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**Health and Social Support  
of the Elderly**

**Kristiana Raube**

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**Health and Social Support  
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The original version of this study was prepared as a dissertation in December 1991 in partial fulfillment of the requirements of the doctoral degree in public policy analysis at the RAND Graduate School. The faculty committee that supervised and approved the dissertation consisted of David Draper (Chairman), John C. Beck, and Joan Buchanan.

**PREFACE**

This report describes the results of the first year of a randomized controlled trial that evaluates whether a community-based in-home preventive program can change the level of social support for and improve the health status in an older population. With support from the W. K. Kellogg Foundation, the project was performed by the University of California Los Angeles Multicampus Division of Geriatrics and Gerontology and the Senior Health and Peer Counseling Center. The Pew Charitable Trusts provided additional support.

## SUMMARY

Many researchers have speculated as to whether social support plays a role in maintaining good health in the elderly. Yet very few have investigated whether an intervention intended to increase social support can have subsequent effects on health, in particular on mental health. This report evaluates whether a community-based in-home preventive program can change the level of social support for and improve health status in an older population.

We randomly assigned noninstitutionalized Santa Monica, California, residents aged 75 and over, who were recruited from a voter registry, to intervention (n=216) and control (n=198) groups. Intervention group participants were visited in their homes by a gerontological nurse practitioner (GNP) every three months for one year. The GNP performed a multidimensional evaluation and, in collaboration with geriatricians, recommended preventive actions. Outcome data were collected by independent examiners for experimental and control subjects every four months.

At baseline, I find a significant positive association between social support and health status, and an even stronger negative association between social support and depression. Specifically, tangible support (e.g., transportation) appears to be the most influential component of social support in those 75 and over. However, I also find that the intervention group participants did not have significantly different levels of social support after the first year.

### ACKNOWLEDGMENTS

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A special thanks to the staff of the Kellogg Project--for their dedication to older people, their hard work, and especially for their friendship over the last three years, I owe a heartfelt thank-you to John Beck, Larry Rubenstein, Andreas Stuck, Harriet Aronow, Marcia Gold, Michele Kemp, and especially Karen Yuhas.

Finally, my friend and colleague Andrea Steiner deserves special thanks. When we started this adventure together, I had no idea how much I would come to rely on her good sense, her ability to see the big picture, her knowledge of aging, her attention to detail, her commitment to her work, and her tireless editing skills. But most of all, I will remember our long talks, our mutual support, and the dreams we shared during this long and difficult process.

CONTENTS

PREFACE .....	iii
SUMMARY .....	v
ACKNOWLEDGMENTS .....	vii
FIGURES .....	xi
TABLES .....	xiii
Section	
1. INTRODUCTION .....	1
2. LITERATURE REVIEW .....	5
Measuring Social Support .....	6
Social Interaction in the Elderly .....	8
Theoretical Perspectives: Social Support and Health ...	11
Mortality and Social Support .....	14
Morbidity and Social Support .....	16
Mental Health and Social Support .....	17
Health Service Utilization and Social Support .....	20
Compliance and Social Support .....	21
Interventions and Social Support .....	23
Summary .....	25
3. EXPERIMENTAL DESIGN AND METHODS .....	27
Introduction .....	27
The Design .....	27
Enrolling the Sample .....	28
The Randomization Procedure .....	32
Description of the Intervention .....	32
The Social Support Aspect of the Intervention .....	33
Description of the Evaluation Component .....	35
Description of the Study Sample .....	36
Variable Selection .....	37
Replacing Missing Values .....	44
Attrition After the First Year .....	45
Summary .....	46
4. CROSS-SECTIONAL ANALYSIS .....	51
Introduction .....	51
Social Support, Social Network, and Health Status .....	51
Components of Social Support and Health Status .....	56
Social Support and Depression .....	57
Components of Social Support and Depression .....	59

Health Services Utilization and Social Support .....	61
Summary .....	62
5. LONGITUDINAL ANALYSIS .....	65
Introduction .....	65
Social Support at One Year .....	65
Social Network at One Year .....	71
Health Status at One Year .....	76
Depression at One Year .....	80
Use of Community Services in the First Year .....	84
Compliance with Nurse Practitioner Recommendations ....	87
Summary .....	89
6. DISCUSSION .....	92
Differences Between This Study and Hendriksen's .....	92
Potential Explanations for the Null Result .....	94
Policy Implications of Social Support .....	97
APPENDIX A: QUESTIONNAIRE ITEMS USED IN CONSTRUCTING THE MAJOR STUDY VARIABLES .....	99
APPENDIX B: QUESTIONNAIRE ITEMS USED IN COMPLIANCE INTERVIEW ...	113
BIBLIOGRAPHY .....	117

**FIGURES**

3.1.	Derivation of Study Population .....	30
5.1.	Posterior Distribution of the Treatment Effect (in Standard Units) on Social Support at One Year .....	68
5.2.	Posterior Distribution of the Treatment Effect (in Standard Units) on Social Network at One Year .....	74
5.3.	Posterior Distribution of the Treatment Effect (in Standard Units) on Health Status at One Year .....	79
5.4.	Posterior Distribution of the Treatment Effect (in Standard Units) on Depression at One Year .....	83

**TABLES**

2.1.	Social Support and Morbidity .....	18
2.2.	Social Support and Mental Health .....	19
2.3.	Social Support and Health Services Utilization .....	22
3.1.	Baseline Characteristics of Study Population .....	36
3.2.	Income at Baseline .....	37
3.3.	Study Variables .....	39
3.4.	Mean Values of Scales at Baseline .....	40
3.5.	Mean Values of Scales at One Year .....	40
3.6.	Health Status at Baseline and One Year .....	41
3.7.	Percent of Sample with Missing Values .....	45
3.8.	First Year .....	46
3.9.	Correlations Among All Variables .....	48
4.1.	Outcome: Health Status; Both Social Support and Social Network .....	52
4.2.	Outcome: Health Status at Baseline; Social Network Only .....	53
4.3.	Outcome: Health Status at Baseline; Social Support Only .....	53
4.4.	Outcome: Health Status; Scale Combining Social Support and Social Network .....	55
4.5.	Outcome: Health Status; Components of Social Support .....	57
4.6.	Outcome: Depression; Scale Combining Social Support and Social Network .....	59
4.7.	Outcome: Depression; Components of Social Support .....	60
5.1.	Outcome: Social Support at One Year .....	66
5.2.	Outcome: Social Network at One Year .....	73
5.3.	Outcome: Health Status at One Year .....	77
5.4.	Outcome: Depression at One Year; Both Social Support and Social Network .....	80
5.5.	Outcome: Depression at One Year; Scale Combining Social Support and Social Network .....	84
5.6.	Outcome Variable: Change in Depression After One Year .....	84
5.7.	Use of Community Services in the First Year .....	85
5.8.	Use of Services at SHPCC in the First Year .....	88

## 1. INTRODUCTION

During the last 30 years, Americans have seen remarkable changes in both health care delivery and the elderly population. Before 1960, less than 15% of the U.S. federal budget was spent on those over 65 (U.S. Senate Special Committee on Aging, 1985). Health care accounted for only 4.4% of the gross national product (Fuchs, 1986), and life expectancy at age 65 had increased by only 2.4 years since 1900. By contrast, today over 28% of the federal budget is spent on the elderly (U.S. Senate Special Committee on Aging, 1985). Health care now represents over 11% of the gross national product (Letsh et al., 1988) and since 1960, life expectancy has increased 2.5 years for 65-year-olds (U.S. Senate Special Committee on Aging, 1985). Additionally, in 1987, those 65 and over made up 12% of the population but consumed over 36% of total personal health care resources (Waldo et al., 1989).

At the same time, the elderly population has grown at a rapid rate. The number of aged Medicare enrollees has increased 54% since 1966 (Mariono, 1989). Between 1900 and 1984, the over-65 segment of the population increased from 3.1 million to 28 million, a ninefold rise. During the same time period, those under 65 experienced just a threefold increase (U.S. Bureau of the Census, 1989). Not only are there more elderly members, but the elderly themselves are becoming older: The 85 and over population is the fastest-growing segment of the population (U.S. Senate Special Committee on Aging, 1985).

Given the rapid growth in the elderly population, increased life expectancy, and increasing health care costs, it is increasingly important to understand what influences older people's health. Policy makers need answers to two fundamental questions in order to efficiently distribute the nation's limited health care resources to this growing older population. First, what influences an older person's health status? Second, why do people utilize differing amounts of health care? Part of the answer lies in the arena of social support.

Broadly defined, social support allows an individual to feel cared for and loved, provides a feeling of self-worth, and allows people to see themselves as part of a network of communication and mutual obligation (Cobb, 1976). More specifically, Woltman and Dunkel-Schetter (1987) described several distinct types of support. First, support can mean conveying that one is cared for, loved, or esteemed. Second, it can mean acknowledging the appropriateness of a person's beliefs or feelings. Third, support can encourage the open expression of beliefs and feelings. Fourth, it can mean offering advice or information. Fifth, it could mean providing aid or assisting with tasks. Sixth, support can mean that the person feels he or she is part of a system of mutual obligation. Cohen and Hoberman (1983) added a seventh dimension of support to their list: social companionship, which can distract people from worrying too much about their problems.

Social support's impact on health has been hypothesized to occur in two different ways: the *buffering hypothesis* and the *direct effect model*. The buffering hypothesis posits that social support "buffers" people from potentially stressful events in two ways. First, support may reduce the harm from a stressful event by preventing the person from perceiving a situation as stressful. Second, support may decrease the impact of the stressful event by eliminating the event itself or by directly influencing the physiological processes or illness behaviors (Cohen and Wills, 1985; Cohen and Syme, 1985).

In contrast to the buffering hypothesis, social support in the direct effect model is thought to be beneficial to health irrespective of stress. The perception that others are willing to help may result in elevated self-esteem and a sense of control over the environment. This in turn influences physical health through the effects on neuroendocrine or immune system functioning (Jemmott and Locke, 1984) or through health-promoting behaviors such as decreased smoking, increased exercise, or medical health seeking (Cohen and Wills, 1985; Cohen and Syme, 1985).

In a comprehensive review of the epidemiologic evidence of the association between social support and health, Broadhead et al. (1983) concluded that poor social support precedes adverse psychologic outcomes and mortality; in fact, the relative risk of mortality given poor social support is in the range of 1.5 to 3.5. They also found a similar direction and magnitude of effect across all major study designs and groups: As the number or frequency of social contacts increases, mortality and physical and psychological symptoms decrease (see Section 2).

Furthermore, in his review of the policy implications of social support research, Kiesler (1985) questioned whether the current style of service provision facilitates or interferes with increasing social support and its impact on physical and mental health. In most service settings, the health professional essentially waits in a central place for a patient with a problem to come to him or her. Kiesler questioned whether changing this "reactive" style of service provision will affect the level of social support.

This report describes analyses from the first year of an innovative, in-home, preventive community-based intervention with people 75 and over. In the first part of the analysis, I investigate whether higher levels of social support are associated with lower levels of depression, changes in health service utilization, and/or better health status in the elderly. In the second part of the analysis, using the direct effect model, I examine whether this community intervention with gerontological nurse practitioners changed the level of social support and consequently improved the health of older adults. I hypothesized that a supportive relationship between the patient and health provider would be marked by effective communication and should lead to improved health practices and outcomes. If the intervention was able to change social support and health status, this could have important implications for the delivery of health services. It would suggest asking whether public policy should be designed to change the delivery of health services with the intention of increasing social support.

The rest of this report is organized as follows. Section 2 describes the social support literature and its relation to health and the elderly, and Section 3 summarizes my experimental design and methods. In Section 4, I describe the cross-sectional analysis from the baseline interview, in which I examine the relation between social support and health. This is followed by the results from an analysis measuring the effects of the randomized controlled trial after the first year (see Section 5). Finally, Section 6 includes a discussion of the results of the analyses, and the policy implications.

## 2. LITERATURE REVIEW

In the mid-1970s, two articles were published that reviewed the evidence of an association between social support and health. Both concluded that in a variety of research designs, for a variety of diseases and conditions, social support had a positive effect on health. Since then, there has been a virtual explosion in the number of articles published on social support.

In the first article, transcribed from his lecture at the 103rd Annual Meeting of the American Public Health Association, Cassel (1976) reviewed the link between social support and health, reporting that research designs, health outcomes, and postulated stressors have varied across studies. He concluded that while no one study alone was convincing, taken together they provided evidence of a positive association between social support and health.

In the second article, from his presidential address to the American Psychosomatic Society, Cobb (1976) reviewed studies in pregnancy, birth and early life, hospitalization, recovery from illness, depression, employment\* termination, aging and retirement, and threat of death. He concluded that social support can protect people in a crisis.

In this review, I synthesize the literature written since these articles were published, focusing on the relationship between social support, health, and the elderly. Using the Medline literature data base, I have reviewed articles published since the 1970s and eliminated those studies with sample sizes smaller than approximately 100 people, those studies not specific to an aging population, and those studies using a convenience sample.

This discussion of the literature begins with a review of the various methods for measuring social support. I next review several theoretical perspectives on social support -- activity theory, disengagement theory, and social exchange theory -- then follow this with a review of the models that relate social support to health. Additionally, I summarize the literature in the areas of mortality, morbidity, mental health, utilization, and compliance. Finally, I look at interventions designed to increase social support.

#### **MEASURING SOCIAL SUPPORT**

Measurement of social support has been the source of much criticism since Cassel and Cobb published their articles. In a critique, Barrera (1986) pointed out that social support definitions are often so vague or broad that the concept has not been distinctly defined. The lack of consensus about how social support should be defined has resulted in diverse measurement of the concept, which Barrera blamed for the lack of consistency in research findings.

Instruments that attempt to measure social support differ on multiple dimensions, including whether they assess the following:

- Structure or function;
- Subjective or objective support;
- Availability or adequacy of support;
- Individual structures or functions, or global indices;
- Several individual structures or functions, versus simply one;
- The role of persons providing support, or simply whether support is available; and
- The number of persons available to provide support, or simply the availability of support (irrespective of the number of people) (Cohen and Syme, 1985).

Given the lack of consensus regarding measurement of social support and the variety of measures used, it is important to examine the particular instrument used in a given study, specifically differentiating between the concepts of social support and social network.

In the literature, the term *social support* most commonly refers to the functional **content** of the relationships, while *social network* refers to the **structure** of those relationships. Empirical research on social support has often relied on the existence or quantity of a person's social relationships. The most widely used indicator of support in relation to health has been marital status. Many studies have shown a higher incidence of various disorders and lower life expectancy for the unmarried than the married. These crude measures of support, while objective and stable, do not tell us about the content or quality of those supportive relationships.

The social network approach generally analyzes the structure of the social network by looking at its size, density, content, reciprocity, durability, intensity, frequency, dispersion, and homogeneity (Israel, 1982). In contrast, measures of the functional content of relationships usually focus on five types of social support: *tangible support*, *affection*, *positive interaction*, *emotional support*, and *informational support* (Sherbourne and Stewart, 1987). *Tangible support* measures behavior that helps a person directly, such as taking someone to the doctor. *Affection* is synonymous with fondness, being cared for or loved. *Positive interaction* refers to shared obligations, reciprocity, social connectedness, and belonging, while *emotional support* is based on personal qualities, such as love, trust, and empathy. Finally, *informational support* provides people with the knowledge that they need to solve a particular problem.

### **SOCIAL INTERACTION IN THE ELDERLY**

Before reviewing studies that focus specifically on social support, I briefly summarize those theories that attempt to explain social interaction in an older population. The first, the *activity theory*, predicts that if people experience the loss of a major social role as they age, for example because of retirement, they will be adversely affected. Accordingly, involuntary decreasing social involvement is imposed by society; it is a natural consequence of aging.

In contrast, the *disengagement theory* postulates that decreasing social involvement is a normal, voluntary part of the aging process, and one that is mutually beneficial for society and for aging individuals. Disengagement theorists assert that disengagement occurs independently of physical and financial capacities. Thus, as people age, they naturally decrease their social involvement as a matter of choice, not because they become ill, retire, or lose their spouses.

The third theory, the *social exchange theory*, views social interaction as an exchange in which rewards are balanced against costs. Therefore, people continue social interactions as long as they perceive them to be rewarding. When the exchange between two people becomes unequal and one person is placed in a position of dependence, the power imbalance can be rectified in one of three ways. First, dependent people can extend their network to other members. Second, they can increase the value of the resources they possess. Or third, they can withdraw from the relationship. According to Dowd (1975), the first two options are difficult for a retired elderly person. They are less likely to have access to a larger network, and they are unlikely to be able to increase the value of their resources because they are retired. Thus, they are most likely to withdraw from the relationship.

Each of the theoretical perspectives described above was based upon the idea that as people age, they will have less social interaction. In response, several empirical studies have investigated older people's

social networks and the way they change over time. Contrary to the theoretical predictions, a number of researchers have found that the size of the social network does not decrease over time. For example, in their national cross-sectional study of 718 men and women aged 50 to 95, Antonucci and Akiyama (1987) found that network size did not decrease with age and that there were no age differences in the number or types of support received. Furthermore, in their review, Kasl and Berkman (1981) concluded that while the elderly are less likely to maintain social ties as extensive as those maintained in younger age groups, the differences are not very large. The exception to this generality is found among unmarried men. When they reach their 60s, they show a sharp decrease in contacts. Further disconfirming the notion that social support is unstable and declines with age, the Baltimore Longitudinal Study on Aging reported that continuity, rather than change, seemed to characterize their sample of married men (Costa et al., 1985).

Likewise, in an analysis of the Longitudinal Retirement History Survey (n=6,630), Wan and Odell (1983) found that the amount an older person participates socially is related to prior social participation, kin-network size, and socioeconomic status rather than role loss, as predicted by the activity theory. Finally, Creecy, Berg, and Wright (1985) developed and tested a causal model of loneliness in a national sample of noninstitutionalized persons, aged 65 and over (n = 2,797). They concluded that age may not be a crucial variable in the development of loneliness. Instead, loneliness was influenced by marital status, self-perceived health status, income, social activity levels, and a sense of social fulfillment.

Together, these studies provide evidence discounting the misconception that isolation and loneliness are necessarily a part of aging. In fact, some studies have found that the size of the helping network is negatively related to functional capacity (Stoller and Earl, 1983). Thus, the support network increases in both size and scope as functional capacity declines. Likewise, Seeman and Berkman (1988) argued that

because many older people are without a spouse, the presence or absence of this tie may be relatively less important. Thus, in terms of adequacy of emotional support, some ties may substitute for others. For example, if you lack a spouse, a confidant assumes a stronger role; if you lack children, friends and relatives become more important. Finally, in a study of informal support resources, Morris and Sherwood (1984) found that their sample of "vulnerable" elderly was not isolated and generally had two or more informal helpers. They concluded that the informal helping network has not been supplanted by the formal support network, even among their "vulnerable" sample.

In contrast, the Commonwealth Fund Commission on Elderly People Living Alone (Kasper, 1988) found that 18% of the elderly who live alone have no one they can depend on for even a few days, and 28% have no one they can depend on for as much as a few weeks. They also found that those who are both alone and poor have less contact with friends and neighbors and rely heavily on community services. Similarly, in a study of stress and social isolation in those over 55, Krause (1991) found that instead of relying on social network members for assistance, older adults may actually become more socially isolated during stressful times.

In conclusion, taken together, these studies give us a good description of the elderly's social ties. They tell us that the network is relatively stable over time and that its size does not decrease appreciably, if at all, with age. However, we also know that the network may change as needs change. The studies describe a network in which the spouse, children, and friends are important, and one in which the informal network has not been supplanted by a formal one. However, we also find that those who live alone, or are under stress, may become more socially isolated.

**THEORETICAL PERSPECTIVES: SOCIAL SUPPORT AND HEALTH**

In turning from descriptions of social support alone, we can begin to relate social support to health. As discussed in Section 1, social support's impact on health has been hypothesized to occur in two different ways: the buffering hypothesis and the direct effect model. Cohen and Wills (1985) compared the two models to determine whether the positive association between social support and well-being is attributable to the direct effect of support or to the buffering action of support. They reviewed studies published through 1983, noting whether the articles used structural or functional measures of social support, and how specific or global the measures were. They found that when support was measured as the amount of integration in the social network, there was evidence for the direct effect model. In contrast, they found evidence for the buffering model if social support measured the interpersonal resources available under stress. Thus, they concluded that social support is multidimensional, and that each model contributes to understanding the relationship between social support and health.

In another review of the validity of the buffering hypothesis, Alloway and Bebbington (1987) examined the literature relating social support to minor affective psychiatric disorders. They found it difficult to compare various studies because of the differences in the way social support and the buffering hypothesis were defined. Finding inconsistent evidence for support of the buffering hypothesis, they concluded that the buffering effect is probably not of "dramatic proportions."

In conclusion, social support can be studied as a buffer against the stress of life events, or as a direct determinant of health or illness, or, finally, as a dependent variable with its own causes and determinants. To more completely understand social support, Broadhead et al. (1983) believe that we need to look at all three perspectives.

In an attempt to further explain the interaction between social support and health, some researchers have theorized that the relationship between health and social support is due to a biological response. For example, according to Cohen and Syme (1985), elevated self-esteem and security may directly aid in recovery from physical illness by helping to mobilize the immune system. To test this hypothesis, Jemmott and Locke (1984) reviewed studies that looked at psychosocial factors, disease, and immunological response. They concluded that the empirical evidence indicated that people who are exposed to high levels of stress have greater "degeneration" of their overall health. More importantly, they found that psychosocial variables may play a role in modulating the human immune response.

Likewise, Henry (1982) reviewed psychophysiological research suggesting that emotion is the crucial driving force in a chain of events leading from psychosocial interaction to neuroendocrine changes. He argued that emotion can override the neuroendocrine feedback loop that leads to homeostasis. If these overrides are strong enough, they can lead to pathophysiological changes. He concluded that social support can be successful in keeping these neuroendocrine "disturbances" to a minimum.

In a similar line of study, in a sample of 256 healthy volunteers aged 61 to 89, Thomas et al. (1985) found an inverse relationship between the degree of social support and the level of serum uric acid or cholesterol, and a positive relationship between social support and total lymphocyte count (after controlling for smoking, body mass, age, alcohol intake, and perceived psychological distress). They concluded that their results are consistent with the buffering effect of social support, which suggests that social support acts to reduce the physiologic response to stress.

