and even their survival depend on what they derive from their fellows (Clark, 1969). Acceptance of this concept of mutual interdependence has varied from society to society...Since American pioneering
days the emphasis has been on the ability of the individual to survive and prosper with a minimum of assistance...In the case of old age, as the balance shifts from independence to dependency, the potential for individual normative conflicts increases...How older people attempt to deal with this conflict can be best understood within the context of modern kinship structure and the relationship between informal support networks and formal organizations (Cantor and Little, 1985, p.746).

When the need for assistance arises, it is the informal system that older people turn to first and most frequently (Cantor, 1975; Shanas, 1979).

The literature pertaining to caregiving consists of four major topics: the abandonment of the older person by the family, the elderly person as a family member, the family as a caregiver, and the relationship between formal and informal care (Horowitz, 1985).

The early literature on caregiving was characterized by predictions of a breakdown in the informal mutual aid network and a greater reliance on formal organizations due to modernization, industrialization, urbanization, social and geographic mobility and the rise of bureaucracies (Rosow, 1974; Schorr, 1966). According to Rosow (1974, p.4) "the aged can preserve their social functions longest in low-productivity economies. Primitive technology with limited production tends to preserve the marginal utility of successive increments of labor" - which can be provided by the elderly. Industrialization and modernization raised living standards, strengthened individual independence and self-sufficiency thereby reducing people's reliance on others for help. Thus, "prosperity and autonomy weakened the informal mutual aid networks that have traditionally been the most important mechanisms for meeting the needs of older people. In a mass society, responsibility for them is becoming increasingly formalized, ritualized, and depersonalized as a public problem" (Rosow, 1974, p.5).

Further, the nuclear family consisting of husband, wife and minor children came to be identified as the most distinctive feature of the American family system (Parsons, 1944). One of the costs of this type of family system was said to be the structural isolation of the
aged and their loss of function (Horowitz, 1985).

Empirical research spanning four decades on the family ties of the elderly has succeeded, in large part, in dispelling the notion of the dissolution of the family and the isolation of the elderly (see Stone, Cafferata and Sangl, 1987; Cantor and Little, 1985; Shanas, 1979). Family relationships were important in the lives of the elderly as demonstrated not only by the availability of kin, but also by their proximity, patterns of contact and mutual aid, as well as affective relationships (Horowitz, 1985).

There is a substantial amount of contact between the elderly and their families. Kovar, (1986) found that among the elderly who lived alone, about 88 percent had talked with someone and gotten together with someone within the previous 2 weeks of the interview. About 90 percent of the people living alone had talked with family, friends, or neighbors on the phone within the previous two weeks. There is also a great deal of assistance that is exchanged between generations (Sussman, 1977; Cantor, 1975; 1980). The pattern of reciprocity begins to shift with a deterioration in the financial or health status of the elderly person (Stone et al, 1987).

Research on the role of the family as a caregiver has focused on the provision of long-term care to dependent elderly. Several studies have found that much of the assistance provided to frail and dependent elderly is provided by the informal network consisting primarily of spouses and children but also including friends, neighbors, other kin and church members (Branch and Jette, 1983; Stoller and Earl, 1983; Scott and Roberto, 1985; Taylor and Chatters, 1986). The presence of family members is critical to the care of the elderly. Widowhood, childlessness, and living alone have consistently been strong predictors of institutionalization (Branch and Jette, 1982; Palmore, 1976).

Since so much of the caregiving function was performed by the informal network, researchers began to focus on the burden of caregiving i.e., the social, emotional, physical and financial costs of caregiving to its providers. According to Stone et al (1987), findings from numerous studies indicated that the most pervasive consequence of caregiving was
the emotional strain on the caregivers due to the burdens placed on them. Competing demands, child rearing and employment in particular, are sources of strain.

The research on caregiver burden coincided with public policy and practice concerns regarding the role of the formal sector in supporting informal caregivers maintain their elderly in the community. The proper mix of formal and informal services became the focus of study (Brody, Poulshock and Masciocchi, 1978; Litwak, 1985). Litwak (1985) postulated that the care of the elderly can be achieved most effectively through a combination of formal and informal services. Others have found that the use of formal services only occurred after the care needs had increased beyond the coping capacity of the informal system (Soldo and Manton, 1985; Stone et al, 1987).

The focus on the utilization of formal and informal care has led researchers to examine the characteristics of caregivers as well as the characteristics of the users of care. The next chapter reviews the literature on the antecedents and models of the use of care.
Chapter 2

ANTECEDENTS OF USE OF CARE

A review of the literature indicates that the utilization of formal and informal care is related to several factors such as advancing age, declining health and functional ability, social network characteristics, and demographic characteristics such as race, gender, age, education and socioeconomic status. Each of these factors and the concept of caregiving itself are discussed separately.

Caregiving: Caregiving has usually been defined as the activities performed by various people when providing assistance to a needy individual. According to Horowitz (1985, p.202), caregiving:

is defined by the older person’s need for assistance rather than any predefined behavior on the part of the caregiver. Therefore, it is not unexpected that most studies find that caregiving activities may vary widely among families and can range from occasional errands to round-the-clock care for the bedridden.

Caregiving is categorized into four types of activities by Horowitz (1985): emotional support; direct service provision; mediation with formal organizations; and financial assistance. Sharing a household was considered to be a special form of caregiving which may encompass and facilitate the provision of services within the four general categories, but also as a special response in itself.

McAuley and Arling (1984) studied the relationship between five caregiving activities that were related to self-care capacity. These five activities were: nursing care, continuous supervision, personal care, meals, and homemaker services. Inability to perform these basic activities requires assistance from others. If no in-home care is available to sustain the elderly person in the community, then either institutionalization or sharing of households is likely to occur.

7
Caregiving activity has generally been classified as either formal or informal. Informal care has been described in the literature as assistance provided by family, friends, and neighbors (Stoller and Earl, 1983; Greene, 1983; Ward, 1985). Formal care is that provided by organized service agencies whether publicly subsidized or private, and hired help (Stoller and Earl, 1983; Greene, 1983). The literature on the use of formal care services consists of two separate and distinct definitions of formal care: one is defined as the use of health services, measured by number of physician visits and number of hospitalized days, and nursing home placements; the second definition relates to the use of community based agency provided services such as home health aides, homemaker services, meals, etc. which enable an elderly person to function in a noninstitutional setting. This study uses the latter definition of formal care because it includes services that can be provided by formal as well as informal intermediaries whereas the former definition is primarily concerned with institutional aspects of care.

Stone (1986) reports on the use of community services (i.e. formal care) by the elderly, using data from the National Health Interview Survey in 1974. A relatively small proportion of elderly age 65 years and over had used community based formal in-home services during the previous year. About 1 percent used homemaker services, 3 percent received care from visiting nurses, and approximately 2 percent used home health aides. Living arrangements had a significant impact on utilization of community services. A larger proportion of elderly persons living alone than those living with others received home delivered meals and homemaker services. Use of services was also related to the amount of functional limitations experienced by the elderly. There was also some evidence that the use of community services increases with age.

Although the institutional emphasis of formal long term care is evident through the medicare disbursement system, there has been a rapid growth in formally provided noninstitutional care and services. In the past few years the annual growth rate of home care agencies has been about 20-25 percent (Waldo, Levit and Lazenby, 1985).
According to Applebaum and Phillips (1990), the development of alternatives to institutionalization has commanded a great deal of interest from researchers, policy makers, practitioners and consumers. Formally provided long term care alternatives are not seen as replacements for nursing homes, but rather as an expansion of care options. The 1981 Omnibus Budget Reconciliation Act (OBRA) expanded Medicaid coverage to include non-medical long term care services. By 1985, 46 states were allowing Medicaid reimbursement for case managed, in-home care.

Similarly, legislation under the 1980 OBRA liberalized the Medicare benefit for home health care and stimulated greater participation of proprietary home care agencies in the Medicare program (Applebaum and Phillips, 1990). The adoption of the Medicare prospective payment system in 1983 which implemented the Diagnosis Related Groupings (DRG's) further stimulated the use of home care agencies by restricting the length of inpatient hospital stays. Between the years 1975 and 1983 (i.e. a nine year span), the number of home health visits was 16.9 million; between 1983 and 1984 (i.e. within one year) the number of visits was 7.7 million (Callahan, 1985). The number of certified proprietary home health agencies increased fourfold between 1982 and 1985 (Waldo et al, 1986).

Thus, the growth of formally provided in-home care in the United States has been dramatic. In 1961, there were only 208 agencies providing home care in the United States. By 1985 there were an estimated 8000 or more provider agencies. Currently there may be as many as 12,000-14,000 home care providers, both certified and non-certified (Applebaum and Phillips, 1990).

According to Pegels (1988) the recent growth in the use of home health care can attributed largely to the substitution of home health care for hospitalization. People were being discharged form the hospitals "quicker and sicker" to be cared for by home health agencies (Fischer and Eustis, 1988). However, Gomick and Hall (1988) using Medicare administrative data that includes all home health care users whether or not they were hospitalized, contend that overall home health care use increased during this period. This
indicates that the trend of increased use of home health care services does not reflect solely the implementation of the DRG system.

**Functional ability**: Functional ability is an important factor in an elderly person's ability to remain independent in the community. It typically is an assessment of an individual's capacity to perform routine activities of daily living (ADL's) that enable one to maintain oneself physically as well as to adapt to one's environment. ADL's are divided into two categories: instrumental and physical. Physical ADL's include feeding, bathing, walking, while instrumental ADL's include using the telephone, meal preparation, and housework.

Individuals unable to perform any of the activities of daily living require assistance from others. An overwhelming majority of non-institutionalized elderly rely on informal sources for assistance in performing instrumental ADL's (Shanas, 1979; Cantor, 1979). In cases where there is no one to help the functionally disabled individual, institutionalization may ensue (Branch and Jette, 1982; Roy and Folmar, 1990).

A decrease in functional capacity and mental competence, as well as advancing age leads to greater use of care (Branch and Jette, 1983; Stoller and Earl, 1983). Cantor and Little (1985) report that there are three variations in chronic illness and disability rates. Most important is the age factor in impairment, with three distinct groups: the 65-74 years of age of whom 61 percent are without any major functional limitation; the 75-84 years of whom about 50 percent are without major impairment; and the 85 years and over, a majority of whom are functionally impaired in some way.

There are also gender and socioeconomic differences. Women are more likely to suffer limitations in their ability to perform normal routines, and to have higher rates of chronic and acute illnesses. "The burden of illness and chronic disability fall heaviest on those of lowest socioeconomic position and minority status" (Cantor and Little, 1985, p.751).

Dawson, Hendershot and Fulton (1987) report similar findings regarding the differential impact of age and gender on functional limitations using data from the 1984
National Health Interview Survey. The elderly were more likely to have problems with walking than with any other personal care activity. The proportion of elderly persons experiencing difficulty with each personal care activity increases with age, whereas 85 percent of persons age 65-69 years had no difficulty with any of seven personal care activities listed, almost half, 49 percent, of those 85 years and over had difficulty with one or more activity. While a greater proportion of women as compared to men over the age of 65 years had difficulty in bathing, transferring, walking, getting outside, and using the toilet, these differences diminish when narrower age groups are considered. About 42 percent of the people who reported having difficulty with one or more personal care activities received help with at least one activity.

The ability to perform ADL's has been linked to deteriorating health status. However, poor health, e.g. high blood pressure, circulation trouble in the extremities, diabetes, chronic lung disease, by itself may not require care from others. With these types of health problems, subjects may be quite functional and not in need of any outside care. For other types of chronic conditions, e.g. arthritis, heart trouble and visual impairment, it is perhaps the severity of the illness that determines functional capacity. This has been confirmed by Ford, Folmar, Salmon, Medalle, Roy, and Galazka (1988) in their study of health and function in the elderly. They present a classification of conditions according to the disability and mortality produced by such conditions. Thus, severely disabling, nonlethal conditions include arthritis, visual impairment and dementia. Variably disabling, lethal conditions include stroke, heart disease, circulatory disorders, cancer and chronic lung disease. Less disabling and less lethal conditions include diabetes, hearing impairment, depression and high blood pressure.

Further, there are problems in the interpretation of changes in self-reported measures of health. A change in self-reported health conditions between the two groups may actually be reflecting a greater awareness of health problems due to exposure to various community health education programs rather than any real increase or decrease
in chronic conditions. Therefore, one's self-reported ability to perform ADL's may be a better predictor of the utilization of formal and informal care rather than one's self-reported health status. Folmar and Ford (1985) report that dependency in any four physical ADL's (feeding, dressing, bathing and transfer) is significantly related to the use of services. Also, there is a linear increase in services used with increasing ADL disability.

