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**FRAIL ELDERLY HOME CARE CLIENTS:
THE EFFECTS AND EXPENSE OF ADDING NURSING HEALTH
PROMOTION AND PREVENTIVE CARE
TO PERSONAL SUPPORT SERVICES**

By

MAUREEN MARKLE-REID, RN, B.Sc.N, M.Sc.N

A Thesis

Submitted to the School of Graduate Studies

in Partial Fulfillment of the Requirements

for the Degree

Doctor of Philosophy

McMaster University

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**NURSING HEALTH PROMOTION FOR
FRAIL ELDERLY HOME CARE CLIENTS**

DOCTOR OF PHILOSOPHY (2002)
(Clinical Health Sciences - Nursing)

McMaster University
Hamilton, Ontario

TITLE: Frail Elderly Home Care Clients: the Effects and Expense of Adding Nursing
Health Promotion and Preventive Care to Personal Support Services

AUTHOR: Maureen Markle-Reid, B.Sc.N. (McMaster University), M.Sc.N. (University
of Toronto)

SUPERVISOR: Dr. Gina Browne

NUMBER OF PAGES: xxii, 273 (+ appendices)

ABSTRACT

Objectives:

- Develop, implement and evaluate a new model for delivering services to frail seniors, focussing on health promotion and preventive care provided by a Registered Nurse within the context of home care services.
- Provide information on the health outcomes and costs associated with existing policies regarding the provision of preventive home care services for frail seniors living at home.
- Provide scientific support for the role of a Registered Nurse in health promotion and preventive care within the context of home care services.

Intervention: Proactive health promotion and preventive care provided by a Registered Nurse for frail elderly home care clients eligible for personal support services. The intervention consisted of a minimum of one contact (primarily home visits) per month by an RN over a 6-month period.

Research Design: Randomized controlled trial with baseline (pre-randomization) and 6 month follow-up and outcome assessment.

Sample and Setting: 94 individuals (44 experimental, 50 controls) 75 years and older newly referred to and eligible for personal support services through a home care programme in Southern Ontario, Canada.

Results: Clinically and statistically significant improvements in physical and mental health functioning and increased level of perceived social support for clients was associated with the study intervention at no additional expense from a societal perspective. There was an economically important difference in the use of acute hospitalization in the intervention group compared to usual care which translates into an annual cost saving of \$200,879 within 1 year for every 100 elderly home care clients.

Implications: Under the current home care delivery system, this study demonstrates that it is more effective and no more expensive to provide proactive RN health promotion to a general population of frail seniors than to provide professional services on a reactive and piecemeal basis.

ACKNOWLEDGEMENTS

The following persons have my deepest respect and thanks:

Dr. Gina Browne – my thesis supervisor- for her mentorship and caring. She has never failed to give support and to exhibit concern for my professional growth and welfare. Over the years, our discussions, interactions, and work on various research projects sowed the seeds, which culminated in the birth of this project. Her wisdom and enthusiasm for research has had a profound impact on my thinking and choice of career.

My thesis committee members:

Dr. Robin Weir – a warm, caring and inspirational guide and coach. I offer my sincere thanks to her for the encouragement and support she provided me in my application to the Ph.D. programme. She has a profound ability and enthusiasm for education and research and a commitment to excellence in clinical practice. Her impact on my thinking has, through the years, been substantial.

Professor Jacqueline Roberts – teacher extraordinaire- for giving me the opportunity to grow and learn through work on various research projects even before I embarked on the thesis journey. These experiences were invaluable and had more impact on my learning than I can describe. Her openness and willingness to help me learn has energized and inspired me as an educator to achieve the same.

Dr. Amiram Gafni – for introducing me to the field of health economics and for helping me see beyond the obvious. I am very appreciative of the support and excellent suggestions he consistently provided, which made a great deal of difference in the finished text.

Sandra Henderson – the Executive Director of the Community Care Access Centre of Halton and administrator supreme – for her vision, leadership and enthusiasm for this project. Her commitment to the project was exemplary and the key to its success.

I offer my deepest thanks and appreciation to the staff at the Community Care Access Centre of Halton and the many clients and their families who so willingly gave their time to participate in the study.

I also offer my deepest thanks and appreciation to the highly skilled and dedicated Registered Nurses from the Victorian Order of Nurses, Halton Branch and SEN Community Health Care who provided the study intervention.

Maria Wong for her care and expertise in assisting me with the statistical analysis. Karen Auld and Karen Henderson for their expertise and dedication to the study as the project coordinators and all of the other dedicated staff in the McMaster University System-Linked Research Unit.

The Canadian Health Services Research Foundation, the Ministry of Health and Long-Term Care, the Community Care Access Centre of Halton, and the McMaster University, System-Linked Research Unit for their financial support and in-kind contributions to this study.

David Reid – my loving husband and friend – for encouraging me to pursue my dreams and for selflessly supporting me as I pursued my studies even though it cost us much of our time together.

Matthew and Michael Reid – my loving children- for their love and support and for being so understanding when I needed to sacrifice family time to complete my work.

William and Frances Markle – my mother and father – for their love and encouragement and for always being there to help when it was needed the most.

Maureen Markle-Reid

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LIST OF ABBREVIATIONS

CCAC	Community Care Access Centre
RN	Registered Nurse
PSW	Personal Support Worker
CES-D	Centre for Epidemiologic Studies Depression Scale
SPMSQ	Short Portable Mental Status Questionnaire
MOS-SF-36	Medical Outcome Study Short Form 36
PCS	Physical Component Summary
MCS	Mental Component Summary
PRQ85	Personal Resource Questionnaire
ANOVA	Analysis of Variance
ANCOVA	Analysis of Covariance

CHAPTER 1:
THE PROBLEM OF FRAILTY: EMPIRICAL ASPECTS

Introduction

Budget constraints, technological advances and a growing elderly population have led to major health care reforms across Canada. The result is fewer acute care hospitals and increasing pressure on community based services¹. It has also led to increased debate about the reorganization of care and the allocation of health care resources² (Bergman et al., 1997). For Canadian home care programmes, these changes have resulted in substantial increases in home care expenditures and the provision of care to older, more vulnerable, and frail individuals (Canadian Home Care Association (CHCA), 1999). Managers and policy makers alike face questions about the appropriate allocation of home care services and the mix of providers needed in this more community based and less hospital-oriented system.

Home care is defined as “an array of services enabling Canadians, incapacitated in whole or in part, to live at home, often with the effect of preventing, delaying or substituting for long-term care or acute care alternatives” (Health Canada, 1999, p. 10). In this paper, the term home care programme is used to mean the provision of case management, nursing, personal care, home support (or homemaking), occupational therapy and physiotherapy through community based agencies (MacAdam, 2000). Home care can be segmented into three distinct functions:

- “a substitution function for other more costly services such as hospitals and long-term care facilities”;
- “a maintenance function which allows clients to remain in the current environment rather than moving to a new and often more costly venue”;
- “a preventive function which invests in client service and monitoring at additional short-run, but lower long-run costs” (CHCA, 1999, p. 2).

This study focussed on evaluation of the preventive function of home care within a Canadian context.

While there is much potential for home care services to play a major role in the management of community care for frail older adults, there are a number of important issues that need to be addressed. Canada does not have a national home care programme, nor are public home care services covered under the principles of the Canada Health Act (MacAdam, 2000), which ensures equal access and public funding (CHCA, 1999). In the absence of a national standard of guaranteed home care services, home care policies, services and their delivery vary greatly within and between provinces/territories across the country (CHCA; Coyte & Young, 1999; MacAdam). Decisions regarding the allocation of home care resources are largely driven by fiscal and demographic principles. These economically driven policies have not been well tested in terms of their impact on health outcomes or changes in real costs (Ontario Ministry of Health (OMH), 1993).

There is a general lack of evidence to support administrative and policy decisions regarding the prioritization and allocation of home care services to reduce health care expenditures in a Canadian context (Fassbender, 2000; Health Services Utilization and Research Commission (HSURC), 1996). Most of the studies and literature reviews on the cost-effectiveness of home care are American and focus on the substitution of home care for long-term care. Few studies have included both a strong research design, such as a randomized controlled trial, and a strong cost assessment (HSURC, 1996).

Over the past decade, in response to budget constraints and a growing elderly population, there has been a national trend toward reducing the extent to which maintenance and preventive home care functions are provided by Registered Nurses in favour of providing nursing services to those with acute care needs (i.e. substitution function) (Boyle, 2001; Canadian Nurses Association (CNA), 1998). Noteworthy, is that nursing is the service most frequently reported as being insufficiently provided by public home care programmes (Picard, 1999). For frail seniors with chronic needs, the result is a fragmented system of health care delivery characterized by the provision of reactive, on-demand, and isolated professional services rather than a proactive system of care (Browne et al., 1994).

Published evidence concludes that on-demand care is inadequate and that seniors who present later with problems require more costly resources such as hospitalization and long-term care placement (Browne et al., 1999; Kennie, 1986; Roos & Shapiro, 1981; Somers, 1984). Browne et al. (1999), in a review of 12 Randomized Controlled

Trials evaluating a community based approach to care in a Canadian setting found that for clients with multiple problems (such as the frail elderly) it is more expensive in the same year to not provide these clients with proactive and comprehensive preventive care and health promotion.

A recent policy statement issued by the Canadian Association of Gerontology (CAG) (2001, p. ii) recommended that a stronger emphasis be placed on both “individualized health promotion and preventive care than currently exists for seniors, and on the integration of health promotion with traditional illness-oriented care”. In a position paper for the Ontario Ministry of Health (OMH), the CNA (1998, p. 5) recommended a “national home care programme that provides an integrated continuum of services, including health promotion, preventive, curative, rehabilitation, and palliative services”.

Visiting nurses are well trained to provide preventive care³ and health promotion⁴ to frail, older adults. Health promotion and screening have typically been within the mandate of Public Health Nursing (PHN) who, in the past, paid periodic home visits to older persons. However, the number of preventive home visits conducted by both PHNs and Visiting Nurses has decreased over the past decade in favour of providing services to those with acute care needs. In the Province of Ontario, most health departments have reduced the time allotted to public health nurses for home visiting from a slight reduction to its elimination. Decision-makers of organizations may not value home visiting and, therefore, opt for elimination at the expense of managing and preventing exacerbations of chronic illness (Ciliska, Hayward, & Thomas, 1996).

Published evidence supports the effectiveness of home based health promotion and preventive care, when compared with standard care, for older adults. The literature suggests that in order to be effective, a preventive care and health promotion intervention must involve assessment or screening combined with regular home visits (Elkan et al., 2001; Jensen, 1997; Stuck, Egger, Hammer, Minder, & Beck, 2002; Stuck, Siu, Wieland, & Rubenstein, 1993b). However, the generalizability of the results is limited by the diversity of programme components, populations assessed, types of outcomes measured, and contexts (Stuck, Mayer-Oakes, Rubenstein, 1993a; Stuck et al., 1993b; Rubenstein, Stuck, Siu, & Wieland, 1991; Rubenstein & Stuck, 2001). In addition, the majority of studies focus on prevention of functional decline or disease specific preventive care, rather than health promotion.

Contextual variables are key variables to consider since models of health promotion and preventive care need to be developed in concert with local and regional resources. There is a dearth of evidence for health promotion and preventive care programmes in both a Canadian context and within the context of home care services. The generalizability of the results is also limited by the lack of research that documents fully the theoretical analysis underpinning the development, implementation, and evaluation of a health promotion and preventive care intervention (Green, 2000). Thus, there were several objectives of the study:

- Develop, implement, and evaluate a new model for delivering services to frail seniors living at home, focussing on home based health promotion and preventive care provided by a Registered Nurse within the context of home care services.
- Provide information on the health outcomes and costs associated with existing policies regarding the provision of maintenance and preventive home care services for frail seniors living at home.
- Provide scientific support for the role of a Registered Nurse in health promotion and preventive care within the context of home care services.
- Provide empirical support for a comprehensive theoretical approach to health promotion and preventive care within the context of home care services.

A randomized trial was used to evaluate two approaches to the promotion of health and prevention of decline in frail elderly seniors eligible for personal support services through a home care programme within the Province of Ontario, Canada. The treatment group received personal support services augmented by a 6-month home based health promotion and prevention care intervention by a Registered Nurse while a comparison group received personal support services under the existing model of service delivery. The groups were then compared on both the costs and the respective health outcomes of clients under each model.

The results of this study will make a national contribution to health care delivery reform by providing information to decision-makers that will guide resource allocation and service integration within a Canadian Home Care setting. The results will also have

implications for other chronic and vulnerable seniors living in the community by demonstrating that timely and proactive interventions by a Registered Nurse will help to identify unrecognized problems and individuals at increased risk, and to link identified clients to appropriate care. The study findings will also be of interest to other jurisdictions that are concerned about the growing cost of institutional care and quality-of-life issues for frail elderly seniors.

The Problem of Frailty

Since the 1930's there has been a steady increase in the proportion of older persons within the population. The proportion of Canadians 65 years and older will increase from around 12% in 1993 to roughly 16% by 2016. By the year 2041, seniors will account for 25% of the total population, e.g. one of every four Canadians (George, Norris, Nault, Loh, & Dai, 1994). Canadians aged 75 and older are the fastest growing segment of the population (Colin, 1999). As the senior population increases, there is an associated increase in the number of seniors living in the community with declining functional status (and declining activity limitations lasting at least 6 months) related to chronic debilitating conditions such as arthritis and dementia (Hum & Simpson, 2002; Lindsay, 1999). A recent Canadian study of community-dwelling people found that the annual incidence of functional decline among previously stable people aged 75 years and above was approximately 12% (Hebert, Brayne, & Spieghalter, 1997). The survey also showed a significant increase in disability with age.

There are many interacting factors to examine when addressing the issue of functional decline that are physical, psychological, social, political, and economic in nature. Physical disabilities include impairments of vision and hearing, cardiovascular disease, diabetes and arthritis (Hebert, 1997). A psychological factor associated with functional decline is depression or depressive symptoms. There is a higher prevalence of depression and depressive symptoms among elderly persons with functional limitations (Barusch, Rogers, & Abu-Bader, 1999). While these disabling conditions can be controlled by diet and/or medication, they tend to limit independence (Oktay, 1985), resulting in varying degrees of frailty among this population.

Functional decline is one of the major challenges to the health care system. The main reason for the admission of elderly persons to institutions and for the disproportionate use of health services by the aging population is the functional decline that accompanies aging (Creditor, 1993; Fried & Guralnik, 1997; Gutman, Milstein, Killam, Lewis, & Hollander, 1993; Hebert, 1997; Markle-Reid, Browne, & Roberts, 1998). There is a higher incidence of admission to hospital for people exhibiting a decline in functional status, independent of other characteristics (Hebert); also depression and depressive symptoms have been associated with increased risk of hospitalization and service utilization (Colenda, Trinkle, Hamer, & Jones, 1991; Saravay, Pollack, Steinberg, Weinschel, & Habert, 1996).

In 1994, Canadians over 65 years of age consumed 38.7% of the total national health expenditures (Health Canada, 1996). Hospitalization rates are substantially higher

among older seniors than younger seniors. In 1996-1997, the number of hospital visits for every 100,000 people aged 75 and over was over 70% higher than that among those aged 65 to 74. Older seniors also stay in hospital longer than the younger seniors do. The average length of stay per hospital visit among the over 75-age group is 21 days, versus 13 days for those in the 65 to 74 age group (Colin, 1999). As the population ages, these projections portend a rapid increase over time in hospital services utilization by the elderly (Desjardins, 1993).

Management of Frailty and Home Care Services:

The Need for this Study In a Canadian Context

The reduction of premature institutionalization and enabling older people to remain in their homes has become a major thrust of government policy for several decades as a strategy for reducing escalating health care costs (OMH, 1993; van Haastregt et al., 2000). As a result, the site of care for frail elderly people is being shifted from hospitals and institutions to the community (Aronson, 2002). Over the past decade in Canada, hospital beds have been reduced by 30%, nursing home beds by 11%, and ambulatory care has increased (Statistics Canada, 2000).

Home care has been promoted as a cost-effective substitute for acute and long-term care for the increasing proportion of frail elderly in the population (HSURC, 1996). The provincial government and district health boards have encouraged the shift to community care by more than doubling spending on home based services since 1991, to \$67- million. One in four home care clients now receives at home treatment, which might otherwise

have been provided in hospital, compared to one in ten in 1991 (HSURC, 1998). Nationally, governments spend \$2.5 billion a year on home care, about 4% of public health spending. Home care spending has increased at a rate of about 20% a year over the last two decades (Coyte & Young, 1999).

Seniors consume a large proportion of these home care resources in Canada. In 1994, Canadians over 65 years of age accounted for 64% of the total home-care expenditures (Health Canada, 1996). Home care service utilization increases with age. Less than 10% of the population aged 65 to 69 receive home care compared to 20% of those aged 80 to 84, and 37% of those aged 85 and older (Canadian Institute for Health Information (CIHI), 2000).

There are four basic models of publicly funded home care in Canada:

1. *Public-provider model*: Public employees deliver professional and home support services. Examples include Saskatchewan, Quebec, Prince Edward Island, Yukon, Northwest Territories and Nunavat.
2. *Public-professional and private home support model*: Public employees deliver all professional services. Home support services are contracted out (for-profit and not-for-profit agencies). Examples include New Brunswick, Newfoundland, British Columbia and Alberta.
3. *Mixed public-private model*: Public employees provide streamlining functions. Professional services are provided by a mix of public employees and contracting out

to private agencies. Home support services are contracted out (for-profit and not-for-profit agencies). Examples include Nova Scotia and Manitoba.

4. *Contractual model*: Publicly funded employees provide streamlining functions. A public authority contracts out professional and home support services to private agencies (for-profit and not-for-profit agencies), which provide the care to clients. This model reflects the Ontario model of home care as organized through its 43 Community Care Access Centres (CCAC's) (Anderson & Parent, 2000).

This study was conducted within a contractual model of home care within Southern Ontario as organized through the Community Care Access Centre (CCAC) of Halton. Community boards that are accountable through service agreements to the Ontario Ministry of Health and Long-Term Care (OMHLTC) manage the CCACs. Community Care Access Centre's coordinate access to homemaking, nursing, therapy and other services to people at home, as well as provide long-term care facility placement, and information and referral to other community services (Coyte & Young, 1999).

Preventive Function of Home Care

Over the past decade, in response to budget constraints and a growing elderly population, there has been a national trend toward reducing the extent to which maintenance and preventive functions are provided by Registered Nurses in favour of providing nursing services to those with acute care needs (Boyle, 2001; CNA, 1998). The beginning of this major change in policy in Ontario was the introduction of the integrated homemaking model of service delivery in the 1993/1994 fiscal year, that

decreased the utilization of registered nursing personnel and increased the utilization of unregulated health care providers⁵, such as personal support workers⁶. Its goal was to provide homemaking and personal support, by unregulated health care providers, to frail elderly persons who did not require professional home care services⁷. It was the first step away from the pure medical model of the Home Care Program (HCP) to a more integrated model that supported the health and social needs of the client (S. Shadwick, CCAC of Halton, personal communication, March 10, 2000). Since 1988, the Province of Ontario has more than doubled the hours of homemaking and personal support services for chronic patients⁸, such as the frail elderly, from 5.5 million to almost 13 million in 1996 (O'Brien-Pallas, Baumann, & Lochhass-Gerlach, 1998).

While there is much potential for this non-professional preventive and maintenance model of home care service delivery to reduce costs, the cost-effectiveness⁹ of this model has not been clearly demonstrated (Aronson & Neysmith, 1996; MacAdam, 2000). The few published Canadian studies, which have evaluated this model, are controversial and utilized weak retrospective study designs (HSURC, 2000; Hollander & Tessaro, 2001; Markle-Reid et al., 1998). Two of these studies reported that seniors receiving homemaking and personal support services are more likely to lose their independence (i.e. through hospitalization or long-term care placement) or die than those not receiving the support (HSURC; Markle-Reid et al.), and their average total health service costs were approximately triple those of non-recipients of this service (HSURC, 2000). In contrast, Hollander & Tessaro (2001) reported that people with low level needs, who

experienced reductions in homemaking and personal care services, had higher death rates, and were more likely to be admitted to an institution.

In summary, there are a number of issues that need to be addressed and a number of assumptions that need to be tested through further research that incorporates both a strong research design and a strong cost assessment. These issues include access to services (eligibility criteria), service capacity (funding), and service provision (assessment and case management).