Together, these studies describe a psychophysiological theory that helps to explain why stress may cause overstimulation through the fight or flight response or through suppression of the immune system. Social

support can act to strengthen the immune system, thereby increasing the sense of control over the environment.

In addition to the buffering hypotheses, the direct effect model, and the psychophysiological model, at least three other models in the literature conceptualize how social support affects health. The first model describes a network in which members take care of each other by providing aid, services, or tangible economic assistance. In essence, the social network enhances a person's resistance, leading to decreased use of health services. Using this model, Salloway and Dillon (1973) conceptualized the network as an adaptive system in which members adjust to a complex environment. When individuals are threatened, for example by illness, they will begin to seek help and support from the network. Similarly, Arling (1985) saw social support as an enabling factor that may facilitate access to care. He looked at people with impairments in their activities of daily living in a statewide cross-sectional survey of noninstitutionalized older people (n=2,146). He found that when it came to overcoming their limitations and obtaining access to medical care, impaired people were highly dependent on the availability of social support.

Likewise, in his work on illness behaviors, Mechanic (1977) described a similar model, the "Coping-Adaptation Model." He suggested that understanding illness behavior may provide strategies for care and rehabilitation that are different from the traditional medical concepts. He stated that illness behavior and coping capacities may be far more influential in medical outcomes than many of the biological indicators on which the physician focuses. In his model, he stressed that for every illness and disability, the patient requires specific skills and information to adjust effectively. Social adaptation depends on several types of resources: economic resources, abilities and skills, social supports, and motivational impetus.

In a second, contrasting model, DiMatteo and Hays (1981) proposed that social support may affect health status through patient compliance. A supportive environment may result in compliance with preventive and rehabilitative regimens.

Finally, in a third model, Berkman (1984) proposed several potential pathways by which social support may affect health. She described a network of individuals who feel constrained to behave like other network members. This group can be health promoting by encouraging healthful behaviors, such as quitting smoking or starting exercising.

In conclusion, there are a variety of theoretical perspectives of social support. The relationship between social support and health can be conceptualized in terms of the direct effect model, the buffering hypothesis, or a psychophysiological model. We can also conceptualize social support's effect on health as occurring through a caring network, through compliance with medical regimens, or through social pressure.

#### **MORTALITY AND SOCIAL SUPPORT**

Some of the strongest evidence for a link between social support and health comes from research on mortality. In a landmark study, a random sample of 6,928 adults in Alameda County, California, were followed for nine years. Berkman and Syme (1979) found that people who lacked social and community ties were more likely to die than those with more extensive ties. This was found to be independent of self-reported physical health status, year of death, socioeconomic status, health behaviors (e.g., smoking), health practices, and low utilization of preventive health services.

Using data from the third round of the Tecumseh Community Health Study, House, Robbins, and Metzner (1982) confirmed the relationship found by Berkman and Syme. Based on a cohort of 1,322 men and 1,432 women in 1967-69 who were 35-69 at the time, this study used a wider range of assessments of health and functional status than those available to the

Alameda County Study. In particular, they found that men who reported more social relationships and activities in 1967-69 were significantly less likely to die during the 9- to 12-year follow-up period (after controlling for other risk factors). A similar but nonsignificant trend was found for women.

In a stratified random sample of 331 persons 65 and over living in Durham County, North Carolina, Blazer (1982) found that three separate aspects of social support predicted 30-month mortality. He looked at perceived social support, available attachment (for example, marital status and number of living children), and the frequency of social interaction. After controlling for ten possible confounding factors, he found that the relative risks of mortality were 2.04 for small (versus large) numbers of available attachments, 3.40 for low (versus high) perceived social support, and 1.88 for impaired (versus unimpaired) frequency of social interaction. In contrast to Berkman and Syme's findings, no consistent pattern of increase in mortality rates was associated with a progressive decrease in social interaction or perceived social support.

In a study that focused on the relationship between social network and cardiovascular disease, Orth-Gomer and Johnson (1987) followed a random sample of Swedes (n=17,433), between 16 and 74 years of age, for six years. After controlling for age, sex, smoking, physical inactivity, and chronic illness, they found an excess mortality risk of 30% for those with low social network interaction scores. The authors suggest there is a critical increase in mortality risk for the 20 to 30% of the population with lower social network scores.

In a 1985 study, Cassileth et al. reported on two groups of University of Pennsylvania cancer patients. The first group of patients (n=204) had an expected survival time of less than one year. These patients were followed for survival. A second group of patients (n=155) was followed for time to recurrence of disease. Cassileth and colleagues

created a total psychosocial score constructed from seven items (social ties, job satisfaction, use of depression medication in lifetime, life satisfaction, self-perceived health, hopelessness, and adjustment to diagnosis). They found that the psychosocial factors, either individually or in combination, did not influence the length of survival or time to relapse ( $P > 0.10$ ).

With the exception of the study on cancer, the link between social support and mortality is well supported. It seems that in the general population, social support has a protective function, decreasing the risk of mortality. In contrast, however, the cancer study shows that when a terminal disease is present, social support may not act to prevent or delay death.

#### **MORBIDITY AND SOCIAL SUPPORT**

Taken together, the studies described in the section above provide convincing evidence of the link between social support and mortality. In contrast, the link between social support and morbidity is less clear.

Ganster and Victor (1988) reviewed studies on the direct and indirect effects of social support on physical and mental health. They found that the evidence for a relationship is strongest for mental health and mortality, and less clear for physical morbidity. They attributed this lack of clarity to the correlational design of most support and health studies. Although the experimental literature suggested that social support may have a causal impact on mental and physical health outcomes, they found that very few of the studies collected data documenting that the intervention actually produced changes in either objective social networks or perceived social support.

Likewise, in an extensive review of the literature on social support and physical health, Wallston et al. (1983) looked at studies on illness onset, stress, utilization of health services, adherence to medical

regimens, recovery, rehabilitation, and adaptation to illness. They concluded that the relationship between stress, social support, and health is not clear.

Table 2.1 lists seven studies focusing on the elderly that give some evidence that better social support is associated with better health. However, it is difficult to compare the results across studies, since the definition of health varied from a self-assessment of health to the incidence of heart disease. Additionally, "social support" definitions varied from social networks to acculturation. Therefore, although social support may be beneficial to health, I would hesitate to draw any conclusions regarding *when or how or under what circumstances* it affects health.

#### **MENTAL HEALTH AND SOCIAL SUPPORT**

In contrast to the unclear relationship between social support and morbidity, the link between social support and mental health is better established. Existing research exploring this link uses several approaches: comparing the direct effect and the buffering effect models, comparing everyday support and support in a crisis, and comparing depression alone or a more comprehensive measure of mental health.

The studies summarized in Table 2.2 provide compelling evidence that social support and mental health are associated in normal population surveys. Generally, it seems that higher levels of social support are associated with better mental health. Additionally, we have some support for the direct effect model. However, we have little, if any, evidence of a causal relationship. To measure mental health, many researchers have investigated well-being, morale, happiness, and life satisfaction. These studies point out the importance of the qualitative, subjective nature of social network interaction when investigating well-being. In addition, it is important to distinguish between the sources and types of social relations to understand how they contribute to well-being.

Table 2.1: Social Support and Morbidity

AUTHORS	SAMPLE	OUTCOME	CONCLUSION
Wan and Weisvert (1981)	channeling demonstration (longitudinal sample) (n=1,119)	physical & mental health	larger networks associated with better physical and mental health
Reed et al. (1982)	longitudinal sample of Hawaiian men of Japanese ancestry (n=4,653)	coronary heart disease	acculturation associated with increased incidence
Asher (1984)	longitudinal (1969 and 1971 waves) study of retirement history	global health	larger network associated with better global health, but
		if illness defined as one that limited person's ability to work in past year	size of network had no impact on illness
Seeman et al. (1985)	longitudinal representative sample of Los Angeles County (n=931)	health status	poorest health associated with combination of low support and low sense of control
Krause (1987)	random community survey in Galveston, Texas, aged 65+ (n=351)	self-perceived health	satisfaction with social support associated with better health
Ho et al. (1988)	cross-sectional sample of Chinese aged 70+ in Hong Kong (n=1,000)	psychosomatic pain	low social support associated with more psychosomatic symptoms
McIntosh et al. (1989)	elderly participants at 13 federally funded nutrition sites (n=170)	nutritional intake	larger network associated with higher intake of nutrients

Table 2.2: Social Support and Mental Health

AUTHORS	SAMPLE	OUTCOME	CONCLUSION
Conner et al. (1979)	noninstitutionalized aged 70+ (n=218)	social interaction	quality, not quantity, of interaction affects life satisfaction
Lin et al. (1979)	random sample from list of 550 Chinese-American households in D.C. (n=170)	social support and stressful life events	social support accounted for 13% of the variation in psychiatric symptoms
Dowd and Larossa (1981)	representative sample of Atlanta residents aged 50-80 (n=757)	morale and amount of contact with family	men in poor health who had frequent family contact had lower morale than those with infrequent contact
Williams et al. (1981)	RAND health insurance exp. (longitudinal) (n=2,234)	social support, stressful life events	support for direct effect model: social support has a direct positive effect on mental health
Baldassare et al. (1984)	random sample of Northern California elderly in 50 communities (n=202)	happiness	social relations and perceived companionship were best predictors of happiness
Barresi et al. (1984)	longitudinal national sample of low- and middle-income elderly (n=2,265)	sociability and well-being	for men: frequency of contact with neighbors associated with well-being. For women: quality of contact with neighbors associated with well-being
Ward et al. (1984)	stratified sample of elderly aged 60+ (n=1,185)	social network	instrumental support and subjective (vs. objective) quality of social relationship most important to well-being
Lin et al. (1986)	64% of the sample from Dean et al. (1990) study (n=690)	tested 12 models of undesirable life events and depression	social support has a strong direct and independent effect on depression
Patrick et al. (1986)	panel data of physically disabled adults aged 45-75 in London, England (n=583)	social contacts and emotional intimacy	if adverse life events, low levels of social contact associated with psychosocial and emotional disfunction
Dimond et al. (1987)	longitudinal sample of recently widowed adults aged 50-93 (n=192)	social support	social support played a significant, but modest, role in bereavement outcomes
Steinkamp and Kelly (1987)	random telephone survey aged 65+ (n=120)	network contact and life satisfaction	quality, not quantity, of contact contributes to life satisfaction
Dean et al. (1990)	New York State multistage disproportionate random sample of people 50+ (n=997)	caring and concern	inadequate social support associated with depressive symptoms

#### HEALTH SERVICE UTILIZATION AND SOCIAL SUPPORT

Much of the early work regarding health services utilization comes from Andersen. His model of the individual determinants of health services utilization assumed a sequence of conditions: the predisposition of people to use services, their ability to secure services, and their illness level. Predisposing measures include demographic, social structure, and belief variables. Enabling characteristics include the family and community's resources to satisfy health service needs. Finally, given their availability, the individuals must perceive themselves as ill before they use health services (see Andersen and Newman, 1973).

Mechanic's work (1979) on illness behavior looked at the way people react to illness and their subsequent decision to seek care. He hypothesized that illness perception and response are the result of a variety of circumstances. They may be socially learned behaviors that result from ethnic or cultural values. They may be the result of earlier experiences with illnesses. Or they may be the result of motivational or situational factors. Often, the way people evaluate their illness or symptoms depends on those around them with whom comparisons are made. Mechanic wrote that the strengthening of social networks may be more effective than individual therapeutic approaches to illness.

Suchman's work (1965) attempted to relate medical orientations and behavior to specific types of social relationships. The basic premise of his model was that certain social relationships produce a nonsupportive orientation toward "modern medicine" that in turn influences the individual's response to medical care. He looked at group involvement on the community level, the social group level, and the family level. In a random sample of 5,340 persons in 2,215 families, he found that a group structure characterized by close and exclusive relationships among family members, friends, and ethnic groups coincided with low knowledge of disease, skepticism of medical care, and high dependency in illness.

Although the basic premise of Suchman's model may be useful, subsequent research has challenged his work. Geersten et al. (1976) proposed that subcultural beliefs and practices, together with socioeconomic status, are the underlying factors determining whether people will seek medical care. Within this general framework, they hypothesized that knowledge of disease and family authority-tradition are intervening variables in health care utilization. They suggested that we need to assess the subcultural beliefs and practices of different groups of individuals independent of their social group structure.

In light of this theoretical foundation, two opposing views of social support and health service utilization are found in the studies summarized in Table 2.3. The studies of Berkanovic et al. (1981), Frankel and Nuttall (1984), and Rundall and Evashwick (1982) found that network contact varies in the same direction as use of physician services. Increased network support and contact were associated with higher use of services. In contrast, Homan et al. (1986) and Broadhead et al. (1989) found that as network contact and support decrease, utilization of physician services increases. According to this view, patients seek out medical care as a form of social support. They rely on care as a method of coping, not only with their medical problems but with other problems in their daily life as well. People with no one else to talk to may use their doctors in part as counselors (Tessler et al., 1976). Additionally, Donald (1986) found the same relationship in the use of mental health services. Coe et al. (1985) found this relationship in emergency room use and Lubben et al. (1989) found it for risk of hospitalization. Thus, we do not find a clear consensus about the relationship between utilization and social support.

#### **COMPLIANCE AND SOCIAL SUPPORT**

As discussed above, some scholars propose that social support affects health through increased compliance. For example, once patients have overcome their initial skepticism of, or opposition to, a medical treatment, they must translate their intention into behavioral change.

Table 2.3: Social Support and Health Services Utilization

AUTHORS	SAMPLE	OUTCOME	CONCLUSION
Berkanovic et al. (1981)	sub-sample of Los Angeles health survey (those who reported 1+ symptoms) (n=769)	decision to seek medical care	those with support more likely to see M.D. (but only explained 1% of variance)
Rundall and Evashwick (1982)	elderly residents of public housing buildings and surrounding neighborhood (n=883)	social network involvement	those with low social involvement tended to have fewer M.D. visits per year
Frankel and Nuttall (1984)	Canadian adults with hearing loss (n=240)	psychological distress and use of M.D.	those with more social support saw M.D. more
Coe et al. (1985)	metropolitan random sample of noninstitutionalized elderly (n=394)	family network, use of health services	if no family support: used emergency room 7-30 times more often; no difference in use of hospital or M.D.
Donald (1986)	RAND health insurance exp. (longitudinal) (n = 4,580)	social support, life events, use of mental health services	when define social support in terms of resources (vs. number of contacts), then more support, less likely to use mental health services
Homan et al. (1986)	1978 health interview survey (n=18,441)	effect of widowhood on M.D. utilization	those who live alone are more likely to see M.D. than those who live with others
Broadhead et al. (1989)	random sample of patients in a Duke Univ. outpatient family practice (n=343) (mean age = 37)	use of services in the practice	mean number of office visits, mean charges, and mean length of visit higher in those with low support
Lubben et al. (1989)	random sample of elderly Medicaid recipients in California (n=931)	health practices, social networks	those with limited social networks 1.5 times more likely to be hospitalized and have extended stays

However, many factors may pose barriers to compliance with a medical regimen. For example, a therapeutic regimen might be too complex to incorporate into a person's life-style. According to DiMatteo and DiNicola (1982), the support of friends and family can make a change in behavior more likely, by helping the patient to overcome physical and emotional difficulties associated with the therapeutic regimen. However, they also conclude that social support seems to be a necessary but not sufficient condition for behavior change.

Likewise, in a review of adherence to diet and drug regimens, Dunbar and Stunkard (1979) describe factors that influence compliance. In five out of six studies, they found greater compliance among patients whose families were supportive. They concluded that family support may be one of the more promising routes for improving adherence.

In a study of compliance, Caplan et al. (1976) described 200 high blood pressure patients. They reported that for those who had both high self-esteem and social support, adherence was the highest. However, high self-esteem, without social support, was associated with the lowest levels of adherence. Thus, they concluded that social support influenced the patient's perceived competence to comply with the regimen, which in turn was associated with increased compliance.

In summary, there is some evidence that social support is beneficial to compliance. In turn, increased compliance may result in better health.

#### **INTERVENTIONS AND SOCIAL SUPPORT**

In view of the evidence that social support can be beneficial to health, the question remains: How do we create or restructure supportive social networks? In a review article, Berkman (1988) suggested three interventions aimed at modifying an individual's social network. First, a sociostructural intervention assumes people lack social connections because of social circumstances such as poverty, community disintegration, or migration. For example, poor people may experience

economic barriers to maintaining social connections. Thus, a sociostructural intervention might focus on economic changes. Second, a social intervention provides opportunities and skills for people to utilize potential links in the network structure. Thus, an intervention might bring all residents in a home for the aged together so that they become aware of potential sources of social support. Third, psychosocial interventions are aimed at people who are prevented from maintaining relationships because of psychological difficulties. An intervention of this type might be group therapy or the establishment of a halfway house.

In his overview article on social support, Gottlieb (1985) described two types of preventive interventions. In the first, a support group can be effective when people experience a stressful life event, such as widowhood or divorce. The support group can offer compensatory social ties and a safe environment for regaining equilibrium. Additionally, the support group is a cost-effective intervention. In a second type of intervention, people are taught to optimize their network's supportive functions. They learn about basic human relations and counseling skills.

Biegel (1985) reviewed a number of interventions to strengthen the support systems of the elderly and concluded with four recommendations. First, the interventions should recognize the heterogeneity of the elderly population. Second, the interventions should strengthen the families' ability to provide support, therefore alleviating the stress of "family burden." Third, the intervention should strengthen the ability of friends to provide support, keeping in mind the limitations of this support. Finally, the intervention needs to coordinate informal and formal support in order to overcome fragmentation of services. Examples of interventions are clinical treatment, family caretaker enhancement, case management, neighborhood helping, volunteer linking, mutual help/self-help, and community empowerment.

In conclusion to her article on loneliness in rural elderly, Kivett (1979) suggested several potential interventions. To meet the need of reintegration into the community, programs such as mutual help groups, personal visiting, or telephone reassurance can be effective. Based on her finding that poor health predisposes people to loneliness, she suggested a need for comprehensive mobile health units in rural areas. Finally, she pointed out the importance of transportation in rural areas to give access to opportunities for social interaction.

After reviewing the compliance literature, Becker and Maiman (1980) suggested ten practical interventions to enhance patient adherence, such as providing patients with information about the regimen, altering characteristics of the regimen, and modifying health-related behaviors. In particular, they emphasized the importance of enlisting social support.

In her review on studies that experimentally manipulated social support to enhance compliance, Levy (1983) was unable to draw any conclusions regarding the specific effects of social support on compliance. She reviewed studies with four types of intervention: home visits, significant-other training, structured reinforcement, and support groups. She commented that very few of the studies provided clear descriptions of the social support intervention conducted. Therefore, she was unable to draw any conclusions regarding the specific effects of social support on compliance.

#### **SUMMARY**

As this review indicates, the literature gives ample evidence that naturally occurring social support has a beneficial effect on health. However, we have yet to learn whether social support interventions are effective. Interventions have been attempted with users of a family practice center (Blake et al., 1987), with teens (Gottlieb, 1985), with people trying to quit smoking (Mermelstein et al., 1986), and with ambulatory patients with high blood pressure (Caplan et al., 1976).

However, in each of these interventions, the results are questionable because of their methods or lack of controls. In the study by Blake et al., the nonresponse rate to the initial questionnaire was 64%. Mermelstein et al. performed only a correlational study, looking at the effects of supportive partners. Gottlieb did not evaluate his intervention with teens at all. Finally, Caplan et al. had only 70 participants who completed the longitudinal intervention.

In conclusion, the literature reveals no well-documented interventions, using randomized controlled designs on an elderly population. The research that follows was designed to fill this gap, by testing an intervention with a social support component in a group of non-institutionalized adults 75 and over.

### 3. EXPERIMENTAL DESIGN AND METHODS

#### INTRODUCTION

This section provides a description of the study design, the sample, and the data-gathering methods. In addition, I will describe the measures I use in my analysis. The study sample comes from a larger ongoing project, the "In-Home Preventive Health Program for Older Persons," based at the Senior Health and Peer Counseling Center (SHPCC) in Santa Monica, in conjunction with the University of California at Los Angeles (UCLA).

#### THE DESIGN

The "In-Home Preventive Health Program for Older Persons" is modeled after two European randomized trials. In one of the trials (Vetter et al., 1984; n = 1,184), elderly patients in two sites (one rural, one urban) were randomized either to receive or not to receive one home visit per year over a two-year period, with follow-up as needed. In the urban practice, health visits were significantly associated with higher use of home services and lower mortality. Higher quality of life was also observed. In the other randomized trial (n=572), Hendriksen and associates (1984, 1986, 1989) made home visits every three months to their treatment group of 285 Danish people 75 and older; the controls were not visited. Using a structured questionnaire, they assessed medical and psychosocial needs, and gave referrals for appropriate services. They did not perform a physical examination during their visits. At the end of the three-year follow-up period, the intervention group had significantly fewer hospital days and admissions, fewer emergency room visits, and lower mortality than the controls. In an attempt to replicate these encouraging results, the Kellogg Foundation funded UCLA/SHPCC's in-home preventive health program.

This program is based at the Senior Health and Peer Counseling Center (SHPCC) in Santa Monica, California. A community-based nonprofit organization, SHPCC's goal is to serve the noninstitutionalized elderly. The Center was originally established in 1976 by four senior citizens concerned about the lack of affordable preventive health care for the community's elderly. Today the Center provides a comprehensive plan of physical and mental health services to older people of all socio-economic levels. Emphasizing health education, self-care, and early detection, the Center had over 20,000 contacts with elderly individuals in 1989.

The In-Home Preventive Health Program for Older Persons was designed to evaluate whether a three-year in-home assessment and educational intervention can improve health status and decrease the use of costly institutional services.

#### **ENROLLING THE SAMPLE**

Participants in the project were recruited from three "populations": a *phone population*, an *address population* and a *nonvoter population* (see Figure 3.1). Once potential participants expressed an interest in the project, they were then screened for the presence of exclusionary criteria. In some cases, this occurred over the phone; in others, after the baseline interview. However, in all cases, subjects were excluded prior to randomization.