Thus, while the increase in the prevalence of functional limitations tends to occur in all aging cohorts, the rate of increase may differ among subgroups and may change over time. Therefore, it is necessary to assess whether the relationship that obtains between age and functional status, and functional status and use of care varies with time.

Social network characteristics: Another important factor associated with the use of formal and informal care is the availability of care through the social network.

The availability of informal care has been studied as an alternative to community services, especially with the escalation of health care costs. The voluminous literature on the social network of the elderly has provided descriptions of the social contact between the elderly and their families and friends, the relationship between affective support and mental health of the elderly, and the amount and type of instrumental assistance provided by families and friends to the elderly (Cantor and Little, 1985; Cohen and Syme, 1985). In the context of this dissertation, the focus will be on the instrumental support provided by the social network in performing the basic self-care activities. The conditions related to formal and informal caregiving such as living arrangements are examined.

According to Horowitz (1985), although there are a lot of references to a family caregiving 'system', these are somewhat idealistic in that, in actuality, only one family member becomes the primary caregiver and the primary provider of direct care assistance. Shared responsibility between two or more members of the informal support system is very much the exception to the rule.

Thus, according to Shanas (1979) family members who provide support are
available to the elder in serial order. The spouse is usually the primary caregiver; and the child assumes primary responsibility for care when the spouse is unavailable. Other relatives provide support as needed when children are unavailable (Johnson, 1983; Shanas, 1979).

However, Johnson (1983) found that care and support are shared responsibilities of several family members with no one member bearing major responsibility of care. An elderly person living at a greater distance from kin has reduced kin involvement and increased use of formal supports. Friends and neighbors can also become caregivers if family members are unavailable (Cantor, 1975).

Living arrangements of the elderly influence the use of both formal and informal long term care services. However, living arrangements are influenced by functional status, in that, elderly people living alone are more likely to be functionally independent, while those living with children but without spouses are more likely to be functionally dependent (Cafferata, 1987; Zyzanski, Medalie, Ford and Grava-Gubins, 1989). Living arrangements are also susceptible to the impact of ethnic and racial differences, gender, socioeconomic status, and geographic mobility.

Bishop (1986) found that for females, income has a moderating effect on the relationship between disability and the propensity to seek shared living arrangements. Thus, higher income may allow individuals to obtain formally provided services that enable them to maintain separate households. Independent living is less likely for people who are not white, for males who are foreign born, those with at least one adult child, and those in states with higher living costs.

Horowitz (1985) regards forming a joint household as a specialized type of caregiving response. Shared living arrangements are most common when caring for extremely impaired older people and among lower income families. Soldo and Myllyluoma (1983), using national data from the 1976 Survey of Income and Education, report that multigenerational living among the impaired elderly is more common among non-whites. Schorr (1980) has called the shared household a 'lifeboat response' which is made when
help cannot be offered in any other way and reflects the extent to which families will go to maintain their elderly in the community. However, there is a strong preference among the elderly to remain in their own homes as long as possible, and to be cared for by relatives (McAuley and Blieszner, 1985).

Doty (1986) reports that survey data does indicate that as individuals become older and more frail (i.e. reach the 75 and older and 85 and older categories), as their spouses die, and as they become functionally more dependent, they do tend to move in with children or other relatives. Some of the major barriers to forming joint households however, are the willingness of the elderly to give up their own homes and move in with relatives; and the concerns of the family caregivers about interpersonal tensions and conflicts.

According to Sussman (1976), families as they exist today do not have the structural, organizational, and economic resources to provide long term care to meet the needs of chronically ill or functionally impaired persons. The family structure of the elderly, their interaction with other family members, and their living arrangements rest on a demographic base. Demographic changes such as a decline in the size of the family, and greater participation of women aged 40–64 years in the work force have contributed to a decline in the family’s caregiving ability (Butler, 1981; Oppenheimer, 1981; Treas, 1977). In a national profile of caregivers to the elderly, Stone, Cafferata and Sangi (1987) substantiated the oft-reported observation that informal caregivers are predominantly female, with wives and daughters providing the bulk of care. About one-third of the caregivers were over age 65, which demonstrates that the informal care system is partially composed of young-old caring for the old-old.

A substantial proportion of caregivers faced the competing demands of employment and familial responsibilities. About 31% of all caregivers were employed, with 44% of the daughters and 55% of the sons in the labor force. Stone et al (1987) remark that these role conflicts may represent an even greater conflict to future caregivers. Due to longer life expectancy and delayed child bearing an increasing number of women will be in the
position of providing care for their children as well as their parents. These social trends coupled with the projected increases in labor force participation rates among older women imply an increasing amount of conflict with caregiving responsibilities. Parsons (1944) argues that family or primary groups should have fewest possible members in the labor force in order to be available for informal care.

The demographic framework within which elderly families exist can be described as having more women than men, an increasing proportion of the unmarried among older women, and an increasing proportion of older persons with few or no children.

Litwak (1985) argues that although the structure of the family and of the neighborhood has changed, families and neighbors still are providers of care to elderly people. However, neighbors and friends are generally available for intermittent and supplementary care and they usually care for less disabled people (Cantor, 1983, 1979; Johnson and Catalano, 1981).

Since living arrangements are influenced by time, the relationship between living arrangements and the use of care is also likely to vary between one decade and the next.

Demographic characteristics: Race, gender, age, education, and socioeconomic status have also been linked to the use of care.

Race: A substantial amount of literature exists on the relationship between informal caregiving and ethnicity. According to Cantor and Little (1985), there are few large scale empirically based studies comparing different ethnic groups on informal caregiving. However, in general, the findings suggest that differences due to ethnicity and/or race may be less than presumed especially when controls for class and age are introduced. Ethnicity was a predictor of patterns of family assistance only with respect to the Hispanic elderly, and it did not differentiate between blacks and whites when class and other relevant variables were introduced (Cantor and Little, 1985).
Research on informal caregiving among blacks has shown that blacks have extensive informal support networks and receive care from a variety of sources such as family, friends, neighbors, and church members (Taylor, 1985, 1986; Taylor and Chatters, 1986; Chatters, Taylor and Jackson, 1986). Caregiving patterns by the informal network for blacks are similar to that of whites. There is a hierarchy of preferred support resources in accordance with Cantor's (1979) hierarchical-compensatory model. Children are viewed as the most appropriate source of support followed by other kin, non-kin and lastly, formal organizations (Taylor, 1985).

Living arrangements have been discussed as an important factor in the use of care. Differences do exist in living arrangements between black and white elderly. According to Chatters and Taylor (1990), irrespective of socioeconomic status, black adults of all ages are more likely to reside in extended households than whites. Although older blacks are less likely than older whites to live with their spouses, older blacks are less likely to live alone and more likely to live with more than one person (Rubenstein, 1971).

While the informal networks of blacks have been examined in great detail, comparatively little is written about their use of formal care services. Several researchers, notably Chatters, Taylor and Jackson (1986), Taylor (1985), and Barresi and Menon (1990) talk about the limited access that blacks have to formally organized supports and resources. However, this lack of access to formal supports is not well documented and appears to have been a conclusion reached on the basis of the general plight of blacks in this society, rather than on actual research on the use formally provided community services. Mindel, Wright and Starrett (1986) using the data collected by the U.S. GAO on elderly people in Cleveland in 1976, studied 20 services that were provided by both formal and informal sources. They found that differences by race primarily occurred within the formal support system even after adjusting for income. Blacks used more formal services than whites in 11 out of 20 services examined. These differences were mostly in the areas of home and personal care, basic maintenance, and social support such as transportation,
social/recreational services, and information and referral. No differences were found in the use of physical and mental health services which were: medical care, physical therapy, mental health services, and psychotropic drugs.

According to Davis et al (1987), in spite of the remarkable gains made by blacks in access to health care services, inequities in utilization that are not explained by differences in the need for care still persist. While whites received one-third more benefits for skilled nursing facility care in 1982, blacks and other races received a higher reimbursement for home health services. The reimbursement for home health services, however, was fairly small for all races.

Hence, in a sample of non-institutionalized elderly there may be differences in the use of formal care in that whites may be institutionalized while blacks are still getting home health care.

Sussman (1977) reported that blacks, more than whites express preference for non-family care alternatives. Most blacks will use available resources of human service organizations if possible (also see Jackson, 1980).

Krishef and Yoelln (1981) report differences in the use of formal transportation services between rural black and white elderly in Florida. Very few elderly used formal transportation services, only 4.8 percent of the whites, and none of the blacks. The study did not ascertain to what degree these services were available.

**Gender**: Among the aged, there is a preponderance of females over males. Since women, in general, tend outlive men, the majority of older people are women, and they make up an increasingly larger proportion of the elderly age 80 years and over. This sex imbalance has serious implications for social care because women are more likely than men to be widowed and limited in financial resources (Cantor and Little, 1985).

Living arrangements, which are related to the use of care, are linked to gender differences. For example, in 1980 approximately 41% of older American women were living
alone as compared to only 15% of older men (Crystal, 1982). However, gender differences in the use of care tend to become insignificant when controls for age, functional ability, and living arrangements are applied (Cantor and Little, 1985).

**Age**: Advancing age has also been associated with increased use of both formal and informal care (Branch and Jette, 1983; Cantor and Little, 1985). However, as pointed out by Hendricks and Hendricks (1986) age is simply an organizing category and a convenient proxy for factors such as declines in health and functional status, social networks, etc.

**Socioeconomic status**: With regard to socioeconomic status, Scott and Roberto (1985) found increased use of formal assistance to be related to lower socioeconomic status among rural elderly. Taylor (1985) found increased frequency of support from family members of black elderly to be related to higher incomes. Socioeconomic status influences living arrangements. Bishop (1986) reported that increasing income was associated with independence in living arrangements holding other things such as race, sex, and disability constant.

**Education**: In terms of education, very little has been written in the literature about the effects of education on the use of informal or formal care. Mostly, education stands as a proxy for socioeconomic status. Education has been found to be a significant predictor of formal care in a study of the use of in-home care by McAuley and Arling (1984). Lower education was found to be associated with increased frequency of family support among black elderly (Taylor, 1985).

Thus, ethnicity, gender, age and socioeconomic status, and education appear to be related to functional ability, social network characteristics such as living arrangements, and the use of informal and formal services.
MODELS OF THE USE OF CARE

The literature on the use of formal and informal care shows the development of several models that attempt to outline the pattern in which informal caregivers are available to an elderly person.

A "substitution model" of care was put forth by Shanans (1979) wherein the family members who provide care to the elder are available in serial order. Support for this model comes from research demonstrating that the spouse is usually the primary caregiver, and that the child assumes primary responsibility for care when the spouse is unavailable. Other relatives provide support as needed when children are unavailable (Johnson, 1983; Shanans, 1979).

Johnson (1983) provides an alternative model known as the "shared-functioning kinship model" in which caregiving is a shared responsibility among several family members with no one member bearing major responsibility of care. This model also operates between informal and formal supports. An elderly person living at a distance from kin has reduced kin involvement and increased use of formal supports.

With regard to other informal networks, Cantor (1975) proposed a "hierarchical-compensatory model" whereby friends and neighbors would provide care if the family were unavailable.

For formal care, Greene (1983) outlined a "substitution model" which demonstrates a substantial tendency for formal care to be used as a substitute for informal care. Coulton and Frost (1982) tested the Anderson-Newman model which emphasizes the importance of need, enabling, and predisposing factors in the use of care. They found that the utilization of formal care is primarily related to perceived need and level of impairment.

One of the major attempts at formulating a theory of social care has been that of Litwak (1985) who proposed a 'balance theory of coordination' whereby caregiving has been conceptualized as achieving a balance of responsibility between the family and the state. According to Litwak (1985) caregiving should include both formal and informal
sources since these groups are differentially effective in performing certain types of tasks. Optimally, families can respond to non-uniform events, situations, or tasks such as the elder’s idiosyncratic, socio-emotional needs, whereas formal organizations or bureaucracies are better equipped to respond to predictable, uniform and routine tasks. Thus, the social organization of care, using Litwak’s model, depends on the fit between form and function i.e. between the structure of the group providing care and the nature of the caregiving task. Litwak’s approach is a functionalist one whereby groups perform tasks for which they are best suited structurally. The structure of care is driven by an efficiency model, and is posited to apply over a wide variety of present and future situations.