Access to Services (Eligibility Criteria)

The Ontario home care programme has six general eligibility criteria for all persons applying for professional services or personal support services¹⁰. The criteria are designed to distinguish qualified from non-qualified persons – they are not intended to establish priorities among qualified persons - case managers are left to their own devices to determine how best to establish priorities within these general criteria (Carefoote, 1998). A recent report commissioned by the OMH found that patients get vastly different care depending on where they live in Ontario. The report noted that there are no specific laws governing the centres. As a result, there is no consistency across the province about who is eligible for nursing and personal support, how much care they get, or how it is provided (Boyle, 2001; Coyte & Young, 1999).

A recent report commissioned by the Canadian Mental Health Association (CMHA), addressed the issue of access to home care services for individuals with a serious mental illness, such as depression. The report suggests that “people with psychiatric or mental

illnesses rarely receive home care services unless they have a primary diagnosis of another (physical) illness or disability” (Parent, Anderson, & Neuwelt, 2000, p. 1).

However, the research suggests that the prevalence of depression among those receiving home care services is estimated to be between 26% and 44% - at least twice that among elderly people in general (Banerjee, 1993; Harrison, Savla, & Kaftez, 1990; Illife et al., 1993).

Service Capacity (Funding)

In response to economic constraints, the home care programmes are under increasing pressure to document the consequences or outcomes of the services that they provide. This information is needed to identify best practices, to identify strengths and weaknesses of particular service delivery models, and to demonstrate accountability for their performance (Richardson, 2000). Health care service providers are being asked to rationalize their activities and compete for scarce resources, while continuing to provide quality service (Raphael et al., 1995) and Canadians underutilize existing community based services (Wilkins & Park, 1998). The challenge is to ensure the “right” person provides the “right” services in the “right” amount at the “right” time. The redirection of Ontario’s long-term care system places increasing demands for evidence to justify the kinds of services provided for what need, by whom and at what cost. There is a need for scientific evidence to support administrative and policy decisions regarding the prioritization and allocation of home care services for individual clients, particularly in the current climate of acute resource constraints (Carefoote, 1998).

An assumption underlying the integrated homemaking model is that reducing access to professional nursing services saves the system money. Professional nursing care is more expensive than care provided by an unregulated health care provider. Conventional reasoning then follows that for every day personal support substitutes for or prevents professional nursing care, health care system costs are averted. Despite the intuitive appeal of such reasoning, there is no available evidence, which has supported this assumption. On the contrary, there is growing evidence in Ontario that underservicing vulnerable clients with piecemeal care is more expensive in the same year because people go into crisis and end up using more expensive services such as hospitalization (Browne et al., 1999; Browne et al., 2001b). “This experience with the acute care system often undermines chronically ill older persons’ self-confidence, and interest in and ability to participate in their own care. The result is often a vicious circle of reliance on institutionalized care” (McWilliam et al., 1997, p. 111).

Given the dearth of Canadian research evidence on the effectiveness and economics of home care services, questions remain about the most cost effective and beneficial mix of services for frail elderly home care clients.

Service Provision (Assessment and Case Management)

An assumption underlying the integrated homemaking model is that the frail elderly have stable and predictable health and support needs and outcomes that can be met primarily by a non-professional health care provider. In fact, frailty is not “*all-or-nothing*”, and, as the risk of frailty increases, the line between the at-risk state and

functional dependencies becomes blurred (Rockwood, Fox, Stolee, Robertson, & Beattie, 1994). In the CCAC of Halton, approximately 70% of the new referrals for homemaking and personal support services alone originate from an acute care hospital setting when the client is at greatest risk of functional decline (Hersch, Sommors, Olsen, Mullen, & Hutner Winograd, 1990). Markle-Reid et al. (1998) found that the fragile and dependent elderly clients who demonstrated a higher level of use of home care services, especially homemaking and personal support services, were at risk for acute hospitalization.

Multiple, interacting factors (physical, psychological, and social) determine the health needs of frail elderly people (Rockwood et al., 1994). Whereas registered nurses can perform “basic care” when needed, unregulated care providers can only perform a narrow range of procedures and have limits to their independent judgment and ability (Helt & Jelinek, 1988; Weir & Browne, 1989). Delays or errors in responding to the client’s changing health care needs increases both the potential for complications and the use of costly health care resources to address complications (CNA, 1998). “The introduction of new categories of health care workers should take place within a framework of integrated health human resource planning and the impact on client care should be evaluated” (CNA, p. 8).

Once eligible for home care services, an individual is assessed by a Case Manager¹¹ to determine the type and intensity of services required, given their specific needs. This initial assessment and ongoing reassessment and evaluation are critical as it defines what the programme is able to provide an individual. The decision is based on the

professional judgment of the case manager and the fiscal realities within which the case manager operates (Carefoote, 1998). However, given the high caseloads of home care clients, it is difficult for case managers to reassess and evaluate clients on a regular and timely basis. In the 1999-2000 fiscal year, the average CCAC case managers' caseload in this Southern Ontario region was 1:150 case managers to clients. Average caseloads consist of a variety of client types and service mixes including but not limited to frail elderly clients receiving homemaking and personal support services. The trend toward increasing acuity of home care clients combined with growing caseloads has resulted in prioritization of case management activities with acute care taking precedence over the management and prevention of exacerbations of chronic illness (Registered Nurses Association of Ontario (RNAO), 1999). As a result, the provision of case management and other professional services to the frail elderly, with chronic needs, are often provided on an on-demand basis (Pathy, Bayer, Harding, & Dibble, 1992).

In a review of the home care literature to determine the cost-effectiveness of home care, the HSURC (1996) proposed that it is the system of continuing care that is the important factor in reducing costs. The Canadian context of continuing care is "a system of service delivery which includes all of the services provided by long-term care, home care and home support" (Hollander, 1999, p. 8). This system requires case management, integrated management of service delivery with single entry (HSURC, 1996). However, the present structure and financing of segregated health services (institutional, community, and other sectors) leads to gaps, fragmentation and discontinuity of services

which interrupt the continuity of care and lead to reactive on-demand and isolated services, rather than a proactive system of care (Browne et al., 1994).

CHAPTER 2:
THE PROBLEM OF FRAILITY: THEORETICAL ASPECTS

The Concept of Frailty

While policy makers, practitioners and researchers have acknowledged that frailty is a major public health problem; there is substantial disagreement among these groups regarding definitions of frailty and the extent and scope of public and private responsibility in the prevention and management of frailty. This disparity in perspectives is reflected in the broad and fragmented body of literature that has addressed the concept of frailty in relation to the older adult (Canadian Study of Health and Aging (CSHA), 1999). Despite the dramatic increase in use of the term 'frailty' over the past two decades (Campbell & Buchner, 1997; Rockwood et al., 1994), there is a lack of consensus in the literature regarding its meaning and use, and no clear conceptual guidelines for establishing criteria to describe older adults as frail (Brown, Renwick, & Raphael, 1995; Campbell & Buchner; CSHA, 1999; Rockwood et al.). Is frailty a disease? OR Is frailty a part of aging? What does frailty look like? How is it defined, framed, and understood? What prompts a clinician to apply this label to some older adults and not to others (Gealey, 1997)? Finally, exactly how frail is frail (Woodhouse et al., 1997)?

A first step in addressing the problem of frailty is to better understand how to identify those who are frail (MacKnight, 1999). Eligibility for health care services as

well as decisions regarding the ability of an individual to remain in the community is often based on a definition of frailty (Cox, 1993). However, the components of frailty have not been sufficiently defined to identify a population at risk or in need of proactive interventions (Campbell & Buchner, 1997). A common meaning of frailty can inform policy decisions regarding the allocation of, and eligibility for, health care resources among the elderly population. A common yet comprehensive meaning will also legitimize and provide insight into the unique and complex needs of the frail elderly, and promote care better aimed at meeting those needs (Cox).

Literature Search Strategy and Selection Criteria

A variety of search strategies were utilized in order to complete a comprehensive and systematic review of the literature. These strategies included computer searches by subject heading, text word and author, e-mail contacts with selected authors and hand searches of texts and journals. Multiple computerized bibliographic databases were used including MEDLINE, CINAHL, SOCIAL SCIENCES INDEX, PsycINFO, SOCIOLOGICAL ABSTRACTS, AGELINE, and HEALTH STAR to access publications from 1985 to 2000. Combinations of the following subject headings and text words were used: "frail" [and synonyms: "frail elderly", "frail elder", and "frailty"] AND "conceptual framework" [and synonyms: "models", "models, theoretical", and "theory"]. All subject headings were exploded in order to include all possible subheadings. The search was limited to articles printed in English. General textbooks dealing with gerontology and geriatrics were reviewed for definitions and/or conceptual

models of frailty. Reference lists of relevant articles were hand searched to find relevant citations.

The synonyms, antonyms, and definitions of frailty that were included in this review were derived from a review of the abstracts of: 1) all articles published in 1999 that listed “frail” in their title, and 2) a random selection of articles published from 1985 to 1998 that listed “frail” in their title. The abstracts of the articles were reviewed for a definition of frailty or criteria for applying this label. Several of the articles were reviewed in their entirety for definitions and criteria for applying the term “frail”. The conceptual models of frailty that were included in this review met two criteria. First, the model consisted of a set of global concepts and propositions. Second, the model addressed the concepts of person, environment, and health (Fawcett, 1989).

Synonyms, Antonyms, and Definitions of the Term Frailty as Applied to the Older Adult

The term frailty has been utilized in a variety of ways that perhaps fit with the perspectives and backgrounds of the various authors. “When we use the term frail, we do not usually do so in relation to its opposite, but to understand the term fully it is important to do so” (Brown et al., 1995, p. 97). Therefore, the antonyms as well as the synonyms of frailty were examined (see Table 1). The main themes of this review were that frailty has been considered when there are indications of: 1) functional impairment and dependence on others for activities of daily living that threaten the ability of a person to live independently in the community; 2) poor physical health, such as chronic illness

Table 1

*Synonyms, Antonyms, and Definitions of Frailty in the Literature*Synonyms

- Failure to thrive (Berkman, Foster, & Campion, 1989)
- Biologically old (Rockwood et al., 1994)
- Wasting syndrome common in people of advanced age (Walston & Fried, 1999)
- Chronically dependent in a variety of ways (Tennstedt, Sullivan, McKinlay, & D'Agostino, 1990)
- Functional disability (Fried, 1994; Buchner & Wagner., 1992; Hallfors, Leutz, Capitman, & Ritter, 1994)
- Functional dependency (Leutz, Capitman, MacAdam, & Abrahams, 1992; Cox, 1993)
- Decreased ability to respond to stressful situations (Jarrett, Rockwood, Carver, Stolee, & Crossway, 1995)
- Fragile, delicate, brittle, tender, easily disturbed (Ebersole & Hess, 1998)
- Functionally vulnerable (Tennstedt et al., 1990; Morris, Sherwood, & Morris, 1984)
- Chronic illness and disability (Lawton, 1991; MacAdam et al., 1989; Pawlson, 1988)
- Feebleness and general vulnerability (Verbrugge, 1991)

Antonyms

- Independence vs. autonomy (Becker, 1994)
- Chronologically old vs. biologically old (often called frail) (Rockwood et al., 1994)
- Vitality vs. frailty (Bortz, 1993)
- Well elderly vs. frail elderly (Rockwood et al.)
- Vigorous vs. frail (Speechley & Tinetti, 1991)
- Hardy vs. frail (Raphael et al., 1995)
- Fit elderly vs. frail elderly
- Robustness vs. feebleness and general vulnerability (Verbrugge, 1991)

Definitions

- Aging (Walston & Fried, 1999; Burnside, 1990; Hirdes, Naus, & Young, 1994)
 - Reduced physiological reserves (Bortz, 1993)
 - Decreased muscle strength, mobility and balance (Dayhoff & Suhrheinrich, 1998; Hadley, Ory, Suzman, & Weindruch, 1993; Ory & et al., 1993; Kline, 1995)
 - Decreased strength, flexibility, cardiovascular endurance and body composition (Wolf, Barnhart, Kutner, McNeely, & Coogler, 1996)
 - Compromised homeostatic mechanisms (Carlson & et al., 1998)
 - Feebleness, delicately constituted, vulnerable or lack of resilience (Buchner & Wagner., 1992)
 - Disability (Schulz & Williamson, 1993; Williams, Wynne, Woodhouse, & Rawlins, 1989; Hallfors et al., 1994; Lawton, 1991)
 - Inactivity combined with weight loss (Chin A Paw, Dekker, Feskens, Schoutens, & Kromhout, 1999)
 - Functional impairment and dependence in activities of daily living (Rockwood et al., 1994; Schulz & Williamson; Cox, 1993; Winograd et al., 1991; Winograd, Gerety, Brown, & Kolodny, 1988; Tennstedt et al., 1990; Chichin, 1989; Minister for Senior Citizen Affairs Seniors Secretariat (MSCASS), 1985)
 - Chronic and disabling illness (Winograd et al., 1991; MacAdam et al., 1989; Lawton, 1991)
 - Acute illnesses, i.e. confusion, falls, immobility, incontinence (Coleman, Giotheus, Sandhu, & Wagner, 1999; Winograd et al., 1988)
 - Poor mental health functioning, such as cognitive impairment (Burnside, 1990) and depression (McDougall & Balyer, 1998; Tennstedt, Cafferata, & Sullivan, 1992)
 - Need for formal or informal assistance with personal care or household tasks (Guralnik & Simonsick, 1993; Kennie & Warshaw, 1989; Hall et al., 1992; Payette, Coulombe, Boutier, & Gray-Donald, 1999), specialized geriatric intervention (Winograd et al., 1988; Clayman, 1990), and long-term (nursing home) care (Gruenberg, Tomplins, & Porell, 1990)
 - Mathematical modelling of morbidity and mortality to denote a latent variable associated with extent of risk (Vaupel, Manton, & Stallard, 1979)
-

or acute illnesses, 3) disability, 4) vulnerability or lack of strength and resilience, 5) poor mental health functioning, i.e. cognitive impairment or depression, 6) requiring formal, informal, or long-term care to meet basic needs, and 7) simply old age. In addition, demographers use the term frailty in mathematical modeling of morbidity and mortality to denote a latent variable associated with extent of risk (Vaupel et al., 1979). These examples predominantly reflect a biomedical perspective, equating frailty with aging, disease, decline, loss, and dependence on others.

Other authors have combined these criteria in their description of frail, suggesting that frailty is multi-dimensional. That is, an individual would be classified as frail if they met any of these or some combination of these aforementioned clinical criteria (Bergman et al., 1997; Brody, Johnson, & Reid, 1997; Coleman et al., 1999; Gagnon, Schein, McVey, & Bergman, 1999; Guralnik & Simonsick, 1993; Winograd et al., 1991; Wolf et al., 1996). Guralnik & Simonsick (1993) for example, described frailty as poor functioning in physical, cognitive, emotional, sensory or social functioning.

While these authors project a multi-dimensional view of frailty, others have described frailty as uni-dimensional in nature. For example, frailty has been subdivided into types including 'medical frailty', 'functional frailty', 'mental frailty' (Jones, 1990; McNamee et al., 1999) and 'physical frailty' (Jones; McNamee et al.), implying that there is just one type of characteristic by which an individual is evaluated for frailty. In summary, the results of this review suggest that many factors may contribute to frailty; however, these factors have not been related to a common meaning for frailty. This lack of common meaning renders its actual prevalence uncertain (Hamerman, 1999; Rockwood et al., 1994).

A Critical Evaluation of Conceptual Models of Frailty

A total of six conceptual models of frailty were identified in the literature as meeting the predefined selection criteria (Bortz, 1993; Brown et al., 1995; Buchner & Wagner, 1992; Campbell & Buchner., 1997; Kaufman, 1994; Raphael et al., 1995; Rockwood et al., 1994; Walston & Fried, 1999) (see Table 2).

Table 2

Conceptual Models of Frailty

Conceptual Models	Dimensions of Frailty	Role and Definition of the Environment	Underlying Cause of Frailty	Types of Processes
Frailty and Disability Medical Sciences Original Model: Buchner & Wagner (1992) Expanded Model: Campbell & Buchner (1997)	Physiological Dimensions of: neurological control mechanical performance energy metabolism (Buchner & Wagner) musculoskeletal function, aerobic capacity, cognitive/neurological state nutritional state (Campbell & Buchner)	Physical environment: external stressors that can precipitate frailty but are also essential for maintenance of function	Frailty results from a loss of a person's capability to withstand environmental stressors related to diminished physiologic reserves beyond a <i>threshold limit</i> . Reserve capacities reduced by disease, disuse, illness and age	Frailty is a precursor to disability (Buchner & Wagner) or unstable disability (Campbell & Buchner) The process of becoming frail consists of a <i>series of episodic, progressive and irreversible losses</i> .
The Physics of Frailty Physical Sciences Original Model: (Bortz, 1993)	Pathology of Frailty: Structural (tissue) integrity	Physical environment: external stressors that can precipitate frailty but are also essential for maintenance of function	Frailty results from the dysfunction of tissue secondary to non-optimal energy flow due to disuse, aging and disease leading to a <i>threshold loss</i> of physiologic function	Frailty is defined as opposite to vitality along a <i>continuum</i> . Frailty is reversible through the reestablishment of optimal energy flow
The Cycle of Frailty Medical Sciences Original Model: Fried (1994) Walston & Fried (1999)	Physiological dimensions of: Loss of skeletal muscle (sarcopenia) Neuroendocrine dysregulation Immune dysfunction	Physical environment: external stressors that can trigger or accelerate the underlying cycle of frailty	Disease, immobility, depression, and medications cause a decline in physiologic function and reserve across multiple systems. A person is considered frail if they have physiologic declines beyond a predefined <i>threshold limit</i> .	Frailty is defined as a <i>cycle</i> - a process of declining energetics, including muscle mass loss, falling metabolic rate, declining strength, energy expenditure and mobility

Table 2 continued

Conceptual Models	Dimensions of Frailty	Role and Definition of the Environment	Underlying Cause of Frailty	Types of Processes
Dynamic Model of Frailty Medical Sciences Original Model: Rockwood et al. (1994)	<i>Assets:</i> health, functional capacity, positive attitude toward health, other resources <i>Deficits:</i> ill health, disability, dependence on others for ADL, burden on caregiver	Social environment: immediate and proximal and includes caregiver and other social and environmental resources Physical environment, e.g. health, functional capacity	The frail elderly are those persons for whom the deficits outweigh the assets, so these people can no longer maintain their independence in the community	<i>Dynamic process with interacting factors</i> resulting in different degrees of frailty characterized by different levels of dependence on others.
Frailty as a Social Construction Behavioural Sciences: Raphael et al., (1995)	<i>Personal Factors:</i> cognitive factors, physical factors, psychological factors, spiritual factors <i>Environmental factors:</i> The individual defines the importance of practical and social activities of daily living.	Environmental factors are both proximal and distal: financial, interpersonal, living situation, institutional factors	Frailty occurs when there is diminished ability to carry out the important practical and social activities of daily living. Reserve capacity contributes to a person's position on the frail-hardiness continuum, but, by itself is sufficient to determine frailty	Frailty is defined as opposite to hardiness along a <i>continuum</i> . The position on the continuum depends on the complex interaction among personal and environmental factors
The Social Construction of Frailty Medical Anthropology: Original Model: Kaufman (1994)	Frailty is socially produced and is a lived experience Frailty reflects a societal view of aging as a battle between independence and dependence	Environment includes family, health care system and society	Frailty is socially produced through the interaction of older adults, their caregivers and their health providers	Frailty is a <i>quality</i> and a <i>dynamic adaptational process</i> on the part of elderly persons, families, and health care personnel

The term conceptual model, and synonymous terms such as conceptual framework, conceptual system, paradigm, and disciplinary matrix, refer to global ideas about the individuals, groups, situations, and events of interest to a discipline. Conceptual models are made up of concepts, which are words describing mental images of phenomena, and propositions, which are statements about the concepts. A conceptual model, therefore, is defined as a set of concepts and the propositions that integrate them into a meaningful configuration (Fawcett, 1989, p. 2).

An abundance of features have been used in the literature to describe conceptual models. The author incorporated many of these features (Fawcett, 1989; Lofland & Lofland, 1995; Walker & Avant, 1983) into the development of five questions, which guided a critical evaluation of the conceptual models of frailty:

1. What is the origin and historical evolution of the model?
2. What are the dimensions of frailty in the model?
3. What is the role of the environment and how has it been defined?
4. What is the underlying cause of frailty?
5. What types of processes are involved in the model?