We excluded potential participants for the following reasons. First, potential subjects were excluded if they had a known active terminal disease that would be expected to result in death within two years. We also excluded all potential participants who appeared to have severe cognitive impairment.<sup>1</sup> Additionally, we excluded those people with a communication barrier, such as not speaking English, being extremely hard of hearing, or not having a telephone. A potential participant was

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<sup>1</sup>Potential participants were excluded if they missed four or more answers on the Mental Status Questionnaire (Kahn et al., 1960).

excluded if he or she was totally dependent in one or more of the basic activities of daily living.<sup>2</sup> Furthermore, we excluded all those who resided in a nursing home or were planning to move to a nursing home. In addition, people who were enrolled in another UCLA preventive health intervention<sup>3</sup> were excluded from the project. Finally, we excluded anyone who was planning to move from the city of Santa Monica.

After meeting all prerandomization exclusionary criteria, we enrolled 414 Santa Monica residents, or approximately 7.6% of the city's population aged 75 and over (see Figure 3.1). According to the Southern California Association of Government's 1985 estimates, 6,186 people 75 and over were living in Santa Monica. Of those, the city of Santa Monica estimated that 11.7% were institutionalized. Therefore, we have estimated our potential study population to be 5,462 people.

To invite residents to participate in our project, we obtained a list of all registered voters in the city. From this list, we identified 2,671 people who were 75 or over, or about 49% of our population. It is possible that more than 49% of those 75 or over are registered voters,<sup>4</sup> but we could identify only those people who had listed their age when registering. The 2,791 people who were not on our voter registration list will be called the nonvoter population. We recruited 52 participants through self-referral or some other mechanism (2% of the nonvoter population). For example, a nonvoter might be asked to participate because he or she lived in the same household as a participant recruited over the telephone (see below), or perhaps he or she heard about the demonstration in some other way and self-referred by calling the project.

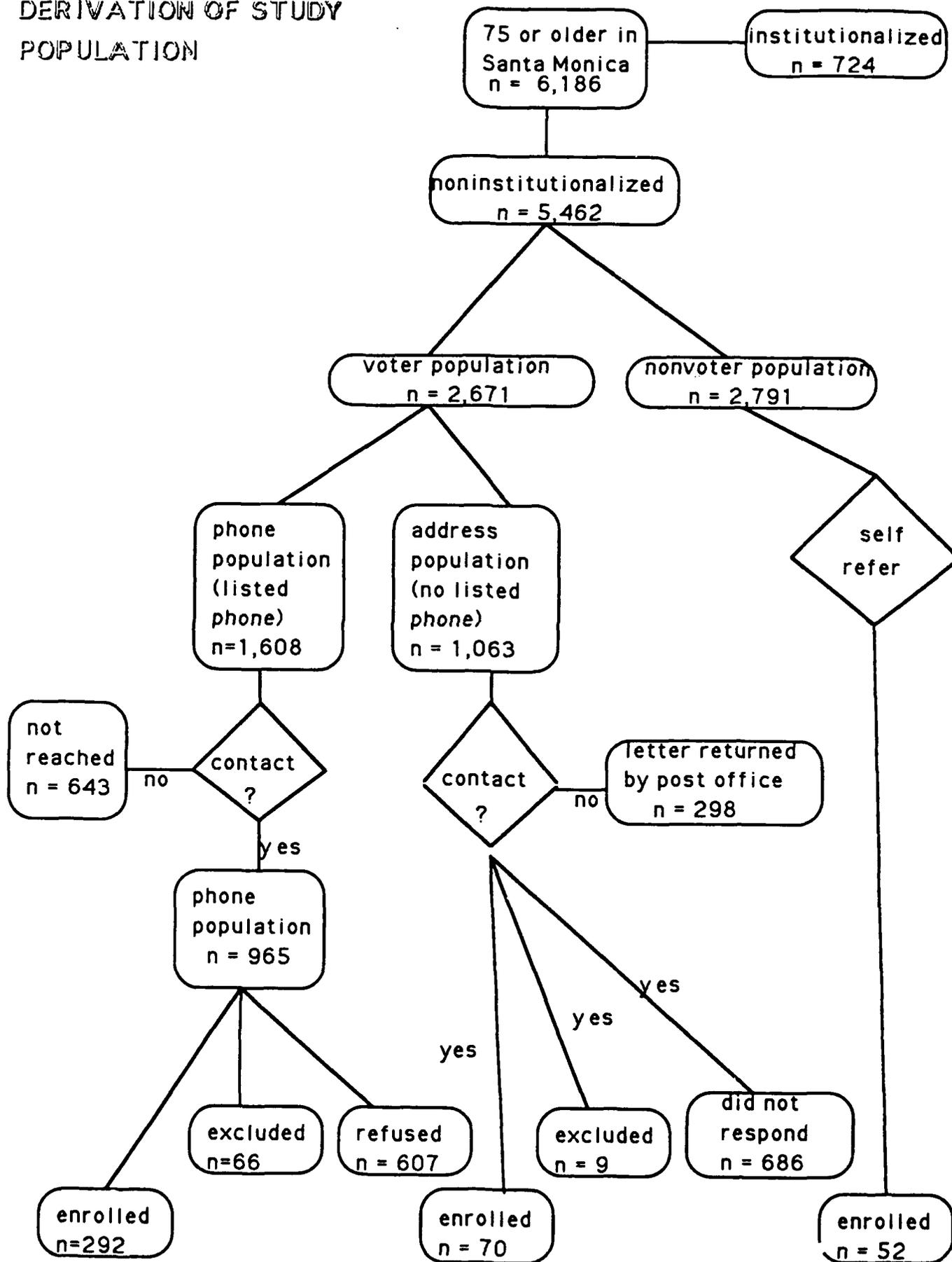
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<sup>2</sup>Philadelphia Geriatric Center Multilevel Assessment Instrument, Personal Self Maintenance, Do you? version (Lawton et al., 1982).

<sup>3</sup>UCLA's Passport to Health project.

<sup>4</sup>In November 1988, 74.4% of those 75 or over in the United States were reported as registered to vote (U.S. Census Bureau, 1989).

Figure 3.1:  
DERIVATION OF STUDY  
POPULATION



Using our list of 2,671 voters, we were able to identify phone numbers for 1,608 people, of which 965 were "functional" numbers (in that we could actually establish contact with a potential participant). I will call this our phone population. To enroll this population, a letter was personally addressed to each potential participant under the letterhead of the Senior Health and Peer Counseling Center. We believe that using SHPCC's letterhead encouraged participation, given its positive reputation in the community. We followed each letter with a personal phone call to invite people to participate in the project. Of those 965 people, 30% (292 people) were enrolled in the project. Seven percent (55 people) were excluded by phone, and 1% (11 people) were excluded on the basis of the baseline interview.<sup>5</sup> 62% refused to participate (607 people).

Almost 40% of the phone population (643 people) could not be reached. Either the phone number seemed to be incorrect (23%), the person had moved (2%) or died (4%), or the call was never answered after a minimum of three attempts (71%). We assumed that those we were unable to reach by phone no longer resided at the address in the voter registry, and so we made no other attempt to contact them.

To recruit from among the 1,063 people who did not have a listed phone number, we sent a letter inviting them to call us to participate in the project. For those who called, a date for the initial in-home interview was set. Of those 1,063 letters, 298 were returned by the post office as nondeliverable. Therefore, we assume that our letter reached 765 potential participants, or our address population. Of the 765 potential subjects, 9 percent (70 people) were enrolled in the project, and 1 percent (9 people) were either excluded or refused after contacting us. We have no information on the remaining 90 percent (686 people) of our address population because they never responded to our letter.

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<sup>5</sup>Of those who were excluded, 32% of the exclusions were for cognitive problems and 24% were for communication problems.

In summary, we enrolled 414 Santa Monica residents aged 75 and over who were not institutionalized, terminally ill, or exhibiting advanced forms of dementia. Approximately 71 percent (292 people) were recruited from our phone population, 17 percent (70 people) from our address population, and 12 percent (52 people) from our nonvoter population.

#### **THE RANDOMIZATION PROCEDURE**

Following the in-home baseline interview, participants were randomly assigned to treatment and control groups. The project director performed the randomization each month in the following way. First, she stratified participants according to male head of household. Couples or roommates (e.g., two sisters who live together) were randomized together. She then put each household into one of four cells according to the husband's values on the following criteria: under 85 years old, 85 years or over, male, female. In the case of the two sisters, one sister was randomly chosen as the head of the household. Within each cell, assignment to treatment and control was at random. Four hundred and fourteen participants were enrolled from December 1988 through June 1990--198 to control and 216 to treatment.

#### **DESCRIPTION OF THE INTERVENTION**

Those participants randomly assigned to the treatment group (n=216) received home visits from a gerontological nurse practitioner (GNP) every three months. A GNP is a registered nurse who has earned a Master of Nursing degree. He or she has received specialized training in physical assessment, diagnosis, and management of both acute and chronic health problems common to the older adult.

At baseline, the GNPs conducted a comprehensive in-home geriatric assessment to identify and evaluate specific needs of the client. During this approximately three-hour assessment, the GNPs reviewed the client's health history, medications, social support, and emotional and mental status. They performed a complete physical examination, including a detailed evaluation of hearing, vision, gait, and balance.

In addition, they assessed the in-home environment and obtained screening tests (for example, hematocrit, blood glucose, stool guaiac, and urinalysis).

Based on initial assessment and discussion with project geriatricians, the GNPs developed specific recommendations for managing newly detected problems and for improving management of suboptimally treated conditions. Recommendations included advice for improved self-management of problems, as well as referrals to physicians, other health care professionals, or community agencies.

The GNPs then visited the clients in their homes every three months during the entire three-year study period. These follow-up visits included evaluation of client compliance with previous recommendations, an interval history and short physical examination, and reassessment of the participant's environment, social support, and emotional status. In addition, the GNPs conducted a complete physical examination once a year. Recommendations to the client were constantly updated.

#### **THE SOCIAL SUPPORT ASPECT OF THE INTERVENTION**

The GNPs had an opportunity to intervene to strengthen the social support system of the older person in a variety of ways. They could work to relieve or reduce the stress of providing support to an older person. For example, several of the participants had spouses who are chronically ill, who exhibit some form of dementia, or who are otherwise disabled. The GNPs worked closely with the older person, the caretaker, the physician, and the extended family to relieve some of the stress associated with caregiving. They may have recommended a variety of services such as respite care, support groups, or technical or financial assistance.

Approximately 9% of the participants exhibited some level of depression upon entry into the project.<sup>6</sup> The GNPs worked closely with the people in

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<sup>6</sup>Participants were judged to be at risk of depression if they

the treatment group to alleviate this depression. Some theorize that when a stressful event occurs, such as the death of a spouse, depression is more likely for people who lack social support (see Section 2). Thus, the GNPs may have tried to work with the depressed client through programs such as support groups, peer counseling, professional counseling, or friendly visitors.

Additionally, the GNPs worked within the existing health and social service delivery system to help address the lack of accessibility, or fragmentation, of those services. Thus, the GNPs coordinated both social and medical services for the participant. This could range from recommending a gynecologist for a pap smear, to transportation services to the doctor, to exercise classes to increase agility.

The GNPs also worked with older participants who are socially isolated. They might have linked the older person with volunteer opportunities in the community or sent a friendly visitor on a regular basis to visit, or they might have recommended a telephone reassurance program so that the older person is phoned on a regular basis.

Finally, the GNPs used their special skills as health educators to encourage self-care. They worked with the participants to help them to take charge of their health whenever possible, and to understand and improve their health. For example, they could spend time helping them to understand the Medicare bureaucracy or to quit smoking, or they could encourage a low-salt diet.

As noted in Section 2, the social support literature describes five support functions: tangible support, positive interaction, emotional support, informational support, and affection. Of the five types of social support, the GNPs most likely affected the first four. Social services, such as transportation to the doctor, can act as tangible

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scored 7 or above on the short form of the Geriatric Depression Scale (Sheikh and Yesavage, 1986).

support. Positive interaction can be created through community activities such as volunteering or visits to the older person by a friendly visitor. The GNPs themselves could provide informational support about health care or other matters to the person. Activities such as a care-giver support group or peer counseling can provide needed emotional support. It would be less likely that the GNP would be able to change the amount of affection a person receives.

#### **DESCRIPTION OF THE EVALUATION COMPONENT**

Before randomization to treatment and control groups, the 414 participants each received an in-home baseline interview. During the approximately two-hour interview, participants were asked questions on a number of health-related topics, such as health status, health service utilization, oral health, falls in the last year, activities of daily living (both basic and instrumental), satisfaction with medical care, pain, self-reported medical conditions, and medications. In addition, participants were asked about social support, in-home assistance, use of community services, community mobility, quality of life, depression, ability to cope, and personal security. The interviewer also assessed the home environment for any potential safety hazards. Finally, the interview covered basic demographics such as marital status, employment status, income, education, and living arrangement.

Following randomization, both groups were followed by phone every four months to assess health status, falls in the last four months, and use of health and community services. Each phone interview lasted approximately ten minutes. At the end of each year in the three-year trial, each participant was reinterviewed at his or her home using an abbreviated version of the baseline questionnaire. The yearly interview lasted approximately 60 to 90 minutes.

Table 3.1

BASELINE CHARACTERISTICS OF STUDY POPULATION

Characteristic	Intervention (n=216)	Control (n=198)
Mean age	80.0	81.0
Percent female	69%	70%
Percent living alone	65%	63%
Percent with annual income < \$11,000	38%	37%
Percent completed high school or above	79%	80%

**DESCRIPTION OF THE STUDY SAMPLE**

Table 3.1 summarizes a number of key demographic characteristics of the study sample. Taking the control and treatment groups together, our participants are relatively old, mostly female, most had relatively high annual incomes, and most lived alone. I find no meaningful differences between intervention and control groups across demographic variables measured during the baseline interview.

Overall, 65% of the study sample lived in an apartment at baseline, and 98% of the sample had lived in the same location for the past 12 months. Approximately 14% lived in housing especially for seniors. Twenty-nine percent of the project participants were married and 96% were white (a reflection of the Santa Monica population 75 and over). In terms of their general health, 69% reported some pain in the last four weeks and 41% reported a fall in the last year. During the baseline home interview, interviewers observed one or more environmental hazards in 43% of the homes they visited. Hazards observed included such things as dangerous floors, barriers to access, and poor lighting. Finally, almost 10% at baseline reported receiving MediCal benefits (California's Medicaid program) and just under 40% were members of HMOs.

Table 3.2

INCOME AT BASELINE

Category.	Frequency	Percent
Less than \$11,000	137	37.6
\$11,000 to \$14,999	50	13.7
\$15,000 to \$19,999	40	11.0
\$20,000 to \$29,999	59	16.2
\$30,000 to \$39,999	32	8.8
\$40,000 or more	46	12.6
Total	364**	100.0

\*\*50 respondents (12% of the baseline sample) refused to state their income.

In the baseline interview, respondents were also asked to describe their annual income by pointing to an income category printed on a card. Two cards were used: one for married participants and one for single participants. Because the categories had different cut-points (see question 149 in Appendix A), I imputed values and collapsed the categories between the married and single respondents as shown in Table 3.2. First, I combined all income categories below \$11,000 and then combined the three upper-income categories. Next, to create the categories "\$11,000 to \$14,999" and "\$15,000 to \$19,999," I imputed values for seven of the married respondents. In this way I was able to create a single variable for income.

**VARIABLE SELECTION**

For this study, I used data collected for both intervention and control groups during the baseline interview, the 4-month interview, the 8-month interview, and the 12-month interview. I analyzed the data in two separate ways. In the first series of analyses I used the data to conduct an observational study (see Section 4) to examine the relationship between social support, social network, and various health measures. In this portion of the analysis, I used only data from the baseline interview. In the second series of analyses, I used data from

the entire first year, contrasting the effect of the intervention on the experimental and control groups (see Section 5). I describe the variables used in the two portions of the analysis below (see Table 3.3). Appendix A displays copies of all instruments used in this study, and Tables 3.4 and 3.5 give the mean values and standard deviations for each scale at baseline and one year. Finally, all pairwise correlations between the variables are found in Table 3.9 at the end of this section.

To measure social support and social network, I used data collected at baseline and at one year. The Lubben Social Network Scale (Lubben, 1988) used in this research is a refined version of the Berkman-Syme Network Index (Berkman and Syme, 1979), which was developed for use in the general adult population. The Lubben Scale was developed specifically for an older population after Lubben noted that there was little variation in marital status and participation in organizations among the older population. The scale consists of ten items that range in value from 0 to 5, so that the total scale can range from 0 to 50. The scale measures family networks, friend networks, and interdependent social supports.

In this sample at baseline, social network scores ranged from 0 (a small social network) to 46. The mean is 25.6 with a standard deviation (SD) of 9.4. At one year, the values ranged from 3 to 48 points, with a mean of 25.4 and a standard deviation of 9.5.

In contrast to social network, which analyzes the structure of the relationship, social support most commonly refers to the functional content of the relationships, measured in five ways: tangible support, affection, positive interaction, emotional support, and informational support. For this study, I chose a subset of six items from 19 measures of social support developed for the RAND Medical Outcome Study (Sherbourne and Stewart, 1989). Two of the items measured tangible support, while the other four measured affection, positive interaction, emotional support, and informational support, respectively. The items

Table 3.3

STUDY VARIABLES

Baseline Measures	Observational Study	Controlled Experiment
Social network	X	X
Social support	X	X
Health status	X	X
Depression	X	X
Chronic conditions	X	X
Instrumental activities of daily living	X	X
Ability to cope	X	X
Quality of life	X	X
Treatment/control group		X

One-Year Measures	Observational Study	Controlled Experiment
Social network		X
Social support		X
Health status		X
Depression		X

Table 3.4

MEAN VALUES OF SCALES AT BASELINE

Scale	Mean	Standard Deviation	Range
Social network	25.6	9.4	0 to 46
Social support	22.0	6.6	6 to 30
Depression	2.9	2.7	0 to 11
Chronic conditions	4.3	2.3	0 to 12
Instrumental activities of daily living	23.1	3.1	12 to 27
Ability to cope	73.5	10.7	40 to 91
Quality of life	94.3	17.4	24 to 110

Table 3.5

MEAN VALUES OF SCALES AT ONE YEAR

Scale	Mean	Standard Deviation	Range
Social network	25.4	9.5	3 to 48
Social support	22.5	6.1	6 to 30
Depression	2.8	3.0	0 to 12

are scored from 1 to 5 indicating how often that type of support is available, with a total score ranging from 6 (low social support) to 30.

Table 3.6

HEALTH STATUS AT BASELINE AND ONE YEAR

	Baseline Frequency	One-Year Frequency
Excellent	14.5%	16.3%
Very good	22.5%	24.1%
Good	31.9%	28.7%
Fair	23.2%	21.5%
Poor	8.0%	9.5%
Total	100.0%	100.0%

To determine whether the six variables should be weighted equally and summed to provide a measure of social support, or whether some other weighted combination should be used, I performed a principal components analysis on the six variables. I found that the first principal component correlated .997 with the equally weighted version of the scale. Therefore, for simplicity, I used a sum in which all six items were given equal weight.

At baseline, the mean score was 22.0 with a standard deviation of 6.6. At one year, the scores had the same range, but the mean was 22.5 and the standard deviation decreased slightly to 6.1.

In the analysis I looked not only at changes in social support and social network, but also at changes in health status and depression. To measure health status, I used the question, "In general, would you say your health is excellent, very good, good, fair, or poor?" I coded the responses from 5 (excellent) to 1 (poor). Table 3.6 displays the distribution of responses at baseline and one year.

To measure depression, I used Sheikh and Yesavage's 15-item Geriatric Depression Scale (1986). The questionnaire is a shorter version of Yesavage's 30-item scale designed to screen for depression in community-

based adults aged 55 and over. Administered in a yes/no format, scores can range from 0 to 15, where 7 or above indicates risk of depression. The authors reported a reliability coefficient (Cronbach's  $\alpha$ ) of .87.

At baseline, depression scores in this study ranged from 0 to 11, with a mean of 2.9 and an SD of 2.7. Our Cronbach's  $\alpha$  was .78. In our sample, 9% of the respondents were at risk of depression at the baseline interview. At one year, the range increased slightly to a high score of 12, with a mean of 2.8 and a standard deviation of 3.0.

As a measure of a respondent's ability to cope, I used Antonovsky's *Sense of Coherence* (1987). Aaron Antonovsky conceptualized health and illness according to a "salutogenic model." In this model, people function along a continuum. He placed optimal well-being, or "health-ease," at one end and "dis-ease" at the other. How people react to stress determines their position along this continuum. The central concept in the salutogenic model is the "sense of coherence." This refers to how people cope: how they assess stimuli, recognize tension, and select strategies for handling that tension. People who believe that their world is predictable (comprehensibility), that they have the resources they need to meet daily demands (manageability), and that meeting those demands is worthwhile (meaningfulness) will stay at the "health-ease" end of the continuum. According to this model, a positive "sense of coherence" will be associated with well-being.

Antonovsky developed both a long (29-item) and a short (13-item) scale. In this study, I used the short scale. Items in the scale are scored between 1 and 7 points, for a range of 13 to 91, where 13 indicates a lower ability to cope. Antonovsky reports a Cronbach's  $\alpha$  of .89. The instrument was developed for a wide age range (teens to age 91).

In the baseline interview, the *Ability to Cope* scores ranged from 40 to 91, with a mean of 73.5 and an SD of 10.7. The Cronbach's  $\alpha$  for our population is .77.

Instrumental Activities of Daily Living (IADLs) assess whether a person performs many of the basic tasks necessary to live independently. In this study, I used the Philadelphia Geriatric Center Multilevel Assessment Instrument (Lawton et al., 1982), which asked whether a person can perform a number of basic tasks or chores without help, with some help, or not at all. Nine domains were included: using the telephone, getting to places beyond walking distance, shopping for groceries, preparing meals, doing housework, doing laundry, doing handy-person work, taking medications, and managing money. If a person performed the activity without help, they got three points; if they needed some help, they received two points; if they did not do the activity, they received one point. Therefore, the scale ranged from 9 to 27 points, where a high score indicated a high level of independence. At baseline, IADL scores ranged from 12 to 27, with a mean of 23.1 and a standard deviation of 3.1.