Litwak’s theory and the other models of care are primarily concerned with the division of labor in terms of caregiving at a given point in time. They address the issue of how caregiving is allocated among various resources: i.e. on the basis of the fit between task and group structure, or as a result of unavailability or exhaustion of certain resources. They are unable to explain how the structure of care changes over time in response to factors that influence the resource allocation process such as the effects of period and of cohort membership. These three factors may moderate the relationships that obtain between the antecedents of care such as functional status, social network characteristics, and demographic characteristics and the use of both formal and informal care.

**Age Stratification Theory and the use of care over time**

A useful starting point to understanding how age, period and cohort effects determine the use of care over time is to consider the process of age stratification in a society.

Age stratification theory is based upon the interplay between two interdependent dynamisms: the aging of individuals in successive cohorts and the changing age structures of society. Each dynamism is distinct and neither is reducible to the other.

Society persists despite the mortality of its individual members. Changes in an
individual throughout his life are distinguishable from changes in the population of which he is a component. Social change becomes possible with the constant demographic replacements of individual members. The continual emergence of new participants in the social process and the continual withdrawal of their predecessors compensate the society for limited individual flexibility (Ryder, 1985). According to Riley, Foner and Waring (1989), it is the asynchrony produced between the two dynamisms of individual aging and structural change that creates strain and exerts pressures for further change upon the individual and society.

Thus, people who start their lives in one historical period, when the age strata (which consists of all age groups) is organized in one particular way. But, as these people age, the full set of age strata is continually being reorganized from one period to the next. Hence people may enter young adulthood with certain images of old age that are developed from the characteristics of their grandparents. However, by the time these people enter old age themselves, society has changed and is very different from that of their grandparents. Thus, new skills and behavioral repertoires need to be acquired to deal with new challenges.

The basic principles of age stratification theory are that individual aging, cohort succession and historical time bring about change in social structures so that successive cohorts of elderly exhibit distinctive patterns of aging.

Age stratification theory proposes that any pattern of behavior which is contingent on age, such as the use of care, is also contingent on cohort membership and historical processes or period effects (Riley, Johnson and Foner, 1972). Age effects pertain to the impact of chronological age on the use of care. Period effects refer to the influence of social conditions on the behavior or characteristics of respondents at the time of measurement on the use of care. Cohort effects are those characteristics that are tied to a birth cohort that continue to influence its behavior such as the use of care over time. Each cohort has distinctive properties such as initial size and composition, age-specific mortality rates, and

The effects of chronological age on the use of care, for example, are that as age increases the need for care also increases; different age groups require different types of care - the "young-old" may need more social and recreational services, while the "old-old" may need more custodial and basic maintenance care; and finally, as the "young-old" get older, their families may become less able to provide care, as the children of the "old-old" are themselves facing the problems associated with aging.

Period effects on the use of care consist of factors such as governmental policies that affect the availability of alternative care resources at the time of measurement. Other examples of historical factors that influence the nature of aging and caregiving include events such as the Depression, World War II, the enactment of Medicare, societal trends such as the changing role of women, as well as more policy specific events such as the adoption of the Diagnostic Related Groupings (DRG's) under the Medicare prospective payment plan in 1983.

Cohort membership can also exert an influence on the nature of caregiving. For example, the cohort that was born during the years 1905 and 1910, which had most of its child bearing during the height of the Depression of the 1930's had a reportedly lower fertility rate than that of other cohorts preceding or succeeding it (Butler, 1981). The relative shortage of available caregivers for a particular cohort could have implications for the way in which the elderly are cared for. Similarly, issues that are raised for public concern are also to some extent guided by cohort characteristics. Thus, for example, when the baby boomers were young adults, a great deal of attention was given to educational opportunities, and when these same people begin to reach old age long term care issues will probably gain more prominence. The sheer size of the cohort could exert a tremendous influence on shaping public policy related to caregiving.

The distinction between period and cohort effects is not always clear cut. Events
such as wars and depressions are generally considered to be period effects. However, individuals exposed to these events may exhibit different effects due to exposure by virtue of their position in the age strata at the time. Thus, a cohort of middle aged individuals exposed to the enactment of Medicare will likely have a significantly different expectation of caregiving in old age than those who were already elderly at the time of the passage of the Act. This difference in expectations of governmental entitlements could be considered a cohort difference.

Riley et al (1989) caution against a common fallacy that could occur when using the age stratification approach to understanding social phenomena: the fallacy of reification. This fallacy occurs when the three concepts of age, period and cohort are themselves treated as causal variables without specifying what aspects of aging, cohort membership and historical change may be pertinent to understanding particular shifts in the process of aging or in the social structures.

The age stratification perspective holds that patterns of social behavior fluctuate with the passage of time because of the intervening processes of role allocation and socialization which are the underlying mechanisms behind age, period and cohort effects.

Role allocation refers to the process of assigning and reassigning people of various ages to suitable roles. Although the size and composition of successive cohorts may change, the functional needs of society evolve at a different rate requiring a redefinition of age-appropriate roles in order to redistribute people in the system. Overall, the criteria used for allocating particular roles or role complexes reflect both social values and the vital processes inherent in aging (Hendricks and Hendricks, 1986).

Thus, who will assume the role of caregiver to the aged person will depend not only on social values, i.e. filial responsibility, but also on other roles assigned to caregivers, for example, being a wage earner, or being a caregiver to one’s children in addition to one’s parents. Similarly, help from one’s neighbors and church members may also be responsive to the changing structure of one’s neighborhood or church membership.
Socialization, the other intervening process in age stratification theory, is a process which ensures a smooth transition of individuals from one age status to the next. Socialization is assumed to be a life-long process operating for every role assumed. It teaches individuals at each stage of the life course how to perform new roles, how to adjust to changing roles, and how to relinquish old ones.

Socialization goes hand in hand with role allocation. For example, a person who has taken on the roles of caregiver and wage earner needs to be adequately prepared to handle these roles. Part of the socialization for these roles may be to look upon formal care sources as a viable solution to caregiving problems. Also, with the increasing number of women in the work force and the emphasis on independence from one's family, older people may also begin to expect more in terms of governmental intervention on their behalf.

The particular configuration of one's social roles is dependent on individual attributes; yet at the same time, it is influenced by structural factors. Crises, exigencies and personnel fluctuations affect the processes of socialization and role allocation. For instance, sequential cohorts manifest distinctive patterns of aging because of differential imprinting by cultural and economic forces.

Hence, any assessment of differences between patterns of social behavior at two different points in time must consider a maturational or developmental aging hypothesis, a generational or cohort hypothesis, and finally, a contemporary events or period hypothesis (Bengtson, Cutler, Mangen, and Marshall, 1985).

Several researchers have used the age-period-cohort framework to examine various social phenomena such as examining the differences in earnings equations; deaths from pulmonary tuberculosis; deaths from cervical and prostate cancer; marital fertility; political partisanship and delinquency (see Mason and Feinberg, 1985).

Wolinsky, Mosely and Coe (1966) examine the utilization of physician and hospital services by different cohorts of elderly Americans, aged 56 years and over. Eight cohorts, each with an age range of 4 years, and three time periods which were four years apart i.e.
1972, 1976 and 1980 were used. The researchers reported two important findings about the aging process. First, as a cohort ages, its members' rate of contact with physicians and hospitals increases. This increase occurred for all cohorts across the two four year aging periods. This finding was supported by extant perceptions of medical sociologists about health and illness behavior of the elderly. The second finding was that of an inverse relationship between aging and the volume of physician utilization. The pivotal point was at or about the time that members of the cohort became octogenarians. The researchers use the literature on hospital and physician use by the elderly to offer and/or rule out alternative explanations for their findings. The nine alternative explanations range from problems with recall among the oldest-old to differential survival of the elderly, and to the loss of long standing personal physicians among the oldest-old. Period effects in the utilization of physicians and hospitals were also detected. This correlated relatively well with the Medicare cost controls introduced in the 1970's which served to constrict the use of health services among the elderly. Cohort effects did not contribute significantly to understanding changes in the utilization of health services in this study.

Thus, age stratification theory provides a framework within which the structure of care can be seen as contingent upon the particular configuration of age, period and cohort. The framework is a global one and provides an organizing principle for the research problem. In order to avoid the fallacy of reification it is necessary to the examine the antecedents of the use of care as well as specific historical changes that could have contributed to changes in the structure of caregiving.

Methodological Issues in Separating Age, Period and Cohort Effects

The data base proposed for this study was that of the General Accounting Office (GAO) Cleveland study in 1975, and its 12 year follow up. This data base offered a unique opportunity to assess period differences in the structure of care since the exact same questions and measures were replicated on similar representative samples at a 12 year
interval in the same geographic location. A design of this nature offers important clues to changes in social structure and its effect on the utilization of care.

While the data set was unique in its ability to provide answers to hypotheses regarding the changing nature of care, there were also constraints in that it did not allow the simultaneous testing of age, period and cohort effects in a single statistical model.

Although it is desirable to independently assess the distinct effects of age, period and cohort, the statistical separation of these three variables is methodologically problematic and has been a subject of great controversy among researchers. The methodological issue is that each main effect is confounded with every other main effect. Thus one variable is wholly contained within the other two. For example,

\[ \text{Age} = \text{Period} - \text{Cohort}. \]

This is known as the problem of identification. In order to resolve the identification problem, analysts have recommended log-linear procedures imposing one or more restrictions on estimates of the parameters to be obtained. Thus, the restriction may be that of setting the effect of being in one cohort equal to that of another, or the effect of being in one age group equal to that of another. Analysts have typically conducted secondary analyses using large, nationally based data sets containing five or more cohorts and an equal number of age groups or periods to assess the separate effects of age, period and cohort (see Wollinsky et al, 1986; Mason and Feinstein, 1985; Knoke and Burke, 1980). Data sets such as the ones described earlier are a rarity in the social sciences, especially in gerontology. Thus, researchers have used various techniques to separate the effects of age, period and cohort.

Costa and McCrae (1982, p.94), using data from the Baltimore Longitudinal Study on Aging, discuss the difficulty in separating age, period and cohort effects and suggest the following:

They (scientists) have developed a body of conventions that is useful in interpreting the fundamentally ambiguous results of any scientific investigation. Among these principles are replicability, parsimony, and consistency. The application of these principles
to a particular body of data is occasionally formalized...but for the most part they require the use of what is called 'scientific judgement'. Adam (1978) showed that rigid application of decision rules is insufficient for separating maturational effects from other possible causes of change in longitudinal studies.

Thus, barring the unusual scenario where the effects of age, period and cohort can be simultaneously assessed in a statistical model, researchers use many different kinds of data to extract the effects of one or more effect (Glenn, 1977).

The data set proposed for this study did not have a large enough number of cohorts, age groups, or periods that would allow the application of the log-linear model. Therefore, an alternative method of data analysis needed to be used.

Since the effect of aging on the use of care has been fairly well documented, it was considered that information on period and cohort effects on the use of formal and informal care would be more useful. Therefore, age was held constant by examining the same age range at two points in time.

One potential problem of holding age constant is that the effect of period may be confounded with that of cohort. However, the only known cohort characteristics that may be relevant to the use of informal care is the reportedly lower fertility rate of the cohort born between 1905 to 1910 who had their main childbearing years in the height of the Depression of 1930's (Butler, 1981). Since children are the primary providers of informal care after spouses, this cohort could be different from others in terms of how their care would be structured socially. The possibility of cohort differences in the number of offspring will be taken into account in the analysis.

With regard to formal care, the demographic characteristics known to be relevant are the rising educational and income levels of succeeding cohorts of elderly. In order to control for the effects of education and income as possible cohort effects, separate analyses are proposed should there be a change in the use of formal care. The procedures for controlling the number of children, educational levels and income are outlined in the next chapter.
RESEARCH QUESTIONS

Since it was not feasible to examine the effects of age, period and cohort simultaneously, this study sought to discover the effect of the historical period on the use of formal and informal care by the elderly. Period effects in the form of a remarkable growth in the number of formal home care agencies and an increase in female participation in the labor force were documented earlier. Therefore, the study asked three interrelated questions: 1) Are there differences in the use of formal and informal care between two historical periods? 2) Do these differences persist after controlling for other determinants of care such as functional ability, social network and demographic characteristics? 3) Do factors such as age and functional status have the same effects on the use of care at two points in time?