This review resulted in the identification of four main categories of assumptions within the models: 1) philosophical assumptions about the nature of scientific knowledge, 2) philosophical assumptions about the level of analysis, 3) assumptions about the aging process, and 4) assumptions about the stability of frailty. Identification of assumptions (explicit and implicit) provides important information about the author's values, beliefs, and philosophical perspective (Fawcett, 1989). Analysis of the underlying assumptions and their implications will provide an understanding of the

strengths and limitations of the existing conceptual models of frailty for informing clinical practice, policy, and research and suggest areas for future development.

Philosophical Assumptions about the Nature of Scientific Knowledge

Every scientific model is tied to some philosophical framework, which presents a distinct and formalized account of the nature and development of scientific knowledge (Guba & Lincoln, 1994; Whall, 1989). Differences in theoretical perspectives will influence how frailty is defined and framed which will, in turn, inform policy decisions regarding the eligibility for, and allocation of, scarce health care resources. With the exception of two conceptual models of frailty, (Brown et al., 1995; Kaufman, 1994), instrumental definitions and conceptual models that reflect a post positivist, predominantly biomedical perspective of frailty (Bortz, 1993; Buchner & Wagner, 1992; Campbell & Buchner, 1997; Fried, 1994; Raphael et al., 1995; Rockwood et al., 1994; Schulz & Williamson, 1993; Walston & Fried, 1999) dominate the literature.

Consistent with tenets of post positivism, the basic posture of these models is mechanistic, reductionistic, and deterministic (Guba & Lincoln, 1994). This perspective is reflected in the way in which frailty has been conceptualized. First, the models support the view that frailty is uni-dimensional and is characterized by functional losses that influence the capacity for independence in daily living (Bortz, 1993; Buchner & Wagner, 1992; Campbell & Buchner, 1997; Fried, 1994; Raphael et al., 1995; Rockwood et al., 1994; Walston & Fried, 1999). Buchner & Wagner (1992) define the frail elderly as those who are unable to fulfill social roles and perform activities of daily living.

Rockwood et al., (1994) define the frail elderly as those persons for whom the deficits outweigh the assets, so they can no longer maintain independence in the community.

Raphael et al., (1995) state that frailty occurs when there is diminished ability to carry out the important practical and social activities of daily living. These examples suggest that dependence on others is a sufficient condition for frailty.

Second, the models suggest that frailty can be reduced to specific and predetermined components that can be quantified and objectively measured in order to predict frailty within an individual (Bortz, 1993; Buchner & Wagner, 1992; Campbell & Buchner, 1997; Fried, 1994; Rockwood et al., 1994; Walston & Fried, 1999). These factors are predominantly biomedical in nature and influence the physiologic capacity of the individual to withstand stress from the physical environment (Bortz; Buchner & Wagner; Campbell & Buchner; Fried; Rockwood et al.; Walston & Fried), which, in turn, influences an individual's capacity for independence (Rockwood et al.).

The conceptual model of frailty and disability, for example, defines frailty as consisting of the physiological dimensions of musculoskeletal function, aerobic capacity, cognitive and nutritional state (Buchner & Wagner, 1992; Campbell & Buchner, 1997). In this model, the authors state that, through measurement of the components of frailty an overall score can be derived and areas of compromised reserve can be identified that can predict frailty and subsequent disability. This is reflective of a post positivist philosophy, which states that through knowledge of the parts, which are objectively defined and quantified, knowledge of the whole will be accumulated (Haase & Myers, 1988).

Implicit in these examples is that frailty has been interpreted within an objective context, which assumes homogeneity and uniformity among individuals.

The models are consistent in their inclusion of the concept of reserve capacity. That is, the ability of an individual to withstand stressors from the environment is a function of their individual threshold limit or reserve capacity, beyond which an individual becomes frail (Bortz, 1993; Buchner & Wagner, 1992; Campbell & Buchner, 1997; Fried, 1994; Rockwood et al., 1994). However, the concept of threshold has been described as predominantly physical in nature, implying that frailty is more a reflection of a disease or physiological state than a statement of need. In the one model, Raphael et al. (1995) state that threshold is defined by the complex interplay of biological, psychological and social factors - not just physical factors. However, the concept of threshold in this model is associated with the physical aspects of aging (Raphael et al.).

While the majority of models have viewed frailty as including primarily biomedical and objective dimensions (Bortz, 1993; Buchner & Wagner, 1992; Campbell & Buchner, 1997; Fried, 1994; Walston & Fried, 1999), others have gone beyond by incorporating psychological and/or social dimensions of frailty (Raphael et al., 1995). Although Raphael et al. and Brown et al. (1995) describe frailty as a social construction, in the end; the authors measure frailty using an objective and quantitative approach. In the model, they explicitly state that a person can be frail in one aspect of life but not another which is reflective of a mechanistic and reductionist approach.

Third, with the exception of one model (Raphael et al., 1995), the components of frailty have been predominantly viewed in isolation. Rockwood et al. (1994), for example, identified assets and deficits and looked at how each of these dimensions can individually predict death, use of acute care services, and long-term care services. In general, the models do not directly address how various physical, psychological, social and environmental factors, in combination, can predict frailty.

While this reductionist and uni-dimensional view of frailty may be useful to clinicians, it may not be a true reflection of the lived experience and cannot capture the complexity and uniqueness of frailty for each individual (Becker, 1994; Kaufman, 1994). The models assume homogeneity, uniformity, and predictability based on objective characteristics. However, studies of subjective health assessments suggest that people's perceptions are more important indicators of health outcomes than objective circumstances (Brubaker, 1990). Becker (1994) reported that objective measures of frailty were not consistent with the lived experience or subjective perception of functional ability. Similarly, Minkler (1990) reported that respondents never used the word "frail" to describe their health or functional ability despite the fact that they were defined by health professionals as being frail.

Philosophical Assumptions About the Level of Analysis (Micro- vs. Macro-Level)

"The micro vs. macro theorizing dimension reflects a long-standing tension in social gerontology between the social psychological and social structural levels of analysis" (Marshall, 1995, p. 14). The micro-level of analysis is concerned with the individual

alone whereas the macro-level of analysis is concerned with the structure of society as the primary object of study (Estes, Linkins, & Binnery, 1995; Marshall, 1995).

Differences in the level of analysis have important consequences for the extent and scope of societal and individual responsibility for the prevention and the consequences of frailty among older adults (Estes et al., 1995).

A common feature of the conceptual models of frailty is the stress on individual-environment interactions. This focus on the individual as the primary unit of analysis reflects a micro-level of analysis (Bortz, 1993; Buchner & Wagner, 1992; Campbell & Buchner, 1997; Fried, 1994; Walston & Fried, 1999). That is, frailty originates from, or exists within, an individual. In these models, environment is defined as consisting of the physical or biological environment of the individual. Rockwood et al. (1994) extended the notion of environment to include the immediate proximal environment, such as, attitudes of caregivers and the availability of finances on the development of frailty. However, in general, the environmental factors specified in these models are primarily assessed for their impact upon individual (physical) functioning (Raphael et al., 1995).

Acceptance of an individualist or micro-level approach implies that by altering the characteristics of an individual, you can improve health. Thus, the problem of frailty is viewed as a medical problem that falls within the realm of the medical community to identify and treat (Raphael et al., 1995). Kaufman (1994, p. 46) refers to this as the medicalization paradigm where “personal and social problems and behaviours come to be viewed as diseases or medical problems that the medical and allied health professionals

have a mandate to treat”. By framing the problems of frailty and, therefore, the solutions as biomedical, this view ignores the role of the broader environment and such non-medical issues as poverty and isolation (Raphael et al.). Estes et al. (1995, p. 351) state that from the perspective of society, “theories that reduce problems of aging to the individual level shift any onus of responsibility from the state to the individual. As a result, any notion of problems stemming from the structural level, i.e. inequities in resource distribution and access, can be ignored” Thus, this individualist viewpoint effectively depoliticizes the problems of frailty (Raphael et al., 1995).

Raphael et al. (1995) and Kaufman (1994) broadened the definition and role of the environment to include both immediate proximal and distal factors, reflecting a macro-level of analysis (Raphael et al., 1995). The presence of frailty may result from the presence or absence of numerous intersecting factors, many of which are external to the individual, and are conditions occurring within the environment (Raphael et al.). “In this definition, ability is not seen as an asset residing within an individual, but rather a situation that exists for each individual” (Raphael et al., p. 225). That is, all levels are viewed in terms of mutual dependency that result in a condition of lived experience (Raphael et al.). This viewpoint suggests that frailty can be addressed by altering the characteristics of the external environment rather than focussing entirely on the individual (Estes et al., 1995).

Kaufman (1994) proposes that frailty is reflective of a label that is primarily applied by the health care system. Frailty has been traditionally interpreted within a medical

model, however, many of the issues of frailty originate from external social and economic problems. Focussing on the person's medical needs ignores the broader influence of the environment on health (Aday, 1993). In summary, the disparity in perspective between micro- and macro-levels of analysis, among the conceptual models of frailty, may be reflective of not only the intellectual but also the political tension in the literature regarding who is responsible for the problems of frailty.

Assumptions about the Aging Process

The conceptual models for understanding frailty both implicitly and explicitly suggest that frailty is a state of reduced physiological reserves associated with aging that affects an individual's capacity for functional independence (Bortz, 1993; Buchner & Wagner, 1992; Campbell & Buchner, 1997; Fried, 1994; Rockwood et al., 1994). Fried (1994) refer to frailty as a wasting syndrome of advanced old age. Rockwood et al. (1994) base their model of frailty on a model of breakdown among old people (Brocklehurst, 1985). In the model, the authors differentiate between the chronologically old versus the biologically old (often called frail) (Rockwood et al.). Other models indicate that frailty results from age-related physiological losses in combination with disease, disuse, illness (Campbell & Buchner) which "historically have been difficult to separate" (Buchner & Wagner, p. 4). Walston & Fried (1999), in a review of the medical literature, identified frailty as a syndrome that is age-related and common in people of advanced age. Raphael et al. (1995, p. 225) incorporate the concept of reserve capacity

into their model because “the concept of reserve capacity is an integral part of most discussions of aging and its effects”.

“Frailty has age-specific connotations that reflect how aged persons are viewed in American society” (Becker, 1994, p.71). The association between frailty, aging, physiological losses, and dependence on others reinforces the assumption that aging is synonymous with disease, disability, and decline. The potential negative implications of this association are threefold. First, the notion of frailty has the potential to stereotype elders with negative effects on well being (Minkler, 1990). The literature has associated frailty with a lack of hope, the absence of positive outlook (Brown et al., 1995), and loss or declining abilities (Kaufman, 1994). Second, when the frail elderly are classified as a homogenous group, the assumption is that there is no individuality and that the experience of aging is typical (Becker, 1994). Third, the current models for understanding frailty reflect the view of aging as a battle between independence and dependence on others, rather than looking at the capacity for autonomy and independence and maximizing a person’s strengths (Kaufman, 1994).

Assumptions about the Stability of Frailty

The various types of process that are involved in the conceptual models of frailty suggest that frailty is *not an all or nothing phenomena*. There are different degrees of frailty that have been described in relative terms, such as: 1) a series of episodic, progressive and irreversible losses (Campbell & Buchner, 1997), 2) a continuum where frailty is defined as opposite to vitality (Bortz, 1993) and hardiness (Brown et al., 1995;

Raphael et al., 1995), 3) a cycle - a process of declining energetics, including muscle mass loss, falling metabolic rate, declining strength, energy expenditure, and mobility (Fried, 1994; Walston & Fried, 1999), 4) a process of adaptation (Schulz & Williamson, 1993), 5) a dynamic process with interacting factors characterized by different levels of dependence on others (Raphael et al., 1995), and 6) a quality and a dynamic adaptation process on the part of elderly persons, families, and health care personnel (Kaufman, 1994). These examples suggest that frailty is a relative state that changes over time.

The types of processes specified in the model have important implications for practice. First, the notion that frailty is a relative term suggests not thinking of people as either frail or not frail, but rather placing them somewhere on a continuum. The notion of different degrees of frailty suggests that frailty be characterized as a vulnerable state in which an individual is at risk of becoming more or less frail over time. The implication of this assumption is that frequent clinical assessments and movement in and out of periods of service may need to occur (Hallfors et al., 1994). The other implication of this assumption is that the trajectory of frailty is unique for each individual. Second, the types of process specified in the model suggest that the process of frailty can be modified or reversed.

Summary of the State of the Knowledge

In summary, this review of the academic literature and conceptual models of frailty suggests that there is both *intellectual and political tension* regarding conceptualizations of frailty in relation to older adults. This tension is reflected in a number of ways, which

limit the usefulness of the concept of frailty for informing clinical practice, policy and research.

First, the term 'frail' or 'frailty', in the general health and social science literature is often used without definition or clear criteria for use in relation to the older adult. Second, the literature suggests that a number of factors may contribute to frailty; however, these factors have not been related to a common meaning for frailty. A third problem with the use of the term frailty is that it appears to support the view that frailty is uni-dimensional, predominantly biomedical in nature, and characterized solely on the basis of functional losses that influence a person's capacity for independence in activities in daily living. Fourth, the components of frailty have been predominantly defined in an objective way that is inadequate to represent the complex, holistic, and unique meaning of frailty for individuals. Fifth, there is a disparity in perspectives among the models in terms of the level of analysis, which has important implications for the level of intervention and responsibility for the problems of frailty in our society. A final problem with the use of the term frailty is that it reflects a negative and stereotypical view of aging that is characterized by dependency, physical losses, and the absence of positive outlook, rather than a focus on capacity for autonomy and maximizing a person's strengths.

The responsibility for delivering services to the frail elderly currently lies with many agencies, jurisdictions and professionals. Since each of these agencies, jurisdictions and professionals are distinct in terms of their own funding mechanisms, criteria for

identifying older people as frail, and distinct responsibilities, client's needs are often left unmet (MacKnight, 1999). Differing assumptions regarding the level of intervention means that no single institution with both clinical and financial responsibility is ultimately responsible and accountable for the prevention and management of frailty.

Conceptualizations of frailty will not only influence access to services, but management strategies such as the nature, frequency, and timing of client assessments and the type and frequency of treatment. For example, if frailty is defined predominantly in terms of physical losses, assessment and management strategies will focus solely on this aspect. This may lead to care that is characterized by fragmentation, with lack of attention to the holistic person. Many long-term care programs and services have protocols that assume stability of frailty among older adults. If the trajectory of frailty is unique and changeable for each individual, movement in and out of periods of service may need to occur (Brown et al., 1995).

The assumption that the process of frailty can be modified or reversed provides support for targeted health promotion interventions. However, the components of frailty have not been sufficiently defined to identify a population at risk or in need of proactive interventions. In summary, a common theoretical approach to the concept of frailty is needed to inform policy and practice regarding the allocation of, and eligibility for, health care resources to prevent or delay frailty and the use of costly health care resources. It can also serve as a conceptual guide for future research in terms of defining study populations and developing instrumentation to assess frailty. A common meaning

of frailty will enhance the comparability and generalizability of research involving older adults.

CHAPTER 3:
THE MODEL OF VULNERABILITY: THEORETICAL APPROACH TO
HEALTH PROMOTION AND PREVENTIVE CARE

Study Definition and Approach to Frailty

Given the lack of a comprehensive framework for the identification and management of frailty, the investigator returned to the level of definition. A consistent theme in the literature is that frailty is a relative term that is characterized by an at-risk or vulnerable state (Brown et al., 1995; Buchner & Wagner, 1992; Rogers, 1997).

Based on this, the investigator used the model of vulnerability developed by Rogers (1997) as an alternative theoretical approach to the identification and management of frailty in this study population. The model of vulnerability was then operationalized to provide the theoretical basis for the development, implementation and evaluation of a comprehensive health promotion and preventive care intervention. The following implicit and explicit assumptions that underlie the model of vulnerability (Rogers) help to address the major problems, omissions, and inconsistencies in the current models and definitions of frailty in the literature:

- The degree of vulnerability is *context dependent* and, therefore, is greatly affected by the subjective perception of the individual. Thus, the concept of vulnerability allows for individual variability (Rogers, 1997).

- The concept of vulnerability is multi-dimensional consisting of intersecting physical, psychological, social and environmental factors.
- The concept of vulnerability is *not age-related* and, therefore, does not portray a negative and stereotypical view of aging. While the frail elderly have been identified as a vulnerable population, other vulnerable populations have been identified including those who are poor, homeless, chronically ill or disabled, people with AIDS, abusing families, pregnant adolescents and their children, immigrants and refugees, and those who are mentally ill (Rogers, 1997).
- The concept of vulnerability reconciles the disparity in the literature between the micro- and macro-level approach by suggesting that *vulnerability can originate from within the individual or from conditions occurring in the environment* (Rogers, 1997). The conceptualization of vulnerable populations requires a community health perspective. “A community health perspective views communities as responsible for the collective well-being and health of their citizens, rather than a focus on individual responsibility for health” (Flaskerud & Winslow, 1998, p. 1). Therefore, the model looks at the broader influence of the environment on health.

In a review of the literature on the study of frail elderly people, Bowsher, Bramlett, Burnside, and Gueldner (1993, p. 876) recommended that “gerontological research, particularly that of frail populations, be constructed within more holistic and optimistic developmental models. Such models focus on positive aspects of aging and redefine health to include the quality of life despite chronic conditions and functional limitations”.

Nursing models, such as the model of vulnerability (Rogers, 1997) offer such a theoretical perspective by projecting a positive view of aging - the potential for health that does not depend solely on traditionally perceived functional capacity.

In a vulnerability index, vulnerability is a net result of an interaction between the person's personal resources (cognitive, emotional, intellectual, behavioural) and their environmental supports (social, material, cultural) (Rogers, 1997), both of which, along with biological characteristics (age, gender, genetic endowment), are determinants of health. Based on published evidence (Browne et al., 2001b; Rogers), the investigator hypothesized that expenditure of use of health and social services increases proportionately with the level of vulnerability. Therefore, the original model of vulnerability developed by Rogers (1997) was extended to include a health and social services index (see Figure 1).

Personal resources can be defined as either inborn or acquired characteristics, which interact with the environment to influence health. Inborn characteristics that influence health include non-modifiable factors such as the person's age, gender, race, temperament, genetic predisposition to disease, susceptibility to illness, sensitivity to drugs and chemical imbalances (Rogers, 1997). Acquired characteristics are modifiable factors such as trauma, the presence of disease, lifestyle, recent life events, and coping skills that are often the result of life experiences (Rogers). Both the inborn and acquired characteristics affect the individual's ability to handle stress.

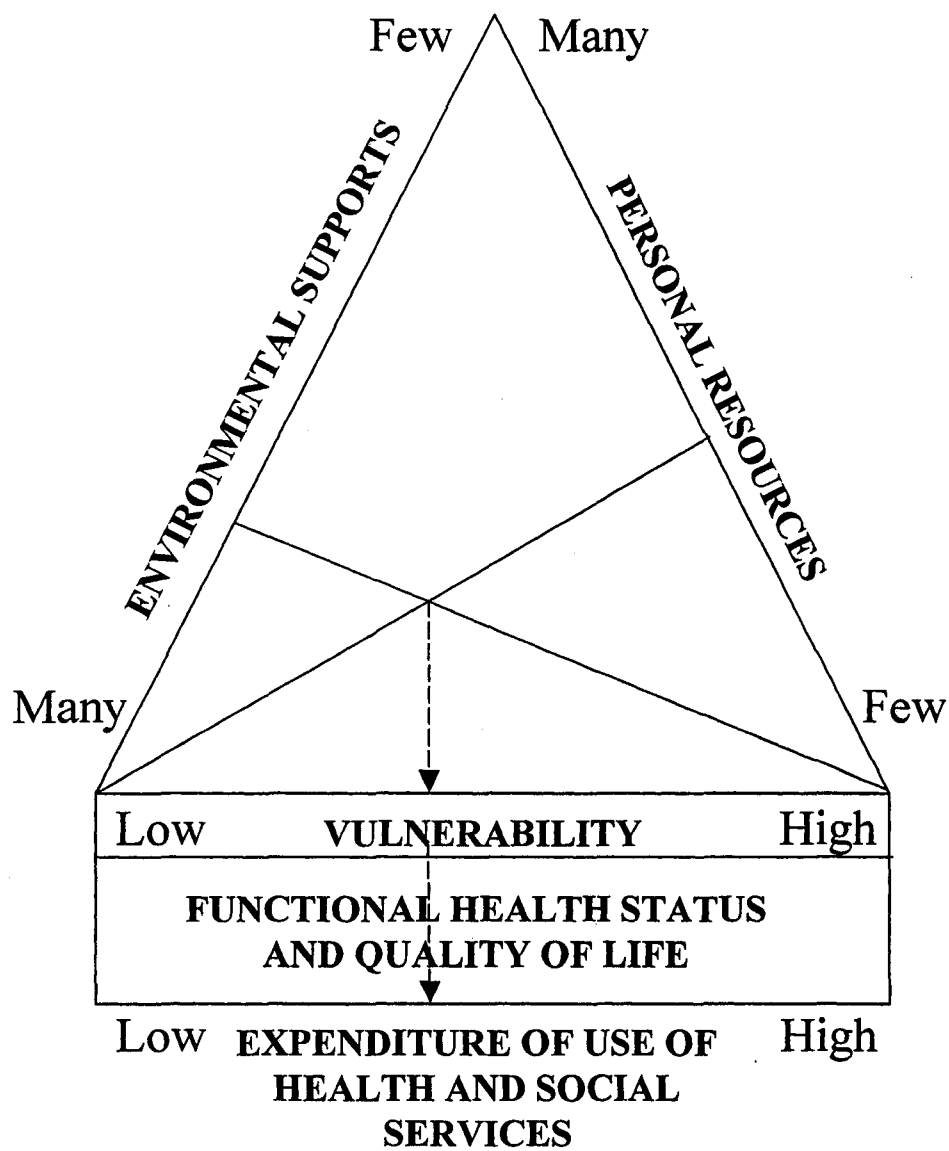


Figure 1. Model of vulnerability (adapted from Rogers, 1997).