As a measure of illness, we developed a list of common chronic conditions based on prevalence in the United States for this age group. During the baseline interview, the interviewer read the list of conditions and asked the respondents if they had that condition at the present time. The interviewer asked about 13 specific conditions: arthritis, diabetes, cataracts, sinusitis, hypertension, cancer, tinnitus, and hearing, vision, orthopedic, heart, respiratory, and circulation problems. At the end of the list, the interviewer could then note up to three other chronic conditions reported by the respondent, so that the number of chronic conditions could range between 0 and 16. At baseline, respondents reported between 0 and 12 chronic conditions, with a mean of 4.3 and a standard deviation of 2.3.

Finally, I used Wood-Dauphinee and Williams' "Reintegration to Normal Living" (1987) as a measure of quality of life. Developed to measure how people with a disabling illness adjust when there is no cure, this scale assesses functional status, incorporating the respondent's perceptions. The scale measures global function, considering both

patients' perceptions and objective indicators of physical, social, and psychological dimensions. The 11-item scale asks respondents to place themselves on a continuum between 1 and 10, where 1 means "doesn't describe my situation" and 10 means "fully describes my situation." The questions ask about moving around one's living quarters and community, taking trips out of town, meeting self-care needs, activity, participation in work, social, family, and recreational activities, personal relationships and one's social self, and the ability to deal with life events. The scores can range between 11 and 110, where a high score indicates better quality of life. Wood-Dauphinee and Williams reported a Cronbach's  $\alpha$  of .90.

In the baseline interview, scores ranged between 24 and 110, with a mean of 94.3 and a standard deviation of 17.4. In our sample, the Cronbach's  $\alpha$  at baseline was .83.

#### **REPLACING MISSING VALUES**

As Table 3.7 illustrates, prevalence of baseline missing values ranged from 1% for number of chronic illnesses to 12% for income. I used two methods to replace missing values. For variables that were measured by a series of questions (scales), I imputed missing responses using the average of those questions that were answered. For example, at baseline 87% of the respondents answered all 15 questions that compose the depression scale. However, 13% (54 people) did not respond to one or more of the questions: 38 respondents missed one question, 8 respondents missed 2 questions, and 8 failed to respond to 3 or more questions. I replaced missing values for the 46 respondents (11.1% of the sample) who had 1 or 2 missing responses out of the total 15 questions. To impute the missing values, I took the average of the other 14 (or 13) responses. Those respondents who missed 3 or more responses from the scale remained as missing in the analysis.

For those variables, such as income, that are measured using one question, I replaced missing values through regression imputation. In this method, I used income as the outcome variable and all other variables in my regression equation as predictors. I then replaced all missing observations with the predicted mean for income.

**ATTRITION AFTER THE FIRST YEAR**

As illustrated in Table 3.8, approximately 84 percent (348 people) of the participants completed the first-year interview. An additional seven people completed a modified or proxy interview because of cognitive impairment or some other disability.<sup>7</sup> Approximately 4 percent of the sample missed their one-year interview because they moved from Santa Monica, were unavailable at the time of the interview, or were out of the area on an extended trip. We have lost track of two respondents who moved from the area and left no forwarding address with our project

Table 3.7

PERCENT OF SAMPLE WITH MISSING VALUES

Measure	Number (Percent) Missing at Baseline	Number (Percent) Missing at One Year
<b>Scales:</b>		
Social support	18 ( 4.3%)	11 ( 3.2%)
Social network	37 ( 8.9%)	25 ( 7.2%)
Depression	54 (13.0%)	35 (10.1%)
Chronic illness	4 ( 1.0%)	
IADL	38 ( 9.2%)	
Ability to cope	31 ( 7.5%)	
Quality of life	18 ( 4.3%)	
<b>Single Items:</b>		
HMO membership	2 ( .5%)	
MediCal	5 ( 1.2%)	
Income	50 (12.1%)	

<sup>7</sup>For example, one participant had a stroke that impaired her speech. In this case, we interviewed her husband as her proxy.

Table 3.8

FIRST YEAR

Category	Number	Percent
Active participants	348	84.1%
Special participants	7	1.7%
Missing interview	17	4.1%
Lost	2	0.5%
Refused	28	6.8%
Died	12	2.8%
Total	414	100.0%

or with the friends given as their emergency contacts. An additional 12 people died before the end of the first year. Finally, about 7 percent (28 people) refused to continue to participate during the first year of the project.

**SUMMARY**

This section describes the study design, sample, and data-gathering methods that provide the basis for the analysis. The sample includes 414 Santa Monica residents aged 75 and over who were not institutionalized, terminally ill, or exhibiting advanced forms of dementia. Following an in-home baseline interview, participants were randomly assigned to treatment and control groups and then followed for one year. Participants in the intervention group received home visits four times a year from a Gerontological Nurse Practitioner (GNP). During her initial visit, the GNP conducted a comprehensive geriatric assessment to identify and evaluate specific needs of the clients. During subsequent follow-up visits, she updated and modified her initial recommendations as needed. All participants (both treatment and control) received short phone interviews four and eight months after their baseline interview and an in-home interview after one year in the project.

In this section, I also describe the variables used in the analysis. Sociodemographic variables include age, sex, education, and income. I also discuss the measurement and frequency distributions of several scales: social network, social support, number of chronic illnesses, independent activities of daily living, quality of life, ability to cope, and depression. Finally, I discuss how I replaced missing values in preparation for the analysis.

Table 3.9  
Correlations Among All Variables

	Social Support (base)	Social Network (base)	Health Status (base)	Depress. (base)	Social Support (year 1)	Social Network (year 1)	Health Status (year 1)
Social Support (base)							
Social Network (base)	.60						
Health Status (base)	.29	.22					
Depress. (base)	-.40	-.34	-.53				
Social Support (year 1)	.72	.53	.21	-.34			
Social Network (year 1)	.60	.74	.17	-.31	.63		
Health Status (year 1)	.27	.22	.65	-.48	.28	.21	
Depress. (year 1)	-.33	-.28	-.45	.70	-.37	-.33	-.57

Table 3.9 - Continued

	Social Support (base)	Social Network (base)	Health Status (base)	Depress. (base)	Social Support (year 1)	Social Network (year 1)	Health Status (year 1)	Depress (yr. 1)
Ctrl/Txt	.03	.01	-.01	.03	.07	.06	-.00	-.03
Age	-.15	-.14	-.04	.07	-.22	-.16	-.06	.00
Sex	-.11	-.07	-.07	.08	-.13	-.09	-.06	.06
Live alone	-.35	-.48	-.06	.11	-.32	-.49	-.07	.04
Income	.35	.32	.18	-.17	.26	.30	.15	-.12
Education	.03	.14	.06	-.03	.06	.13	.13	-.04
Chronic conditions	-.27	-.12	-.41	.32	-.18	-.14	-.43	.26
IADL	.05	.12	.26	-.32	.09	.15	.24	-.32
Ability to cope	.28	.26	.34	-.56	.25	.22	.25	-.43
Quality of life	.42	.40	.46	-.63	.45	.40	.42	-.52

Table 3.9 - Continued

	Ctr/Txt	Age	Sex	Live Alone	Income	Education	Chronic Condit.	IADL	Ability to Cope
Age	-.07								
Sex	-.01	-.01							
Live alone	-.02	.14	.36						
Income	-.11	-.08	-.37	-.44					
Education	-.02	-.18	-.07	-.09	.24				
Chronic conditions	.03	.00	.03	.08	-.06	-.06			
IADL	.05	-.15	.18	.16	-.12	.04	-.16		
Ability to cope	-.04	-.04	-.03	-.11	.11	.03	-.35	.19	
Quality of life	.04	-.11	-.04	-.12	.18	.06	-.35	.48	.48

#### 4. CROSS-SECTIONAL ANALYSIS

##### INTRODUCTION

In this section, I describe the results of five analyses examining the association between social support and health. In particular, I look at the association between social support and health status, social support and depression, and social support and health services utilization. I also analyze the association between the components of social support, depression, and health status.

Primarily, I conducted my analysis using multiple linear regression. In each of the analyses presented below, I tested the standard assumptions of a multiple regression model: linearity, homoscedasticity, and normality. I explored interaction terms when relevant and examined the sensitivity of my findings to outliers. In each of the analyses, I began with a tentative main-effects model, in which I controlled for a number of possible confounding factors. Ultimately, to find a more parsimonious model, I dropped variables from the model, one at a time. I reported all results using standardized coefficients to ease interpretation.

In this portion of the analysis, I used the results from the baseline interview. Therefore, the control and treatment groups are pooled.

##### SOCIAL SUPPORT, SOCIAL NETWORK, AND HEALTH STATUS

In the first regression equation, I examined the association between older people's health status and the size of their social network or their level of social support. In particular, I wanted to know if elderly people who have different levels of social support report different levels of health status. Similarly, I tested to see if those 75 and over who have different-size social networks have different levels of health.

To test my hypothesis that people with larger social networks and more social support would have better health status, I used health status as my outcome variable and social support and social network as my predictors. Hypothesizing that health status may be different for people with different sociodemographic variables, I controlled for age, sex, income, whether they received MediCal, whether they were members of a health maintenance organization, and whether they lived in housing especially for seniors. None of these variables were significant in the final equation. I also controlled for whether the respondent had had a visit to a health provider in the last four weeks. I created four dummy variables indicating whether the respondent had no visits, one visit, two visits, or three or more visits in the last four weeks. Further theorizing that health status may be a function of a nursing home or hospital admission, I controlled for any institutional admission within the last three months. Once again, none of these variables were significant in the final equation.

Two control variables were predictively useful (see Table 4.1).<sup>1</sup> The first measured the number of chronic conditions. In the final

Table 4.1

OUTCOME: HEALTH STATUS; BOTH SOCIAL SUPPORT AND SOCIAL NETWORK

Independent Variables	Coefficient	Standard Error
Social support	.14	.06
Social network	.02	.06
Instrumental activities of daily living	.21	.04
Number of chronic conditions	-.32	.05

NOTES: Adjusted  $R^2$  = .21  
n = 406

<sup>1</sup>In this study, "predictively useful" refers to statistical significance at least at the .05 level.

Table 4.2

OUTCOME: HEALTH STATUS AT BASELINE; SOCIAL NETWORK ONLY

Independent Variables	Coefficient	Standard Error
Social network	.10	.04
Instrumental activities of daily living	.21	.04
Number of chronic conditions	-.35	.04

NOTES: Adjusted  $R^2 = .20$   
n = 406

Table 4.3

OUTCOME: HEALTH STATUS AT BASELINE; SOCIAL SUPPORT ONLY

Independent Variables	Coefficient	Standard Error
Social support	.16	.05
Instrumental activities of daily living	.21	.04
Number of chronic conditions	-.32	.05

NOTES: Adjusted  $R^2 = .21$   
n = 406

regression equation, I found that the fewer the number of chronic conditions, the better a person's self-reported health status. The second variable measured the person's score on a scale of "instrumental activities of daily living." As discussed in Section 3, the higher the score, the more independent the person is. In the final equation, we see that the more independent the respondent, the better their health status. The direction of the coefficients in both of these variables makes intuitive sense.

In modeling health status, I was unable to differentiate between social support and social network. In all cases, the signs of the coefficients indicate that more social support and a larger social network are associated with better health status. As Table 4.1 demonstrates, when both social support and social network are in the equation, social support appears to be the stronger measure. However, I found that if I did not have a measure for social support (i.e., when I dropped social support from the equation), social network is important when predicting health status (see Table 4.2). The same is true if we do not have a measure of social network, and only use the measure of social support (see Table 4.3). The standardized coefficients indicate that social support is somewhat stronger (.16) than social network (.10).

To test whether there was some linear combination of the two scales that better explains health status, I used principal components analysis to create a variable that was a weighted combination of the two scales. Using principal components analysis on the covariance matrix, I weighted the two scales 1.71:1 (social network:social support). Interestingly, the weighted scale correlated .99 with a simply weighted combination of the two scales (i.e., when social network and social support both received a weight of one). Therefore, for simplicity, I used the simply weighted scale in the regression equation. When I regressed health status against the simple scale, unadjusted for possible confounds, the coefficient was .21 with a standard error of .05. As displayed in Table 4.4, the coefficient decreases to .14 with a standard error of .04 after adjusting for confounds. Because I am unable to determine which measure (social support or social network) is causal, I will report only the scale that combines the two measures.

As illustrated in Table 4.4, my final equation shows that better health status is associated with increased social support and a larger social network, after controlling for the number of chronic conditions and independence in the activities of daily living. The standardized coefficients tell us that a one standard deviation change in social

Table 4.4

OUTCOME: HEALTH STATUS; SCALE COMBINING SOCIAL SUPPORT AND SOCIAL NETWORK

Independent Variables	Coefficient	Standard Error
Simple scale of social support and social network	.14	.04
Instrumental activities of daily living	.21	.04
Number of chronic conditions	-.33	.05

NOTES: Adjusted  $R^2 = .21$   
n = 406

support/social network is associated with a .14 standard deviation change in health status.

According to this final equation and the  $R^2$ , I was able to explain 21% of the variance in health status. To put this number in practical terms, we can imagine predicting an older person's health status with no knowledge of social support, social network, or the potential confounders in Table 4.4; about the best we could do would be to guess the mean. The regression in Table 4.4 produces estimates of health status with predictive standard errors that are 11% smaller than those obtained by simply predicting the mean. Therefore, by knowing a person's social support and social network (and the confounds), our prediction of health status improves by 11% over not knowing these variables.<sup>2</sup>

As is the case with almost all regressions, this model was best at predicting actual values near the mean and worst at predicting more extreme values. For example, the model never predicted self-reported "poor" health correctly within half a point. However, the model predicted self-reported "good" health within a half a point almost 70% of the time.

<sup>2</sup>Improvement in predictive error:  $100 [1 - (1 - R^2)^{1/2}]$ .

#### COMPONENTS OF SOCIAL SUPPORT AND HEALTH STATUS

In the second portion of the cross-sectional analysis, I examined whether certain types of social support were associated with health status more than others. In a practical sense, now that I had established a relationship between better health status and increased social support, I wanted to determine which aspects of social support were most influential in determining health status.

As discussed in Section 3, social support is composed of five distinct aspects: tangible support, emotional support, informational support, positive interaction, and affection. Using the model I described above, I predicted health status with the five components of social support, controlling for independence in the activities of daily living and the number of chronic conditions.

Beginning with a model that kept all five aspects of social support, I found that each aspect of social support dropped out of the model, leaving only tangible support. However, I also found that if we did not have a measure for tangible support, the components positive interaction, emotional support, and informational support are each individually significant when predicting health status. The only aspect of social support that is not significant after controlling for independence in the activities of daily living and the number of chronic conditions is affection.

As displayed in Table 4.5, tangible support is the most important aspect of social support when predicting health status. The coefficient for tangible support increased slightly to .16 as opposed to .14 when using the entire social support scale. This indicates that a one standard deviation increase in tangible support is associated with a .16 standard deviation increase in health status. Additionally, the coefficients for independence in activities of daily living and the number of chronic conditions are almost the same as those found when predicting health status from the entire social support scale.

Table 4.5

OUTCOME: HEALTH STATUS; COMPONENTS OF SOCIAL SUPPORT

Independent Variables	Coefficient	Standard Error
Tangible support	.16	.04
Instrumental activities of daily living	.22	.04
Number of chronic conditions	-.33	.05

NOTES: Adjusted  $R^2 = .22$   
n = 404

#### SOCIAL SUPPORT AND DEPRESSION

In the third analysis, I examined whether older people with different levels of social support and different-size social networks have differing levels of depression. I hypothesized that elderly people with larger social networks and those with higher levels of social support were less likely to be depressed. To test my hypothesis, I used depression as my dependent variable and the social network and social support scales as my predictors.

Hypothesizing that depression may also be a function of certain sociodemographic variables, I controlled for the respondent's age, income, and whether he or she lived in housing especially for seniors. However, none of these variables were predictively useful. In contrast, I found that four other scales were useful in predicting depression. As shown in Table 4.6, I controlled for the level of independence in the instrumental activities of daily living. The sign of the coefficient indicates that older people who are more independent in their daily activities -- such as shopping, cooking, and washing -- are less likely to be depressed. I also found that the number of chronic conditions is positively associated with depression. Thus, those with more chronic illnesses are more likely to be depressed.

Two of the control variables, a quality of life scale and a scale measuring the ability to cope, were both strongly predictive of depression. Intuitively this is sensible: those with a higher quality of life are less likely to be depressed, as are those who are more able to cope.

As in the first analysis with health status, I also found that the social network scale was not predictively useful when entered in the model with social support, but was predictively useful when entered alone. As expected, the size of the social network was negatively associated with the level of depression. Additionally, social support appeared to be the stronger of the two measures.

I used the simple scale combining social support and social network (see the discussion of health status and social support) to determine whether some combination of social support and social network would better explain the outcome of depression (see Table 4.6). Unadjusted for confounds, the simple scale had a standardized coefficient of  $-.40$  with a standard error of  $.05$ . After controlling for functional status, chronic conditions, quality of life, and ability to cope, the coefficient decreased to  $-.14$  with a standard error of  $.04$ . Because I am unable to conclude that social network is not an important measure when considering depression, I have chosen to use the scale that combines the two measures.

In summary, I find that increased social support and larger social networks are associated with a lower risk of depression, after controlling for quality of life, the ability to cope, the number of chronic conditions, and independence in the activities of daily living. Specifically, a one standard deviation change in social support/social network is associated with a  $-.14$  SD change in depression. This model was able to explain 52% of the variance. To put this in practical terms, we can imagine predicting depression with no knowledge of social support, social network, or the potential confounds in Table 4.6; about

Table 4.6

OUTCOME: DEPRESSION; SCALE COMBINING SOCIAL SUPPORT AND SOCIAL NETWORK

Independent Variables	Coefficient	Standard Error
Simple scale of social support and social network	-.14	.04
Instrumental activities of daily living	-.08	.04
Number of chronic conditions	.07	.04
Quality of life	-.33	.05
Ability to cope	-.34	.04

NOTES: Adjusted  $R^2 = .52$   
n = 387

the best we could do would be to guess the mean. The regression in Table 4.6 produces estimates of depression with predictive standard errors that are 31% smaller than those obtained by simply predicting the mean.

#### COMPONENTS OF SOCIAL SUPPORT AND DEPRESSION

In the fourth part of the analysis, I looked at whether certain types of social support were associated with depression more than others. In this portion of the analysis, I disaggregated social support into its five components parts: tangible support, emotional support, informational support, positive interaction, and affection. I used the components of social support as predictors of depression, after controlling for quality of life, the ability to cope, independence in the activities of daily living, and the number of chronic conditions.

As reflected in Table 4.7, I found that tangible support is the most important aspect of social support when predicting depression. The more tangible support people receive (for example, having someone to help them when they are confined to bed), the less likely they are to be depressed. As when predicting depression from the social support scale,

Table 4.7

OUTCOME: DEPRESSION; COMPONENTS OF SOCIAL SUPPORT

Independent Variables	Coefficient	Standard Error
Tangible support	-.14	.04
Instrumental activities of daily living	-.10	.04
Number of chronic conditions	.06	.04
Quality of life	-.35	.05
Ability to cope	-.35	.04

NOTES: Adjusted  $R^2$  = .53  
n = 385

the coefficients and adjusted  $R^2$  values are very similar in magnitude and direction. Before adjusting for confounds, the standardized coefficient for tangible support was  $-.31$  with a standard error of  $.05$ . After controlling for potential confounding factors, I found that a one standard deviation increase in tangible support was associated with a  $-.14$  standard deviation decrease in depression.

I also found that if I did not include a measure of tangible support in the model, measures for emotional support and informational support were individually predictively useful. Like tangible support, I found that the higher the level of emotional support or informational support, the lower the level of depression. In contrast, the other two aspects of social support, positive interaction and affection, were not as meaningful when predicting depression. Interestingly, no combinations of social support variables were simultaneously useful when predicting depression.

#### HEALTH SERVICES UTILIZATION AND SOCIAL SUPPORT

In my final cross-sectional analysis, I investigated whether the level of social support and the size of the social network were associated with health services utilization. I hypothesized that an older person living in the community who became ill might seek support from three sources. They may use available medical services: a physician, a nurse, or the local hospital. They may also rely on formal support services-- for example, transportation to the doctor or a home-delivered meal. Finally, they may turn to such informal social supports as a friend or relative to talk to, to help them, or to give them advice. I hypothesized that if the ties to any of these sources were absent or weak, then the ill person would compensate by relying more heavily on the other sources (physicians, health providers, and hospitals). Specifically, a person who lived alone and was relatively isolated may not know about formal support services in the area and may be unable to rely upon informal supports. One might expect such a person to make greater use of medical services than a similar elderly person with more social support (assuming no barriers to access).

To test my hypothesis that better social support and larger social networks would be associated with decreased health services utilization, I used a logistic regression analysis. In the first set of equations, my outcome was whether or not the respondent had been to a health provider in the past four weeks. Using social support and social network as predictors, I controlled for several sociodemographic characteristics: sex, income, whether the person received MediCal, and whether he or she was a member of a health maintenance organization. I also controlled for his or her self-reported health status, the number of chronic conditions, and functional status.

This model, as well as the ones I will describe below, was statistically and practically insignificant and exhibited high levels of instability. In addition to the health provider utilization outcome, I also tried the following outcomes: whether or not the respondent had been in the

hospital or nursing home during the last three months, whether or not the respondent had seen a physician in the last four weeks, and whether or not the respondent had seen a nonphysician in the last four weeks. However, none of these models was useful or meaningful.

To determine whether some combination of the dummy variables might be used as an outcome, I used canonical correlation analysis for dimensionality reduction. My first canonical variate was statistically significant, so I then used the weights to create a scale of utilization. The scale consisted of a weighted sum of four variables: whether or not the respondent had seen a health provider in the last four weeks, whether or not the respondent had been referred to another health provider in the last four weeks, whether or not the person had surgery during a health provider visit in the last four weeks, and finally, whether or not he or she had been in a hospital or nursing home in the last four months. The weights on these four variables were .75, .38, .18, and .10, respectively.