Figure 1. represents a diagram of the model used in this study. It shows that period effects modify the relationship between functional ability, social network and demographic characteristics and formal and informal care. In other words, the strength and direction of the effects of the predictor variables on the use of care may be different across the two time periods. For example, the effect of functional ability on the use of care may be stronger in a time period when there is greater availability of alternative resources.
FIGURE 1. MODEL OF THE PROPOSED STUDY

Period

- Functional Ability
  - (ADL)

- Social Network
- Living Arrangements

- Demographics
  - Race
  - Gender
  - Age
  - Income
  - Education

In-home Care

1. Formal Care
2. Informal Care
Chapter 3.

HYPOTHESES

This study seeks to test the following hypotheses:

1.1) Among the elderly, aged 77 to 88 years, there will be an increase in the use of formal care in 1987 as compared to 1975.

1.2) The increase in use of formal care in the age group 77-88 years will hold after controlling for the effects of age\(^1\), functional ability, living arrangements, race, gender, education and income.

There has been a growth in the number of home health care agencies as well as other services provided to the elderly over the last decade (Waldo et al, 1985; Applebaum and Phillips, 1990). Further, with the implementation of a prospective payment plan under Medicare based upon Diagnostic Related Grouping (DRG) in 1983, there was a sharp decrease in Medicare length of stay in short-stay hospitals in 1984 and in 1985. Correspondingly there was an increased use of nursing homes and home health agencies as documented by the Health Care Financing Administration (HCFA) (Fischer and Eustis, 1988; Pegels, 1988). As patients were leaving the hospital "quicker and sicker", home health care became one of the main avenues of formal care. This however, did not eliminate the informal network as the families had to get involved in planning for care. Such families termed "managerial families" by Fischer and Eustis, increasingly serve as mediators, supervisors, and planners for both in-hospital and post-hospital care.

2.1) Among the elderly, aged 77 to 88 years, there will be a decrease in the use of

---

\(^1\) Although the age group is identical in the two samples, the age distribution within this group may vary between time periods. Therefore, within-group age will be controlled for all hypotheses.
Informal services in 1987 as compared to 1975.

2.2) The decrease in the use of informal care will hold after controlling for functional status, age, living arrangements, race, gender, education and income.

Due to growing labor force participation rates of women, and an overall decline in fertility rates which implies that there will be fewer caregiving resources, it is anticipated that there will be decreasing use of informal care due to unavailability of caregivers (Treas, 1977; Soldo and Myllyluoma, 1983).

3.1) Period will have a significant moderating or interaction effect on the relationships that obtain between the independent variables i.e. functional status, living arrangements, and demographic characteristics and the dependent variables i.e. use of formal and informal care.

Historical factors affect the use of care both directly and indirectly through altering the influence of a given independent variable on the use of care. For example, while poor functional status may be the largest predictor of the use of informal care, a greater willingness or ability to look for alternative sources of care may modify the impact of functional status on the use of informal care. Conversely, a shortage of formal resources may increase the impact of functional disability on the use of formal care because of an increase in the entry barriers to the formal care system.

RESEARCH DESIGN

A secondary analysis of data with a replicated cross-sectional research design was conducted for this study. It sought to discover differences between two similar groups measured at two different points in time. The data used for this study was collected by the
Cleveland General Accounting Office (GAO) Study conducted in 1975-76 and its follow-up in 1987 by the Case Western Reserve University School of Medicine. 1598 noninstitutionalized individuals aged 65 years and over were selected randomly from the Medicare rolls and interviewed at home using the OARS Multidimensional Functional Assessment Questionnaire. In 1987, a second representative sample of Cleveland elderly was obtained in the following manner: the survivors of the 1975 GAO study were reinterviewed, and a fresh sample of the young-old (ages 65 to 76 years) was drawn in a manner similar to the original 1975 sample. The survivors of the old study remained representative of the population of that age group. However, since the survivors are not randomly drawn, the sample for that age group closely resembles rather than statistically represents the population. For the purposes of this study only data from noninstitutionalized subjects was used so that the two samples were comparable at time 1 and time 2. Thus the total new sample in 1987 consisted of 1536 noninstitutionalized elderly people aged 65 and over.

The investigators of the study reported that comparison of the sample values to Cleveland population parameters obtained through the US Bureau of the census showed that the sample was demographically representative. Further, since these population parameters reflect the demographic characteristics of most large northern urban centers (US Bureau of the Census 1973) the sample was considered to be representative of the older population of such areas. (Grant Application to the Dept. of Health and Human Services, 9/23/85, investigators). Moreover, the 1987 sample was also compared to census projections for the Cleveland population and was found to be representative in terms of demographic characteristics.

The 1987 sample exhibits many of the characteristics of demographic change as indicated by other population studies (O'Hare, 1987; Soldo, 1981; Treas, 1981). The 1987 sample consists of a greater proportion of blacks. According to O'Hare (1987) the movement of blacks from the city to the suburbs has not been as rapid as that of the
whites, and thus central city populations are becoming increasingly black. The 1987 sample is also better educated, has a higher average income, and demonstrates changes in living arrangements whereby more people live alone and fewer people live with their children. Thus, the sample in 1987 certainly appears to resemble the larger population and shows many of the predicted demographic changes.

Since part of the total 1987 sample was new (i.e. selected randomly from Medicare lists in 1987) while the balance consisted of survivors of the 1975 study it was not feasible to use the entire samples for cross-sectional analysis. The observations for the survivors from 1975 would not be independent in 1987. Thus, people using any kind of care in 1975 would have a higher likelihood of using care in 1987. Therefore, age-group specific analysis was conducted with independent samples. The sample is graphically depicted in Figure 2.
FIGURE 2. SAMPLE DESIGN

Time 1 (1975)  
Time 2 (1987)  

YEAR OF INTERVIEW

Cohort    Born in Years
A         1875 - 1886
B         1887 - 1898
C         1899 - 1910
D         1911 - 1922

AGE COHORTS       NUMBER OF CASES
                 T1    T2
65 - 76          1079  1105
77 - 88          480   368
89 +             39    48
As mentioned earlier, there were three age groups in each sample each with an age range of 12 years. It was necessary to have this age range so that it conforms to the measurement interval of 12 years. Since the number of cases in the last age group (89 years and over) were extremely small, they were excluded from analysis. Of the two remaining age groups, the 77 to 88 years old were selected for the purpose of this study. The 65 to 76 years old represented the young-old and their need for, as well as their use of services, were not as pronounced as that of the older group.

CONCEPTUAL AND OPERATIONAL DEFINITIONS

The use of care has been conceptualized as the utilization of direct in-home care services provided by family, friends or formal agencies. It consists of five caregiving activities which are: nursing care, personal care, continuous supervision, meal services, homemaker services. Care has been divided into 2 types: formal and informal. Formal care is defined by the provision of the 5 services that are provided by an agency or paid helper, while informal care consists of the delivery of the five services by the unpaid network of family, friends, or neighbors. One issue needs mention here: the division between unpaid informal assistance and between paid formal assistance. While it is possible for family and friends to receive monetary compensation for care provided, the present data does not allow for this distinction. Most studies of informal care have not made this differentiation either.

Use of informal care has been operationally defined as the use of five caregiving activities - nursing, personal care, continuous supervision, meals and homemaker services - that are provided by unpaid family members and friends.

Use of formal care has been operationalized as the use of the same five caregiving activities listed earlier, but provided by an agency or paid helper.

Functional status was conceptualized as an individual’s ability to maintain himself and get around by independently performing the activities of daily living. It consists of those
activities that enable one to maintain oneself physically as well as to adapt to one’s environment.

Functional ability was measured by a scale made up of 13 items that assess ability to perform instrumental ADL’s known as IADL’s and physical ADL’s. The physical ADL functions consist of activities that are essential for self-care i.e. feeding, dressing, taking care of one’s appearance, walking, transferring in and out of bed and bathing. The IADL scale consists of items that measure the capacity for adapting independently to the environment i.e. using the telephone, getting to places out of walking distance, shopping, meal preparation, housekeeping, taking medicine and handling money. The ADL scale has been widely used in assessing functional capacity in the elderly (see Spector, Katz, Murphy, and Fulton, 1987).

The social network has been conceptually defined as the presence of family members and other individuals who provide in- home assistance to an elderly person. The concept of social network has been defined in diverse ways by researchers (see Cohen and Syme, 1985). For the purposes of this study the presence or absence of caregivers in the home are defined as the structural aspect of the social network.

Thus, social network was operationalized by living arrangements. Living arrangements were assessed by a variable called household composition. This variable was developed from the responses to the question, “Who lives with you?” The responses included: no one, spouse, children, parents, grandparents, siblings, other relatives, friends, non-related paid helper, and others. The classification that was developed was partly based on the classification of Zyzanski et al (1989) and also on the basis of the construct of theoretical interest.

The responses were collapsed to form five categories: living alone, living with spouse, living with children, living with spouse and children, and living with other non-paid individuals. The demographic profile of the five main categories are presented in Table 3.1. There were only 29 people who lived with spouse and children. In order to avoid extremely
small cell sizes this group was classified as living with spouse since their demographic profile most closely resembled the living with spouse group. This was also consistent with the findings of Zyzanski et al (1989).

**Table 3.1. Demographics of groups by household composition.**

<table>
<thead>
<tr>
<th>Living with:</th>
<th>Alone</th>
<th>Others</th>
<th>Child</th>
<th>Spouse</th>
<th>Spouse &amp; Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female</td>
<td>75</td>
<td>61</td>
<td>83</td>
<td>38</td>
<td>17</td>
</tr>
<tr>
<td>% White</td>
<td>79</td>
<td>62</td>
<td>76.5</td>
<td>73</td>
<td>76</td>
</tr>
<tr>
<td>% median income or less</td>
<td>60</td>
<td>71</td>
<td>81</td>
<td>22</td>
<td>34.5</td>
</tr>
<tr>
<td>% 8 yrs school or less</td>
<td>60</td>
<td>76</td>
<td>78</td>
<td>57</td>
<td>69</td>
</tr>
</tbody>
</table>

Thus, the sample was finally classified into four mutually exclusive categories: 1) living alone; 2) living with spouse and others; 3) living with children and others; 4) living with others but not spouse or children. There were 7 people who lived with a non-related paid helper who were classified as living alone on the grounds that this arrangement constituted formal care and could not be a useful predictor of the use of informal care.

*Race, gender, and time* are measured nominally, while *age* of respondents is measured continuously. *Race* is categorized as white and black. *Income* is used as a measure of socioeconomic status and is assessed through a ratio level scale. *Education* is treated as a dichotomy whereby the two categories are: Eight years of school or less; and More than eight years of school. The actual questions used in the study are presented in Appendix 1.

**RELIABILITY AND VALIDITY OF MEASURES**

According to Fillenbaum (1988) the OARS Multidimensional Functional Assessment
Questionnaire (OMFAQ) is "the result of an iterative procedure, which started by selecting standardized items, pretesting them for comprehension with elderly community and institutional residents, rephrasing them to improve clarity, and rearranging them to facilitate flow" (p. 13).

Content and consensual validity were assured by the manner of item selection. Since the instrument was intended to be clinically relevant, questionnaire based assessments, for example on self care capacity, were matched with professional assessments of the same persons to establish criterion validity.

Level of agreement between questionnaire ratings and criterion ratings (i.e., those made by professionals) was determined by using Kendall's tau and Spearman's rank order correlations. There was a statistically significant agreement (tau = .83; Spearman r = .89; p = .001) between questionnaire based ratings and the criterion on the relative placement of individuals on self-care capacity. Thus, the ADL scale not only has content and consensual validity, but criterion validity as well.

The OARS questionnaire also has pre-established measures of test-retest reliability, inter-rater reliability. Test-retest reliability was high with 90.7 % of the responses being identical by the criteria established by Fillenbaum and Smyer (1981).

Inter-rater reliability, using the intraclass correlation coefficients derived from an analysis of variance performed for each of the 5 OARS scales, was also statistically significant at an alpha level of .001. Fillenbaum (1988) reports from unpublished data on the US GAO Cleveland Survey that the raters for this study were in complete agreement on 86% of the ratings.

An attempt was made to construct scales for the measurement of formal and informal care. Scale construction is an effective technique for data reduction, parsimonious explanation, and improving reliability and validity of measurement. Thus, a Guttman scalogram procedure was applied to five variables that indicated use of a particular service. This is consistent with the scale developed by McAuley and Arling (1984) who used both
sources of care in their analysis. With regard to use of care, the five variables produced a Guttman scale in the following hierarchical order: nursing, continuous supervision, personal care, meals, and homemaker services. There was a minor difference in the ordering of the variables between this Guttman procedure and that of McAuley and Arling's: their scale had personal care ordered higher than continuous supervision. The coefficients obtained by the Guttman procedure on the use of care (which includes both formal and informal care) are presented in Table 3.2.