Environmental supports can be defined as factors, which interact with personal resources to influence health. The environment in which the individual lives includes the immediate environment (temperature, light, noise), as well as the broader context of family, community, and society. Societal attitudes and stereotypes of aging will affect the functioning of the older individual in the environment. Environmental factors also include modifiable factors such as social support, education, employment and income (Rogers, 2000).

Within an individual, personal resources and environmental supports intersect, as shown in Figure 1, and can be synergistic and cumulative (Browne et al., 2001b). The relationship between personal resources, environmental supports, and degree of vulnerability is conceptualized in Figure 1. The base of the triangle represents the degree of vulnerability (Rogers, 1997), and thus also their expenditure of use of health and social services. An individual is continually adapting to threatening or stressful events that can originate from within the individual or because of conditions occurring in the environment (Rose & Killien, 1983). Through creating “equilibrium” between the individual’s personal resources and environmental supports, adaptation is facilitated (Rogers).

The continua of personal resources and environmental supports are each represented by the other two sides of the triangle. To estimate an individual’s degree of vulnerability, one would locate the person’s level of environmental supports on one side of the triangle and draw a straight line from this point to the opposite apex. The same would be done for the person’s personal resources. At the point where the two lines intersect, a line would be dropped perpendicular to the base to intersect the vulnerability continuum. This point of intersection, the degree of vulnerability,

therefore, represents an outcome of the interaction of personal resources and environmental supports (Rogers, 1997, p. 68).

Figure 2 illustrates that even if personal resources hold constant, changes in the individual's environmental supports can greatly alter their degree of vulnerability, and thus their use of health and social services. What is needed is "a 'fit' between the needs and resources of the person and the demands and resources of the environment" (Rogers, 1997, p. 68). Proactive, individualized, multi-disciplinary interventions either targeted at the individual or the environment can be developed to identify and strengthen available resources to considerable economic effect (Browne et al., 1999). One published study was found that provided support for the model of vulnerability in a population of elderly surgical patients with acute confusion (Rogers, 2000). Conclusions regarding the theoretical support or refutation of this extended vulnerability model in a frail elderly home care population will be drawn.

The vulnerability model was operationalized to form the basis for a proactive and individualized health promotion and preventive care intervention. Theory is essential to the design of both programmes and evaluations due to its explanatory and predictive capabilities. Empirical evidence alone is insufficient to direct the design and evaluation of interventions. Theory enhances the generalizability of the results by providing the basis for informing the systematic development and implementation of intervention strategies as well as evaluation indicators (Green, 2000; Nutbeam, 1999). The key concepts and assumptions of the model provided the structure for a comprehensive health

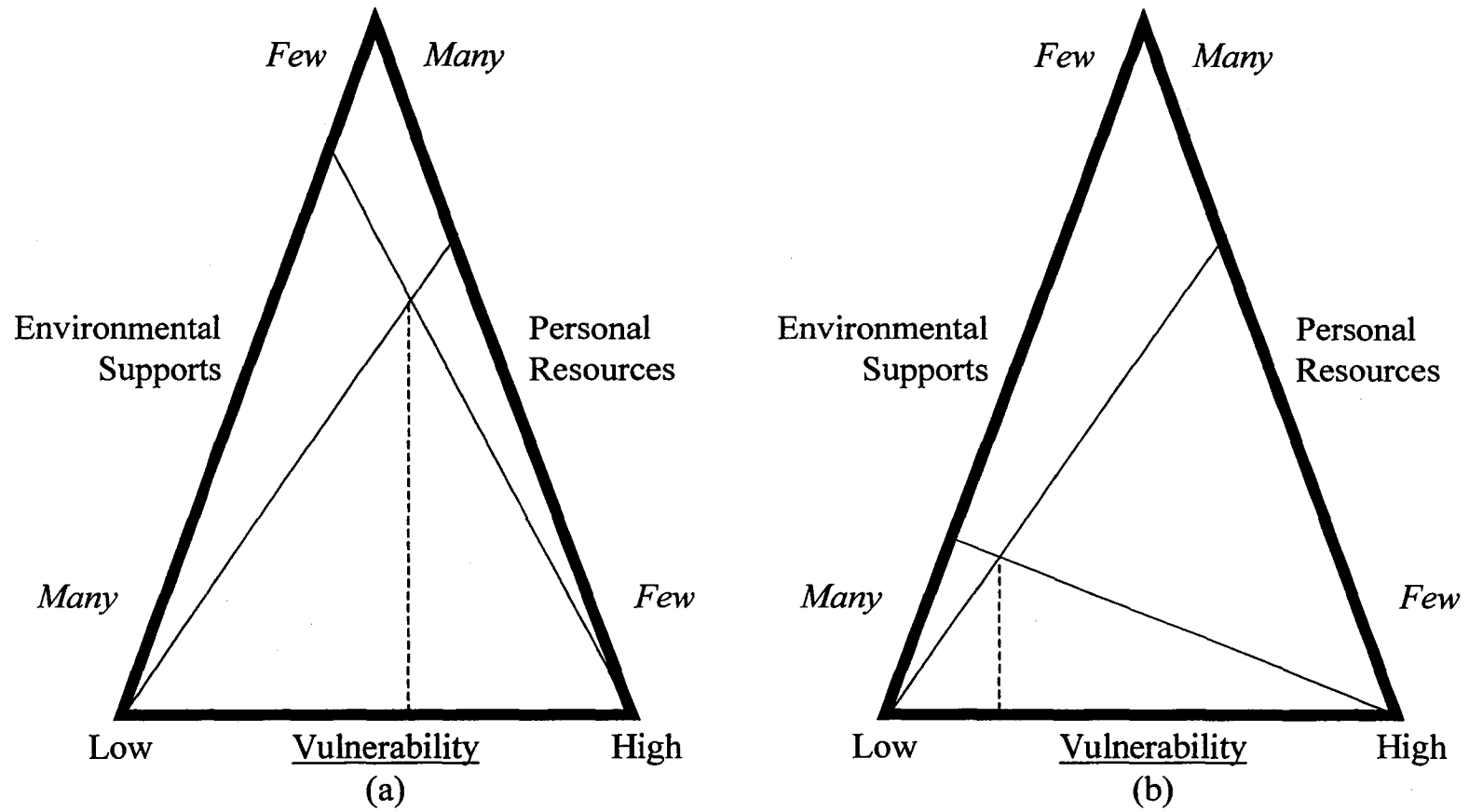


Figure 2: Degrees of vulnerability (Rogers, 1977).

promotion and preventive care intervention in the study and an important construct for evaluation.

The operationalization of the model of vulnerability required extensive research and preliminary groundwork that included:

1. Examination of the concepts of health promotion and preventive care, including issues surrounding measurement of effectiveness of health promotion and preventive care in a community based setting, to guide the development and evaluation of a health promotion and preventive care intervention.
2. Critical appraisal of the research evaluating the effectiveness of home based health promotion and preventive care for older adults to determine the state of the knowledge in this area and 'best-practice'.
3. Evidence from the literature on risk factors for functional status decline among community dwelling elderly persons to identify key personal and environmental study variables to address through the study intervention.
4. An environmental scan of the current home care delivery system for this population including practice patterns to design an intervention that fit within the existing structure and financing of home care services. This involved three organizations and their providers: the regional home care organization (CCAC of Halton), and two visiting nursing agencies (Victorian Order of Nurses (VON) Halton Branch and St. Elizabeth's Nursing (SEN) Community Health Care).

Once this preliminary work was completed, the model of vulnerability could be utilized as a framework for a proactive health promotion and preventive care intervention with a frail elderly home care population, incorporating evidence from empirical studies, with usual providers, within already existing services and programmes.

The Model of Vulnerability: Conceptual Approach to Health Promotion

Although the concept of health and prevention of health problems is identified by Rogers (1997), she does not specifically address the concepts of health promotion and preventive care in the Model of Vulnerability. However, inferences can be made from the model as noted below.

Health promotion and preventive care are conceptually distinct but complementary processes with the goal of enhancing health and well-being (Pender, Murdaugh, & Parsons, 2002; Stachtchenko & Jenicek, 1990). Health promotion is the process of enabling people to take control over the determinants of health and thereby improve their health (Epp, 1986). Health promotion is “behaviour motivated by the desire to increase well-being and actualize human health potential” (Pender et al., 2002, p. 7). Preventive care (also referred to as health protection or disease prevention), is any intervention that reduces the chance that a disease or disorder will affect an individual by interrupting or slowing the progress of a disorder or reducing disability (Dietrich, McWilliam, Ralyea, & Schweitzer, 1999; Stachtchenko & Jenicek). Preventive care is “behaviour motivated by a desire to actively avoid illness, detect it early, or maintain functioning within the constraints of illness” (Pender et al., p. 7).

The concept of health in the Vulnerability model is depicted as a positive and multi-dimensional concept that is determined by physical, psychological, social, environmental and political factors that are context specific and subjectively defined. This theoretical approach is consistent with the concept of health in health promotion, which is holistic, subjectively defined, and includes several distinct dimensions: physical health (functional and structural integrity), mental health (emotional and intellectual functioning), social functioning, role functioning and general perceptions of well being (McWilliam, Stewart, Brown, Desai, & Coderre, 1996; Pender et al., 2002; Stachtchenko & Jenicek, 1990). In contrast, the concept of preventive care, defines health as the absence of disease -health promotion is not illness or injury specific whereas preventive care is (Maville & Huerta, 2002).

The strategies for enhancing health in the Vulnerability model include altering personal and environmental factors, which are the determinants of health. This theoretical approach for altering personal and environmental factors can be inferred as health promotion that includes preventive care strategies.

According to the World Health Organization (WHO), health promotion strategies include: developing personal health skills, creating supportive environments, strengthening community action, reorienting health services, and building healthy public policy (Pederson, O'Neil, & Rootman, 1994). Thus, health promotion strategies are multi-level focussing not only on individuals but also on family, community and societal health. Health promotion is not only concerned with enabling the development of life

skills, self-concept, and social skills, but also concerned with environmental intervention through a broad range of political, legislative, fiscal, and administrative means (Stachtchenko & Jenicek, 1990). Similarly, strategies for enhancing health in the model of vulnerability are multi-level. Vulnerability is a result of conditions originating from within an individual or from conditions occurring within the environment. Therefore, strategies must be aimed at both individual and societal levels in order to reduce vulnerability and improve health and well being (Rogers, 1997).

Health promotion strategies are based on a participatory model of health (Stachtchenko & Jenicek, 1990). A participatory model seeks to expand an individual's positive potential for health whereas preventive care, which is grounded in the traditional biomedical model of health (Stachtchenko & Jenicek, 1990), seeks to avoid risks or decrease risks to health and well being (Pender et al., 2002). Thus, the focus of the model of vulnerability on identifying areas of strength as well as deficits, as a strategy for enhancing health, is consistent with the concept of health promotion (Rogers, 1997). Rogers (1997) proposes that vulnerability can be decreased through strategies that identify and strengthen personal and environmental resources.

A participatory approach to enhancing health involves activities that seek to empower individuals and to promote positive attitudes, knowledge and skills to maintain and enhance health (Maville & Huerta, 2002; McWilliam et al., 1997; Stachtchenko & Jenicek, 1990). Health promotion interventions are developed, implemented and evaluated together with individuals, families, and stakeholders from different

organizations (Koelen, Vaandrager, & Colomer, 2001). Empowerment for health goes beyond illness and the management of a specific disease. Its success is seen in terms of enhanced health, well being, quality of life, sense of self-esteem and self-worth (Pederson et al., 1994).

While health promotion is approach motivated, preventive care is avoidance motivated (Pender et al., 2002). That is, preventive care tends to focus on the individual as the focus of care and involves strategies that are directive and concern a specific medical problem in order to avoid or reduce risk to health and well being (Maville & Huerta, 2002; Stachtchenko & Jenicek, 1990). Its success is seen in terms of reducing morbidity or mortality (Clark, 2001; Pederson et al., 1994). The model of vulnerability proposes that by determining what factors in the individual or the environment are most predictive of problems with health, nurses can intervene earlier to alter personal or environmental factors (Rogers, 1997). This strategy for enhancing health is consistent with the concept of preventive care, which focuses on reducing or avoiding the risk of illness or disability (Stachtchenko & Jenicek). Three levels of prevention are described in the literature: primary prevention (to prevent problems from occurring in the first place), secondary prevention (early detection of health problems), and tertiary prevention (to avoid further decline) (Maville & Huerta). While the intervention in this study directly focussed on the individual as the focus of care, the results will have implications for the broader systems by informing public policies, which promote and maintain health.

CHAPTER 4:

REVIEW OF THE LITERATURE: EFFECTIVENESS OF HOME BASED HEALTH PROMOTION AND PREVENTIVE CARE FOR OLDER ADULTS

Evidence is accumulating from several studies that suggests that early detection of older people at risk of functional decline or losing their autonomy, might decrease morbidity and prevent or delay the use of costly health care resources (Barber & Wallis, 1976; Currie, MacNeil, Walker, Barnie, & Mudie, 1974; Williamson, 1981). Several papers conclude that on-demand care is inadequate and that seniors who present later with problems require more costly resources, e.g. hospitalization and nursing home placement (Kennie, 1986; Roos & Shapiro, 1981; Somers, 1984). As a result, several studies of screening and case finding among elderly persons have been conducted in an attempt to proactively identify and address problems to reduce the use of costly resources later.

In a practice population survey of 674 elderly persons aged 65 and over, Hay, Browne, et al. (2001) found that 92% had at least one of 28 treatable health concerns or risks, of which 83% had at least one unreported or unrecognized risks. Similarly, Caulfield, Frank, McMurray, Henderson, and Hutchison (1986) with a study population of 100 aged 75 and over, demonstrated that 96% of the study population had at least one concern or risk. Hanger & Sainsbury (1990) in a study population of 204 aged 65 and over from a city suburb in New Zealand, demonstrated that 99% of the study

population had a concern or risk, of which 66% were unrecognized. Over a period of two years, Tulloch & Moore (1979) in a practice population of 295 patients aged 70 years and over, found many social problems and a total of 380 medical conditions, of which 144 (38%) were undetected. Many of these concerns have the potential to increase health care expenditures if left undetected and, therefore, untreated. Harrison, Martin, Rous, and Wilson (1985) in a practice population of 110 patients over 70 years of age, found that 35% of the study population who received an unsolicited home visit by a health visitor were found to have previously unidentified needs.

Similar results were reported by Brown, Boot, Groom, and Williams (1997), in an audit of 40 general practices in the United Kingdom of patients over 75 years of age. In this audit, 12% of the eligible practice population was seen over the study period; 44% were found to have at least one health problem that was previously undetected. Similarly, Ramsdell, Swart, Jackson, and Renvall (1989) found that home based assessment of elderly persons resulted in the detection of up to four new problems as compared to an office-based assessment. Stuck et al. (1993a) identified several key advantages of in-home visits versus office-based visits. A home based assessment allows for assessment of the physical environment to identify risk factors and equipment needs, review of medications, contacts with family members, and better accessibility for clients with mobility problems (Stuck et al.).

Browne et al. (1999), in a review of 12 Randomized Controlled Trials evaluating a community based approach to care in a Canadian setting, found that for clients with

multiple problems (such as the frail elderly), it is more expensive in the same year to *not* provide these clients with proactive and comprehensive preventive care and health promotion. Similarly, Caulfield et al. (1986, p. 87), in a review of the literature on geriatric screening programmes, concluded that “home based, comprehensive screening of the elderly for undetected physical, mental and socio-economic problems by nursing or other trained personnel may be able to prolong survival, improve quality of life and perhaps even postpone dependency or institutionalization”.

The literature also suggests that timely and proactive initiatives directed toward the caregiver can also save personal and financial costs in the long run. This includes early diagnosis of caregiver stress and depression, and the introduction of proactive initiatives to help caregivers cope with the stress and burden of caregiving. The extensive role played by family caregivers in meeting the needs of the frail elderly has been extensively documented in the literature (Greene & Monahan, 1989). Approximately 15% of the Canadian population are caregivers (Cochrane, Goering, & Rogers, 1997). One-third to one-half of caregivers are people living in chronic circumstances, with cognitive and functional limitations, who are burdened or overwhelmed with caregiving. This perception of burden is most likely related to caregiver depression (Browne & Roberts, 1999).

A recent review of the literature found that caregivers that are self-reportedly overwhelmed (most likely depressed), are reluctant to utilize available community services (Browne & Roberts, 1999; Cox, 1997). Despite the efficacy of services, and

even in the absence of financial barriers, there are individual, family, cultural, organizational, and policy barriers to the appropriate and earlier use of support services by overwhelmed caregivers (Gwyther, Ballard, & Hinman-Smith, 1990). In the end, depressed and overwhelmed caregivers use more expensive services for themselves and their relatives toward the end of the illness cycle (Roberts et al., 1999). Supports to these caregivers should be considered as part of the system's mix of services to enable home care and prevent caregiver burnout (CHCA, 1999). In a study of frail elderly persons receiving formal home care services, Tsuji, Whalen, & Finucan (1995) found that caregiver problems were significant predictors of nursing home placement, but functional disabilities generally were not.

Evidence suggests, however, that screening and case finding alone is insufficient. Two meta-analyses of randomized controlled trials on the effectiveness of geriatric home assessment programmes confirmed that in order to be effective, a geriatric assessment programme must deliver an intervention that combines assessment or screening with sustained treatment (Stuck et al., 1993b; Stuck et al., 2002). Stuck et al. (2002) found that the detection of risk factors for functional decline and the implementation of recommendations to address them (through multiple follow-up home visits) were key factors contributing to the success of in-home preventive programmes. Similarly, Jensen (1997) in a review of 12 randomized controlled trials of preventive programmes for older people concluded that preventive home visits have a beneficial effect on elderly people and that hospital and nursing home admissions decrease. The underlying cause of this is

not clear. However, the studies indicate that a) health care personnel have to undertake the visits, b) social and medical intervention is necessary, and c) visits have to be made on an ongoing basis.

Elkan et al. (2001) in a recent meta-analysis of randomized and non-randomized controlled trials on the effectiveness of home based support for older people, found that regular home visits to older people was associated with a significant reduction in mortality and admission to long term institutional care. Several other studies have documented the effectiveness of preventive home visitation programmes for community-dwelling seniors as a strategy for delaying or preventing functional decline and dependency, reducing hospital admissions, and promoting the appropriate use of health and social services (Barber & Wallis, 1976; Currie et al., 1974; Ramsdell et al., 1989; Williamson, 1981). It is estimated that around 80% of health problems associated with aging could be prevented through lifestyle changes (Gingold, 1993).