After creating a utilization scale for the outcome variable, I then used multiple regression with social support and social network as the predictors, controlling for functional status, sex, health status, chronic conditions, HMO membership, and receipt of MediCal. However, I found that social support and social network were not meaningful when predicting utilization. In fact, the  $R^2$ , while statistically significant, was less than .04. I therefore concluded that in this group of seniors no significant relationship exists between health services utilization and the size of the social network or the magnitude of the social support.

#### **SUMMARY**

In summary, in this section I investigated how social support relates to health. In my first analysis, I found that health status was positively associated with social support and social network after controlling for functional status and the number of chronic problems. Thus, the higher

the level of social support and the larger the social network, the better the health status in those 75 years or over. Specifically, a one standard deviation change in social support and social network was associated with a .14 standard deviation change in health status.

In the second analysis, I found that better social support and a larger social network are associated with lower levels of depression in those 75 and over, after controlling for functional status, quality of life, ability to cope, and the number of chronic problems. Specifically, a one standard deviation increase in social support and social network is associated with a .14 standard deviation decrease in depression. Thus, older people who are surrounded by family and friends, whom they feel they can rely on, tend to be less depressed than those who do not have as large and as dependable a network.

In addition, I found that tangible support is the most important aspect of social support when predicting both health status and depression. Tangible support measures a "practical kind of support": having someone to take you to the doctor if you need it or to help you if you are confined to bed. Intuitively, it makes sense that this aspect of social support would be the most important when predicting health status. Using the same logic, affection appears to be the least important aspect of social support when predicting health status, and indeed this is borne out by the data.

It is interesting that even when predicting a person's mental health, the most important aspect of support involves actually "doing" something (or being available to do something). An alternative theory might have held that better mental health would be associated with the amount of affection a person receives. For example, we can imagine an older person whose out-of-town children call regularly to express their love and affection. However, the data presented here show that as older people become less able to live independently, what they need most is someone they can count on to help them out. Affection alone is simply

not enough. Intuitively, it is appealing that having someone to count on to provide more "practical" aspects of support is associated with lower levels of depression.

Finally, I found no relation between levels of social support and social network when predicting health services utilization in this group of seniors.

## 5. LONGITUDINAL ANALYSIS

### INTRODUCTION

In this section, I assess whether our in-home intervention changed the size of the social network or the level of social support for our participants. I hypothesized that the gerontological nurse practitioners could identify those people with poor social support and then intervene to strengthen their level of social support or to increase the size of their social network. If this were possible, one would expect the change in social support or social network to subsequently cause a change in health status and depression.

As in Section 4, multiple linear regression is my primary analytic method. In each of the analyses, I tested the standard assumptions of the model, including linearity, homoscedasticity, and normality. To meet those assumptions, I transformed some variables logarithmically, created interaction terms, and set aside the occasional outliers with large influence on the results. Therefore, some variables may be measured on the original scale, while others may be transformed. I began each analysis with a tentative main-effects model, controlling for confounding factors. Using backwards selection, I then selectively dropped variables from the model until all remaining terms were predictively useful. I report all results using standardized coefficients for ease of interpretation. In this portion of the analysis, I used data from the first year of the project, contrasting the effect of the intervention on the treatment and control groups.

### SOCIAL SUPPORT AT ONE YEAR

To answer the question of whether the intervention resulted in a change in social support, I used social support at one year as my outcome, and whether the person was in the control or treatment group as my predictor. I hypothesized that those participants in the treatment group would have better social support than those in the control group

after one year. I then controlled for a number of baseline characteristics, thereby ensuring that any differences at one year were due to the intervention, and not to some baseline difference. I began by controlling for the level of social support at baseline (see Table 5.1). As one might expect, it has a positive coefficient, indicating that better social support at one year is associated with better social support at baseline.

Hypothesizing that differences in social support at one year may be due to differences in living arrangements, I controlled for whether a participant lived in housing especially for seniors and whether he or she lived alone. I hypothesized that those who lived alone or did not live in housing for seniors might have lower social support at baseline. However, both variables were insignificant in the final equation. I also controlled for variables that might influence a person's social support, such as his or her quality of life, his or her ability to cope, and his or her level of depression. I hypothesized that people who rated themselves as having better quality of life, who were more able to cope with life's ups and downs, and who were less depressed may have better social support. Of these variables, only quality of life was predictively useful. As indicated in Table 5.1, it has a positive

Table 5.1

OUTCOME: SOCIAL SUPPORT AT ONE YEAR

Independent Variable	Coefficient	Standard Error
Treatment group	.04	.04
Social support at baseline	.64	.04
Age	-.08	.04
Quality of life	.16	.04

NOTES: Adjusted  $R^2$  = .52  
n = 337

coefficient, indicating that better social support at one year is related to better baseline quality of life.

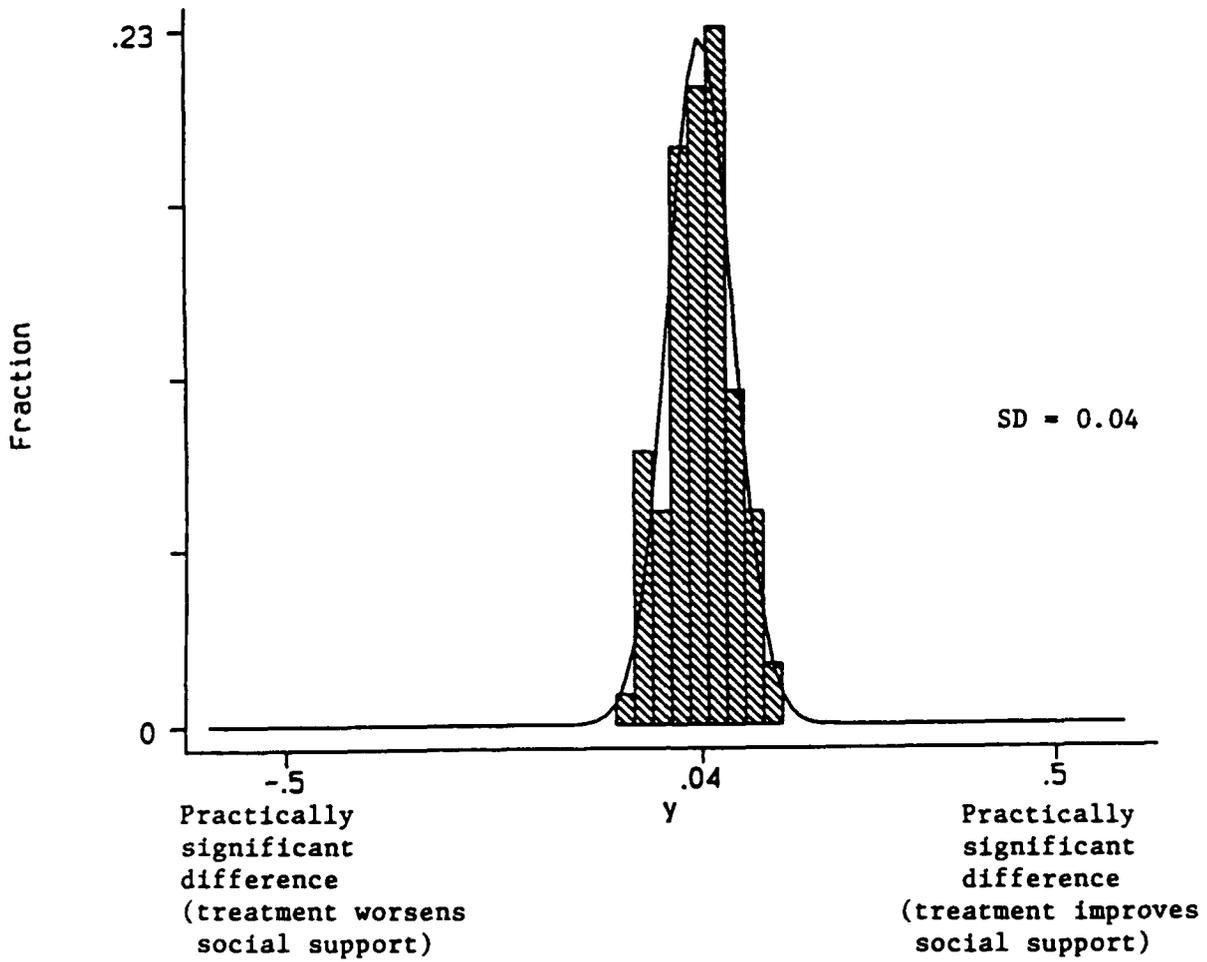
Additionally, I controlled for two health-related variables: the level of independence in the instrumental activities of daily living and the number of chronic illnesses at baseline. I hypothesized that the more independent the participant and the fewer the number of chronic illnesses, the higher the level of social support. However, neither of these variables was significant in the final equation.

I also controlled for two demographic differences: age and income. I hypothesized that the older people were and the lower their income, the lower their social support. In the final equation I found that only age was predictively useful (see Table 5.1). Age's negative coefficient indicates that better social support is associated with younger participants.

As displayed in Table 5.1, social support at one year does not appear to be strongly related to the intervention. It has a positive coefficient, indicating that (after adjusting for confounds) the treatment group had larger values of the social support variable on average than the control participants. Before controlling for baseline characteristics, the treatment/control coefficient was .07 with a standard error of .05, not a large change from the adjusted coefficient.

Another way to present these results is by examining posterior distributions for the treatment effects given the data (assuming little or no prior information). In this situation, such a distribution is approximately normal with the mean given by the regression coefficient for the treatment/control dummy variable and SD given by the corresponding standard error. Figure 5.1 gives the posterior distribution for the treatment effect (in standard units) on social support at one year. This distribution is sufficiently concentrated near zero that the posterior probability that the underlying effect is

Figure 5.1 -- Posterior Distribution of the Treatment Effect (in Standard Units) on Social Support at One Year



large in practical terms -- say, at least 1/2 standard deviation on the social support scale either way from zero -- is essentially zero. The interpretation is that if the treatment intervention employed in this study were repeated, with no change in implementation details, on a large set of elderly people similar to those in this experiment, I am virtually certain that a treatment effect of a practically relevant magnitude, either helpful or detrimental, on social support would not be found.

Additionally, I investigated whether the intervention at one year made a difference in any of the components of social support. First, using a t-test for the difference in the means for the treatment and control groups, I looked at each component of social support: tangible support, positive interaction, emotional support, informational support, and affection. However, I found no difference between treatment and control groups on any of the measures. Second, I controlled for the level of each component of support at baseline, to determine if there was a difference between the two groups at one year. I again found no meaningful difference between the two groups.

Although the intervention was not successful in changing the level of social support for the treatment group as a whole, it was more successful for some participants than others. I therefore wanted to know if I could identify those participants from their baseline characteristics. Perhaps, to change social support, this intervention would be better targeted at certain people more than others. I created a variable that measured the change in social support between baseline and one year for the treatment group. I then contrasted those people in approximately the upper twenty-fifth percentile ( $n = 51$ ) with those in approximately the lowest twenty-fifth percentile ( $n = 61$ ) (these sample sizes were unequal because of discreteness in the social support variable).

I then tried to predict the difference between the means of the two groups using various baseline characteristics. I looked at differences between the two groups in levels of baseline depression, quality of life, and ability to cope. I looked at various demographic identifiers such as age and income. I tested health-related variables such as number of chronic problems, health status, and the level of independence in the activities of daily living, as well as the instrumental activities of daily living. I tested differences in utilization: number of health provider visits, community services used, and hospital admissions. I tested for differences in how the participants compared their health and social activities three months before the baseline interview. Finally, I tested how accessible they felt the community was, how mobile they were, how often they had fallen, and whether pain had limited their activities. However, none of these baseline variables was helpful in identifying for whom the treatment was most successful.

Using the same logic, I wanted to look in more detail at those people who had the greatest decrease in social support over the first year. Perhaps in the distribution of change in social support from baseline to one year, the people who were most at risk of decreases in their levels of social support could be identified by some baseline characteristics. Then an intervention to help those at risk could be implemented.

I compared those people in the control group who were in the lowest twenty-fifth percentile ( $n = 50$ ) with those in the highest twenty-fifth percentile ( $n = 39$ ). Once again, I compared the two groups on their baseline measures of depression, quality of life, ability to cope, number of chronic problems, health status, activities of daily living, instrumental activities of daily living, use of community services, number of provider visits, number of hospital admissions, environmental hazards, falls, mobility, community access, income, and age.

I found significant differences between the two groups on two measures. First, I found a difference of 2.89 days (standard error 1.42) between those in the upper twenty-fifth percentile and those in the lower twenty-fifth percentile on how often pain had limited them in their activities.<sup>1</sup> Those people in the control group with the largest decrease in social support were more likely to have been limited in their activities because of pain.

The second difference was in response to a question that asked respondents to rate their overall (physical and emotional) health now as compared to three months ago. Those who had the largest decrease in their social support were more likely to have rated their health as worse compared to three months before the baseline interview. In summary, I find that those most at risk of a large decrease in their social support in the control group are those whose health is becoming worse and those who are limited in their activities by pain.

#### **SOCIAL NETWORK AT ONE YEAR**

In the next set of analyses, I investigated whether those people who had received the in-home intervention had a larger social network at the end of one year. I hypothesized that those who had participated in the intervention would have a larger social network than those in the control group. In the regression model, I used social network at one year as my outcome variable, and a dummy variable for whether the person was in the control or treatment group as the main potentially causal predictor. As before, I began with a large model in which I controlled for a number of baseline characteristics. In this way I could be sure that any differences in social network at one year could be attributed

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<sup>1</sup>The question asked "About how many days in the last four weeks has pain interfered with (or limited) your normal daily activities? Would you say (a) no days (b) 1-3 days (c) 4-10 days (d) 11-15 days (e) more than 15 days?" To quantify the question, I created responses 0, 2, 7, 13, and 20, respectively, for the number of days limited by pain. I then tested the sensitivity of responses by using endpoints between 16 days (difference of 2.36 days, standard error 1.16) and 28 days (difference of 3.94 days, standard error 1.97).

to the intervention, and not to some baseline differences. I then used backwards selection in eliminating those control variables that were not predictively useful.

I hypothesized that participants who were older may have smaller social networks because of the increased likelihood of the death of friends and family. I also thought that women may have smaller social networks because so many are widowed in their later years (in contrast to men, who are less likely to lose their spouses). In addition, I thought that those people living in housing especially for seniors may have a larger social network than those living in single-family homes or nonelderly housing. This could be due to the increased opportunity to meet people of their own age who live nearby. Therefore, I controlled for age, sex, and housing at baseline. However, none of these variables was predictively useful in the final equation.

I also controlled for the number of chronic problems, depression, functional status, and the ability to cope. I hypothesized that a person who had more chronic health problems, or who was less independent in the instrumental activities of daily living, would probably be less able to socialize on a regular basis, in comparison with a person who had fewer chronic problems and was more independent. Likewise, if someone was depressed, he or she was probably less likely to have a large social network. Finally, I hypothesized that a person who had a better ability to cope would also have a larger social network. However, none of these variables was useful when predicting social network at one year.

As displayed in Table 5.2, I found that the social network at one year is not strongly related to the intervention. After controlling for the quality of one's life and the size of the social network at one year, the coefficient for the treatment/control group variable is not large. Even unadjusted for baseline social network and quality of life, the coefficient for treatment/control group is minimally nonzero (.05 with a

Table 5.2

OUTCOME: SOCIAL NETWORK AT ONE YEAR

Independent Variable	Coefficient	Standard Error
Treatment group	.04	.04
Social network at baseline	.71	.04
Quality of life	.13	.04

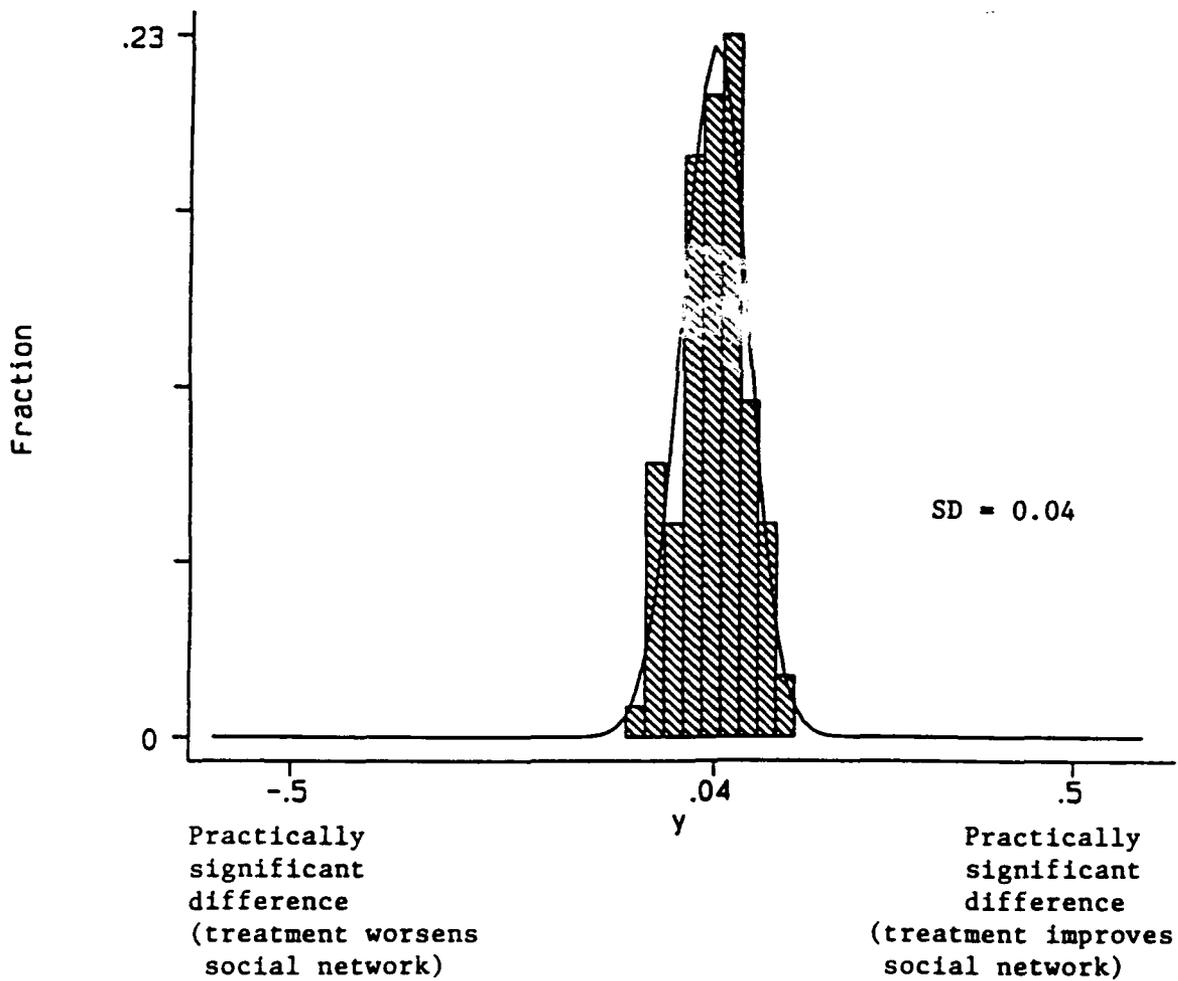
NOTES: Adjusted  $R^2$  = .58  
n = 340

standard error of .05). The treatment/control variable has a positive coefficient, indicating that an increase in the social network is associated with being in the treatment group. As one might expect, the coefficient for social network at baseline is quite large and is the driving force behind the adjusted  $R^2$  of .58. A positive coefficient for quality of life indicates that better quality of life is associated with a larger social network.

Computation of posterior probabilities produces results identical to those with social support. Figure 5.2 presents the posterior distribution of the underlying effect of the treatment on social network (in standard units). As before, I am virtually certain that this effect does not differ from zero in either direction by an amount that is of practical relevance.

Although the change in the social network scale was not meaningfully large after one year, the intervention was effective for some participants. I wanted to know who benefited the most from the intervention in the first year, and whether those people could be identified by their baseline characteristics. I created a variable measuring the change between baseline and the first year for the treatment group, and then contrasted those people in the upper twenty-

Figure 5.2 -- Posterior Distribution of the Treatment Effect (in Standard Units) on Social Network at One Year



fifth percentile (n = 49) with those in the lower twenty-fifth percentile (n = 48).

Using the mean scores on the baseline measures, I tested to see if there were any meaningful differences between the two groups. I tested differences in depression, ability to cope, and quality of life. I looked at various health measures, such as how they rated their health status, the number of times they had fallen in the last 12 months, whether they saw a health provider in the past four weeks, and whether they had been admitted to a hospital in the last 3 months. I also contrasted use of community services, community mobility, neighborhood accessibility, and social activities compared to 3 months ago. In addition, I tested differences in pain limitation and in levels of independence in both instrumental and basic activities of daily living. Finally, I looked at differences between the two groups in income and age. There were no meaningful differences between the two groups on these measures.

The only difference I found between the two groups was in how they compared their overall health at baseline to three months before. Those people in the upper twenty-fifth percentile of change rated their health as better than those in the lower twenty-fifth percentile. Thus, those who were able to take advantage of the intervention, and had a subsequent increase in the size of their social network, were more likely to be in better health than they had been three months before the baseline interview. Intuitively, this makes some sense. If a person is feeling more healthy, he or she is probably better able to follow up on the nurse practitioner's recommendations.

Finally, in addition to investigating whether I could identify those who most benefited from the intervention, I looked at those most at risk of a large decrease in their social network. If this group could be identified at baseline, we could then target the intervention. As before, I created a variable measuring change in the social network

between baseline and the end of the first year for the control group. I then contrasted those people in the lower twenty-fifth percentile (those most at risk) with those in the upper twenty-fifth percentile (n = 44 for both groups), using the same baseline variables as above.

I found only one baseline difference, and not a particularly strong one, between the two groups. Those in the lower twenty-fifth percentile were likely to have fallen more often in the 12 months before the baseline interview than those in the upper twenty-fifth percentile. Thus, those most at risk of a large decrease in their social network after one year are those who are also more likely to have fallen in the past 12 months. Intuitively, this is sensible: a person who is falling more often may become fearful of going out in the community, which results in increased isolation and a smaller social network.