Table 3.2. Guttman coefficients for Use of Care

<table>
<thead>
<tr>
<th></th>
<th>1975 (n=1598)</th>
<th>1987 (n=1536)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of Reproducibility</td>
<td>.95</td>
<td>.96</td>
</tr>
<tr>
<td>Minimum Marginal Reproducibility</td>
<td>.86</td>
<td>.88</td>
</tr>
<tr>
<td>Coefficient of Scalability</td>
<td>.69</td>
<td>.67</td>
</tr>
</tbody>
</table>

The coefficient of Reproducibility measures the relative amount of deviation from an actual hierarchical scale. A coefficient of .90 or greater is established as the desired standard. The Minimum Marginal Reproducibility measures the extent to which reproducibility can be determined from the marginal distributions alone. The Coefficient of Scalability measures the maximum percent of reproducibility associated with scalability after adjusting for skewness of the data. A coefficient of .60 or greater is considered acceptable (McIver and Carmines, 1981).

While the overall use of care conforms to a Guttman scale, this pattern does not hold when informal and formal care are analyzed separately. Informal care still scales at both times whereas formal care does not scale at either time. The Guttman coefficients for informal care are presented in Table 3.3.
Table 3.3. Guttman coefficients for Informal Care

<table>
<thead>
<tr>
<th></th>
<th>1975 (n = 1598)</th>
<th>1987 (n = 1536)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of Reproducibility</td>
<td>.96</td>
<td>.96</td>
</tr>
<tr>
<td>Minimum Marginal Reproducibility</td>
<td>.89</td>
<td>.91</td>
</tr>
<tr>
<td>Coefficient of Scalability</td>
<td>.69</td>
<td>.60</td>
</tr>
</tbody>
</table>

As stated earlier, the variables measuring formal did not scale in a Guttman format. The coefficients of scalability are well below the required .60. The coefficients for formal care at both times are presented in Table 3.4.

Table 3.4. Guttman coefficients for Formal Care

<table>
<thead>
<tr>
<th></th>
<th>1975 (n = 1598)</th>
<th>1987 (n = 1536)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient of Reproducibility</td>
<td>.97</td>
<td>.98</td>
</tr>
<tr>
<td>Minimum Marginal Reproducibility</td>
<td>.96</td>
<td>.97</td>
</tr>
<tr>
<td>Coefficient of Scalability</td>
<td>.26</td>
<td>.29</td>
</tr>
</tbody>
</table>

From the Guttman scalogram analysis of type of care, it appears that informal and formal care differ in structure. Informal care is unidimensional and cumulative, and perhaps more finely tuned to need. Formal care, on the other hand, may be an all-or-nothing phenomena in which the use of different services are highly correlated with each other. The possible reasons for this may be that eligibility criteria for such services require greater levels of impairment, or poorer fiscal resources (medicaid eligibility).

Internal consistency of the informal care scale was assessed through Cronbach’s alpha. Scores ranged from 0 to 5, with higher scores indicating greater use. The results of this procedure are presented in Table 3.5.
Table 3.5. Reliability of the Informal Care scale

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale Mean</td>
<td>.65 (sd 1.19)</td>
</tr>
<tr>
<td>Range of inter-item correlations</td>
<td>.22 to .61</td>
</tr>
<tr>
<td>Mean inter-Item correlation</td>
<td>.41</td>
</tr>
<tr>
<td>Standardized Alpha</td>
<td>.78</td>
</tr>
</tbody>
</table>

The scale mean of .65 indicates that in general, the use of informal care is very low among this group. The results also indicate that the different variables do have unique contributions to the scale since the correlations between items are moderate to low. Typically, an alpha of .80 is considered to indicate good reliability. Thus, an alpha of .78 shows that the informal care scale has a great deal of internal consistency, and therefore reliability.

The ADL scale was also tested for internal consistency using Cronbach's alpha and the results are presented in Table 3.6. The range of scores is from 0 to 26, with higher scores indicating better levels of functioning.

The scale mean of 23.0 indicates that in general, this group does quite well in terms of functional ability. The different variables appear to make unique contributions to the scale since the correlations between items are moderate to low. An alpha of .93 shows that the ADL scale is internally consistent, and therefore reliable.

Table 3.6. Reliability of the ADL scale

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale Mean</td>
<td>23.0 (sd 4.7)</td>
</tr>
<tr>
<td>Range of inter-item correlations</td>
<td>.26 to .74</td>
</tr>
<tr>
<td>Mean inter-Item correlation</td>
<td>.56</td>
</tr>
<tr>
<td>Standardized Alpha</td>
<td>.93</td>
</tr>
</tbody>
</table>
Construct validity of the ADL and Informal Care scales was assessed by Pearson correlations with other variables. According to Carmines and Zeller (1980), construct validity can be assessed within a particular theoretical context. It focuses on a pattern of external evidence - associations external to the set of indicants designed to measure a given concept. Thus, in order to assess the construct validity of the ADL and Informal Care scales, it was hypothesized (on the basis of existing theory and research) that ADL scores would be inversely related to a person's age, i.e. as age increased ADL’s would deteriorate. Similarly, as ADL scores decreased the use of care would increase. The Pearson correlations between these three variables are presented in Table 3.7.

**Table 3.7. Pearson correlations - ADL, Informal Care and Age**

<table>
<thead>
<tr>
<th></th>
<th>ADL</th>
<th>Informal Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADL</td>
<td>-.69</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.14</td>
<td>-.22</td>
</tr>
</tbody>
</table>

$p < .01$

From Table 3.7, it is evident that the variables correlate in the expected manner. All correlations were significant at the .01 level. Thus, the informal care and ADL scales appear to have construct validity.

**METHODS**

In order to test for demographic differences between the two samples, chi square and t-tests were used. To test hypothesis 1.1 and 1.2, a logistic regression procedure was used. Logistic regression is the method of choice when the dependent variable is dichotomous and the data are skewed. The logistic model is a form of non-linear regression which gives an estimate of the probability of the occurrence of an event.

Logistic regression allows for the assessment of the best fitting model by also
considering interaction effects. Thus, Hypothesis 3 will be tested by examining the interaction effects between functional status, living arrangements, demographic characteristics and period on the use of formal care in the logistic model.

For Hypotheses 2.1 and 2.2, multiple regression will be used since informal care has been defined as a continuous variable. Interaction effects can also be tested in the multiple regression model. Thus, hypothesis 3 regarding the interaction between functional status, living arrangements, demographic characteristics and period and its effects on informal care will also be tested within the multiple regression model.

As discussed earlier in Chapter 2, due to the unfeasibility of conducting age-period-cohort analysis within a single statistical model, an analysis of more limited scope was proposed. This analysis would hold age constant and examine the effects of period on the use of formal and informal care. There has been a great growth in the number of providers of formal care, and there has also been an increase in female participation in the labor force as well as changes in the living arrangements of the elderly. All these factors were thought to contribute to changes in the structure of formal and informal care from one time period to the next.

It was also mentioned that the effects of period may be confounded with those of cohort membership. Some potential cohort effects such as fewer number of children, increased level of education and income were discussed. Therefore, separate analyses were proposed in order to control for the effects of cohort membership.

In order to control for cohort differences in the number of children that may be available for caregiving, it is necessary to examine these differences between the two groups. However, measures on the number and availability of children are available only for the 1987 sample. Thus, it was proposed that the 1987 sample would be split into two groups - one group born between the years 1899 and 1904, and the other group born between the years 1905 and 1910, to compare the number of children available for caregiving to each group. It is the latter group or cohort which had its main child bearing
years during the height of the depression, that is reported to have a lower fertility rate than that of other cohorts.

Similarly, cohort differences that may arise due to greater educational levels can be examined through separate analyses. Thus, the two samples would be divided into four groups i.e. two groups for those with low education, one for each year, and two groups for those with high education, one for each year. If there is an increase in formal care in 1987, and period effects were to be inferred, then the entire sample in 1987, those with both low and high education, should have an increase in the use of formal care, and not just for those with greater education. Similar analyses can be performed for cohort differences in income.
Chapter 4

RESULTS

This chapter presents descriptive data on the samples of individuals ages 77 to 88 years of age at 1975 and 1987 and also discusses the results of the regression analyses used to test the hypotheses.

Given that the sample consisted of non-institutionalized elderly, the use of in-home care, provided by either formal or informal sources, was relatively low. About 31 percent of the people in the total combined sample used any informal care, whereas about 15 percent of the people used any formal care.

There were differences in the demographic characteristics of the two samples. The 1987 sample demonstrated changes in composition which were consistent with many predictions of demographic change in the literature (O'Hare, 1987; Soldo, 1981; Treas, 1981). The demographic characteristics of the two samples are presented in Table 4.1.

Table 4.1.

Demographic characteristics of the 1975 & 1987 samples ages 77 to 88

<table>
<thead>
<tr>
<th></th>
<th>1975</th>
<th>1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% female)</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>Race (% black)</td>
<td>20 *</td>
<td>31 *</td>
</tr>
<tr>
<td>Age (mean age)</td>
<td>81</td>
<td>81</td>
</tr>
<tr>
<td>Income (mean income)</td>
<td>4274 **</td>
<td>4979 **</td>
</tr>
<tr>
<td>Education (% more than 8 years of schooling)</td>
<td>27 **</td>
<td>47 **</td>
</tr>
</tbody>
</table>

* p = < .01
** p = < .05

Table 4.1 indicates that the two samples do not differ from each other in gender and
age composition. There are, however, significant differences by income, education and race. The sample in 1987 as compared to that of 1975 consists of a higher percentage of blacks, a greater number of people with more than 8 years of schooling and a higher mean income.

As mentioned in chapters 2 and 3, greater levels of education among successive groups of elderly can be interpreted as cohort differences and thus provide a rival explanation for changes in the structure of care. Greater education has previously been associated with increased use of formal care (McAuley and Arling, 1984). The procedures for ruling out cohort effects due to education, income, and fewer number of offspring were outlined at the end of chapter 3 and will be performed as needed.

The samples were also compared on the other independent variables: functional status and social network structure. Differences in functional status were assessed by a t-test. The mean score on ADL’s for the 1975 sample was 23.12 (sd 4.43) whereas for the 1987 sample the mean was 22.84 (sd 5.06). These differences were not significant.

The social network structure as measured by household composition was submitted to a chi square test which indicated significant differences between the two samples. The results of the chi square test (chi square = 16.63, df = 3, p < .01) are presented in Table 4.2.

<table>
<thead>
<tr>
<th></th>
<th>1975</th>
<th>1987</th>
</tr>
</thead>
<tbody>
<tr>
<td>% living alone</td>
<td>43</td>
<td>51</td>
</tr>
<tr>
<td>% live with other</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>% live with child</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>% live with spouse</td>
<td>24</td>
<td>27</td>
</tr>
</tbody>
</table>

Thus, in 1987, a higher percentage of people lived alone or with their spouse, while a lower percentage of people lived with their children.
In order to assess the possibility of differences among the samples in the number of offspring available for caregiving, the 1987 sample was split into two six-year cohorts - those born between 1899 and 1904 versus those born between 1905 and 1910 - and were tested for differences on the following variables: 1) Have you ever had any children? (yes/no); 2) Number of living daughters/sons; 3) number of daughters/sons living in the Cleveland area. Chi square and t-tests revealed no significant differences between the two cohorts on any of these variables. By this we can infer that any changes in the structure of informal and formal care between 1975 and 1987 are not likely to be related to differences in the number of children available for caregiving to the two groups.

**Multiple regression analysis of informal care**

A hierarchical multiple regression analysis (Cohen and Cohen, 1975) was performed to determine whether the use of informal care had changed over time. The independent variables were grouped into 3 blocks and entered sequentially into the model. The first block consisted of the main effects of ADL, household composition and the demographic variables such as age, sex, race, education and income. The second block consisted of the main effect of Period. This was consistent with the hypothesis that period would account for changes in the use of informal care after controlling for the effects of other important variables cited in the literature. The third block contained all the interaction terms between the variables in the first block and Period. According to Cohen and Cohen (1975), interaction terms must be entered last into the regression equation after each component of the interaction term has been entered and allowed to account for their respective variance in the dependent variable.

All dichotomous variables (sex, race, education and period) were effect coded using 1 and -1 to categorize the variables. Household composition was also effect coded with k-1 variables (Cohen and Cohen, 1975). The continuous variables (age, income and ADL’s) were centered prior to creating the interaction terms (Jaccard, Turrisi and Wan, 1990). All
of these measures helped resolve the problem of multicollinearity that arises with the introduction of interaction terms.