Visiting nurses are well trained to assess functional status in elderly people living at home. In one Canadian study, Hall et al. (1992) found that personalized health promotion visits from a nurse, within a context of supportive health care and community support services, reduced mortality and prolonged living at home for a portion of the frail elderly population. Ramsdell et al. (1989) investigated the yield of a home visit by a geriatric nurse specialist compared to an office-based assessment. The study indicated that up to four new problems and one to eight new recommendations emerged as a result of a home assessment compared to an office-based assessment by a general internist.

Similarly, Alessi et al. (1997) found that annual in-home comprehensive geriatric assessment and quarterly home visits by gerontologic nurse practitioners resulted in the identification of major problems in medical, functional, mental health, and social environmental domains. In the first year of the intervention, 76.7% of study participants had at least one major problem identified that was either previously unknown or sub optimally treated. In a study by Kravitz et al. (1994), a gerontologic nurse practitioner (GNP) conducted post-discharge screening on 150 patients with one or more risk factors for functional decline. During the home assessment, the GNP identified new or worsening problems in 150 patients, of which 61 problems were identified as needing urgent medical attention. The authors concluded that post-discharge visiting by a GNP to high risk clients could result in the detection of important and potentially reversible clinical problems.

Literature Search Strategies

A variety of search strategies were utilized in order to complete a comprehensive and systematic review of the literature. These strategies included computerized searches by subject heading and author, e-mail contacts with selected authors, as well as an Internet search and relevant Ontario and Canadian government documents. Reference lists of review articles were scanned to identify relevant literature. Multiple computerized bibliographic databases were used including MEDLINE, CINAHL, COCHRANE CONTROLLED TRIALS REGISTER, AGELINE, HEALTH STAR, PSYCHINFO, SOCIOLOGICAL ABSTRACTS, CANADIAN BUSINESS AND CURRENT

AFFAIRS, and the SOCIAL SCIENCES INDEX to access publications from 1984 to 2002. Combinations of the following subject headings and text words were used: “frail elderly”, “elderly”, “aged”, “home”, “in-home”, “prevention”, “home care”, “home visit”, “health visit”, “home health care”, “home nursing”, “health promotion”, “anticipatory care”, and “geriatric assessment”. All subject headings were exploded in order to include all possible subheadings. The search was limited to studies printed in English and randomized controlled trials.

Selection of Articles

Research studying home visits by nurses includes studies that evaluate the outcomes of nursing services and those that describe the process of home visiting (McNaughton, 2000). This review was limited to outcome-focussed studies. In the literature, in-home preventive programs are described under various names including “comprehensive geriatric assessment” (Rubenstein et al., 1991), “home visit program”, “home based geriatric health screening program”, “case finding and surveillance”, and “community assessment and intervention” (Stuck et al., 1993b). For the purpose of this study, preventive home visits included:

- Home visits to independently living elderly people.
- Multi-dimensional assessment of clients in medical, functional, psychosocial, spiritual, and environmental domains (Stuck et al., 1993a).
- Identification of needs and strengths leading to specific recommendations aimed at decreasing risk factors and enhancing client strengths.

- Multiple follow-up contacts to address these recommendations.

In the first stage of selection, all articles were included that described randomized controlled trials studying the effects of interventions consisting of home visits to elderly people living in the community aged 65 and over. The study setting was limited to developed countries.

At the second stage, the investigator applied the following criteria to make a final selection of articles for review:

1. The study population includes elderly persons (65 years and older) living outside of an institutional setting.
2. The study design is a randomized controlled trial with a comparison group, evaluating a home visiting programme.
3. The intervention is provided by a Registered Nurse or equivalent (i.e. health or home visitor) alone or as part of an interdisciplinary health care team and occurred exclusively within the community setting.
4. The intervention involves the pursuit of a wide range of preventive outcomes rather than a single goal such as the prevention of falls or fractures.
5. The study provides information on client-focussed outcomes including mortality, use of acute hospitalization, health status, functional status, use of other health and social services, admission to long-term institutional care, caregiver outcomes and/or costs.

The literature that was *excluded* from this review included:

1. Studies that involved only screening and referral or recommendations, not an on-going home based preventive programme involving nursing services.
2. The home visits were exclusively aimed at clients who had been discharged from hospital.
3. Studies that analyzed home visits for therapeutic or rehabilitative purposes (treatment of depression, support for dementia, cardiac rehabilitation, stroke rehabilitation, terminal care, exercise programmes, vaccination programmes, or pharmacy programmes).

The reference lists of these selected papers were screened for other relevant studies.

Literature was excluded from this review if the patient sample was inappropriate.

Experts were contacted to identify additional published articles, unpublished literature, and secondary analysis of published data.

Quality Rating

To assess the methodological quality of studies determining the effectiveness of home based health promotion interventions, the investigator used an adapted version of the criteria developed by Roberts and Bennett (1997) and van Tulder, Assendelft, Koes, and Bouter (1997) (see Table 3). The maximum quality score for each study was 17 (“yes”, 1 point, “partly”, 0.5 points, and “no” or “unclear”, 0 points). No cut-off score was set to differentiate “good” and “bad” studies; the score was interpreted as relative quality. Critical appraisal criteria for critiquing review articles (Oxman, Cook, & Guyatt, 1994) were used to assess the quality of the review articles included (Table 4).

Table 3

*Criteria for Critical Assessment of an Article About "Effectiveness" of a Health Care Intervention
(Maximum Score: 17)*

Patient Selection (Maximum Score: 3)

Are the study methods the most appropriate for the research question?

Were the eligibility criteria clearly specified?

Were the study groups being studied comparable at baseline?

Outcome Measures (Maximum Score: 4)

Were all important health care outcomes reported?

Are the outcomes or health measures defined (reliability and validity reported)?

Was outcome assessment blinded to the intervention?

Was the timing of the outcome assessments in both groups comparable?

Complete Follow-Up (Maximum Score: 5)

Are all participants who started the study at baseline accounted for at the study's conclusion?

Is the withdrawal or drop out rate acceptable?

Is the withdrawal or drop out rate the same in all study groups?

Did the analysis include an intention to treat analysis?

Are subjects lost to follow-up similar to those retained in terms of baseline characteristics?

Statistics (Maximum Score: 3)

Was the sample size for each group described?

Were statistically significant results given?

Were clinically significant results given?

Clinical Applicability (Maximum Score: 2)

Are the study participants described and similar to your patients?

Is the health care intervention described and feasible? (i.e. compliance?, length of treatment?, who provided treatment?, what was their training?, accessibility? affordability?, acceptability?)

(Adapted from Roberts and Bennett (1997) and van Tulder et al. (1997).)

Table 4

Criteria for Critical Assessment of a Review Article or Overview

Did the overview address a focussed clinical question?

Was it specific and not too broad?

Stated in the title?

Were criteria used to select articles for inclusion appropriate?

What were the inclusion criteria?

Were design or methodology issues identified, i.e. RCT?

Is it unlikely that important relevant studies were missed?

What databases were used?

Did they use personal contacts?

Were an adequate number of studies used?

Were the included studies critically appraised according to appropriate criteria?

Type of studies reviewed?

Were criteria appropriate? What were criteria?

Did authors or reviewers agree on their assessments of the included studies?

Were bias or errors between reviewers obvious?

Are there two or more reviewers of the articles included in the review?

Did they look at inter-rater reliability?

Were results similar from the reviewed studies?

Were factors of each study, such as patients, exposure, outcome and designs, the same?

Was there a test of homogeneity?

Were the overall results of the review given in appropriate detail?

What were the summarized results?

Were they precise?

Were weighting factors used?

Are the results applicable to my patients?

Why? Were all clinically important outcomes considered?

Are the benefits worth the harms and costs?

Were there sub group analyses?

Were patients comparable to mine

(Adapted from Oxman et al., 1994.)

Criteria for assessing an article that included a cost assessment were as follows:

1. Was the viewpoint of the economic evaluation stated and rationale provided for the viewpoint?
2. Was the measure of cost consistent with the viewpoint?
3. Did the cost measure have established reliability and validity?
4. Are the results applicable to a Canadian system of national health and social insurance (Drummond, O'Brien, Stoddart, & Torrance, 1997)?

Data Extraction

The following data was extracted from the randomized controlled trials:

characteristics of the intervention, study and location, study objectives, source of study population and inclusion criteria, sample size, and results regarding mortality, hospital admission and hospital stay, health and functional status, use of other health and social services, admission to long term institutional care, caregiver outcomes and costs.

Results

Search Strategy

The search resulted in 12 published randomized controlled trials (Bernabei et al., 1998; Dalby et al., 2000; Gunner-Svensson, Ipsen, Olsen, & Waldstrom, 1984; Hall et al., 1992; Hebert, Robichaud, Roy, Bravo, & Voyer, 2001; Hendriksen, Lund, & Stromgard, 1984; Pathy et al., 1992; Stuck et al., 1995; Stuck et al., 2000; van Rossum et al., 1993; Vetter, Jones, & Victor, 1984; Zimmer, Groth-Juncker, & McCusker, 1985) with data on 13 trials (1 article included the results of 2 trials, Vetter et al. (1984), and 7

review articles (Elkan et al., 2001; Hirdes et al., 1994; Rubenstein, Siu, & Wieland, 1989; Stuck et al., 1993a; Stuck et al., 1993b; Stuck et al., 2002; van Haastregt et al., 2000) which met the inclusion criteria. One review article (Rubenstein et al., 1991) was an elaboration of Rubenstein et al. (1989) so the original article was reviewed. Two studies (Bula et al., 1999; Rubenstein et al., 1994) were an elaboration of Stuck et al. (1995), one study (Martin, Stuck, Minder, & Beck, 2000) was an elaboration of Stuck et al. (2000), and one study, Hendriksen, Lund, and Stromgard (1989), was an elaboration of Hendriksen et al. (1984) so the original articles were reviewed.

The process for identifying the 12 eligible randomized controlled trials is displayed in Figure 3.

The main characteristics of the 12 randomized controlled trials included in this review of preventive home visits for older people are summarized in Table 5. The trials are described in terms of study location, aims or objectives, source of study population, inclusion criteria, and sample size (see Table 5). The main characteristics of the 7 review articles are summarized in Table 6. The review articles are described in terms of the type of review, main objectives, inclusion criteria, outcomes measured, and number of studies included.

Methodological Quality of the Included Randomized Controlled Trials

Table 7 provides a summary of the methodological quality of the 12 randomized controlled trials. The quality scores ranged from 53% to 88%, with a mean score of 73.5%. The main shortcomings of the studies were in the areas of intention to treat

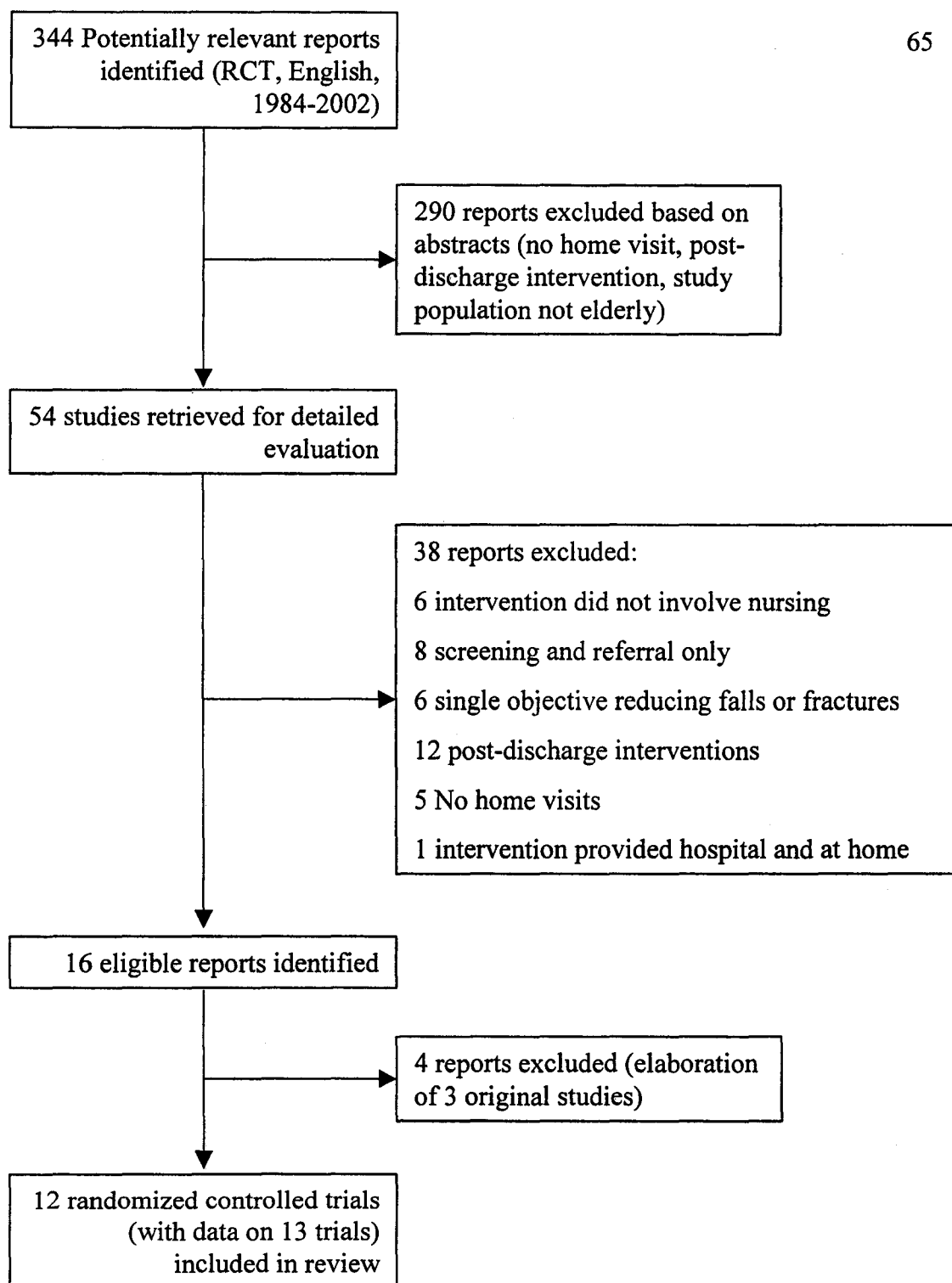


Figure 3. Identification of 12 eligible randomized controlled trials.

Table 5

Characteristics of 12 RCT's Included in Review of Home Based Health Promotion for Older Adults

Study and Location	Study Aims/Objectives	Source of Study Population	Inclusion Criteria & Age, yr	No Allocated Intervention/Control Group
Hebert et al. (2001) Quebec City, Quebec, Canada	To verify the efficacy of a multidimensional preventive programme on functional decline of older people	Quebec Insurance Register	≥75 years Living at home One risk factor for functional decline as identified by postal questionnaire (Hebert et al., 1997) Excluded low risk people from the study	250/253
Stuck et al. (2000) Bern, Switzerland	To test the hypothesis that preventive home visits with annual multidimensional assessments have more favorable effects on functional status and nursing home admissions in low-risk vs. high-risk older persons	Insurance Register	≥75 years Living in the community No terminal illness	Low Risk: (148/296) High Risk: (116/231)
Hall et al. (1992) New Westminster, BC Canada	To test the hypothesis that by providing seniors with a personalized health promotion programme in addition to the current standard LTC services, there will be an increase in the proportion of clients able to remain at home	LTC programme in New Westminster, BC	≥65 years Eligible for personal care at home programme	81/86

Table 5 continued

Study and Location	Study Aims/Objectives	Source of Study Population	Inclusion Criteria & Age, yr	No Allocated Intervention/Control Group
Zimmer et al. (1985) Rochester, New York USA	To examine the effectiveness of a team approach to home care for homebound chronically or terminally ill elderly	General Population	Elderly – age not defined Living at home Have “significant” illness (not defined) Requiring medical care No access to physician for home visit	85/82
Gunner-Svensson et al. (1984) Denmark	To examine the effectiveness of case finding and social medical intervention on preventing nursing home admissions	General population	≥70 years	2055/2073
Pathy et al. (1992) South Wales (UK)	To examine the effectiveness of a self-reported functional screening postal questionnaire with selective patient follow-up by a health visitor	General practice list	≥65 years Reported at least one problem on a postal questionnaire	369/356
Bernabei et al. (1998) Northern Italy	To evaluate the impact of a programme of integrated social and medical care among frail elderly people at home	Home health agency	≥65 years Recipients of home health services or home assistance programmes	100/100
Hendriksen et al. (1984) Denmark	To evaluate the effect of preventive community measures for elderly people at home	Population Register	≥75 years living at home	285/287
Vetter et al. (1984) Wales (UK)	To test effectiveness of health visitors’ visiting	Patients of two general practice lists: urban and rural	≥70 years living at home and part of 2 general practice lists	577/571

Table 5 continued

Study and Location	Study Aims/Objectives	Source of Study Population	Inclusion Criteria & Age, yr	No Allocated Intervention/Control Group
van Rossum et al. (1993) Netherlands	To assess the effect of preventive home visits by public health nurses on health and the use of services by elderly people	Population Register	Patients of GP, 75-84 years, not receiving home care	292/288
Stuck et al. (1995) Santa Monica, California USA	To test the effect of preventive home visits on the rate of disability in older persons living in the community	Voter registration list	≥75 years living at home and without severe cognitive impairment, language problems, terminal illness, or severe functional impairment	215/199
Dalby et al. (2000) Hamilton, Ontario CANADA	To evaluate the impact of a visiting primary care nurse on the rate of deaths, admissions to an institution and rate of health service use among frail elderly people living at home	Patients of two general practice lists	Patients of two GP's, ≥70 years and living at home, reported functional impairment; admission to hospital or bereavement on a postal questionnaire	73/69

Table 6

Characteristics of the 7 Review Articles Included in Review of Home Based Health Promotion for Older Adults

Review Article	Type of Review	Main Objectives	Inclusion Criteria & Year of Publication	Outcomes Studied	No. Studies Included (Dates of publication)
Stuck et al. (2002)	Systematic Review & Meta-Regression Analysis	To evaluate the effect of preventive home visits on functional status, nursing home admissions, & mortality	Randomized controlled trials on the effects of preventive home visits in older people (mean age > 70 years) Published in English, French, German, Italian, or Spanish Excluded studies that were based on patients at hospital discharge, home visits for therapeutic or rehabilitative purposes, and studies that tested home care services for disabled persons January 1985-November 2001	Functional Status Nursing home admissions Mortality	17 RCT's describing 18 trials 1984-2001
Elkan et al. (2001)	Systematic Review and Meta-Analysis	To evaluate the effectiveness of home visiting programmes that offer health promotion and preventive care to older people	Randomized and non-randomized trials evaluating a home visiting programme (Mean age > 65 years) Home visitor functioned within the scope of British health visitors (excluded studies where home visitor was a specialist in a branch of nursing other than health visiting) Excluded studies that involved screening and referral only 1966-1997	Mortality Admission to hospital Nursing home admissions Functional status Health status	15 trials (13 were RCT's) 1984-1995

Table 6 continued

Review Article	Type of Review	Main Objectives	Inclusion Criteria & Year of Publication	Outcomes Studied	No. Studies Included (Dates of publication)
Van Haastregt et al. (2000)	Systematic Review	To assess the effects of preventive home visits for elderly people living in the community	Randomized controlled trials studying the effects of interventions consisting of home visits to elderly people living in the community (> 65 years) Home visits were aimed at prevention or reduction of problems related to aging, multidimensional assessment of problems in at least 2 categories (medical, functional, psychosocial, or environmental) Not aimed exclusively at patients discharged from hospital Data present on at least 1 of the following outcomes: physical function, psychosocial function, falls, admissions to institutions, mortality 1966-1999	Physical function Psychosocial function Falls Admissions to institutions Mortality	15 RCT's 1981-1995
Stuck et al. (1993b)	Meta-analysis	What is the effectiveness of comprehensive geriatric assessment?	Randomized controlled trials evaluating the effectiveness of comprehensive geriatric assessment programmes: 1) hospital geriatric evaluation and management unit, 2) inpatient geriatrics consultation services, 3) home assessment service for elderly persons, 4) hospital home assessment service, and 5) outpatient assessment services. Year of publication not stated	Mortality Living at home Hospital admissions Physical function Cognitive function	6 RCT's evaluating the effectiveness of home assessment services with data on 7 trials 1984-1992