#### **HEALTH STATUS AT ONE YEAR**

Although I found that the intervention made no difference in the size of the social network and the level of social support after one year, I wanted to know whether the intervention made a difference in the way people rated their health status after one year. In this analysis, I used health status at one year as my outcome and whether the person was in the treatment/control group as my potentially causal predictor. To assure that any difference at one year could be attributed to the intervention, I controlled for a number of baseline characteristics. As displayed in Table 5.3, I controlled for the baseline level of health status. The standardized coefficient indicates that health status at baseline is the driving force behind this equation; the sign of this coefficient indicates that the better the health status at one year, the better the health status at baseline.

I hypothesized that health status at one year may be a function of several demographic characteristics. For example, we might imagine that a younger person would rate his or her health as better than an older person. Additionally, there is evidence in the literature that lower

Table 5.3

OUTCOME: HEALTH STATUS AT ONE YEAR

Independent Variable	Coefficient	Standard Error
Treatment group	-.002	.04
Health status at baseline	.55	.05
Social network	.09	.04
Number of chronic problems	-.17	.04

NOTES: Adjusted  $R^2$  = .43  
n = 345

incomes are associated with poorer health. However, none of these demographic characteristics was predictively useful in the final equation.

I also controlled for a number of health-utilization variables. For example, we might assume that a person who had been hospitalized in the three months before the baseline interview would rate his or her health as worse. Or we might imagine that people who had seen a health provider more often in the four weeks before the baseline interview would rate their health as worse. There is some evidence in the literature that HMO members are healthier than fee-for-service users. Along the same lines, some analysts have shown that those on MediCal are in worse health than those who are not on MediCal. Therefore, I controlled for hospital use, health provider visits, HMO membership, and MediCal. However, none of these variables was meaningful when predicting health status at one year.

Hypothesizing that people who were more independent in their instrumental activities of daily living would rate their health status as better, I tried to control for IADL scores. However, this also was insignificant in the final equation. I did find that the number of

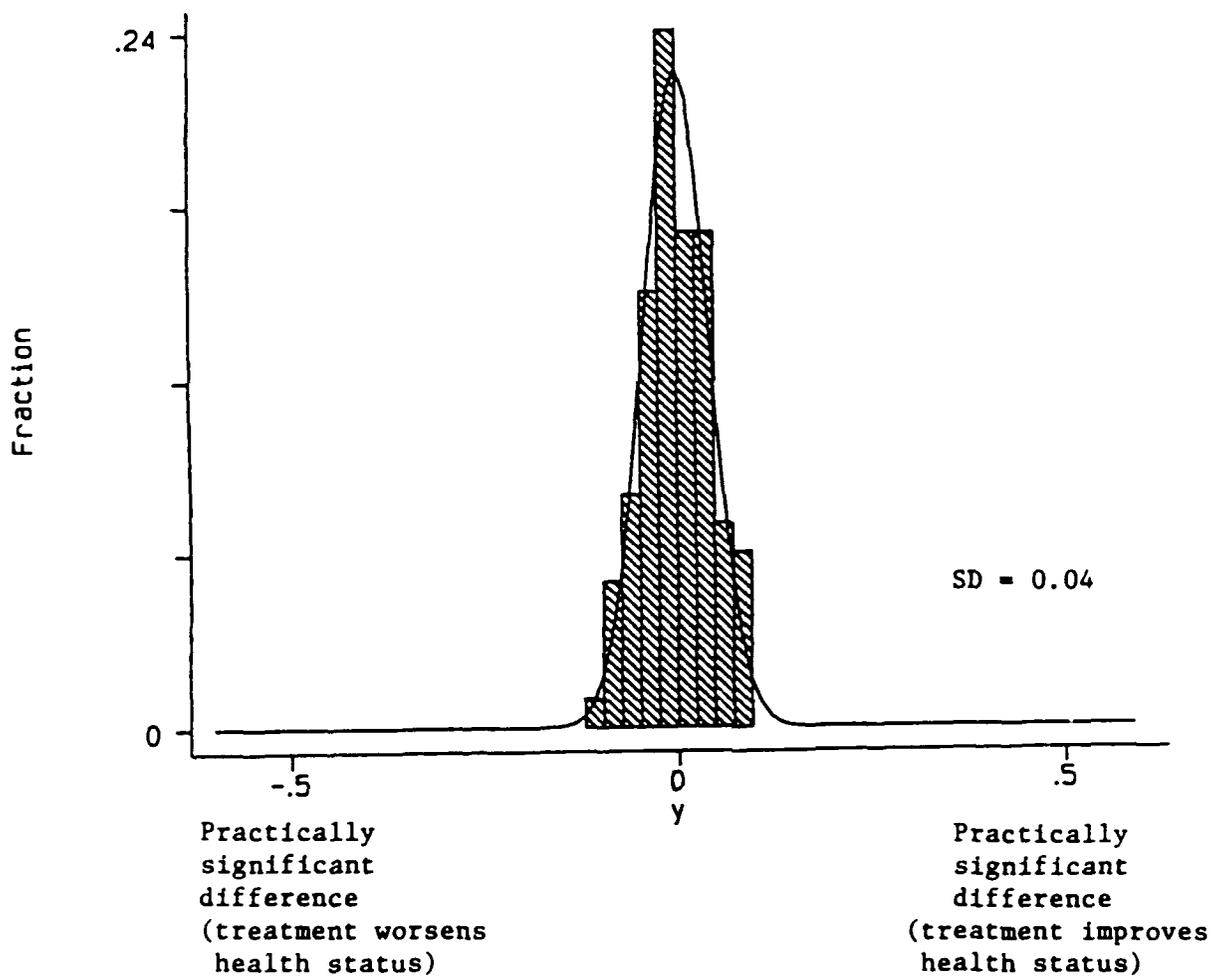
chronic problems was meaningful when predicting health status at one year. The sign of the coefficient indicates that the larger the number of chronic problems, the worse the health status.

As displayed in Table 5.3, I found that social network scores were important in predicting health status at one year. The sign of the coefficient indicates that the better the health status, the larger the social network, which makes intuitive sense. Social support was not meaningful in predicting health status at one year, either with or without social network also in the equation.

When I predicted health status at one year, without adjusting for any confounding factors, the coefficient for the treatment/control group indicator was  $-.02$  with a standard error of  $.05$ . After controlling for health status, social network, and chronic problems at baseline, the coefficient was  $-.002$  with a standard error of  $.04$ . In neither case was membership in treatment/control group useful in predicting health status at one year. As with social support and social network, computation of the posterior probability showed that the intervention effect does not differ from zero in a direction or amount that is of practical relevance (see Figure 5.3).

To determine whether a change in health status between baseline and the end of the first year was a function of a change in social network and/or social support, I used a linear regression equation. I subtracted health status at baseline from health status at year one for my outcome variable. Similarly, for the two predictors, I created change scores for social network and social support. I then attempted to control for the same variables as above. However, the entire equation was insignificant. The adjusted  $R^2$  never went above  $0.00$ , and the equation had no stability.

Figure 5.3 -- Posterior Distribution of the Treatment Effect  
(in Standard Units) on Health Status at One Year



**DEPRESSION AT ONE YEAR**

Although I found that the intervention was unsuccessful in changing levels of social network, social support, and health status, I wanted to test whether there had been any changes in the level of depression. I used the logarithm of depression at one year as my outcome and whether the person was in the treatment/control group as my potentially causal predictor, and then controlled for a number of baseline measures. I used the logarithmic scale because depression scores on the raw scale were skewed.

I hypothesized that the level of depression may vary according to age and income, so I controlled for both variables. I also thought that a person who had more chronic problems or had a lower quality of life might have a higher level of depression. Therefore, I controlled for age, income, quality of life, and chronic conditions in the original equation. However, none of these variables was meaningful when predicting depression at one year.

Table 5.4

OUTCOME: DEPRESSION AT ONE YEAR; BOTH SOCIAL SUPPORT AND SOCIAL NETWORK

Independent Variable	Coefficient	Standard Error
Treatment group	-.01	.04
Logarithm of depression at baseline	.56	.05
Social network	-.10	.05
Logarithm of social support	.03	.05
Logarithm of IADL	.10	.04
Ability to cope	-.08	.05

NOTES: Adjusted  $R^2 = .48$   
n = 324

I controlled for functional status using the logarithm of the scale measuring instrumental activities of daily living (IADL).<sup>2</sup> This conversion reversed the sign. In each equation, the higher the level of depression, the lower the level of functional status. I also controlled for a person's ability to cope. I found that the lower the level of depression, the better the ability to cope. Both of these interpretations are intuitively satisfying.

As in the cross-sectional analysis, I was unable to differentiate between the importance of social support and social network. I used the logarithm of social support,<sup>3</sup> which meant that the sign on the coefficient in each regression was the opposite of the sign for social network. In all cases, the signs indicated that the lower the level of depression, the higher the level of social support and the larger the social network. As Table 5.4 demonstrates, when both social support and social network are in the equation, social network appears to be the stronger measure. However, if we do not have a measure of social network, social support is important in predicting depression at one year (coefficient for social support = .08, standard error = .04). The same is true if we do not have a measure for social support and only control for the size of the social network (coefficient for social network = -.11, standard error = .04). The standardized coefficients show that social network is somewhat stronger (.11) than social support (.08), but the difference is not dramatic. When I use a simple scale that combines social support and social network (see Section 4), the coefficient increases slightly to .12 (see Table 5.5). Therefore, I prefer to use the scale that combines the two measures, since it is not clear which individually is preferable.

As shown in Table 5.5, I predicted depression at one year from membership in the treatment or control group, after adjusting for baseline differences. However, I find that the coefficient for that

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<sup>2</sup>Logarithm of IADL =  $\log(28 - \text{IADL})$ .

<sup>3</sup>Logarithm of Social Support =  $\log(31 - \text{Social Support})$ .

variable is not large. Unadjusted, I find a standardized coefficient of  $-.007$  with a standard error of  $.05$ . This decreases slightly after adjusting for baseline differences to  $-.01$  with a standard error of  $.04$ . However, it is not predictive of depression at one year. As displayed in Figure 5.4, the posterior distribution of the underlying effect of the treatment on depression is nearly identical to those for health status, social support, and social network. As before, I am virtually certain that the treatment effect on depression does not differ from zero by an amount that is of practical relevance.

After concluding that the intervention was not successful in changing the level of depression after one year, I tested whether a change in depression at one year was due to a change in the level of social support or a change in the size of the social network. I created three variables--change in depression, change in social support, and change in social network. As above, I adjusted for age, income, number of chronic conditions, quality of life, functional status, and the ability to cope. Only quality of life and functional status were important when predicting change in depression after one year. The signs on the coefficients (see Table 5.6) indicate that the greater the independence in the instrumental activities of daily living, the greater the change in depression (the outcome had a negative sign). Interestingly, the better the quality of life, the lower the level of change in depression.

Both the change in social network and social support are meaningful in predicting a change in depression. Additionally, the greater the change in depression, the greater the change in social network and social support (change in depression also has a negative sign). However, the adjusted  $R^2$  indicates that we have not explained much of the variation, and so we cannot have much confidence in individual level predictions. As with change in health status, the change in depression associated with the interaction was small.

Figure 5.4 -- Posterior Distribution for the Treatment Effect  
(in Standard Units) on Depression at One Year

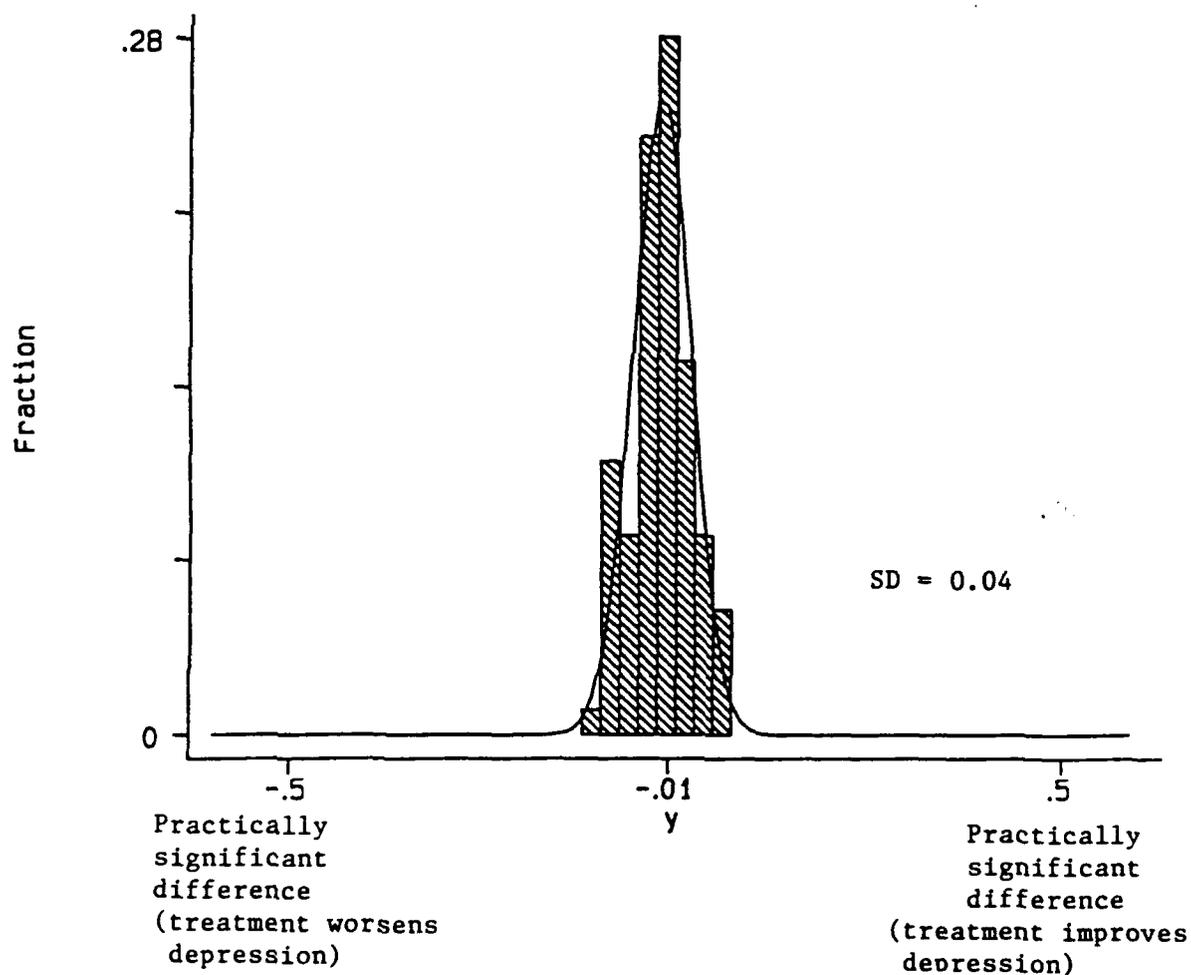


Table 5.5

OUTCOME: DEPRESSION AT ONE YEAR;  
SCALE COMBINING SOCIAL SUPPORT AND SOCIAL NETWORK

Independent Variable	Coefficient	Standard Error
Treatment group	-.01	.04
Logarithm of depression at baseline	.56	.05
Scale of social network & social support	-.12	.04
Logarithm of IADL	.10	.04
Ability to cope	-.09	.05

NOTES: Adjusted  $R^2$  = .48  
n = 324

Table 5.6

OUTCOME VARIABLE: CHANGE IN DEPRESSION AFTER ONE YEAR

Independent Variable	Coefficient	Standard Error
Change in social network	-.11	.05
Change in social support	-.18	.06
Functional status	-.12	.08
Quality of life	.15	.06

NOTES: Adjusted  $R^2$  = .06  
n = 326

#### USE OF COMMUNITY SERVICES IN THE FIRST YEAR

As I discussed in Section 3, I had hypothesized that people in the treatment group would receive recommendations from their gerontological nurse practitioner about community services. The treatment group would then use more community services--for example, participate in more social activities or receive visits from a friendly visitor. This would then facilitate increases in the level of social support and the size of

the social network. Since I was unable to find any significant difference in social support and social network, I wanted to compare the use of community services by those in the treatment and control groups over the first year.

At 4 months, 8 months, and 12 months, we asked about use, in the previous 4 months, of home repair services, friendly visitors, telephone reassurance, case management, respite care, food stamps, legal services, family counseling, money management, Alcoholic's Anonymous, transportation services, meals-on-wheels, meals in a senior center, and social programs for seniors. Table 5.7 shows that during the first year of the project, the treatment group used an average of .84 community services, in comparison to .69 for the control group. This difference is not significant either statistically or practically. I then compared use of meals-on-wheels, transportation services, meals in a senior center, and social programs during the last four months of the first year. When I limited the comparison to use of only these four services (the most commonly used community services), I found a statistically significant difference between the treatment and control groups, but the

Table 5.7

USE OF COMMUNITY SERVICES IN THE FIRST YEAR

Measure	Group	n	Mean	SD	Range	Estimated Differences (SE)	p-value
Use first year	T	187	.84	1.11	0 to 5	.15	.18
	C	160	.69	1.05	0 to 5	(.11)	
Use of 4 services	T	187	.56	.76	0 to 3	.15	.05
	C	162	.41	.66	0 to 3	(.07)	
Change in use of 4 services	T	186	-.02	.76	-2 to 2	.18	.03
	C	160	-.20	.74	-3 to 2	(.08)	

difference is not large in practical terms. I then created a variable that measured the change in use of these four services from baseline to the end of the first year. I limited my comparison to these four services because at the baseline interview the full sample was only asked about these four community services. The difference between treatment and control in how much participants' use of these services changed was significant statistically but again was small in practical terms.

Having established that at least for some community services, those people who see the nurse practitioner use more community services than those who don't, I wanted to test whether this had any relation to a change in the level of social support or a change in the size of the social network. The correlation between use of community services in the first year and change in social support is  $-0.03$ , while correlation with change in social network is  $.04$ . The correlation between use of the four community services at one year and change in social support is  $-0.01$ , while correlation with change in social network is  $0.05$ . Finally, the correlation between the change in the use of the four community services and change in the level of social support is  $-.04$ , while the change in the size of the social network is  $-0.00$ . Thus, although those in the intervention group had a statistically significant change in their use of community services in the first year, this appears to have little relation to the change in social network or social support.

I then used a secondary data base to further compare the use of community services by the treatment and control groups. At the Senior Health and Peer Counseling Center (SHPCC), where the intervention is based, providers keep records of the services they provide. This is then entered into a data base for SHPCC's use. I used this data base to look at service use within SHPCC for the participants in our project.

The Senior Health and Peer Counseling Center offers a variety of services to older people in the community at little or no cost. For

example, they offer social services such as case management, money management, and friendly visitors. They offer a broad range of classes through the Emeritus College (a part of Santa Monica College). Physical health services include full physical exams, as well as specialty clinics, such as blood pressure clinics, dental clinics, and dermatology clinics. Mental health services are perhaps SHPCC's most well-known community service. They offer peer counseling, individual mental health counseling, and specialty support groups for men, stroke victims, and widows.

Table 5.8 displays the differences in the use of SHPCC services for the treatment and control group. I did not include any services provided by the project nurse practitioners that were not available to the community at large. Table 5.8 clearly demonstrates that the people in the intervention group are using more SHPCC services than those in the control group. Of course, it makes sense that the nurse practitioners would refer within SHPCC, but it does demonstrate that the intervention group is receiving a myriad of services beyond the visits of the nurse practitioners. However, the correlation between use of SHPCC services and change in social support after the first year is  $-0.04$ , the same as for change in the social network. Interestingly, the negative correlation is even larger between use of SHPCC social services and change in social support ( $-0.09$ ) and change in social network ( $-0.11$ ).

#### **COMPLIANCE WITH NURSE PRACTITIONER RECOMMENDATIONS**

Finding that the intervention was not successful in changing levels of social support or social network, we might question whether the lack of success could be due to noncompliance with the nurse practitioner's recommendations. Therefore, in addition to the regular interviews, we developed a phone interview to measure the intervention group's self-reported compliance or noncompliance. We interviewed all intervention group clients who had at least been seen by the nurse practitioner for their visit 18 months after the project began ( $n = 102$ ). Although this is outside the time window of the first year of the study, it gives us

Table 5.8

USE OF SERVICES AT SHPCC IN THE FIRST YEAR

Service	Group	n	Mean	SD	Range	Estimated Difference (SE)	p-value
Social services	T	216	.52	1.64	0 to 14	.47	.000
	C	198	.05	.39	0 to 5	(.12)	
Classes	T	216	.33	1.36	0 to 29	.25	.012
	C	198	.08	.44	0 to 4	(.10)	
Physical health	T	216	.78	1.72	0 to 19	.41	.022
	C	198	.37	1.91	0 to 41	(.18)	
Mental health	T	216	.73	2.63	0 to 23	.54	.010
	C	198	.19	1.36	0 to 15	(.21)	
Total use	T	216	2.36	4.53	0 to 39	1.68	.000
	C	198	.68	2.81	0 to 25	(.37)	

some insight as to whether participants complied with their nurse's recommendations. The interview was conducted approximately 3 to 12 weeks after the last nurse practitioner visit, to allow the client time to implement nurse practitioner recommendations.

During the approximately ten-minute structured interview (see Appendix B), we asked each client what the nurse practitioner had recommended during her last home visit. We prompted for different aspects of the intervention--for example, whether the GNP had suggested increased physical activity, or a change in diet, or use of a community service. For each suggestion, we asked whether the client had followed the nurse's recommendation. If they had not followed the recommendation, we asked why they hadn't followed the suggestion.

Of those interviewed, 30% said that the GNP had suggested that they take advantage of a community service, such as a support or social group, Emeritus college class, peer counseling, or something similar. However, of these 30 people, 73% said they had not followed the nurse's suggestion. When asked why they had not followed the recommendation, the 25 respondents gave a variety of answers, such as not believing they needed the community service or not believing that the service would help them (28%), not having the transportation necessary to partake in the community service (20%), or having an emotional conflict, such as fear or anxiety (16%).