Square root transformations of the dependent variable, informal care, did not substantially alter the pattern of residuals which indicated some deviance from normal distribution. Therefore, the untransformed variable was used in order to simplify interpretation of the results.

Table 4.3 presents the results of the hierarchical regression. The variables are listed in the order of entry into the regression model, which was done in three steps. The $r$ square increment for each step is also presented. Thus, Period added a small but significant increment to the first model which contained only the main effects of functional status, living arrangements, and demographic characteristics. The interaction between period and the other independent variables which were added to the final model also added significantly to the explained variance. 56 percent of the variance in informal care is accounted for by all the variables.

Table 4.4 contains the zero-order correlations ($r$), unstandardized and standardized regression coefficients ($b$ and $\beta$) for the final model including all the independent variables.

The main effect of Period is significant in block 2 ($\beta = -.05, \ p < .05$) but loses its significance in the final model when the interaction terms are introduced.

Thus, the results of the multiple regression indicate that functional status (as an indicator of need) is the largest predictor of the use of informal care. This is consistent with the findings of other studies (e.g. Coulton and Frost, 1982) where functional status, as an indicator of need, accounts for most of the variance in the use of care. The social network structure, as measured by household composition is also a significant predictor of the use of informal care. Household composition was treated as a k-1 dummy variable with Living Alone as the reference category. Living with someone is associated with greater use of informal care than living alone. The use of informal care increases as living arrangements...
differ in the following order: living with others, living with one's spouse, and finally living with one's children which is associated with the greatest use of informal care.

The betas for all of the demographic characteristics were extremely small and did not contribute significantly in explaining the use of informal care.

Table 4.3. Hierarchical regression analysis of informal care

<table>
<thead>
<tr>
<th>Block 1. ADL</th>
<th>R square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livspouse</td>
<td></td>
</tr>
<tr>
<td>Livother</td>
<td></td>
</tr>
<tr>
<td>Livchild</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.53 *</td>
</tr>
</tbody>
</table>

| Block 2. | Period (time) | .54 * |

<table>
<thead>
<tr>
<th>Block 3.</th>
<th>ADL x time</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Livspouse x time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Livother x time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Livchild x time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex x time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race x time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education x time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income x time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age x time</td>
<td>.56 *</td>
<td></td>
</tr>
</tbody>
</table>

* p < .01
Table 4.4. Regression coefficients for informal care

<table>
<thead>
<tr>
<th>Variables</th>
<th>r</th>
<th>b</th>
<th>beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADL</td>
<td>-.70</td>
<td>-.16</td>
<td>-.64 *</td>
</tr>
<tr>
<td>Livspouse</td>
<td>.02</td>
<td>.14</td>
<td>.10 *</td>
</tr>
<tr>
<td>Livchild</td>
<td>.32</td>
<td>.31</td>
<td>.20 *</td>
</tr>
<tr>
<td>Livother</td>
<td>.07</td>
<td>.19</td>
<td>.09 *</td>
</tr>
<tr>
<td>Sex</td>
<td>-.02</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Race</td>
<td>-.01</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Education</td>
<td>.09</td>
<td>.03</td>
<td>.03</td>
</tr>
<tr>
<td>Age</td>
<td>.15</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Income</td>
<td>-.10</td>
<td>.00</td>
<td>-.01</td>
</tr>
<tr>
<td>Period (time)</td>
<td>-.05</td>
<td>.10</td>
<td>.08</td>
</tr>
<tr>
<td>ADL x time</td>
<td>.16</td>
<td>.03</td>
<td>.14 *</td>
</tr>
<tr>
<td>Livspouse x time</td>
<td>-.03</td>
<td>.05</td>
<td>.04</td>
</tr>
<tr>
<td>Livchild x time</td>
<td>-.03</td>
<td>.10</td>
<td>.08 **</td>
</tr>
<tr>
<td>Livother x time</td>
<td>.06</td>
<td>.05</td>
<td>.04</td>
</tr>
<tr>
<td>Sex x time</td>
<td>.03</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Race x time</td>
<td>-.07</td>
<td>-.03</td>
<td>-.02</td>
</tr>
<tr>
<td>Education x time</td>
<td>-.00</td>
<td>-.01</td>
<td>-.01</td>
</tr>
<tr>
<td>Age x time</td>
<td>-.05</td>
<td>-.00</td>
<td>.02</td>
</tr>
<tr>
<td>Income x time</td>
<td>-.00</td>
<td>-.00</td>
<td>-.02</td>
</tr>
</tbody>
</table>

* p < .01 ; ** p < .05.

Two interaction terms were significant in the model: ADL x Period and Living with Children x Period. A significant interaction effect indicates that the relationship between an
independent variable and the dependent variable is conditional upon the effects of another independent variable (Cohen and Cohen, 1975). When a categorical variable consists of 2 categories, effect coding and orthogonal coding are indistinguishable (Kerlinger and Pedhazur, 1973). According to Cohen and Cohen (1975), the regression coefficient for the interaction term of orthogonally coded variables is equal to the difference between the regression coefficient of the group coded 1 and the group coded -1.

Thus for the interaction between Living with children x Period, the regression coefficient, \( b = .10 \), indicates that living with children in 1987 has a greater effect on using informal care than living with children in 1975. To examine the nature of the interaction, descriptive statistics were obtained through the ANOVA procedure which compared the means of the four groups on informal care. These descriptive statistics are presented in Table 4.5. The n's in each group are in parentheses. Since the effects at both time periods are different but in the same direction, the interaction can be called uncrossed or ordinal (Cohen and Cohen, 1975).

| Table 4.5. |
| Number of Informal care services by Period and Living with children |

<table>
<thead>
<tr>
<th></th>
<th>Live with children</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>1975</td>
<td>.52 (370)</td>
<td>1.43 (110)</td>
</tr>
<tr>
<td></td>
<td>1987</td>
<td>.42 (304)</td>
<td>1.60 (40)</td>
</tr>
</tbody>
</table>

For the interaction between ADL x Period, separate regression equations were calculated using the methods prescribed by Kerlinger and Pedhazur (1973).

For the sample in 1987, i.e. the group coded 1, the intercept \( A \) equals the \( b \) for this variable plus the average of the intercepts, or the \( A \) for the overall regression equation. Thus the intercept for the sample in 1987 is:

\[
4.83 + .10 = 4.93
\]
The intercept for the group assigned -1 is equal to the A (intercept) of the overall regression equation minus the b for the same variable. Thus the intercept in 1975 is : 4.83 - .10 = 4.73.

When effect coding is used for a categorical variable, the b coefficient associated with the continuous variable (ADL) is equal to the average of the regression coefficients for the separate regression equations. The b for ADL is -.16.

The b associated with each interaction term is equal to the difference or deviation of the b for the group assigned 1 in the vector that was used to generate the interaction, from the average of the b's. Therefore, the b for the 1987 sample is equal to the b for the interaction vector with which it is associated plus the average of the b's : -.16 + .03 = -.13. Whereas, the b for the group assigned -1 (1975) is equal to the average of the regression coefficients minus the sum of the b's for the interaction term, i.e. -.16 - (.03) = -.19. Therefore, the two regression equations are:

\[
Y^* (1987) = 4.93 - .13 \\
Y^* (1975) = 4.73 - .19
\]

To assess the nature of the interaction it is necessary to determine the point of intersection of the two regression lines. The point of intersection can be calculated with the following formula : Intersection = A1 - A2 / b2 - b1 where A = intercepts of the regression lines; and b = regression coefficients. The point of intersection is -3.33 which lies outside the range of interest (0 to 26) and thus the interaction can be considered ordinal. Thus, the impact of ADL on informal care is weaker in 1987 than in 1975, i.e. one unit change in ADL’s in 1987 led to a smaller change in the use of informal care than in 1975.

**Logistic regression analysis of formal care**

A logistic regression analysis was performed to determine whether the use of formal care had changed over time. Formal care was treated as a dichotomous variable whereby those respondents receiving any type of care were coded as one and the non-recipient respondents were coded as 0. The following discussion of the logistic regression model is based on

The variables were added to the model in a hierarchical manner: the first model consists of the main effects of all the independent variables except for Period. The second model consists of the addition of Period and the interaction terms are added in a block in Model 3. The logistic model is assessed by means of a chi-square test. The improvement chi-square test is comparable to the F-change test in multiple regression. Period, which was introduced in the second block did not have a significant main effect and did not contribute significantly to chi-square improvement. Period did, however, interact significantly with some of the independent variables. The results of the hierarchical logistic regression with the chi-square values are presented in Table 4.6 on the next page.
Table 4.6. Hierarchical logistic regression of formal care

<table>
<thead>
<tr>
<th>Block 1. ADL</th>
<th>Chi square change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Livspouse</td>
<td></td>
</tr>
<tr>
<td>Livother</td>
<td></td>
</tr>
<tr>
<td>Livchild</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>84.78 *</td>
</tr>
</tbody>
</table>

| Block 2. Period (time)               |                   |
| period (time)                        | .19               |

| Block 3. ADL x time                  |                   |
| Livspouse x time                     |                   |
| Livother x time                      |                   |
| Livchild x time                      |                   |
| Sex x time                           |                   |
| Race x time                          |                   |
| Education x time                     |                   |
| Income x time                        |                   |
| Age x time                           | 16.88 **          |

* p < .01
** p < .05

Table 4.7 presents the regression coefficients and the change in odds associated with the use of formal care. The logistic regression coefficients (b's) represent the effect of
the independent variables on the probability of the use of formal care. The coefficients can be interpreted as the change in the log odds associated with a one unit change in the independent variable. The column marked Exp(B) represents the change in the odds of using formal care when the independent variable increases by one unit. If Exp(B) is larger than 1, this means that the odds have increased whereas, if it is smaller than 1, then the odds of using care have decreased. As in multiple regression, the contribution of individual variables depends on other variables in the model. The R statistic is used to look at the partial correlation between the dependent variable and each of the independent variables. R can range in value from -1 to +1. A positive value indicates that as the variable increases in value so does the likelihood of the event occurring. If R is negative, the opposite is true. Small values for R indicate that the variable has a small partial contribution to the model.

All categorical variables, including household composition, were effect coded 1, -1. The b's obtained by using this method have to be multiplied by 2 in order to get the difference for a one unit change in the independent variable. This is because effect coding creates a difference of two units between values of the independent variables i.e. 1 and -1 instead of a one unit difference as in 1 and 0 in a dummy or contrast coded variable. The modified b's along with the modified Odds Ratios Exp(B) are presented in Table 4.7.

The results of the logistic regression indicate that once again ADL capacity is the important variable in predicting the use of formal care. A higher score on ADL indicates better functioning. Thus, a one unit increase in ADL functioning leads to a .84 decrease in the odds of using formal care. Living arrangements are only significant in the case of those individuals living with their children where such an arrangement is negatively associated with using formal care. Two demographic variables emerged significant in predicting the use of formal care: race and education. For race, Blacks are coded as 1 and Whites as -1, while education is categorized as 'more than 8 years of school' (1) and '8 years of school or less' (-1). Being black and being better educated were associated with greater use of formal care. The Exp(B) column showing the change in the odds of using care shows that being black
significantly increases the odds of using formal care by 1.64. Having more education, however, increases the odds of using care threefold. In fact, having more education was the second most important predictor of the use of formal care as can be seen by the R statistic.

The other demographic characteristics did not contribute significantly to predicting the use of formal care.