Table 6 continued

Review Article	Type of Review	Main Objectives	Inclusion Criteria & Year of Publication	Outcomes Studied	No. Studies Included (Dates of publication)
Stuck et al. (1993a)	Systematic Review	Summarize the characteristics of published programmes, the data on impacts and effectiveness, and identify under what circumstances such programmes may be effective	Randomized and non-randomized trials (including descriptive studies) Original findings described a geriatric in-home programme that performed multidimensional preventive assessment linked with a prevention plan - primary, secondary, and/or tertiary prevention was a main focus of the program. Excluded studies if the in-home preventive program was part of a home nursing program, hospital discharge planning, and home assessment program. Year of publication not specified	Summarized outcome data from 5 published RCT's	19 trials (8 RCT's & 11 Descriptive) Outcome data available on only 5 of the RCT's 1969-1990
Hirdes et al. (1994)	Literature Review	What is the evidence for the effectiveness of preventive home visits among frail elderly persons and what is the relevance of these findings to the Canadian context?	Randomized controlled trials evaluating the effectiveness of preventive home visits in the UK, Denmark and the Netherlands Year of publication not specified	Summarized outcome data from 3 published RCT's	3 RCT's describing 4 trials 1984-1992
Rubenstein et al. (1989)	Meta-analysis	What is the impact of comprehensive geriatric assessment on mortality?	Randomized controlled trials Concurrent control group Included mortality as an outcome measure	Meta-analysis of mortality data Summary of data citing other benefits of community based home assessment	2 RCT's evaluating the effectiveness of community based home assessment services with data on 3 trials

Table 7

Methodological Quality of 12 RCT's Included in Review of Home Based Health Promotion for Older Adults

Study	Patient Selection (Maximum 3)	Outcome Measures Appropriate (Maximum 4)	Complete Follow- up (Maximum 5)	Statistics (Maximum 3)	Clinical Applicability (Maximum 2)	Total (%) Score (Maximum 17)
Hebert et al. (2001)	Stratified by sex, age (75-84 and over 84) and level of disability Comparable at baseline Eligible if had at least one risk factor for functional decline as identified by postal questionnaire (3)	Baseline and 1 year: SMAF disability scale General well-being schedule Social provisions scale Health Service Use Interviewers blind to group allocation Reliability and validity reported with exception of health service use (Primary outcome: functional decline: i) increase of > 5 points on the SMAF score, ii) admission to nursing home or long-term care hospital, and iii) death during the follow-up period (3.5)	All subjects accounted for Drop out rate (24/503) (5%) Did not compare subjects retained to drop-outs on baseline characteristics (4)	Sample size described and appropriate to detect a difference with 80% power Clinical and statistical significant results given (3)	Educational preparation and role of nurses not described 10.2% did not receive follow-up calls (no recommendation made) Measured compliance Cost of intervention not calculated (1) No information regarding whether subjects were currently receiving health services Multi-dimensional assessment focused on medical conditions (tertiary domain) vs. identifying risk factors for functional decline, i.e. lack of physical activity, use of alcohol	14.5/17 (85)

Table 7 continued

Study	Patient Selection (Maximum 3)	Outcome Measures Appropriate (Maximum 4)	Complete Follow- up (Maximum 5)	Statistics (Maximum 3)	Clinical Applicability (Maximum 2)	Total (%) Score (Maximum 17)
Stuck et al. (2000)	1:2 randomized stratified by risk of nursing home admission Comparable at baseline with the exception of higher rate of people who needed assistance with ADL's in the intervention group (3)	Primary outcome: level of independence in ADL's, number of admissions to nursing homes (3 yr. f/u) Interviewers blind Secondary outcomes (2 yr. f/u): depression, cognitive function, gait and balance, general health, # meds, influenza vaccination status, health care costs and utilization Reliability and validity of measures not reported (3.5)	All subjects accounted for Did not compare subjects retained to drop-outs on baseline characteristics Not sure of how drop out rate in control compared to intervention group. Overall drop out rate after 3 years = 15% (3)	Sample size described and adequate to provide 80% power Clinical and statistical significant results given (3)	Educational preparation of nurses described Additional training not clearly described Cost of intervention provided Thorough description of intervention Did not look at compliance Mean # visits reported and length of visit (1.5)	14/17 (82%)

Table 7 continued

Study	Patient Selection (Maximum 3)	Outcome Measures Appropriate (Maximum 4)	Complete Follow- up (Maximum 5)	Statistics (Maximum 3)	Clinical Applicability (Maximum 2)	Total (%) Score (Maximum 17)
Hall et al. (1992)	Groups comparable at baseline with the exception of the fact that there were more subjects in the treatment group attending Seniors' programs (3)	Primary outcome – LTC level of care (12, 24 & 36 months) & survival analysis – obtained from MOHLTC data system. Secondary outcomes (36-month follow-up): Scale of Happiness, Health Locus of Control Scale, Health Opinion Survey, Loneliness Scale, Social Readjustment Rating Scale. Reliability and validity of measures not reported. Interviewers not blind (2)	All subjects accounted for at 36 month follow-up (15% drop out rate). Did not compare subjects retained to drop-outs on baseline characteristics. Not sure of how drop out rate in control compared to intervention group (3)	Sample size described and adequate to provide 90% power. Clinical and statistical significant results given (3)	86% of sample had weekly homemaking services. Eligibility included: independently mobile, able to eat and use a toilet without assistance, may require minimal help with bathing and dressing. Stable medically – no professional supervision. No information on nurse. Cost of intervention not addressed. Content of intervention described (1.5)	12.5/17 (74%)
Zimmer et al. (1985)	Groups comparable at baseline with the exception of the fact that there were more females in the control group. Eligibility criteria vague, i.e. significant illness, age not specified (2)	Health Service Utilization, Sickness Impact Profile, Morale or life satisfaction, Patient and caregiver satisfaction questionnaire. Provided references for measures – no discussion of reliability and validity. Patients used a diary to record health service utilization – reliability? Unsure if interviewers were blind (2.5)	All subjects accounted for at follow-up (10.2% drop out rate). Attrition rate higher for controls (15.9%) than for intervention (4.6%). Did not compare subjects retained to drop-outs on baseline characteristics (2)	Small sample size. Provided clinically and statistically significant results (3)	Intensity of visits not described. Subjects were severely disabled homebound patients with multiple medical problems (1)	10.5/17 (62%)

Table 7 continued

Study	Patient Selection (Maximum 3)	Outcome Measures Appropriate (Maximum 4)	Complete Follow- up (Maximum 5)	Statistics (Maximum 3)	Clinical Applicability (Maximum 2)	Total (%) Score (Maximum 17)
Gunner- Svensson et al. (1984)	Random allocation Groups comparable at baseline Eligibility criteria specified (3)	Primary outcome: incidence of nursing home admission and duration Mortality rate Did not assess functional or health status Collected data through in- home interviews Unsure if interviewers were blind (2)	Specified number lost to follow-up due to death Did not compare subjects retained to drop-outs on baseline characteristics Intention to treat analysis (2.5)	Large sample Provided clinically and statistically significant results (3)	General description of age, sex, marital status of participants. No description of functional status. Affordability & accessibility of intervention not described. Nature of intervention not explicit Conclusions are not applicable to areas other than those with similar eligibility criteria and access to services (Denmark) (1)	11.5/17 (68%)

Table 7 continued

Study	Patient Selection (Maximum 3)	Outcome Measures Appropriate (Maximum 4)	Complete Follow- up (Maximum 5)	Statistics (Maximum 3)	Clinical Applicability (Maximum 2)	Total (%) Score (Maximum 17)
Pathy et al. (1992)	Randomization by household Groups comparable at baseline Eligibility criteria specified (3)	Mortality rate, hospital admissions, admissions to nursing homes, self-rated health, and use of health and social services. All information collected from practice records except self-rated health and use of selected health services (postal q). Data on mortality, hospital and nursing home admissions cross checked with other sources. Data collectors blind (3.5)	All subjects accounted for at 3 year follow-up Low drop-out rate 1. similar in both groups Did not compare subjects retained to drop-outs on baseline characteristics Intention to treat analysis (4.5)	Large sample size – no sample size calculation Clinically and statistically significant results given (3)	Few demographic characteristics given (age, sex, living status) Intervention generally described - no information on cost, little information describing the process of care (1)	15/17 (88%)
Bernabei et al. (1998)	Comparable at baseline Current recipients of conventional community services (eligibility criteria for these services not specified) (2.5)	Admission to institution Use and cost of health services Physical function (BC LTC assessment form) and cognitive function (SPMSQ and geriatric depression scale) Mortality – National Death Registry Data collectors blind to patient assignment Intention to treat analysis (3.5)	Other than mortality rate, subjects lost to follow-up not reported 1 yr. mortality groups comparable Did not compare subjects retained to drop-outs on baseline characteristics (3)	Adequate sample size – however, no justification given Clinically and statistically significant results given (2.5)	Intervention: Unclear who the case managers were and the role of the nurse within the team Cost of the case management part of the intervention reported Demographics adequately reported (1.5)	13/17 (76%)

Table 7 continued

Study	Patient Selection (Maximum 3)	Outcome Measures Appropriate (Maximum 4)	Complete Follow- up (Maximum 5)	Statistics (Maximum 3)	Clinical Applicability (Maximum 2)	Total (%) Score (Maximum 17)
Hendriksen et al. (1984)	Random allocation Eligibility criteria specified Groups comparable at baseline with regards to sex, marital status, age (3)	Incidence of hospital and nursing home admissions, mortality, and use of home nursing and social services – obtained from medical records Health and functional status not assessed Interviewers also provided intervention (not blinded) Physicians blind Timing of assessment differed between two groups(only intervention group interviewed at baseline) (1)	25% of intervention group lost to follow-up No information on control group Reasons for lost to follow-up not explicit Did not compare subjects retained to drop-outs on baseline characteristics Intention to treat analysis (2)	No sample size justification provided Clinical and statistically significant results reported (2)	Educational preparation/training of nurses not described Minimal information provided on the content of the intervention Subjects in both groups also received home nursing care during the study – possible co- intervention Calculated cost of intervention in Danish kroner Mean of 12 visits over 3 year follow-up (1) Continuity of provider	9/17 (53%)

Table 7 continued

Study	Patient Selection (Maximum 3)	Outcome Measures Appropriate (Maximum 4)	Complete Follow- up (Maximum 5)	Statistics (Maximum 3)	Clinical Applicability (Maximum 2)	Total (%) Score (Maximum 17)
Vetter et al. (1984)	Random allocation Subjects comparable at baseline Eligibility criteria based on age and affiliation with GP (3)	Outcomes: physical & mental disability (anxiety and depression), social characteristics, type and quality of housing, quality of life, use of health and social services, available and characteristics of caregiver. Reliability and validity of measures not described. Unsure if interviewers were blind. Timing of assessments comparable (2)	All subjects accounted for at 2 year follow-up Low number lost to follow-up (5%) and comparable in both groups No intention to treat (5)	Clinically and statistically significant results reported No sample size justification provided (2)	Preparation/training of nurses not described Continuity of provider Minimal information provided on intervention, i.e. content, cost, compliance rate Subjects in both groups also received home nursing care – possible co-intervention Intervention acceptable to clients (1)	13/17 (76%)
van Rossum et al. (1993)	Eligibility criteria based on age and affiliation with general practice Recruited by postal questionnaire Comparable at baseline with exception of functional status -higher for intervention group (2)	Outcomes: mortality, self rated health status, functional state, psychological state, well-being, use of services and cost. Outcome assessment same for both groups using a postal questionnaire at 1 ½ yrs and end of intervention Also interviewed at end of study: Interviewers were blind. Intention to treat analysis. Reliability validity not reported (3)	All subjects accounted for Low drop out rate (8%) Intention to treat analysis (4)	Clinical significance, confidence intervals, p-values not reported Sample size justification not provided (1)	Subjects received a mean of 12 visits with 95 subjects receiving additional visits Brief description of intervention and cost – reference given for further details on intervention. Continuity of provider. Educational background of nurses not clear or nature and intensity of training in home health care. Some demographics given (1)	11/17 (65%)

Table 7 continued

Study	Patient Selection (Maximum 3)	Outcome Measures Appropriate (Maximum 4)	Complete Follow-up (Maximum 5)	Statistics (Maximum 3)	Clinical Applicability (Maximum 2)	Total (%) Score (Maximum 17)
Stuck et al. (1995)	Randomized stratified by age and sex Comparable at baseline Eligibility criteria clearly specified (3)	Primary outcome: functional status (ADL and IADL) and nursing home admissions Secondary outcomes: hospital and length of stay in nursing home, visits to GP, use of community services Reliability and validity of measures not described. Missing clinical data bias. Unsure if interviewers were blind Timing of outcome assessments comparable (2)	Intention to treat analysis All subjects accounted for and reasons provided for drop-out Low drop-out rate 21% (Intervention) and 26% (control) (4)	Clinically and statistically significant results given and CI Sample size justification provided (3)	Measured compliance with recommendations Calculated cost of intervention Generalizability limited: subjects were more educated, had a higher mortality rate and lower rate of hospital admissions than general US population Detailed description of content of intervention (2)	14/17 (82%)
Dalby et al. (2000)	Groups comparable at baseline with exception of higher number in intervention group who had lost someone close. Specified eligibility criteria (3)	Primary outcome: combined rate of death and institutionalization Secondary outcome: use of health and social services. Did not assess cost, quality of life, and functional status. Data collected from medical records. Timing of data collection comparable Assessor blind (2)	All subjects accounted for at follow-up Low rate of dropout and similar between groups: (Intervention 19%; control 22%) (3)	Sample size justification provided - small sample size - 50% power. Statistically and clinically significant results given No confidence intervals given (3)	Background of nurse and # nurses not explicit. Intensity, duration and cost of in-home visits and telephone contacts not described. Only targeted high risk subjects; therefore, generalizability to low risk subjects is limited (1)	12/17 (71%)

analysis, reporting on the presence or absence of co-interventions, reporting on the reliability and validity of the outcome measures, reporting on compliance and cost of the intervention, blinding of outcome assessors, handling of drop-outs, and description of the background and role of the nurses providing the intervention. In addition, several of the studies were underpowered due to small sample sizes (Hall et al., 1992; Zimmer et al., 1985; Dalby et al., 2000).

Methodological Quality of the Included Review Articles

Table 8 provides a summary of the methodological strengths and limitations of the 7 review articles. Four of the articles were systematic reviews and meta-analyses (Elkan et al., 2001; Rubenstein et al., 1989; Stuck et al., 1993b; Stuck et al., 2002). The remaining three review articles consisted of systematic reviews (Stuck et al., 1993a; van Haastregt et al., 2000) and a literature review (Hirdes et al., 1994). With the exception of two articles (Elkan et al., 2001; Stuck et al., 1993a), all review articles included randomized controlled trials only. The main shortcomings of the review articles were in the areas of literature search strategies, use of two or more reviewers, reporting inter-rater reliability, critical appraisal of included studies, statistical analysis, and the generalizability of the results. In addition, several of the review articles were underpowered due to the fact that they were based on a small number of trials (Hirdes et al.; Rubenstein et al.; Stuck et al., 1993a; Stuck et al., 1993b).

Table 8

Summary of Results and Methodological Quality of the 7 Review Articles Included in Review of Home Based Health Promotion for Older Adults

Review Article	Results (Based on no. Trials)	Summary of Methodological Quality	
		Strengths	Limitations
Stuck et al. (2002) Meta-analysis	34% reduction in nursing home admissions only for programs with at least 9 home visits (13 trials) 24% reduction in risk of functional status decline in trials that combined multidimensional geriatric assessment with follow-up among persons at lower risk of death (16 trials) 24% reduction in mortality for clients aged 72.7-77.5 years (18 trials)	Addressed focused clinical question Inclusion criteria clearly specified Used appropriate and thorough methods for searching the literature Databases used: Medline, Psychinfo, Embase, Cochrane Library Correctly applied criteria on effectiveness to appraise articles Sub-group analysis completed on basis of age, duration and content of intervention, and risk of death	Inter-rater reliability not reported regarding assessments of included studies
Elkan et al. (2001) Meta-analysis	24% reduction in mortality in elderly people in general (8 trials) No effect on admission to hospital (6 trials), health status (5 trials), or functional status (7 trials) 35% reduction in nursing home admissions in elderly people in general (5 trials) None of the three predictors (population type, duration of intervention, and age group) had any effect on mortality or admission to nursing homes	Addressed focused clinical question Inclusion criteria clearly specified Databases used: CINAHL, Embase, Cochrane Library Correctly applied criteria on effectiveness to appraise articles Inter-rater reliability reported re: assessment of quality of included trials Sub-group analysis completed on basis of population (general population vs. those at risk), duration of intervention (< 2 vs. > 2 yrs.), and age group (< 75 vs. > 75 yrs.)	Combined trials of in-home preventive programs with trials of home based care for clients discharged from hospital Nursing intervention limited to scope of practice of British Health Visitors – excluded studies involving a district nurse Personal contact with authors not made Included studies which did not meet inclusion criteria

Table 8 continued

Review Article	Results (Based on no. Trials)	Summary of Methodological Quality	
		Strengths	Limitations
Van Haastregt et al. (2000) Systematic Review	Favorable effects of home visits observed in 5 out of 12 trials measuring physical functioning, 1 out of 8 measuring psychosocial functioning, 2 out of 6 measuring falls, 2 out of 7 measuring admission to institutions, and 3 out of 13 measuring mortality	Addressed focused clinical question Inclusion criteria clearly specified Databases used: Medline, Embase, Cochrane Library Correctly applied criteria on effectiveness to appraise articles Disagreement between reviewers resolved by consensus	Included trials where home visits were undertaken solely by non-nursing personnel (Carpenter & Demopoulos, 1990; Sorenson & Sivertsen, 1988), and trials in which the nurse was involved only in screening and referral (Fabacher et al., 1994; McEwan, Davison, Forster, Pearson, & Stirling, 1990) Inter-rater reliability not reported. Qualitative analysis; no statistical analysis. Publication bias: Search strategy limited to computerized data bases
Stuck et al. (1993b) Meta-analysis	14% decrease in mortality after 3 years (6 trials) Medical control over CGA recommendations was associated with reductions in mortality at 2 years No effect on living at home, hospital admissions, or physical and cognitive function	Addressed focused clinical question Databases used: Medline Personal contact with authors, unpublished literature Subgroup analysis Two reviewers used to select articles	Limited databases to Med-line. Based analysis and conclusions on only 6 trials. Inclusion criteria not clearly specified. Statistically combined studies evaluating home assessment services when they differed in terms of programme characteristics, i.e. combined trials of in-home preventive programs with trials involving screening and referral only. No Inter-rater reliability

Table 8 continued

Review Article	Results (Based on no. Trials)	Summary of Methodological Quality	
		Strengths	Limitations
Stuck et al. (1993a) Systematic Review	Reduction in mortality observed in 3 trials Reduction in hospital admissions and fewer medical calls observed in 1 trial	Databases used: Medline Addressed focused clinical question Inclusion criteria specified	Review based on only 5 RCT's which consisted of in-home preventive programmes and trials of case finding and referral only Qualitative analysis of study findings Inter-rater reliability not reported
Hirdes et al. (1994) Literature Review	Summarized results of three trials Discussed relevance of these results to the Canadian Context	All included RCT's were in-home preventive programmes Implications for the Canadian context clearly described	Non-specific inclusion criteria No information on literature search strategies Review based on only 3 RCT's Qualitative analysis of study findings Inter-rater reliability not reported
Rubenstein et al. (1989) Rubenstein et al. (1991) Meta-analysis	32% reduction in mortality for all comprehensive geriatric programmes including inpatient, outpatient and community based home assessment Further analysis by Rubenstein et al., (1991) found a 29% reduction in mortality for home assessment services	Addressed focused clinical question Criteria for inclusion specified for meta-analysis	Data on CBAS limited to 2 RCT's Inter-rater reliability not reported No information on literature search strategies

*Outcomes of the Studies and Review Articles on the
Effectiveness of Home Based Health Promotion for Older People*

This review is a qualitative analysis of the 12 available randomized controlled trials and 7 review articles on the effectiveness of home based health promotion for older people. Although individual studies and meta-analyses suggest that home based preventive programmes are effective, there is inconsistency regarding whether they can prevent functional decline, reduce mortality, hospitalization, and nursing home admissions, which programme components are effective, and which populations are most likely to benefit (Eggar, 2001; Stuck et al., 2002; van Haastregt et al., 2000). Their extreme heterogeneity with respect to subject selection, characteristics of the intervention, length of follow-up, measures of effectiveness, and context may explain discrepant results among these studies. Consequently, the investigator decided not to pool the results of the trials statistically (Cook, Sackett, & Spitzer, 1995).