We also asked whether the nurse practitioner had suggested seeking outside help, such as cleaning services, transportation services, meals on wheels, or something similar. Only 14 percent (n = 14) said that the nurse had made this type of recommendation at her last visit. Of those 14 people, 4 had followed her suggestion. Of the 10 people who did not follow the suggestion, half of them said they didn't follow the recommendation because they thought they didn't need to. Perhaps they did not perceive that it was a serious problem, or that the service would help.

This substudy indicates that participants do not have high levels of compliance with recommendations to increase use of community services. In part this may be due to a lack of confidence that the services will help them or that they are even needed.

#### **SUMMARY**

In summary, in this section I tested whether an in-home preventive intervention can change the level of social support and the size of the social network after one year. I found that people in the intervention group did not have levels of social support that differed meaningfully from those of the control group. Additionally, the intervention did not change the level of any of the components of social support (emotional support, instrumental support, informational support, positive interaction, or affection).

I also did not find any baseline characteristics that identify those for whom the intervention was most successful. However, I did find that people who say their health is worse than three months before and whose activities are limited by pain are most at risk of a large decrease in their levels of social support. Therefore, any intervention to change the level of social support should perhaps be directed at people like them.

With respect to changes in the size of the social network, I found that the intervention did not change the social network after the first year. The intervention was most successful in increasing the size of the social network for those who rated their health as better than three months before the baseline interview. Thus, to take advantage of the intervention's impact on social network, it appears that a person must be in relatively good health. I also found that those who are at greatest risk of a large decrease in the size of their social network are people who have had more falls recently. Evidently, this acts to isolate them, and subsequently they decrease the size of their social network.

Originally, I had hypothesized that a change in social support and social network would result in a change in health status and depression. Therefore, I tested whether the intervention had changed the level of health status and depression, and then what part of that change could be attributed to changes in social support and social network. I found that the intervention did not change health status or level of depression by a meaningful amount.

To investigate whether the lack of change in social support and social network could be explained by the lack of use of community services, I looked at the differences in use by the treatment and control groups. I found that although the treatment group used significantly more transportation services, meals-on-wheels, meals in a senior center, social programs, and SHPCC service, there was no correlation between use

and change in social support or social services. Additionally, although the nurse practitioner recommended use of community services to 30% of respondents, only 27% of those people complied with the recommendation. A majority of those who did not comply said it was because they didn't believe that the service would help them or that they needed it.

## 6. DISCUSSION

In this study, I find a significant positive association between social support and health status, and an even stronger negative association between social support and depression. In addition, I find that a community-based in-home intervention does not change the level of social support and subsequently improve the health of an older population. Given these results, this section will focus on explaining why I was unable to find a change in social support for those in the intervention group after one year.

### DIFFERENCES BETWEEN THIS STUDY AND HENDRIKSEN'S

Our community intervention was based, in part, upon the work of Hendriksen, Lund, and Stromgard (1984) in Denmark. In their three-year study, they evaluated the effect of preventive community measures for elderly people on mortality, number of admissions to hospitals and nursing homes, and number of contacts with general practitioners. They randomly assigned approximately 600 elderly Danes, aged 75 and over, to treatment and control groups. The project staff made visits every three months to the treatment group participants. During the visits, they discussed each older person's social and health conditions. When a need for a social or medical service was disclosed, the staff member would apply for and coordinate the community service. The assessment did not include clinical examinations.

At the end of three years, they found that preventive visits reduced mortality, the number of hospital admissions, and the number of bed days. They also noted that an effect was noticeable after the first year and a half.

In their article, Hendriksen and colleagues (1989) wrote, "The conditions causing the favorable results are considered to be a combination of:

- Increased confidence through contacts with professionals who could intervene if needed;
- Changed attitudes toward themselves - more active, less feeling old or sick; and
- Improved social network because of our visits and increased home help service."

In another article based on their study, Hendriksen (1986) outlines the methodological and practical experiences of the study, in order to facilitate the planning and accomplishment of future intervention studies. In that article, he wrote, "Each of the interviewers ... visited the same part (sic) of the participants of the intervention group over the three years, in order to establish a high degree of knowledge and confidence of one another ... It was important that our efforts were based on a human relationship..."

These comments indicate Hendriksen's belief that the success of the intervention was due, in part, to the social support provided by the project staff member. However, although I found a relationship between social support and health in our study, I did not find that those people in the intervention group had a change in their social support. I can hypothesize several potential explanations for the null result:

- The intervention will affect social support in the long term, but not in the first year;
- Our study will not show the same results as Hendriksen's at the end of three years;
- Hendriksen was wrong about the importance of social support;
- We are affecting changes in social support, but our measures are not accurate enough to pick up those changes;
- Our study was too medically oriented;
- The staff fluctuations in our study adversely affected the relationship between GNP and participants;

- American social services are inadequate to improve social support; and/or
- American elderly are different enough from Danish elderly that we cannot make changes in their social support.

In what follows, I will discuss these various explanations and their policy implications.

#### **POTENTIAL EXPLANATIONS FOR THE NULL RESULT**

First, because preventive interventions tend to show their effects in the long term, the full study is based over a three-year period. Like other preventive measures, perhaps changes in social support will occur, but not after the first year. Thus, perhaps I found no change in social support after one year because it was not a long enough period of time to see any changes. Hendriksen noted that they began to see an effect from the intervention after one and a half years.

Second, we might hypothesize that our study will not show the same positive results found by Hendriksen. If so, this might explain why I found no change in social support. However, after one year, we found that the intervention group had used significantly fewer nursing home days, had higher levels of independence in the instrumental activities of daily living, and used health providers significantly more. These differences indicate the potential for significant differences in mortality and hospital admissions by the end of the full study. Therefore, it is premature to conclude that the null result in this sub-analysis is due to lack of the overall success of the intervention.

Third, to my knowledge, Hendriksen has never published a paper that specifically measures the impact of the intervention in terms of social support. Therefore, I must assume that his conclusions regarding social support are only anecdotal. If so, perhaps he is wrong in concluding that the social support aspect of the relationship was key to the changes he saw in his study. We might hypothesize that his success was

due instead to better networking of health and social services and had little to do with the social network.

Fourth, many scholars have bemoaned the problems of measuring social support. In fact, there is no consensus in the field on what exactly should be measured and how. Although I used state-of-the-art measures of social support, it is conceivable that they are not sufficiently refined to pick up modest changes. If this was true, then perhaps the intervention really did change social support, but I was unable to measure those changes.

Fifth, our intervention involved actual examination by the nurse practitioners, which was not formally done in the Hendriksen study. As discussed in Section 3, our intervention had a large clinical component. Although the gerontological nurse practitioners attended to social service needs, their primary orientation was medical. In part, this was a result of the American health care system. In Denmark, medical and social services for the elderly are almost totally financed by public taxes. Additionally, all citizens are registered with the municipal social welfare authorities, and physician and medical records were available to the investigators. In sharp contrast, in the United States, we have a mix of payers and providers. Because of the limited accessibility to community health and social services, our nurse practitioners played a more clinical role than did the Danish health team. For example, in our study, the nurse practitioners performed an extensive geriatric assessment. This information was then used as the basis for the intervention with that participant. In contrast, in Denmark, the staff member was able to field "complaints" and then interact within the Danish health and social service system. The principal investigators of our study determined that the fragmentation of the U.S. health system prevented our nurse practitioners from assuming the same role.

Additionally, we must acknowledge that the majority of the project staff had a clinical orientation. On a weekly basis, the gerontological nurse practitioners met with the project geriatricians to discuss cases. At least half of these discussions focused on the medical implications of the nurse's findings. Although the GNP's interacted with social workers, case managers, and psychologists in the community, none of these professions were represented at the weekly clinical meetings. Therefore, it is no surprise that the meetings tended to be clinical in nature. As a result, perhaps the clinical orientation made changes in social support unattainable.

Sixth, Hentriksen specifically noted the importance of establishing a long-term relationship with the elderly participant. He points out that each staff member saw the same person over the three-year period. In contrast, in our project, we have had difficulty with staff turnover. Since the GNP's began seeing participants in January 1989, we have lost three nurse practitioners. During the first year of the study, 23.5% of the treatment group saw only one nurse practitioner; however, 71.7% saw two GNP's, while 4.8% saw three different nurses. This inconsistency may affect the ability of the nurse and client to build a trusting and secure relationship.

Seventh, perhaps our social service system is to blame for the lack of change after one year. In contrast to the American system, the Danish social service system is publicly financed and institutionalized. Therefore, when the Danish staff identified problems, they could make referrals. Although by some standards Santa Monica is service-rich for older residents, anecdotally our GNP's report that they had difficulties finding appropriate referrals for services such as transportation needs and affordable short-term and ongoing help. Interestingly, in my cross-sectional analysis, I found that tangible support was the most important aspect of social support. If the GNP's feel that these services are inadequate, perhaps this explains the lack of change in social support.

Finally, if we do assume that Hendriksen is correct in believing that social support made a difference, then perhaps the lack of change in social support in my study is due to a difference between older Danes and elderly Americans. Perhaps the Danish elderly are more open to establishing a relationship with the project staff and more accepting of any suggestions. In contrast, perhaps our participants are less trusting of someone in their home and more independent in their approach, and thus less willing to accept the nurse practitioner's suggestions.

In conclusion, I am unable to explain why I did not see a change in social support after one year. It is most likely due to some combination of the factors I discussed above.

#### **POLICY IMPLICATIONS OF SOCIAL SUPPORT**

From my cross-sectional work, as well as the work of others in the field of social support, it seems clear that there is a relationship between better social support and larger social networks on the one hand and better general health on the other. However, little work in the field has focused on interventions that attempt to change levels of social support. Although some have been successful in convincing alcoholics to seek treatment (Logan, 1983), or in helping children to cope with divorce (Kessler and Bostwick, 1977), many of the studies are not well controlled or executed. In view of my negative results, one might question whether social support interventions are an effective mode of health promotion. Or more generally, should public policy be formed to encourage social support interventions?

When we consider what is relevant to public policy makers, we must look at outcomes that affect the cost and effectiveness of health care. For example, policy makers are not particularly interested if people with higher levels of social support are happier. However, they would be interested if social support affected outcomes such as health care costs, incidence of disease, mortality, and utilization of health care

services. Given the large current deficit and generally conservative attitude toward federal spending, policy makers are hesitant to implement policies that do not have a proven record of cost effectiveness.

In terms of social support and its future as a "policy lever," I must conclude somewhat pessimistically. Although it appears that social support is related to health, I would not recommend pursuing it as a potential policy alternative. Instead, I would argue that social support researchers should concentrate more work in the area of basic or applied research, in contrast to the field of policy research. For example, perhaps better measurement of social support would reveal more of its impact. Or perhaps controlled interventions in which social support is directly affected would provide more evidence as to the effects of social support.

In conclusion, I have shown that better social support and larger social networks are associated with better health in the elderly. The importance of attending to the personal relationship when delivering health care should not be underestimated. However, I must also conclude that changing the level of an older person's social support is not easy. I would recommend considering other styles of intervention that focus specifically on social support. It is too early to base public policy on the evidence of social support's effect on health.

APPENDIX A: QUESTIONNAIRE ITEMS USED IN CONSTRUCTING THE MAJOR STUDY VARIABLES

SOCIAL NETWORK

88. How many relatives do you see or hear from at least once a month?(IF APPROPRIATE: NOT COUNTING SPOUSE)

(NOTE: Include in-laws with relatives)

0 = ZERO	3 = THREE OR FOUR
1 = ONE	4 = FIVE TO EIGHT
2 = TWO	5 = NINE OR MORE

89. Tell me about the relative with whom you have the most contact. How often do you see or hear from that person?

0 = < MONTHLY	3 = WEEKLY
1 = MONTHLY	4 = A FEW TIMES A WEEK
2 = A FEW TIMES A MONTH	5 = DAILY

90. How many relatives do you feel close to? That is, how many of them do you feel at ease with, can talk to about private matters, or can call on for help?

0 = ZERO	3 = THREE OR FOUR
1 = ONE	4 = FIVE TO EIGHT
2 = TWO	5 = NINE OR MORE

91. Do you have any close friends? That is, do you have any friends with whom you feel at ease, can talk to about private matters, or can call on for help? If so, how many?(IF APPROPRIATE: INCLUDE SPOUSE HERE)

0    1    2    3    4    5    6 or more

92. How many of these friends do you see or hear from at least once a month?

- |          |                   |
|----------|-------------------|
| 0 = ZERO | 3 = THREE OR FOUR |
| 1 = ONE  | 4 = FIVE TO EIGHT |
| 2 = TWO  | 5 = NINE OR MORE  |

93. Tell me about the friend with whom you have the most contact. How often do you see or hear from that person?

- |                         |                        |
|-------------------------|------------------------|
| 0 = < MONTHLY           | 3 = WEEKLY             |
| 1 = MONTHLY             | 4 = A FEW TIMES A WEEK |
| 2 = A FEW TIMES A MONTH | 5 = DAILY              |

94. When you have an important decision to make, do you have someone you can talk to about it?

- |        |       |       |           |        |       |
|--------|-------|-------|-----------|--------|-------|
|        | Very  |       |           |        |       |
| Always | Often | Often | Sometimes | Seldom | Never |
| 5      | 4     | 3     | 2         | 1      | 0     |

95. When other people you know have an important decision to make, do they talk to you about it?

- |        |       |       |           |        |       |
|--------|-------|-------|-----------|--------|-------|
|        | Very  |       |           |        |       |
| Always | Often | Often | Sometimes | Seldom | Never |
| 5      | 4     | 3     | 2         | 1      | 0     |

96.1. Does anybody rely on you to do something for them each day? For example: shopping, cooking dinner, doing repairs, cleaning house, providing child care etc.

NO—IF NO, GO ON TO 96.2

YES—IF YES SKIP TO 97

96.2. Do you help anybody with things like shopping, filling out forms, doing repairs, providing child care, etc.

- |       |       |           |        |       |
|-------|-------|-----------|--------|-------|
| Very  |       |           |        |       |
| Often | Often | Sometimes | Seldom | Never |
| 4     | 3     | 2         | 1      | 0     |

5. Who lives with you?

- a. HUSBAND/WIFE
- b. NO ONE
- c. FRIEND(S)
- d. HUSBAND/WIFE AND OTHERS
- e. OTHER RELATIVE OR FRIEND AND OTHERS
- f. OTHER RELATIVE(S)
- g. NON-RELATED PAID HELPER ONLY

## SOCIAL SUPPORT

97. Would you say you have someone to help you if you were confined to bed..
- a. none of the time
  - b. a little of the time
  - c. some of the time
  - d. most of the time
  - e. all of the time
98. Would you say you have someone to take you to the doctor if you needed it..
- a. NONE OF THE TIME
  - b. A LITTLE OF THE TIME
  - c. SOME OF THE TIME
  - d. MOST OF THE TIME
  - e. ALL OF THE TIME
99. Would you say you have someone to share your most private worries and fears with..
- a. NONE OF THE TIME
  - b. A LITTLE OF THE TIME
  - c. SOME OF THE TIME
  - d. MOST OF THE TIME
  - e. ALL OF THE TIME

100. Would you say you have someone to turn to for suggestions about how deal with a personal problem..

- a. NONE OF THE TIME
- b. A LITTLE OF THE TIME
- c. SOME OF THE TIME
- d. MOST OF THE TIME
- e. ALL OF THE TIME

101. Would you say you have someone to do something enjoyable with...

- a. NONE OF THE TIME
- b. A LITTLE OF THE TIME
- c. SOME OF THE TIME
- d. MOST OF THE TIME
- e. ALL OF THE TIME

102. Would you say you have someone to love and make you feel wanted

- a. NONE OF THE TIME
- b. A LITTLE OF THE TIME
- c. SOME OF THE TIME
- d. MOST OF THE TIME
- e. ALL OF THE TIME

**HEALTH STATUS**

17. In general, would you say your health is:

- a. excellent
- b. very good
- c. good
- d. fair
- e. poor

## DEPRESSION

- 
- |   |     |    |
|---|-----|----|
| 133. Are you basically satisfied with your life?                                | YES | NO |
| 134. Have you dropped many of your activities and interests?                    | YES | NO |
| 135. Do you feel that your life is empty?                                       | YES | NO |
| 136. Do you often get bored?  | YES | NO |
| 137. Are you in good spirits most of the time?                                  | YES | NO |
| 138. Are you afraid that something bad is going to happen to you?               | YES | NO |
| 139. Do you feel happy most of the time?  | YES | NO |
| 140. Do you often feel helpless?  | YES | NO |
| 141. Do you prefer to stay at home, rather than going out and doing new things? | YES | NO |
| 142. Do you feel you have more problems with memory than most?                  | YES | NO |
| 143. Do you think it is wonderful to be alive now?                              | YES | NO |
| 144. Do you feel pretty worthless the way you are now?                          | YES | NO |
| 145. Do you feel full of energy?  | YES | NO |
| 146. Do you feel that your situation is hopeless?                               | YES | NO |
| 147. Do you think that most people are better off than you are?                 | YES | NO |

QUALITY OF LIFE

122. I move around my living quarters as I feel is necessary.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

123. I move around my community as I feel is necessary.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

124. I am able to take trips out of town as I feel necessary.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

125. I am comfortable with how my self care needs (dressing, eating, toileting, bathing) are met.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

126. I spend most of my days occupied in a work activity that is necessary or important to me. (Activity could be paid employment, housework, volunteer work, school, etc.)

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

127. I am able to participate in recreational activities (hobbies, crafts, sports, reading, television, games, computers, etc.) as I want to.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

128. I participate in social activities with my family, friends or acquaintances as is necessary or desirable to me.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

129. I assume a role in my family which meets my needs and those of other family members. (Family means people with whom you live and/or relatives with whom you don't live but see on a regular basis).

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

130. In general, I am comfortable with my personal relationships.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

131. In general, I am comfortable with myself when I am in the company of others.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

132. I feel that I can deal with life events as they happen.

1 2 3 4 5 6 7 8 9 10

---

doesn't  
describe  
my situation

fully  
describes  
my situation

### ABILITY TO COPE

156. Do you have the feeling that you don't really care about what goes on around you?

1	2	3	4	5	6	7
very seldom or never						very often

157. Has it happened in the past that you were surprised by the behavior of people whom you thought you knew well?

1	2	3	4	5	6	7
never happened						always happened

158. Has it happened that people whom you counted on disappointed you?

1	2	3	4	5	6	7
never happened						always happened

159. Until now your life has had:

1	2	3	4	5	6	7
no clear goals or purpose at all						very clear goals and purposeful

160. Do you have the feeling that you're being treated unfairly?

1	2	3	4	5	6	7
very often						very seldom or never

161. Do you have the feeling that you are in an unfamiliar situation and don't know what to do?

1	2	3	4	5	6	7
very often						very seldom or never

162. Doing the things you do every day is:

1	2	3	4	5	6	7
a source of deep pleasure and satisfaction				a source of pain and boredom		

163. Do you have very mixed-up feelings and ideas?

1	2	3	4	5	6	7
very often				very seldom or never		

164. Does it happen that you have feelings inside you would rather not feel?

1	2	3	4	5	6	7
very often				very seldom or never		

165. Many people—even those with a strong character—sometimes feel like sad sacks (losers) in certain situations. How often have you felt this way in the past?

1	2	3	4	5	6	7
never				very often		

166. When something happened, have you generally found that:

1	2	3	4	5	6	7
you overestimated or underestimated its importance				you saw things in the right proportion		

167. How often do you have the feeling that there's little meaning in the things you do in your daily life?

1	2	3	4	5	6	7
very often				very seldom or never		

168. How often do you have feelings that you're not sure you can keep under control?

1	2	3	4	5	6	7
very often				very seldom or never		

## INSTRUMENTAL ACTIVITIES OF DAILY LIVING

103. Do you use the telephone:

- a. Without help (including looking up numbers & dialing)
- b. With some help (answer phone, dial operator in an emergency, but have a special phone or help in getting a number or dialing, or use a special device)
- c. Don't use the telephone at all?

104. Do you get to places out of walking distance:

- a. Without help (travel alone on buses, taxis, or drive your own car),
- b. With some help (have someone to help you or accompany you)
- c. Don't go at all (unless arrangements are made for a specialized vehicle like an ambulance)?

105. Do you go shopping for groceries:

- a. Without help  
(take care of all shopping needs yourself)
- b. With some help (have someone to go with you on all shopping trips or,
- c. Don't shop for groceries at all?

106. Do you prepare your own meals:

- a. Without help (plan and cook full meals)
- b. With some help (prepare some things but don't cook full meals yourself)
- c. don't fix any meals at all

107. Do you do your own housework:

- a. Without help  
(do heavy housework, scrub floors, etc).
- b. With some help (do light housework but have help  
with heavy work)
- c. Don't do housework at all

108. Do you do your own handyman work:

- a. Without help
- b. With some help (do some things, not others)
- c. Don't do handyman work at all

109. Do you do your own laundry:

- a. Without help (take care of all laundry or all  
except sheets and towels),
- b. With some help
- c. Don't do any laundry at all?

110. Do you take any medicines or use  
any medications:

YES NO

110.1 (IF YES), Do you take your own medicine:

- a. Without help (in the right doses at the right time)
- b. With some help (take medicine if someone prepares  
it for you and/or reminds you to take it)
- c. Completely unable to take your own medicines?

111. Do you manage your own money

- a. without help (write checks, pay bills, etc.)
- b. with some help (manage day-to-day buying but have some  
help with your checkbook and paying bills), or
- c. don't you handle money at all (no day-to-day buying)?

**INCOME**

149. Please tell me or point to the letter on this card that describes your total income last year that you (and your wife/husband) received from all sources. Be sure to include social security, SSI, pensions, support from children or family, bank interest, reparations, annuities, and so forth. (HAND CARD)

(SHOW CARD A TO SINGLE Ss, CARD B TO MARRIED Ss; CIRCLE NUMBER OF ANSWER.)