Table 4.7. Logistic regression of formal care

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>Std Error</th>
<th>Exp(B)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADL</td>
<td>-0.17</td>
<td>0.02 *</td>
<td>0.84</td>
<td>-0.26</td>
</tr>
<tr>
<td>Sex</td>
<td>0.06</td>
<td>0.26</td>
<td>1.06</td>
<td>0.00</td>
</tr>
<tr>
<td>Race</td>
<td>0.50</td>
<td>0.12 **</td>
<td>1.64</td>
<td>0.05</td>
</tr>
<tr>
<td>Age</td>
<td>0.02</td>
<td>0.03</td>
<td>1.02</td>
<td>0.00</td>
</tr>
<tr>
<td>Income</td>
<td>-0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Education</td>
<td>1.14</td>
<td>0.12 *</td>
<td>3.12</td>
<td>0.18</td>
</tr>
<tr>
<td>Livother</td>
<td>0.34</td>
<td>0.58</td>
<td>1.40</td>
<td>0.00</td>
</tr>
<tr>
<td>Livchild</td>
<td>-2.14</td>
<td>0.32 *</td>
<td>0.11</td>
<td>-0.12</td>
</tr>
<tr>
<td>Livspouse</td>
<td>0.32</td>
<td>0.48</td>
<td>1.37</td>
<td>0.00</td>
</tr>
<tr>
<td>Period (time)</td>
<td>-5.00</td>
<td>6.42</td>
<td>0.08</td>
<td>0.00</td>
</tr>
<tr>
<td>ADL x time</td>
<td>0.14</td>
<td>0.04 *</td>
<td>1.15</td>
<td>0.09</td>
</tr>
<tr>
<td>Sex x time</td>
<td>-0.48</td>
<td>0.26</td>
<td>0.61</td>
<td>-0.04</td>
</tr>
<tr>
<td>Race x time</td>
<td>-0.06</td>
<td>0.24</td>
<td>0.94</td>
<td>0.00</td>
</tr>
<tr>
<td>Age x time</td>
<td>0.02</td>
<td>0.06</td>
<td>1.02</td>
<td>0.00</td>
</tr>
<tr>
<td>Income x time</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Education x time</td>
<td>0.20</td>
<td>0.24</td>
<td>1.22</td>
<td>0.00</td>
</tr>
<tr>
<td>Livother x time</td>
<td>0.52</td>
<td>0.58</td>
<td>1.68</td>
<td>0.00</td>
</tr>
<tr>
<td>Livchild x time</td>
<td>1.04</td>
<td>0.64</td>
<td>2.82</td>
<td>0.03</td>
</tr>
<tr>
<td>Livspouse x time</td>
<td>-1.16</td>
<td>0.24 *</td>
<td>0.31</td>
<td>-0.07</td>
</tr>
</tbody>
</table>

*  p < .05 ; ** p < .01 (test of significance based on Wald Statistic)
Two interaction effects were significant: ADL x Period and Living with Spouse x Period. Descriptive analysis through 2 separate logistic regressions (one for each time period) were done to assess the nature of the interaction effects. The results of this analysis are presented in Table 4.8.

Table 4.8. Interaction effects on formal care

<table>
<thead>
<tr>
<th>Period</th>
<th>Variables</th>
<th>b</th>
<th>Std Error</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>ADL</td>
<td>-.10</td>
<td>.02</td>
<td>.90 *</td>
</tr>
<tr>
<td>1987</td>
<td>ADL</td>
<td>-.24</td>
<td>.04</td>
<td>.78 *</td>
</tr>
<tr>
<td>1975</td>
<td>Live with Spouse</td>
<td>-.41</td>
<td>.32</td>
<td>.66</td>
</tr>
<tr>
<td>1987</td>
<td>Live with Spouse</td>
<td>.74</td>
<td>.36</td>
<td>4.39 **</td>
</tr>
</tbody>
</table>

* p < .01
** p < .05

Thus, for ADL’s, a one unit change in scores in 1987 leads to a greater decrease in the odds of using formal care than in 1975. Living with one’s spouse in 1987 significantly increases the odds of using formal care, whereas in 1975 this variable did not contribute significantly in the prediction of the use of formal care.

Thus, both ADL functioning and living with one’s spouse had different influences on the use of formal care in 1987 versus 1975. The implications of the interactions between ADL and period, and living arrangements and period on both formal and informal care will be examined more fully in the next section.
Chapter 5

DISCUSSION

The preceding analysis has yielded some interesting findings regarding the changing structure of formal and informal care over time. It has demonstrated the utility of applying the age stratification approach to the understanding of caregiving to the elderly by showing that the structure of caregiving does change over time in response to changing social conditions.

The first hypothesis regarding the increased use of formal care is not supported by the results. While there is a small increase in the use of formal care at time 2 in 1987, the change is not significant. This may be partly due to the fact that although there are a greater number of formal care sources in the community, access to their services is still restricted by eligibility criteria especially due to the cost containment efforts in health care in the last two administrations. About 75 percent of the expenditure for noninstitutional care (e.g. home health care or home maker services) is privately financed by the elderly or their relatives (Liu, Manton and Liu. 1986). Thus making such services inaccessible to those elderly with limited means.

The regression analysis for informal care confirms the second hypothesis that there has been a small but statistically significant decrease in the use of informal care in 1987. However, the main effect of period on informal care lost its significance when the interaction terms were introduced in the multiple regression model. The importance of period lies not in an overall change in the use of care, but more significantly, in the impact that period has on the variables that affect the use of care. Thus, the third hypothesis about the moderating effect of period on the relationships between the independent variables and the use of formal and informal care is partly substantiated by the results. That is, the interactions between period and functional ability, and between period and living arrangements are significant predictors of the use of both formal and informal care. None of the interactions
between period and demographic characteristics were significant.

For informal care, the effects of ADL capacity and household composition are conditional upon the period in which they are measured. Living with children in 1987 has a greater likelihood of using informal care than in 1975. However, as indicated in Table 2, fewer people lived with their children in 1987 than in 1975. This may be explained by the fact that increasingly, the elderly are living close to their children rather than with them (Sussman, 1985). Among those of higher socioeconomic and educational status, it has become increasingly common for children to live at a distance from their parents (Cicirelli, 1981). However, the proportion of elderly living within a 10-minute distance of a child has increased to greater than 50 percent. Those elderly who live with their children are more likely to be females who have severe ADL impairments (Zyzanski et al, 1989). Thus, living with one’s children in 1987 is more likely to indicate that there was a need for in-home care as compared to living with one’s children in 1975.

An improvement in ADL scores in 1975 is associated with a greater decline in the use of informal care as compared to a similar improvement in 1987. This indicates that need, as measured by functional status, had a weaker influence on informal care in 1987 than in 1975. Other factors such as decreasing caregiving ability, changing living arrangements, and policies such as the DRG’s influenced the structure of informal care and altered the impact of need or functional status on the use of informal care.

For formal care, the effects of ADL and living with one’s spouse are conditional upon the period of measurement. Living with one’s spouse in 1987 significantly increases the likelihood of using formal care as compared to 1975. This may be explained by the findings presented earlier in Table 3.1, where it was shown that those who live with spouses tend to be slightly more educated and of higher socioeconomic status than other groups. Also, a slightly higher proportion of elderly lived with their spouses in 1987. Another possible explanation for the change in the impact of living with one’s spouse on the use of formal care may be due to the implementation of the DRG system. With people being discharged
from the hospital quicker and sicker, those who lived alone and had no one to help care for them at home were more likely to be discharged to a nursing home. Those who lived with spouses, on the other hand, were more likely to be sent home along with home health care services. However, this explanation is only suggestive since the study does not contain institutionalized subjects. This is contrary to the findings of Soldo and Manton (1985) who found that the probability of receiving formal services is lowest for those living with spouses or other relatives.

An improvement in ADL scores in 1987 is associated with a greater decrease in the odds of using formal care as compared to a similar improvement in 1975. Hence, functional status had a smaller influence on the use of formal care in 1987 than in 1975.

The findings for the relationships between ADL x Period and formal and informal care appear to be similar. In both multiple and logistic regression models, the impact of any one variable depends upon the other variables in the model. Thus, the impact of one variable may increase or decrease due to a corresponding change in another important predictor variable.

Hence, for both informal and formal care, functional status appears to have decreased in its impact on the use of care. This may be due to factors other than need having an increased impact on the use of both types of care. Such factors may include increased availability of formal care, decreased availability of informal resources, and greater willingness and ability to seek formal care alternatives due to increased levels of education and income, and the impact of policies such as the DRG’s that influence both formal and informal care.

These findings can be considered in conjunction with the findings of Coulton et al (1990; 1982) who used the Anderson-Newman model of health service utilization. These researchers found need for care to have the greatest predictive value for the use of services. This study demonstrated that the impact of need on the use of care is subject to change.

These findings are both interesting and important. They suggest that although
functional status (as an indicator of need) is one of the most important predictors of the use of both formal and informal care, its impact is subject to change due to other conditions that may prevail in the environment such as the availability and knowledge of alternative resources and the willingness to use these alternatives. The impact of living arrangements on the use of care are also subject to change and depend not only on the preferences of living arrangements of family members but also due to policy changes such as the DRG’s. This demonstrates the usefulness of the age stratification approach in understanding the structure of caregiving to the elderly. It also points to the shortcomings of one-time cross-sectional studies that are unable to provide insight into the changing nature of care.

One additional finding of this study deserves mention. It was mentioned earlier that the Guttman scalogram analysis revealed differences in the structure of formal and informal care. Informal care was found to be cumulative and unidimensional and more finely tuned to individual needs. Formal care on the other hand, seemed to be an all-or-nothing phenomenon with high correlations among the number of services received. Hence, the findings of McAuley and Arling (1984) regarding the scalability and unidimensionality of in-home care need to be qualified. They appear to be valid only for informally provided care.

Although formal care did not scale in a Guttman format, it is instructive to examine the pattern of use of formal care at both time periods. Table 5.1 presents the number of individuals that used a given type of formal caregiving activity which are listed in a hierarchical order from low to high use. Table 5.2 does the same for informal care.

| Table 5.1. Pattern of use of formal care |
|-----------------|--------|--------|--------|--------|--------|
| Period | Supervision | Meals | Personal Care | Nursing | Chores |
| 1975   | 30     | 34     | 42     | 47     | 88     |
| 1987   | 14     | 22     | 27     | 56     | 96     |
Table 5.2 Pattern of use of informal care

<table>
<thead>
<tr>
<th>Period</th>
<th>Nursing</th>
<th>Supervision</th>
<th>Personal Care</th>
<th>Meals</th>
<th>Chores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>47</td>
<td>96</td>
<td>133</td>
<td>215</td>
<td>320</td>
</tr>
<tr>
<td>1987</td>
<td>16</td>
<td>105</td>
<td>106</td>
<td>175</td>
<td>241</td>
</tr>
</tbody>
</table>

It is evident from the above table that the pattern of use of formal care is quite distinct from that of informal care. The use of formally provided homemaker services and nursing care showed an increase from 1975 to 1987. These are also the same services that are mostly provided by the growing number of home health agencies. Furthermore, there does not appear to be any logical hierarchy in which formal care services are used. It seems that the most easily available formally provided services are the ones that are used the most.

Informal care, on the other hand, appears to have some logical consistency in the way care is provided. The variables are arranged in a very different hierarchy and they range from tasks that require little skill and time commitments to tasks that require greater skills and time on the part of the caregiver. With the exception of continuous supervision, informal care declined for all other activities in 1987.

One might argue in favor of substitution theory (Greene, 1983) on the grounds that the increase in formally provided nursing and homemaker services is responsible for the decline in the informal provision of such services. However, informal care appears to have declined for other activities as well where formal service provision has not increased, thereby indicating that other factors may be responsible for the decline in informal care. These factors include those discussed earlier such as the changing impact of living arrangements and functional ability on the use of care over time.

The results of the regression analysis provide further insight into the factors that influence the use of formal versus informal care.
The multiple regression analysis of informal care indicated that none of the demographic variables such as age, race, sex, education and income were significant predictors of the use of informal care. The logistic regression of formal care, however, showed two demographic variables - race and education to be significant predictors of the use of formal care.

The more educated people are, the more likely they are to use formal care. This is consistent with the study done by McAuley and Arling (1984) who found higher education to be positively correlated to the use of formal care.

Greater education may simply mean that a person is better informed about available resources. However, it is unlikely that formal education obtained in one's early years is likely to give information about resource availability that changes constantly. More likely, greater formal education may alter peoples' help-seeking or help-mobilizing behaviors. It may reflect an attitudinal difference in using formal care resources in that, people with more education may consider the range of caregiving alternatives open to them and may feel that formal care is a viable option to relying solely on the informal network.

Similarly, in terms of race, being Black is associated with an increased odds of using formal care. This is consistent with the findings of other researchers e.g. Palmore and Maddox, 1977; Jackson, 1980; Mindel, Wright and Starrett, 1986; and Sussman, 1985 who offers the following explanation:

As a result of limited economic opportunities and resources, increasing numbers of blacks have become experienced in utilizing human service systems. Their use of these non-family services for sustenance and care results in a complementarity of processes: individuals can maintain their linkages with family and kin without being economic burdens to them while obtaining assistance from a fragmented human service system (Sussman, 1985, p.422).