The main results of the included review articles and trials are shown in Tables 8 and 9 respectively. Measures of effectiveness included mortality, hospital admission and hospital stay, health and functional status, use of other health and social services, admission to long-term institutional care, caregiver outcomes, and cost. With the exception of two studies, Vetter et al. (1984) in Powys (UK) & Hebert et al. (2001), all studies reported at least one (significant) favourable effect of the in-home preventive intervention. None of the trials or review articles reported a negative effect. The most commonly reported outcomes among the included studies and review articles were:

Table 9

Outcomes of Preventive Home Visits to Older Adults: Hospital Admission, Health and Functional Status, Mortality, Admission to Long-Term Care, Use of Other Health and Social Services, Costs, and Caregiver Outcomes

Study	Mortality	Hospital Admission and Hospital Stay	Health Status	Functional Status	Use of Other Health and Social Services	Admission to Long Term Institutional Care	Caregiver outcomes	Costs
Hebert et al. (2001)	No difference	Not assessed	No effect on well-being or perceived social support	No effect on functional autonomy	No difference	No difference	Not assessed	Not assessed
Stuck et al. (2000)	No difference	No significant difference in hospital use	Improved vaccination coverage for influenza for low-risk subjects No effect on level of depression	Low risk subjects were more independent in basic ADL at 3 years	Higher use of primary care providers at 2 years for low-risk subjects No difference in use of traditional home care services	Higher use of nursing homes at 3 years in high-risk group	Not assessed	Cost analysis completed Net cost savings in the third year (US \$1403/person per year) due to prevention of nursing home admits for low risk clients
Hall et al. (1992) ¹	Decreased mortality at 12, 24, & 36 months *	More at home and at the PC level at 2 & 3 yrs: (75.3% vs. 59.3% at 3 yrs)	No effect on psychological status	Not assessed	Not assessed	Live at home 3 months longer Fewer admissions to long-term care	Not assessed	Not assessed

Table 9 continued

Study	Mortality	Hospital Admission and Hospital Stay	Health Status	Functional Status	Use of Other Health and Social Services	Admission to Long Term Institutional Care	Caregiver outcomes	Costs
Zimmer et al. (1985)	Not assessed	Fewer hospitalizations and outpatient visits	Not assessed	No effect	Not assessed	Fewer nursing home admissions	Caregivers expressed significantly higher satisfaction with the care	Used more in-home services but overall cost was lower than controls
Gunner-Svensson et al. (1984)	No difference	Not assessed	Not assessed	Not assessed	Not assessed	Fewer nursing home admissions for women over 80 years at the end of the follow-up period and after 2.5 yrs.	Not assessed	Not assessed
Pathy et al. (1992)	Decreased mortality during all 3 years of the intervention	Mean length of hospital stay shorter for subjects aged 65-74 years (difference: 4.6 days)	Increase in self-rated health	No effect	Fewer specialist visits Increased visits by GP	No difference	Not assessed	Not assessed
Bernabei et al. (1998)	No effect	Lower use of hospital and emergency room. No. of days spent in hospital was reduced by 50%	Increased cognitive status and decreased level of depression	Increased functional status (ADL's and IADL's) ²	No difference	Number of days spent in nursing homes reduced	Not assessed	23% cost savings due to reductions in nursing home & hospital expenses

Table 9 continued

Study	Mortality	Hospital Admission and Hospital Stay	Health Status	Functional Status	Use of Other Health and Social Services	Admission to Long Term Institutional Care	Caregiver outcomes	Costs
Hendriksen et al. (1984)	Reduced mortality	Reduced no. of hospital admissions: Reduced no. of hospital bed days	Not assessed	Not assessed	Increased use of home health care services Lower use of emergency medical services	No difference	Not assessed	Calculated costs of intervention vs. gains in bed days, no. of months in nursing home and EMS Decreased costs of medical care
Vetter et al. (1984)	Reduced mortality in urban practice	Not assessed	No difference in anxiety scores, depression, quality of life, or social contacts	No difference in physical disability or mobility	Increased use of home health services	Not assessed	Not assessed	Not assessed

Table 9 continued

Study	Mortality	Hospital Admission and Hospital Stay	Health Status	Functional Status	Use of Other Health and Social Services	Admission to Long Term Institutional Care	Caregiver outcomes	Costs
van Rossum et al. (1993)	No difference	No difference	No difference in well-being, loneliness, or depressive complaints	No difference in self-rated health, health complaints, IADL's or ADL's	Increased use of community care, i.e. home help, home nursing care, and outpatient care	No difference	Not assessed	No difference
Stuck et al. (1995)	No difference	No difference	Not assessed	More independent in basic ADL's No effect on IADL's	Increased use of physicians, services promoting socialization	Fewer permanent nursing home admissions No effect on short-term nursing home admissions	Not assessed	Cost savings related to prevention of permanent nursing home admissions
Dalby et al. (2000)	No difference	No difference	Improved vaccination coverage	Not assessed	No difference	No difference	Not assessed	Not assessed

Differences were statistically significant, $p < 0.05$

- 1 Hall et al. (1992) tested the difference between "living at home" versus "died or admitted to a facility"
- 2 Instrumental ADL (IADL) includes cooking, handling finances, handling medication, housekeeping, laundry, shopping, using the telephone, and using transportation

mortality, admission to long-term institutional care, hospital admissions, use of other health and social services, and health and functional status. None of the review articles and only half of the studies examined the effect of the intervention on cost; only four studies examined the effect on emotional status (i.e. depression). One study examined caregiver outcomes (Zimmer et al., 1985).

Effects on Mortality

In four of the eleven studies investigating the effects of the intervention on mortality, the intervention group showed a significantly lower mortality rate in comparison to the control group (Hall et al., 1992; Hendriksen et al., 1984; Pathy et al., 1992; Vetter et al., 1984 in Gwent). It is noteworthy that the four meta-analyses of controlled trials showed a 14-29% reduction in mortality among clients receiving an in-home preventive programme (Elkan et al., 2001; Rubenstein et al., 1991; Stuck et al., 1993b; Stuck et al., 2002). Pathy et al. (1992) suggested that the reduction in mortality in the intervention group is due to clearer identification of health, social, and financial problems, and the responses to them and enhanced social support.

Effects on Use of Long-Term Institutional Care and Acute Care Hospitals

Eleven studies investigated the effect of the intervention on admission to institutions and/or length of stay in hospital or nursing homes. In five of these, the intervention group showed either a significantly lower number of admissions to hospital or a lower number of days spent in hospital compared to the control group (Bernabei et al., 1998; Hall et al., 1992; Hendriksen et al., 1984; Pathy et al., 1992; Zimmer et al., 1985). Pathy

et al. (1992) found a reduction in hospital stay for younger subjects only (aged 65 to 74 years). The two meta-analyses that examined acute hospitalization as an outcome did not report any significant effects (Elkan et al., 2001; Stuck et al., 1993b).

Five of the ten studies that examined long-term care as a measure of effectiveness, showed significantly lower use of long-term institutional care among those receiving an in-home preventive intervention (Bernabei et al., 1998; Gunner-Svensson et al., 1984; Hall et al., 1992; Stuck et al., 1995; Zimmer et al., 1985). In a meta-analysis of 13 controlled trials, Stuck et al. (2002) reported a 34% reduction in nursing home admissions. Hall et al. (1992) looked at the combined outcome of mortality and institutionalization and found that more intervention clients were alive and living outside an institutional setting compared to the control group at both the two and three year follow-up. Only one study found a higher use of long-term institutional care among the intervention group for clients classified as high risk of functional decline (Stuck et al., 2000). The authors suggested that this finding could be explained by the assumption that a preventive intervention works best at early and reversible stages in the process from health to disability; more disabled and frail clients require a more intensive intervention such as institutional care (Rubenstein et al., 2001).

Stuck et al. (1995) suggested that the controversial results on the effectiveness of in-home preventive programmes on the use of acute hospitalization might be due to two opposing effects of the intervention. That is, the detection of previously unrecognized

problems may have simultaneously increased hospital admissions and prevented unnecessary admissions among others.

Effects on Use of Other Health and Social Services

Nine studies investigated the effects of the intervention on use of other health and social services. Six of these studies showed a higher use of services such as primary health care providers (Pathy et al., 1992; Stuck et al., 1995; Stuck et al., 2000), community health services (Hendriksen et al., 1984; van Rossum et al., 1993; Vetter et al., 1984), and services promoting socialization (Stuck et al., 1995). An increased use of health and social services can be expected with an overall decrease in the use of hospitalization and other institutional care. The lack of effect on use of other health services may be related to two factors that are independent of the client's need for services: a) the differences in the intervention's focus on referral to outside agencies or b) the unavailability of other health and social services.

Effects on Health and Functional Status

Six studies looked at psychosocial factors, such as, level of depression (Bernabei et al., 1998; Stuck et al., 2000; van Rossum et al., 1993; Vetter et al., 1984), psychological status (Hall et al., 1992), anxiety (Vetter et al.), loneliness (van Rossum et al.), and perceived social support (Hebert et al., 2001). Only one study demonstrated favourable effects of the intervention on psychosocial status by reducing the level of depression (Bernabei et al.).

Four out of eight studies that examined functional status showed clearly that clients of in-home preventive programmes are more likely than controls to experience and retain functional gains (Bernabei et al., 1998; Pathy et al., 1992; Stuck et al., 1995; Stuck et al., 2000). In these studies, the intervention group showed a major improvement in at least one measure of physical functioning (basic or instrumental) (Bernabei et al., 1998; Stuck et al., 1995; Stuck et al., 2000), self-rated health (Pathy et al., 1992), or cognitive status (Bernabei et al.). Two meta-analyses that examined functional or health status as an outcome reported a positive effect. Stuck et al. (2002), in a meta-analysis of 16 controlled trials reported a 24% reduction in the risk of functional status decline in trials that combined multi-dimensional geriatric assessment with follow-up among persons at lower risk of death.

Two studies showed an improvement in vaccination coverage among intervention clients versus usual care clients (Dalby et al., 2000; Stuck et al., 2000).

Effects on Cost

Six studies investigated the effects of the intervention on costs. Is the intervention being delivered to those who would benefit from it with an optimal use of resources? Five of these studies showed cost savings due to prevention of nursing home admissions (Bernabei et al., 1998; Stuck et al., 1995; Stuck et al., 2000; Zimmer et al., 1985) and hospital admissions (Bernabei et al.; Hendriksen et al., 1984; Zimmer et al., 1985). However, none of these studies were completed in a Canadian context. Therefore, the generalizability of the results to a Canadian system of national health and social

insurance is limited. Additionally, the cost analyses in these studies were limited to the costs of institutional care; the use and cost of the full range of health and social services has not been examined. In sum, none of the studies provided adequate information regarding the effectiveness of an in-home preventive programme on costs from a societal point of view.

Effects on Caregivers

Only one study examined the effect of the intervention on caregivers (Zimmer et al., 1985). In this study, caregivers in the intervention group expressed significantly higher satisfaction with the care than those in the usual care group. This study is unique in terms of its' focus on both the client and caregiver as the recipient of care. For example, the team provided support to the informal care provider and a 24-hour telephone service over the six months of the study (Zimmer et al., 1985).

Summary

Table 10 provides a summary of the results of the studies for the nine main outcome measures that were identified in the included randomized controlled trials. Favourable and significant effects of the intervention were observed in 4 out of the 11 trials measuring mortality, 4 out of the 8 trials measuring functional status, 5 out of the 9 trials measuring hospital admissions, 5 out of the 10 trials measuring admission to long-term institutional care, 1 of the 4 trials measuring level of depression, 6 out of the 9 trials measuring use of other health and social services, and 5 out of the 6 trials measuring cost. None of the trials measuring affect (i.e. anxiety, loneliness) showed a significant effect.

Table 10

Summary of the Outcomes Studied in the 12 RCT's included in the Review of The Effectiveness of Home Based Health Promotion for Older Adults

Benefit Claimed or Demonstrated	Total number of Studies	Studies Showing Significant Positive Findings	Studies Showing no Difference in Findings
Reduced Mortality	11	Hall et al. (1992) Hendriksen et al. (1984) Pathy et al. (1992) Vetter et al. (1984)	Bernabei et al. (1998) Dalby et al. (2000) Gunner-Svensson et al. (1984) Hebert et al. (2001) Stuck et al. (1995) Stuck et al. (2000) van Rossum et al. (1993)
Improved Functional Status	8	Bernabei et al. (1998) Pathy et al. (1992) Stuck et al. (1995) Stuck et al. (2000)	Hebert et al. (2001) van Rossum et al. (1993) Vetter et al. (1984) Zimmer et al. (1985)
Decreased Hospital Admissions and Hospital Stay	9	Bernabei et al. (1998) Hall et al. (1992) Hendriksen et al. (1984) Pathy et al. (1992) Zimmer et al. (1985)	Dalby et al. (2000) Stuck et al. (1995) Stuck et al. (2000) van Rossum et al. (1993)
Decreased Admission to Long-Term Institutional Care	10	Bernabei et al. (1998) Gunner-Svensson et al. (1984) Hall et al. (1992) Stuck et al. (1995) Zimmer et al. (1985)	Dalby et al. (2000) Hebert et al. (2001) Hendriksen et al. (1984) Pathy et al. (1992) van Rossum et al. (1993)
Decreased Level of Depression	4	Bernabei et al. (1998)	Stuck et al. (2000) van Rossum et al. (1993) Vetter et al. (1984)
Improved affect, (i.e. anxiety, mental status, social support)	4	0	Hall et al. (1992) Hebert et al. (2001) van Rossum et al. (1993) Vetter et al. (1984)
Increased Use of Health and Social Services	9	Hendriksen et al. (1984) Pathy et al. (1992) Stuck et al. (1995) Stuck et al. (2000) van Rossum et al. (1993) Vetter et al. (1984)	Bernabei et al. (1998) Dalby et al. (2000) Hebert et al. (2001)
Reduced Cost	6	Bernabei et al. (1998) Hendriksen et al. (1984) Stuck et al. (1995) Stuck et al. (2000) Zimmer et al. (1985)	van Rossum et al. (1993)
Improved Caregiver Outcomes	1	Zimmer et al. (1985)	0

Noteworthy is that the study of the effects of the intervention on the level of depression and caregiver well being has been largely ignored. In addition, only three studies addressed the impact of the intervention on perceived social support (Hebert et al., 2001), and level of social contacts (van Rossum et al., 1993; Vetter et al., 1984). None of the studies addressed the level of acceptability or satisfaction with the study intervention.

These findings are significant and point to several limitations in the literature. The first limitation relates to the lack of focus on depression and perceived social support. In a systematic review of the literature, Stuck et al. (1999) found that depression and low frequency of social contacts were major risk factors for functional decline in community-dwelling elderly people. In comparison with the general elderly population, those clients who receive home care are older, more socially isolated, and have high rates of disability and depression (Banerjee, 1993). The prevalence of depression among those receiving home care is estimated to be between 26% and 44% - at least twice that among elderly people in general (Banerjee; Harrison et al., 1990; Ilife et al., 1993). The role of social support in buffering the effects of stress is well documented, and studies have shown an association between low social support and higher rates of depression (Bazargan & Hamm-Baugh, 1995; Chu, 1995; Lamb, 1996; Steffens, Hays, George, Krishnan, & Blazer, 1996). Although 80-90% of persons with depressive disorders can be successfully treated, only about one in three persons who suffer from depressive disorders seeks treatment in the general or speciality mental health sector (Reiger et al., 1988).

A second limitation relates to the lack of focus on quality of life. Effectiveness has been predominantly measured within an objective context focusing on objective rather than subjective measures of effectiveness. What outcomes would older adults select as indicators of effective services (Clark, 2001)?

A third limitation relates to the lack of attention to informal caregivers. Caregivers, rather than professionals, are the main providers of care to the chronically ill (Morris, Sherwood, & Morris, 1996). Approximately 80% of community dwelling, functionally impaired elderly individuals receive assistance entirely from informal care providers (Clark, 1996; Ferguson, 1995; National Advisory Council on Aging (NACA), 1999). Clinicians, practitioners and policy makers have acknowledged the sustained energy and commitment that are required by caregivers, and clearly sanction the need to support family caregivers in their role (Ontario Ministry of Health (OMH), 1998; Minister of Long-term Care and Responsibility for Seniors (MLTCRS), 1999; NACA, 1999). This is related to the recognition that without adequate supports in place to enable caregivers to fulfil their roles, the cost of formal health care will rise substantially (CNA, 1998; Health and Welfare Canada, 1991; Levine, 1999; NACA), particularly related to institutionalization (Hu, Huang, & Cartwright, 1986; Weinberger et al., 1993), and potential secondary disability in the primary caregiver (Roberts et al., 1999).

A final limitation relates to the lack of studies, which include a strong cost assessment. A potential barrier to the implementation of preventive home visits is the reluctance to fund additional services in times of fiscal constraint. Even if preventive

home visits demonstrate a reduction in use of hospitalization and/or an increase in health status, they are unlikely to be introduced without clear evidence of costs averted (Hirdes et al., 1994). None of the studies addressed the level of acceptability or satisfaction with the study intervention.

Summary of the Evidence: Factors Contributing to the

Success of Home Based Health Promotion and Preventive Programmes

A major contributor to the discrepant findings among previous studies of preventive home visits is the wide range of differences in the design, intensity, and duration of the in-home preventive intervention used by the various studies (Rubenstein & Stuck, 2001). Table 11 outlines the main characteristics of the interventions of the 12 studies included in this review. Studies differed specifically in terms of target populations, programme components, type of provider, and visit intensity, duration, and context. Three meta-analyses conducted sub-group analyses to identify features that distinguish highly effective programmes from those that are less effective (Elkan et al., 2001; Stuck et al., 1993b; Stuck et al., 2002). The findings from these reviews are incorporated in the following discussion of the characteristics of in-home preventive programmes.

Target Populations: Which populations are most likely to benefit?