- | 149.1  | 149.2  |
|--|--|
| A: SINGLE PERSON--PER YEAR<br>(divorced, widowed,<br>separated, never married) | B. MARRIED PERSON--PER YEAR<br>(even if spouse lives else-<br>where, i.e., nursing home) |
| A. Under 5,500   | A. Under 7,500   |
| B. 5,500 - 6,999   | B. 7,500 - 8,999   |
| C. 7,000 - 8,999   | C. 9,000 - 10,999  |
| D. 9,000 - 10,999  | D. 11,000 - 12,999   |
| E. 11,000 - 14,999   | E. 13,000 - 15,999   |
| F. 15,000 - 19,999   | F. 16,000 - 19,999   |
| G. 20,000 - 29,999   | G. 20,000 - 29,999   |
| H. 30,000 - 39,999   | H. 30,000 - 39,999   |
| I. 40,000 or more<br>DK/REFUSED  | I. 40,000 or more  |

APPENDIX B: QUESTIONNAIRE ITEMS USED IN COMPLIANCE INTERVIEW

9a. At this visit, did \_\_\_\_\_(GNP's name) suggest that you take advantage of a community service, such as support or social groups, Emeritus college classes, peer counseling or something similar?

- A) yes
- B) no
- <9) client doesn't know>

*if yes, go to question 9b*

*if no, go to question 10a*

*if doesn't know, go to question 10a*

9b. What exactly did she suggest?

suggestion1: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(category: \_\_\_\_\_)

suggestion 2: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(category: \_\_\_\_\_)

9.1c. Did you follow [this/\_\_\_\_\_ suggestion #1] suggestion?

- A) yes
- B) no
- C) partly
- <9) client doesn't know>

*if yes, skip question 9.1d*

*if no, go to question 9.1d, use "didn't follow"*

*if partly, go to question 9.1d, use "followed only in part"*

*if doesn't know, skip question 9.1d*

9.1d. Please tell me why you [didn't follow/followed only in part] [this/ \_\_\_\_\_ suggestion #1] suggestion.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(category: \_\_\_\_\_)

9.2c. Did you follow [this/\_\_\_\_suggestion #2] suggestion?

- A) yes
- B) no
- C) partly
- <9) client doesn't know>

*if yes, skip question 9.2d*

*if no, go to question 9.2d, use "didn't follow"*

*if partly, go to question 9.2d, use "followed only in part"*

*if doesn't know, skip question 9.2d*

9.2d. Please tell me why you [didn't follow/followed only in part]  
[this/\_\_\_\_ suggestion #2] suggestion.

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(category: \_\_\_\_)

10a. At this visit, did \_\_\_\_\_ (GNP's name) suggest that you seek outside help, such as cleaning services, transportation services, meals on wheels or something similar?

- A) yes
- B) no
- <9) client doesn't know>

*if yes, go to question 10b*

*if no, go to question 11a*

*if doesn't know, go to question 11a*

10b. What exactly did she suggest?

suggestion1: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(category: \_\_\_\_\_)

suggestion 2: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(category: \_\_\_\_\_)

10.1c. Did you follow [this/\_\_\_\_\_ suggestion #1] suggestion?

- A) yes
- B) no
- C) partly
- <9) client doesn't know>

*if yes, skip question 10.1d*

*if no, go to question 10.1d, use "didn't follow"*

*if partly, go to question 10.1d, use "followed only in part"*

*if doesn't know, skip question 10.1d*

10.1d. Please tell me why you [didn't follow/followed in part] [this/\_\_\_\_\_ suggestion #1] suggestion.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(category: \_\_\_\_\_)

10.2c. Did you follow [this/\_\_\_\_suggestion #2] suggestion?

A) yes

B) no

C) partly

<9) client doesn't know>

*if yes, skip question 10.2d*

*if no, go to question 10.2d, use "didn't follow"*

*if partly, go to question 10.2d, use "followed only in part"*

*if doesn't know, skip question 10.2d*

10.2d. Please tell me why you [didn't follow/followed in part]  
[this/\_\_\_\_suggestion #2] suggestion.

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(category: \_\_\_\_\_)

**BIBLIOGRAPHY**

- Alloway R. and P. Bebbington, "The Buffer Theory of Social Support - A Review of the Literature," *Psychological Medicine*, 17, 1987.
- Andersen R. and J.F. Newman, "Societal and Individual Determinants of Medical Care Utilization in the United States," *Milbank Memorial Fund Quarterly*, 51(1), 1973.
- Antonovsky A., *Unraveling the Mystery of Health: How People Manage Stress and Stay Well*, Jossey-Bass Publishers, San Francisco, 1987.
- Antonucci T.C. and H. Akiyama, "Social Networks in Adult Life and a Preliminary Examination of the Convoy Model," *Journal of Gerontology*, 42(5), 1987.
- Arling G., "Interaction Effects in a Multivariate Model of Physician Visits by Older People," *Medical Care*, 23(4), 1985.
- Asher C.C., "The Impact of Social Support Networks on Adult Health," *Medical Care*, 22(4), April 1984.
- Baldassare M., Rosenfield S., and K. Rook, "The Types of Social Relations Predicting Elderly Well-Being," *Research on Aging*, 6(4), 1984.
- Barrera M., "Distinctions Between Social Support Concepts, Measures and Models," *American Journal of Community Psychology*, 14(4), 1986.
- Barresi C.M., K.F. Ferraro, and L.L. Hobey, "Environmental Satisfaction, Sociability, and Well-Being Among Urban Elderly," *International Journal of Aging and Human Development*, 18(4), 1983 - 84.
- Becker M.H. and L.A. Maiman, "Strategies for Enhancing Patient Compliance," *Journal of Community Health*, 6(2), 1980.
- Berkanovic E., C. Telesky, and S. Reeder, "Structural and Social Psychological Factors in the Decision to Seek Medical Care for Symptoms," *Medical Care*, 19(7), 1981.
- Berkman L.F., "Assessing the Physical Effects of Social Networks and Social Support," *Annual Review of Public Health*, 5, 1984.
- Berkman L.F., "Maintenance of Health, Prevention of Disease, A Psychosocial Perspective," *Vital Health Statistics*, 4(24), DHHS Publication (PHS) 89-1488, 1988.

- Berkman L.F. and S.L. Syme, "Social Networks, Host Resistance and Mortality: A Nine-Year Follow-up Study of Alameda County Residents," *American Journal of Epidemiology*, 109(2), 1979.
- Biegel D.E., "The Application of Network Theory and Research to the Field of Aging," in W.J. Sauer and R.T. Coward (eds.), *Social Support Networks and the Care of the Elderly*, Springer, New York, 1985.
- Blake R.L., M.E. Doyle, V.W. Straub, S.C. Zweig, E.E. Brent, S.R. Ingman, T.A. Vandiver, D. Glanz, and L.A. Macek, "A Randomized Controlled Evaluation of an Educational Program in Adults with High Psychosocial Risk of Morbidity," *Journal of Family Practice*, 24(4), 1987.
- Blazer D.G., "Social Support and Mortality in an Elderly Community Population," *American Journal of Epidemiology*, 115, 1982.
- Broadhead W.E., S.H. Gehlbach, F.V. DeGruy, and B.H. Kaplan, "Functional Versus Structural Social Support and Health Care Utilization in a Family Medicine Outpatient Practice," *Medical Care*, 27(3), 1989.
- Broadhead W.E., B.H. Kaplan, S.A. James, E.H. Wagner, V.J. Schoenbach, R. Grimson, S. Heyden, G. Tibblin, and S.H. Gehlbach, "The Epidemiological Evidence for a Relationship Between Social Support and Health," *American Journal of Epidemiology*, 117(5), 1983.
- Caplan R.D., E.A.R. Robinson, F.R.P. French, J.R. Caldwell, and M. Shinn, *Adhering to Medical Regimens: Pilot Experiments in Patient Education and Social Support*, University of Michigan, Ann Arbor, 1976.
- Cassel J., "The Contribution of the Social Environment to Host Resistance," *American Journal of Epidemiology*, 104(2), 1976.
- Cassileth B.R., E.J. Lusk, T.B. Stouse, D.S. Miller, L.L. Brown, P.A. Cross, and A.N. Tenaglia, "Psychosocial Correlates of Survival in Advanced Malignant Disease," *New England Journal of Medicine*, 312(24), 1985.
- Cobb S., "Social Support as a Moderator of Life Stress," *Psychosomatic Medicine*, 38(5), Sept-Oct 1976.
- Coe R.M., F.D. Wolinsky, D.K. Miller, and J.M. Prendergast, "Elderly Persons Without Family Support and Use of Health Services," *Research on Aging*, 7(4), 1985.
- Cohen S. and H. Hoberman, "Positive Events and Social Supports as Buffers of Life Change Stress," *Journal of Applied Social Psychology*, 13, 1983.

- Cohen S. and S.L. Syme, "The Study and Application of Social Support," in S. Cohen and S.L. Syme (eds.), *Social Support and Health*, Academic Press, Orlando, Florida, 1985.
- Cohen S. and T.A. Wills, "Stress, Social Support and the Buffering Hypothesis," *Psychological Bulletin*, 98(2), 1985.
- Conner K.A., E.A. Powers, and G.L. Bultena, "Social Interaction and Life Satisfaction: An Empirical Assessment of Late-Life Patterns," *Journal of Gerontology*, 34(1), 1979.
- Costa P.T., A.B. Zonderman, and R.R. McCrae, "Longitudinal Course of Social Support Among Men in the Baltimore Longitudinal Study of Aging," in I.G. Sarason and B.R. Sarason (eds.), *Social Support: Theory, Research and Applications*, Martinus Nijhoff Publishers, Boston, MA, 1985.
- Creedy R.F., W.E. Berg, and R. Wright, "Loneliness Among the Elderly: A Causal Approach," *Journal of Gerontology*, 40(4), 1985.
- Dean A., B. Kolody, and P. Wood, "Effects of Social Support from Various Sources on Depression in Elderly Persons," *Journal of Health and Social Behavior*, 31, 1990.
- DiMatteo M.R. and R. Hays, "Social Support and Serious Illness," in B. Gottlieb (ed.), *Social Networks and Social Support*, Sage Publications, Beverly Hills, 1981.
- DiMatteo M.R. and D.D. DiNicola, *Achieving Patient Compliance: The Psychology of the Medical Practitioner's Role*, New York, Pergamon Press, 1982.
- Dimond M., D.A. Lund, and M.S. Caserta, "The Role of Social Support in the First Two Years of Bereavement in an Elderly Sample," *Gerontologist*, 27(5), 1987.
- Donald C.A., "The Role of Social Supports and Life Stress Events in Use of Mental Health Services," PhD Dissertation, UCLA, 1986.
- Dowd J.J., "Aging as Exchange: A Preface To Theory," *Journal of Gerontology*, 30, 1975.
- Dowd J.J. and R. LaRossa, "Primary Group Contact and Elderly Morale: An Exchange/Power Analysis," *Sociology and Social Research*, 66(2), 1981.
- Dunbar J.M. and A.J. Stunkard, "Adherence to Diet and Drug Regimen," in R.I. Levy, B.M. Rifkind, et al. (eds.), *Nutrition, Lipids and Coronary Heart Disease: A Global View*, Vol. 1, Raven Press, New York, 1979.

- Frankel B.G. and S. Nuttall, "Illness Behavior: An Exploration of Determinants," *Social Science and Medicine* 19(2), 1984.
- Fuchs V.R., "Paying the Piper, Calling the Tune: Implications of Changes in Reimbursement," in *The Health Economy*, Howard University Press, Cambridge, Mass., 1986, pp. 332-356.
- Ganster D.C. and B. Victor, "The Impact of Social Support on Mental and Physical Health," *British Journal of Medical Psychology*, 61, 1988.
- Geersten R., M.R. Klauber, M. Rindflesh, R.L. Kane, and R. Gray, "A Re-examination of Suchman's Views on Social Factors in Health Care Utilization," *Journal of Health and Social Behavior*, 16, 1976.
- Gottlieb B.H., "Social Networks and Social Support: An Overview of Research, Practice and Policy Implications," *Health Education Quarterly*, 12(1), Spring, 1985.
- Gottlieb B.H., "Theory into Practice: Issues that Surface in Planning Interventions Which Mobilize Support," in I.G. Sarason and B.R. Sarason (eds.), *Social Support: Theory, Research and Applications*, Martinus Nijhoff, Boston, Massachusetts, 1985.
- Hendriksen C., E. Lund, and E. Stromgard, "Consequences of Assessment and Intervention Among Elderly People: A Three Year Randomized Controlled Trial," *British Medical Journal*, 289, 1984.
- Hendriksen C., "An Intervention Study Among Elderly People," *Scandinavian Journal of Primary Health Care*, 4, 1986.
- Hendriksen C., E. Lund, and E. Stromgard, "Hospitalization of Elderly People: A 3-Year Controlled Trial," *Journal of the American Geriatric Society*, 37(2), 1989.
- Henry J.P., "The Relation of Social to Biological Processes in Disease," *Social Science and Medicine*, 16, 1982.
- Ho S.C., S.P.B. Donnan, and A. Sham, "Psychosomatic Symptoms, Social Support and Self Worth Among Elderly in Hong Kong," *Journal of Epidemiology and Community Health*, 42, 1988.
- Homan S.M., C.C. Haddock, C.A. Winner, R.M. Coe, and F.D. Wolinsky, "Widowhood, Sex, Labor Force Participation, and the Use of Physician Services by Elderly Adults," *Journal of Gerontology*, 41(6), 1986.
- House J.S., C. Robbins, and H.L. Metzner, "The Association of Social Relationships and Activities with Mortality: Prospective Evidence From the Tecumseh Community Health Study," *American Journal of Epidemiology*, 116(1), 1982.

- Israel B.A., "Social Networks and Health Status: Linking Theory, Research and Practice," *Patient Counseling and Health Education*, 4(2), 1982.
- Jemmott J.B. and S.E. Locke, "Psychosocial Factors, Immunologic Mediation, and Human Susceptibility to Infectious Diseases: How Much Do We Know?," *Psychological Bulletin*, 95(1), 1984.
- Kahn R., A.I. Goldfarb, M. Pollack, and A. Peck, "Brief Objective Measures for the Determination of Mental Status in the Aged," *American Journal of Psychiatry*, 117, 1960.
- Kasl S.V. and L.F. Berkman, "Some Psychosocial Influences on the Health Status of the Elderly: The Perspectives of Social Epidemiology," in J.L. McGaugh and S.B. Kiesler (eds.), *Aging: Biology and Behavior*, Academic Press, New York, 1981.
- Kasper J.D., *Aging Alone: Profiles and Projections*, Commonwealth Fund Commission on Elderly People Living Alone, 1988.
- Kessler S. and S.H. Bostwick, "Beyond Divorce: Coping Skills for Children," *Journal of Clinical Child Psychology*, 6, 1977.
- Kiesler C.A., "Policy Implications of Social Support Research," in S. Cohen and S.L. Syme (eds.), *Social Support and Health*, Academic Press, Inc., Orlando Florida, 1985.
- Kivett V.R., "Discriminators of Loneliness Among the Rural Elderly: Implications for Intervention," *Gerontologist*, 19(1), 1979.
- Krause N., "Satisfaction with Social Support and Self-Rated Health in Older Adults," *Gerontologist*, 27(3), 1987.
- Krause N., "Stress and Social Isolation," *Journal of Gerontology: Social Sciences*, 46(4), 1991.
- Lawton M.P., M. Moss, M. Fulcomer, and M.H. Kleban, "A Research and Service Oriented Multilevel Assessment Instrument," *Journal of Gerontology*, 37(1), 1982.
- Letsch S.W., K.R. Levit, and D.R. Waldo, "National Health Expenditures, 1987," *Health Care Financing Review*, 10(2), Winter 1988.
- Levy R.L., "Social Support and Compliance: A Selective Review and Critique of Treatment Integrity and Outcome Measurement," *Social Science and Medicine*, 17(18), 1983.
- Lin N., A. Dean, and W.M. Ensel (eds.), *Social Support, Life Events, and Depression*, Academic Press, Orlando, 1986.

- Lin N., W.M. Ensel, R.S. Simoene, and W. Kuo, "Social Support, Stressful Life Events, and Illness: A Model and an Empirical Test," *Journal of Health and Social Behavior*, 20(2), 1979.
- Logan D.G., "Getting Alcoholics to Treatment by Social Network Intervention," *Hospital and Community Psychiatry*, 34, 1983.
- Lubben J., "Assessing Social Networks Among Elderly Population," *Family Community Health*, 11(3), 1988.
- Lubben J.E., P.G. Weiler, and I. Chi, "Health Practices of the Elderly Poor," *American Journal of Public Health*, 79(6), 1989.
- Mariono L.A., "Growth of the Medicare Population," *Health Care Financing Review*, 10(3), Spring 1989.
- McIntosh W.A., P.A. Shifflett, and J.S. Picou, "Social Support, Stressful Events, Strain, Dietary Intake, and the Elderly," *Medical Care*, 27(2), 1989.
- Mechanic D., "Illness Behavior, Social Adaptation, and the Management of Illness," *Journal of Nervous and Mental Disease*, 65(2), Aug. 1977.
- Mechanic D., "Correlates of Physician Utilization: Why Do Studies of Physician Utilization Find Trivial Psychosocial and Organizational Effects?" *Journal of Health and Social Behavior*, 20(1), 1979.
- Mermelstein R., S. Cohen, E. Lichenstein, J.S. Baer, and T. Kamarck, "Social Support and Smoking Cessation and Maintenance," *Journal of Consulting and Clinical Psychology*, 54(4), 1986.
- Morris J.N. and S. Sherwood, "Informal Support Resources for Vulnerable Elderly Persons: Can They Be Counted On, Why Do They Work?" *International Journal of Aging and Human Development*, 18(2), 1983-84.
- Orth-Gomer K. and J.V. Johnson, "Social Network Interaction and Mortality: A Six Year Follow-up Study of a Random Sample of the Swedish Population," *Journal of Chronic Diseases*, 40(10), 1987.
- Patrick D.L., M. Morgan, and J.R.H. Charlton, "Psychosocial Support and Change in the Health Status of Physically Disabled People," *Social Science and Medicine*, 22(10), 1986.
- Reed D., D. McGee, J. Cohen, K. Yano, S.L. Syme, and M. Feinleib, "Acculturation and Coronary Heart Disease Among Japanese Men Living in Hawaii," *American Journal of Epidemiology*, 115(6), 1982.
- Rundall T.G. and C. Evashwick, "Social Networks and Help-Seeking Among the Elderly," *Research on Aging*, 4(2), 1982.

- Salloway J.C. and P.B. Dillon, "A Comparison of Family Networks and Friend Networks," *Journal of Comparative Family Studies*, 4, 1973.
- Seeman T.E. and L.F. Berkman, "Structural Characteristics of Social Networks and Their Relationship with Social Support in the Elderly: Who Provides Support?" *Social Science and Medicine*, 26(7), 1988.
- Seeman M., T. Seeman, and M. Sayles, "Social Networks and Health Status: A Longitudinal Analysis," *Social Psychology Quarterly*, 48(3), 1985.
- Sheikh J.I. and J.A. Yesavage, "Geriatric Depression Scale (GDS): Recent Evidence and Development of a Shorter Version," *Clinical Gerontologist*, 5(1/2), 1986.
- Sherbourne C.D. and A.L. Stewart, "The Medical Outcome Study Social Support Survey: Reliability and Validity in a Patient Population," *RAND*, WD-3356-RWJ/HJK/PCT, March 1989.
- Steinkamp M.W. and J.R. Kelly, "Social Integration, Leisure Activity, and Life Satisfaction in Older Adults: Activity Theory Revisited," *International Journal of Aging and Human Development*, 25(4), 1987.
- Stoller E.P. and L.L. Earl, "Help with Activities of Everyday Life: Sources of Support for the Noninstitutionalized Elderly," *Gerontologist*, 23(1), 1983.
- Suchman E., "Social Patterns of Illness and Medical Care," *Journal of Health and Human Behavior*, 6 (Spring), 1965.
- Tessler R., D. Mechanic, and M. Dimond, "The Effect of Psychological Distress on Physician Utilization: A Prospective Study," *Journal of Health and Social Behavior*, 17, 1976.
- Thomas P.D., J.M. Goodwin, and J.S. Goodwin, "Effect of Social Support on Stress-Related Changes in Cholesterol Level, Uric Acid Level, and Immune Function in an Elderly Sample," *American Journal of Psychiatry*, 142(6), June 1985.
- U.S. Senate Special Committee on Aging, *Aging America: Trends and Projections*, U.S. Department of Health and Human Services, Washington, D.C., 1985.
- U.S. Bureau of the Census, *Current Population Reports, Series P-20, No. 440, Voting and Registration in the Election of November 1988*, U.S. Government Printing Office, Washington, D.C., 1989.
- Vetter N.J. et al., "Effect of Health Visitors Working with Elderly Patients in General Practice: A Randomized Controlled Trial," *British Medical Journal*, 288, 1984.

- Waldo D.R., S.T. Sonnefeld, D.R. McKusick, and R.H. Arnett, "Health Expenditures by Age Group, 1977 and 1987," *Health Care Financing Review*, 10(4), Summer 1989.
- Wallston B.S., S.W. Alagna, B.M. DeVillis, and R.F. DeVillis, "Social Support and Physical Health," *Health Psychology*, 2(4), 1983.
- Wan T.T.H. and B.G. Odell, "Major Role Losses and Social Participation of Older Males," *Research on Aging*, 5(2), 1983.
- Wan T.T.H. and W.G. Weissert, "Social Support Networks, Patient Status, and Institutionalization," *Research on Aging*, 3(2), 1981.
- Ward R.A., S.R. Sherman, and M. LaGory, "Subjective Network Assessments and Subjective Well-Being," *Journal of Gerontology*, 39(1), 1984.
- Williams A.W., J.E. Ware, and C.A. Donald, "A Model of Mental Health, Life Events, and Social Supports Applicable to General Populations," *Journal of Health and Social Behavior*, 22(4), 1981.
- Wood-Duaphinee S.L. and J.I. Williams, "Reintegration to Normal Living as a Proxy to Quality of Life," *Journal of Chronic Disability*, 40(6), 1987.
- Wortman C.B. and C. Dunkel-Schetter, "Conceptual and Methodological Issues in the Study of Social Support." in A. Baum, S. Taylor, and J.E. Singer (eds.), *Handbook of Psychology and Health* (Vol. 5), Erlbaum, Hillsdale, NJ, 1987.