Hence, while blacks also have extensive informal support networks, their care seeking patterns seem to differ from that of whites in terms of utilizing formal in-home care. These findings support those of Davis et al (1987), and Mindel et al (1986) who also found that blacks tend to use a greater amount of formally provided in-home care than whites.
The ethnic differences in the use of in-home care may also be understood in terms of the differences in the rates of utilization of nursing home care. Davis et al. (1987) report that whites received one-third more benefits for skilled nursing facility care than blacks. Thus, it may be that blacks, with the help of formal in-home care services, may be able to maintain themselves in the community longer than whites. This also may be due to the differences in living arrangements where more blacks are likely to live with others than whites and thus may be able to get along with a combination of care giving sources. Another possible explanation for the greater use of formal in-home care by blacks is that of the economics of caregiving. By keeping the elder in the home, the family continues to receive the elder's social security benefits which may be needed in order to maintain the family. Home ownership by the elderly person may also be an incentive for the family to keep the elder at home.

Thus, the large amount of research on caregiving indicates that informal caregiving occurs in all socioeconomic and racial groups. Formal care, however, is influenced not only by need but also by various demographic factors. More research appears to be necessary to understand the dynamics of formal care since that is the most susceptible to external intervention.

One of the limitations of this study, as with most studies, is the issue of generalizability. The sample in 1987, while it closely resembled the Cleveland population, was not strictly representative as it was not randomly drawn in 1987. Thus, there may be a change in the heterogeneity of the sample in 1987. It is possible that the 1987 sample differed from the 1975 one in unknown ways which were not measured. This is a potential alternative hypothesis that cannot be completely ruled out. However, the sample was remarkably representative of the predicted demographic changes such as a greater proportion of blacks, greater levels of income and education, and changes in the living arrangements of individuals. Hence, given the size of the sample, and the fact that it did not differ significantly in composition from population parameters, certain generalizations can
be made at least about the status of caregiving to the elderly in northern industrial cities which seem to share a great deal in common.

A second limitation is that this study examines only period effects on the structure of care. It is necessary to determine whether the findings of this study hold across other age groups, cohorts, and periods. It would also be instructive to obtain information on the simultaneous effects of age, period, and cohort on the use of care by the elderly.

Other limitations include a restriction in the range of income reported by the sample whereby the middle class are not represented in the sample. Thus, the conclusions may be generalizable to a restricted group of inner-city populations.

Finally, there may be some possible under-reporting of services used since subjects were asked to recall their activities over a six month period.

To summarize, this study found that there was a decrease in the use of informal care in 1987, no significant change in formal care although there was a small but insignificant increase in the use of formal care in 1987, and that the influence of functional status and social network structure on the use of formal and informal care is moderated by Period effects. It also found the structure of formal and informal care to differ from each other. Informal care was found to be unidimensional and cumulative through the Guttman procedure, whereas formal care was found to be highly inter-related and an all-or-nothing phenomenon. Formal care appeared to be influenced by demographic characteristics as well as functional status and social network, whereas informal care was not influenced by any of the demographic characteristics of the sample.
IMPLICATIONS

This study attempted to examine the stability of patterns of caregiving to the elderly over time. It reviewed the literature on the antecedents of the use of care which were functional status, living arrangements, and demographic characteristics such as age, race, sex, education and income. The various models of the use of care, both formal and informal, were presented. The limitations of these models i.e. their inability to explain what happens to care over time due to their reliance on cross-sectional data gathered at only one point in time was also discussed. The central thesis of this study, drawing upon age stratification theory was that the structure of care was subject to the influence of three factors: the effects of aging, period, and cohort membership. The difficulty in assessing the effects of all three factors simultaneously was also discussed. The kind of data required for age-period-cohort analysis is not yet available in the area of caregiving to the elderly. Hence, the focus of the study was on the effects of period on the use of care. Age was held constant, and known cohort effects were controlled for. The findings of this study, that the structure of formal and informal care changes over time in response to changing social conditions, have implications for theory, social policy, and service delivery.

Implications for theory  Most of the literature on caregiving is based on cross-sectional research where the focus has been on the factors associated with the use of care without reference to environmental processes that impinge upon the use of such care. This study highlights how the use of care is determined not only by individual-level characteristics and environmental conditions but also by the interactions between both these sets of variables. This can be evidenced by the finding that period was a significant predictor of informal care, and that period moderated the effects of ADL’s and living arrangements on the use of both formal and informal care. The finding that the structure of
care is contingent on environmental conditions at a given point in time extends current conceptions of care by making the use of care a historically contingent social process. Thus, while need (as defined by functional ability) remains an important predictor of the use of formal and informal care, its impact is modified by factors such as availability of alternate caregiving resources and the ability to seek and the willingness to use alternate sources of care. Therefore, it is necessary to examine the interrelationships between the antecedents of the use of care and how these relationships change over time in response to various environmental influences.

Thus, any theory of caregiving should include the effects of age, period, and cohort upon both caregivers as well as the recipients of care. Caregiving needs to be placed in a dynamic framework whereby changes in the structure of care are viewed as not just due to a decline in familial responsibility, but due to important social forces such as increased longevity, female employment, changing family structures, and increasing levels of education, all of which influence the process of giving and receiving care.

Researchers also need to make a distinction between formally and informally provided care as we have seen that these two types of care differ considerably in structure. According to Chatterjee (1985) social welfare programs and policies are a product of the demographic, technological and ideological structure of a society. Hence, the availability of formal care may be related more to macro-level social forces such as the stage of social and economic development of the country, the proportion of elderly in the population, and the dominant value system regarding the appropriate roles of the individual and society in providing care to elderly dependent persons (Cantor and Little, 1985). Changes in technology, demography or ideology can produce changes in the current system of policies and programs.

**Implications for social policy** The findings on both formal and informal care have implications for social policy. As discussed earlier, contrary to the hypothesis, there
was no increase in the use of formal care in 1987. This raises an interesting question as to why there was no increase in the use of formal care inspite of the growth in the number of home health care agencies and the implementation of the DRG’s. One possible explanation may be that the formal care needs of those requiring acute post-hospital care are not being met adequately. Thus, there appear to be two divergent groups of elderly: those who need short-term acute post-hospital care, and those who are frail and need long-term chronic care. Hence, it will be important for policy makers to address the needs of both groups and not just those in need of long-term care.

It is possible that barriers to the use of formal care have not decreased, and although Medicare benefits allow for more home care visits, there are still entry barriers and restrictions upon the type of services that are offered. As mentioned in Chapter 5, about 75 percent of the expenditure for non-institutional care is financed privately by the elderly or their relatives (Liu et al., 1986), thus making such services relatively inaccessible to those elderly with limited means.

Given that this study had a sample with a restricted income range, the findings on formal care suggest that there may be a segment of the elderly population whose needs for formal care are inadequately met. This segment may include those elderly who do not have resources for supplemental insurance but are not impoverished enough to meet Medicaid eligibility. This group of elderly needs to be researched further to assess how their needs for care are being met. While researchers (Easterlin, MacDonald and Macunovich, 1990) predict that future cohorts of elderly especially the baby boomers will be entering retirement in a better economic position than their predecessors, they will however, reach retirement with greater income inequality. This disparity in income may be due to other demographic trends such as single parenthood, female headed households and changing family structures which contribute to a decline in the family’s caregiving ability. Thus, it will be important for policy makers to attend not only to averages but to distributional considerations as well. It is possible that some type of income as well as service strategy
may be required for those elderly whose needs for formal care are not being addressed adequately. Perhaps an expansion of health care benefits to cover post hospital care may help in easing some of the problems encountered in obtaining formal care.

In terms of the family's declining ability to provide informal care due to competing demands from participation in the work force, employment related benefits for caregivers such as Paid Time Off may also prove to be a useful strategy to meet the acute post-hospitalization care needed by the elderly family member.

Thus, future policy research needs to focus on both the long term care and acute post-hospital short term care needs of the elderly.

Implications for service delivery  In terms of service delivery, there are two target populations: the elderly themselves, and their families. Demonstration projects are a useful way of evaluating the relative success of different types of programs. Several states such as Maryland, New York and Florida have introduced such projects. Some of the projects provide direct home care services while others provide substantial reimbursement to families who provide care to their elderly.

There has been some debate about the relative advantages of service versus financial supports (Horowitz, 1985). The issue is whether the informal network should receive assistance in continuing their provision of care to the elderly through the means of direct services, vouchers for service, cash allowances, or some combination thereof. If the findings of this study hold for future cohorts of elderly, then it may become increasingly difficult for families to provide long term care due to various competing demands. Thus, while financial support to the caregiver may be useful in certain situations, it is perhaps actual services that might render the greatest assistance.

There may be an increasing place for social workers in EAP's to provide information and counseling to caregivers as well as to elderly people. This will obviously be a growing area of concern and practitioners need to be alert to symptoms of stress among caregivers
and aware of possible resolutions to these problems.

DIRECTIONS FOR FUTURE RESEARCH

Future research needs to focus on obtaining data necessary for age-period-cohort analysis to provide a comprehensive picture of the dynamic nature of aging and caregiving. Future research will need to be more explicit in measuring the factors that are responsible for the changing nature of care. Thus, it would be desirable to directly measure the factors responsible for changes in the nature of caregiving such as the impact of various policies, events and social trends on the interrelationships between variables such as functional status and living arrangements on the use of formal and informal care.

As mentioned earlier, there appears to be two diverse segments of the elderly population in need of care - those who need short term acute post-hospital care, and those who need chronic long term care. Future policy research needs to examine the needs of those who need both types of care to assess how well the need for care is being met.

While the literature provides a great deal of information and insight into informal care, the antecedents of formal care are not explicated as well. This study revealed that formal care was influenced by demographic characteristics such as education and race but informal care was not. It is important for policy makers to better understand the sources of variation in formal care so that services can be planned for and delivered effectively. Further, since much of the sample belongs to a lower socioeconomic strata, the use of formal care is probably quite restricted. A larger sample with greater socioeconomic diversity would likely provide a different picture of formal and informal care.

Another important variable on which there is a paucity of data is the extent to which informal caregivers are reimbursed, monetarily or otherwise, by elderly care recipients. Other issues that need clarification are whether the provision of in-home care substitutes for or delays an individual’s entry into institutional care. Thus both longitudinal and cross sequential data is necessary in understanding the dynamic process of caregiving and its
responsiveness to changing conditions.

Furthermore, the differences between blacks and whites on the use of formally provided in-home care and nursing home care needs to be better understood. Several questions still remain: is there a relationship between higher use of formally provided in-home care and lower use of nursing home care among blacks? Are the racial differences in the use of formal care influenced by the pattern of use of informal care? Does the phenomena of "mortality crossover" (see Manton, Poss and Wing, 1979) help in explaining differences in the use of in-home versus nursing home care between blacks and whites? The answers to these questions will provide important insights into the nature of racial differences in the use of care.

Finally, while there may be a brief respite in the issue of long term care during the next two decades due to the slowdown projected in population growth among the elderly, this problem is only going to return with greater severity and magnitude in the future. It thus behooves researchers and policy makers to continue addressing the issues of long term care to the elderly.
REFERENCES


Greene, V.L. 1983. Substitution between formally and informally provided care for the impaired elderly. Medical Care, 21(6), 609-619.


Appendix 1

Operational Definitions – Questionnaire Items

Formal and Informal Care

1. During the past 6 months have you had any nursing care, in other words did a nurse or someone else give you treatments or medications prescribed by a doctor?

   Who helped you in this way?

2. In the past six months did someone have to help you with your personal care, for example helping you to bathe or dress, feeding you, or helping you with toilet care?

   Who helped you in this way?

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

   Who looked after you?

4. During the past six 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?

   Who helped with household chores?

5. During the past six 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?

   Who prepared meals for you?

RESPONSE CATEGORIES:

1 - Unpaid family member or friend
2 - Someone hired to help you in this way or someone from an agency
3 - Both
Functional Ability – Activities of Daily Living

1. Can you use the telephone?
2. Can you get to places out of walking distance?
3. Can you go shopping for groceries or clothes?
4. Can you prepare your own meals?
5. Can you do your housework?
6. Can you take your own medicine?
7. Can you handle your own money?
8. Can you eat?
9. Can you dress and undress yourself?
10. Can you take care of your appearance?
11. Can you walk?
12. Can you get in and out of bed?
13. Can you take a bath or shower?

RESPONSE CATEGORIES:

2 - Without help
1 - With some help
0 - Completely unable to do activity
Living Arrangements

1. Who lives with you?

RESPONSE CATEGORIES:

No one
Husband or wife
Children
Grandchildren
Brothers and sisters
Other relatives
Friends
Non-related paid helper
Other