Selection of the target population can be an important factor in determining the effectiveness of a health care intervention (Tugwell, Bennett, Sackett, & Haynes, 1985; van Haastregt et al., 2000). Therefore, a potential contributor to the discrepant findings is the wide range of differences in the composition of the study population among the

Table 11

Characteristics of Interventions of 12 RCT's Included in Review of Home Based Health Promotion for Older Adults

Study and Base of Intervention	Content of Intervention	Intervention Personnel	Duration and Intensity of Visits (Compliance measured?)	Comparator (Characteristics of Standard Care)	Mean Number of Follow-up Visits
Hebert et al. (2001) Quebec City, Quebec, CANADA Primary Care	In-home visit at beginning of study Used a standardized instrument to evaluate dimensions of risk – focused on medical or geriatric conditions requiring further treatment or rehab Results sent to family physician with recommendations for interventions In some cases, nurse made a direct referral to community agencies Nurse monitors client's progress and compliance with treatment via telephone	Trained nurse	1 year follow-up Initial in-home visit Monthly (12) telephone contacts Reported number of recommendations made for each problem and compliance with the recommendations	Regular care	0 Telephone contacts only
Stuck et al. (2000) Bern, Switzerland Geriatric Research Unit, Department of Geriatrics and Rehabilitation	Annual multidimensional geriatric assessments in their homes including medical history, physical exam, blood samples, hearing, vision, nutrition, oral health, medication use, safety, social support, ease of access to external environment Developed a problem list and discussed with project team's geriatrician In-home follow-up visits to monitor implementation of recommendations, facilitate compliance, identify new problems, provide health education	3 Health Nurses (RN's) with additional degree in Public Health Nursing based on 8-month postgraduate course Nurses had additional training in gerontology and physical assessment	3 year follow-up 2 annual in-home multi-dimensional geriatric assessment Follow-up visits every 3 months for 2 years Some telephone contacts – not clear if this replaced a visit and/or occurred between visits. Single visit 74 + 12 minutes with yearly assessments taking 2 hours and follow-up visits – 1 hr.	Regular care	8.5 + 2.9 ~ 4 visits per year

Table 11 continued

Study and Base of Intervention	Content of Intervention	Intervention Personnel	Duration and Intensity of Visits (Compliance measured?)	Comparator (Characteristics of Standard Care)	Mean Number of Follow-up Visits
Hall et al. (1992) New Westminster, BC, CANADA Community Care Long-Term Care Programme	Initial assessment: identified goals and developed a personal health plan jointly with client based on his/her needs in the areas of health care, substance use, exercise, nutrition, stress management, emotional functioning, social support and participation, housing, finances, transportation. Problem identification and treatment according to a standard protocol. Follow-up visits to support clients focused on development of personal health skills in relation to identified problem areas and referral to community resources. Also received usual care provided by the LTC programme in BC	One project nurse for all subjects	3 year follow-up Frequency of visits depended on client needs	Usual care provided by the long-term care programme (LTC) programme in BC Home health services. This included screening and preadmission assessment, arrangement or purchase of needed services and review at 3 months and at least yearly thereafter	4-12 hours per year x 3 years
Zimmer et al. (1985) Rochester, New York, USA Primary Care	At intake, all patients received one home visit by each team member to perform the initial assessment. An interdisciplinary care plan was developed which designated one team member as the primary care provider with consultative visits by the others as needed. The team provided support to the informal care provider and a 24-hour telephone service.	Physician-led intervention. Team included: physician, nurse practitioner (Master's prepared), medical social worker experienced in geriatric care	6-month follow-up Actual duration and intensity of visits not described	Usual care	Not reported

Table 11 continued

Study and Base of Intervention	Content of Intervention	Intervention Personnel	Duration and Intensity of Visits (Compliance measured?)	Comparator (Characteristics of Standard Care)	Mean Number of Follow-up Visits
Gunner-Svensson et al. (1984) Denmark Primary Care	Introduction to services, advice to elderly person and caregiver, identification of goals and coordination of plan of care in collaboration with client.	Nurses with experience in geriatrics and medicine	Follow-up visits were based on client needs and level of risk	Usual care	5 ~ 1-2 visits per year
Pathy et al. (1992) South Wales UK Primary Care	Screening by functional status postal questionnaire followed by direct contact only with subjects with identified problems. Provided advice, health education, and referral to GP or community services	Specialized geriatric home visitor working in Primary Care	3 year follow-up 40% of subjects were not visited because the postal questionnaire indicated that they did not have a problem	No questionnaire sent Self-directed use of health visitors Health visitor contact with population mainly confined to crisis visiting	9 3 visits per year

Table 11 continued

Study and Base of Intervention	Content of Intervention	Intervention Personnel	Duration and Intensity of Visits (Compliance measured?)	Comparator (Characteristics of Standard Care)	Mean Number of Follow-up Visits
Bernabei et al. (1998) Northern Italy Home Health Agency	Case managers perform initial assessment and every 2 months thereafter. Initial physical exam completed by GP. Case managers reported the initial assessment to the GEM, which determined the services that patients were eligible for and designed and implemented individualized care plans in collaboration with general practitioners. Problems emerging from home visits were discussed at weekly team meetings. Clients were evaluated based on: physical and cognitive function, level of depression using established scales, and medication use	Case Management and care planning by community geriatric evaluation unit. Team composition: general practitioners, social worker, several nurses Case managers completed course on case management and comprehensive geriatric assessment	1 year follow-up Visited every 2 months	Primary and community care with no case management Community and primary care included: GP services, nursing and social services, home aids, meals on wheels	6
Hendriksen et al. (1984) Denmark Primary Care	Interview was conducted using a structured questionnaire to identify the need for social or medical services. The health visitor applied for and coordinated the community services, distributing aids and modifications	Home visitor (2 nurses or 1 physician) Nurses: (5-21 yrs. experience in home nursing)	3 year follow-up Visited every 3 months for 3 years Visit duration: (0.5-1.5 hours)	Self-directed use of social and medical services in the community No home visits	12 4 visits per year
Vetter et al. (1984) Wales, UK Primary Care	Health education and prevention, referral to community services, follow-up of services, communication with other practitioners	Home visitors (RN's working in primary care) General Practitioners	2 year follow-up Minimum of 1 visit per year and further visits if needed	No home visits	2.9 (urban) 1.9 (rural)

Table 11 continued

Study and Base of Intervention	Content of Intervention	Intervention Personnel	Duration and Intensity of Visits (Compliance measured?)	Comparator (Characteristics of Standard Care)	Mean Number of Follow-up Visits
van Rossum et al. (1993) Netherlands Primary Care	Discussed health topics in a broad sense and provided information, advice, and referral to other services. Standardized checklist: functional state, medications, social contacts, housing conditions	Public health nurses trained for study and already involved in home nursing care	3 year follow-up Minimum of 4 visits per year with extra visits if necessary Mean duration of visits: 45-60 minutes	No home visits	12 4 visits per year
Stuck et al. (1995) Santa Monica, California, USA Geriatric Medicine and Gerontology, Department of Medicine	Annual comprehensive in-home geriatric assessments by GNP. In collaboration with geriatrician, GNP evaluated problems and risk factors for disability Ongoing follow-up included health education, compliance, and assessment and recommendations in areas of functional and health status, mental status, gait and balance, medications, social support, body weight, vision	Gerontological Nurse Practitioners in collaboration with geriatrician	3 year follow-up Annual in-home comprehensive geriatric assessments plus a minimum of 1 follow-up visit every 3 months with additional telephone contacts if necessary	No home visits	10.9 + 3.2 ~ 4-5 visits per year
Dalby et al. (2000) Hamilton, Ontario CANADA Primary Care	Nurse used "functional consequences theory" of gerontologic nursing (Miller, 1995). Comprehensive assessment, development of care plan, follow-up visits and phone calls to provide vaccinations, monitor, promote health and provide psychosocial support Assisted clients in identifying need for and accessing community services	Primary care nurse affiliated with a general family practice unit	14-month follow-up visits and telephone calls conducted as needed	Usual primary care services	Not reported

included trials. The consensus in the literature is that the effectiveness of geriatric assessment and management is related to the ability to target those clients who are most likely to benefit from a given treatment (Rubenstein et al., 1991). This notion of directly targeting clients who are known to be at risk of adverse health outcomes is consistent with preventive care (Maville & Huerta, 2002). However, the literature is controversial in terms of what populations are most likely to benefit from them (Elkan et al., 2001).

In the majority of the trials, the intervention was aimed at the general population of elderly people aged 70 and over, without specific selection criteria. Only three trials targeted subjects with specific risk factors for functional decline as reported through a screening questionnaire (Dalby et al., 2000; Hebert et al., 2001; Pathy et al., 1992), and Zimmer et al. (1985) only included individuals who had “significant illness”. In contrast, Stuck et al. (1995) excluded individuals with poor functional status, cognitive impairment as well as those with good functional status. Other studies conducted further subgroup analyses to determine if there was a difference in the outcomes for high versus low risk subjects (Bula et al., 1999; Stuck et al., 2002; van Rossum et al., 1993). Hebert (1997) stated that the inconsistency in the literature and lack of evidence for the effectiveness of in-home preventive programmes is due to the fact that most of the studies target all elderly people, thus, diluting the potential benefit for those at higher risk.

However, there is a lack of consensus among these studies regarding the effectiveness of in-home preventive programmes with high-risk versus low-risk elderly

persons. In a separate subgroup analysis, van Rossum et al. (1993) found significant positive benefits in hospitalization, mortality, disability, and subjective health for those individuals in poor subjective health at baseline. Conversely, other studies suggest that there is limited evidence for the effectiveness of in-home preventive programmes for individuals at high-risk for functional decline (Bula et al., 1999; Stuck et al., 2000). Stuck et al. (2000) found those individuals in the high-risk group receiving the intervention were higher users of nursing homes than those in the usual care group. In a planned subgroup analysis of these findings, Stuck et al. found that disability was reduced among people at low risk at baseline but not among participants at high risk.

Similar findings have appeared in other studies suggesting that subjects identified as low risk have more favourable outcomes (Bula et al., 1999; Stuck et al., 2000). Similarly, Stuck et al. (2002), in a meta-analysis of controlled trials of in-home preventive programmes, found that most benefits were seen in persons at low risk of functional decline at baseline. One explanation for this finding is that a preventive intervention works best at early and reversible stages in the continuum from health to disability (Rubenstein & Stuck, 2001). Consequently, higher risk elderly individuals would benefit most from a more intensive intervention, which includes systematic follow-up and co-ordination, as well as more frequent intervention (Bula et al., 1999; Bernabei et al., 1998; Rich et al., 1995; Rubenstein & Stuck; Stuck et al., 2000). In sum, the evidence is unclear regarding whether or not targeting on the basis of subjective

health indicators is a useful approach to identifying persons most likely to benefit from home visits.

Five studies examined the efficacy of a proactive health promotion strategy with people 75 years and older (Hebert et al., 2001; Hendriksen et al., 1984; van Rossum et al., 1993; Stuck et al., 1995; Stuck et al., 2000). The results of a recent study by Newbury and Marley (2000) and a systematic review by van Haastregt et al. (2000) of randomized controlled trials of preventive home visits for the elderly suggest that annual preventive home visits are most useful in persons aged 75 or over. Similarly, the work of Hall et al. (1992), Pathy et al. (1992) and van Rossum et al. (1993) suggest that home visits with community based elderly are more likely to be effective with the frail elderly (Hirdes et al., 1994). Three studies included individuals aged 70 and older (Dalby et al., 2000; Gunner-Svensson et al., 1984; Vetter et al., 1984), and the remaining studies included those 65 years and older (Bernabei et al., 1998; Hall et al., 1992; Pathy et al., 1992). One study did not specify the age of the elderly persons included in the study (Zimmer et al., 1985). However, Stuck et al. (2002), in a meta-analysis of 18 controlled trials on preventive home visits found that preventive home visits are more effective if targeted at persons who are relatively young (< 80 years). Thus, questions remain regarding which populations benefit most from an in-home preventive programme?

Content of the Intervention: Which programme components are most effective?

A further factor that may explain the discrepant findings obtained from previous studies of home visits is the differences that exist in the conceptual approach to the

intervention. The majority of the studies included in this review focus on preventive care or disease prevention, which is consistent with the biomedical model of health (Stachtchenko & Jenicek, 1990), rather than health promotion. Therefore, the main objective of the home based intervention is early identification and diagnosis of disease and risk factors for functional decline that require further treatment (Bernabei et al., 1998; Dalby et al., 2000; Hebert et al., 2001; Hendriksen et al., 1984; Pathy et al., 1992; Stuck et al., 1995; Stuck et al., 2000; Zimmer et al., 1985), and the use of mortality and morbidity as outcomes of effectiveness (Clark, 2001).

In contrast, other studies focus on health promotion that involve goals such as autonomy, empowerment, and independent decision-making. This was achieved through the development of personal health skills (Hall et al., 1992), health education (van Rossum et al., 1993; Vetter et al., 1984), and mutual goal setting in collaboration with the client (Gunner-Svensson et al., 1984; Hall et al.). The main objectives of the visits and the orientation of the disciplines that were responsible for conducting the study are important, and direct the selection of outcome measures of effectiveness (Clark, 2001).

In general, the content of the study intervention and the comparator (standard care) is poorly described. Most studies provide only a general description of the intervention. Therefore, it is difficult to determine aspects of the intervention that were or were not effective and which components of the intervention made a difference to the outcomes assessed. The domains involved in the assessment and follow-up interventions also differed between the trials. However, as outlined in Table 12, four main domains

Table 12

Summary of the Evidence: Factors Contributing to the Success of In-Home Preventive Programmes for Older Adults

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Programme Characteristics							Comparator	Intervention personnel	Length of follow-up
		Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits					
Reduced mortality	Hall et al. (1992)	✓	✓	✓				Frequency of visits dependent on clients' needs 4-12 hrs/yr	Usual care provided by the long-term care programme (LTC) programme in BC Home health services.	One project nurse for all subjects	3 years
	Hendriksen et al. (1984)	✓	✓				12 4 visits per year	Self-directed use of social and medical services in the community No home visits	Home visitor (2 nurses or 1 physician)	3 years	
	Pathy et al. (1992)	✓	✓	✓			9 3 visits per year	No questionnaire sent Self-directed use of health visitors Health visitor contact with population mainly confined to crisis visiting	Specialized geriatric home visitor working in Primary Care	3 years	
	Vetter et al. (1984)	✓		✓	✓		2.9 (urban) 1.9 (rural)	No home visits	Home visitors (RN's working in primary care) General Practitioners	2 years	

Table 12 continued

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Programme Characteristics							Length of follow-up
		Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits	Comparator	Intervention personnel	
Improved functional status	Bernabei et al. (1998)	✓	✓		✓	6	Primary and community care with no case management Community and primary care included: GP services, nursing and social services, home aids, meals on wheels	Case Management and care planning by community geriatric evaluation unit. Team composition: general practitioners, social worker, several nurses	1 year
	Pathy et al. (1992)	✓	✓	✓		9 3 visits per year	No questionnaire sent Self-directed use of health visitors Health visitor contact with population mainly confined to crisis visiting	Specialized geriatric home visitor working in Primary Care	3 years
	Stuck et al. (1995)		✓	✓	✓	10.9 ± 3.2 ~ 4-5 visits per year	No home visits	Gerontological Nurse Practitioners in collaboration with geriatrician	3 years
	Stuck et al. (2000)		✓	✓	✓	8.5 ± 2.9 ~ 4 visits per year	Regular care	3 Health Nurses (RN's)	3 years

Table 12 continued

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Programme Characteristics							Length of follow-up
		Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits	Comparator	Intervention personnel	
Decreased hospital admissions and hospital stay	Bernabei et al. (1998)	✓	✓		✓	6	Primary and community care with no case management Community and primary care included: GP services, nursing and social services, home aids, meals on wheels	Case Management and care planning by community geriatric evaluation unit. Team composition: general practitioners, social worker, several nurses	1 year
	Hall et al. (1992)	✓	✓	✓		Frequency of visits dependent on clients' needs 4-12 hrs/yr	Usual care provided by the long-term care programme (LTC) programme in BC Home health services.	One project nurse for all subjects	3 years
	Hendriksen et al. (1984)	✓	✓			12 4 visits per year	Self-directed use of social and medical services in the community No home visits	Home visitor (2 nurses or 1 physician)	3 years
	Pathy et al. (1992)	✓	✓	✓		9 3 visits per year	No questionnaire sent Self-directed use of health visitors Health visitor contact with population mainly confined to crisis visiting	Specialized geriatric home visitor working in Primary Care	3 years

Table 12 continued

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Programme Characteristics							Length of follow-up
		Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits	Comparator	Intervention personnel	
	Zimmer et al. (1985)		✓		✓	Not reported	Usual care	Physician-led intervention. Team included: physician, nurse practitioner (Master's prepared), medical social worker experienced in geriatric care	6 months
Decreased Admission to Long-Term Institutional Care	Bernabei et al. (1998)	✓	✓		✓	6	Primary and community care with no case management Community and primary care included: GP services, nursing and social services, home aids, meals on wheels	Case Management and care planning by community geriatric evaluation unit. Team composition: general practitioners, social worker, several nurses	1 year

Table 12 continued

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Programme Characteristics							Comparator	Intervention personnel	Length of follow-up
		Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits					
	Gunner-Svensson et al. 1984)	✓		✓		5 ~ 1-2 visits per year		Usual care		Nurses with experience in geriatrics and medicine	Follow-up visits were based on client needs and level of risk
	Hall et al. (1992)	✓	✓	✓		Frequency of visits dependent on clients' needs 4-12 hrs/yr		Usual care provided by the long-term care programme (LTC) programme in BC Home health services.		One project nurse for all subjects	3 years
	Stuck et al. (1995)		✓	✓	✓	10.9 ± 3.2 ~ 4-5 visits per year		No home visits		Gerontological Nurse Practitioners in collaboration with geriatrician	3 years

Table 12 continued

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Programme Characteristics							Comparator	Intervention personnel	Length of follow-up
		Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits					
	Zimmer et al. (1985)		✓		✓	Not reported		Usual care	Physician-led intervention. Team included: physician, nurse practitioner (Master's prepared), medical social worker experienced in geriatric care	6 months	
Decreased Level of Depression	Bernabei et al. (1998)	✓	✓		✓	6		Primary and community care with no case management Community and primary care included: GP services, nursing and social services, home aids, meals on wheels	Case Management and care planning by community geriatric evaluation unit. Team composition: general practitioners, social worker, several nurses	1 year	
Improved affect	0	-	-	-	-	-		-	-	-	
Increased Use of Health and Social Services	Hendriksen et al. (1984)	✓	✓			12 4 visits per year		Self-directed use of social and medical services in the community No home visits	Home visitor (2 nurses or 1 physician)	3 years	

Table 12 continued

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Programme Characteristics							Comparator	Intervention personnel	Length of follow-up
		Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits					
	Pathy et al. (1992)	✓	✓	✓		9 3 visits per year		No questionnaire sent Self-directed use of health visitors Health visitor contact with population mainly confined to crisis visiting	Specialized geriatric home visitor working in Primary Care	3 years	
	Stuck et al. (1995)		✓	✓	✓	10.9 ± 3.2 ~ 4-5 visits per year		No home visits	Gerontological Nurse Practitioners in collaboration with geriatrician	3 years	
	Stuck et al. (2000)		✓	✓	✓	8.5 ± 2.9 ~ 4 visits per year		Regular care	3 Health Nurses (RN's)	3 years	
	Van Rossum et al. (1993)	✓		✓		12 4 visits per year		No home visits	Public health nurses	3 years	
	Vetter et al. (1984)	✓		✓	✓	2.9 (urban) 1.9 (rural)		No home visits	Home visitors (RN's working in primary care) General Practitioners	2 years	

Table 12 continued

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Programme Characteristics							Comparator	Intervention personnel	Length of follow-up
		Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits					
Reduced Cost	Bernabei et al. (1998)	✓	✓		✓	6		Primary and community care with no case management Community and primary care included: GP services, nursing and social services, home aids, meals on wheels	Case Management and care planning by community geriatric evaluation unit. Team composition: general practitioners, social worker, several nurses	1 year	
	Hendriksen et al. (1984)	✓	✓			12 4 visits per year		Self-directed use of social and medical services in the community No home visits	Home visitor (2 nurses or 1 physician)	3 years	
	Stuck et al. (1995)		✓	✓	✓	10.9 ± 3.2 ~ 4-5 visits per year		No home visits	Gerontological Nurse Practitioners in collaboration with geriatrician	3 years	
	Stuck et al. (2000)		✓	✓	✓	8.5 ± 2.9 ~ 4 visits per year		Regular care	3 Health Nurses (RN's)	6 months	

Table 12 continued

Programme Characteristics

Benefit Claimed Or Demonstrated	Studies Showing Significant Positive Findings	Referral And Coordination Of Community Services	Comprehensive Assessment	Health education	Communication with interdisciplinary team	Mean number of follow up visits	Comparator	Intervention personnel	Length of follow-up
Improved Caregiver Outcomes	Zimmer et al. (1985)	✓	✓	✓	✓	Not reported	Usual care	Physician-led intervention. Team included: physician, nurse practitioner (Master's prepared), medical social worker experienced in geriatric care	6 months
	Dalby et al. (2001)	✓	✓	✓		Not reported	Usual primary care services	Primary care nurse affiliated with a general family practice unit	14 months
	Stuck et al. (2000)	✓	✓	✓	✓	8.5 ± 2.9 ~ 4 visits per year	Regular care	3 Health Nurses (RN's)	3 years

emerged from this analysis: health education, referral and coordination of community services, comprehensive assessment, and communication with the interdisciplinary team. Five studies included multidimensional geriatric assessment (CGA) and follow-up (Hebert et al., 2001; Hendriksen et al., 1984; Stuck et al., 1995; Stuck et al., 2000; Vetter et al., 1984) which is defined as:

Comprehensive geriatric assessment (CGA) is a multidimensional, often interdisciplinary, diagnostic process intended to determine a frail elderly person's medical, psychosocial, and functional capabilities and problems with the objective of developing an overall plan for treatment and long-term follow-up (Rubenstein et al., 1989, p. 87).

In a meta-analysis of 16 controlled trials, Stuck et al. (2002) reported that functional decline was reduced in trials that used multi-dimensional assessment with follow-up. Noteworthy, is that problems such as depression and low frequency of social contacts, which have been associated with increased risk for functional status decline for older adults (Stuck et al., 1999), were not identified as part of the study interventions.

To date, the research directed toward evaluating in-home preventive interventions has lacked a guiding theoretical framework. Only one study was found that utilized a theoretical framework to guide the design of the study intervention and the selection of outcomes (Dalby et al., 2000). Dalby et al. (2000) used a "functional consequences theory" of gerontologic nursing (Miller, 1995) to guide the study intervention, however, no rationale was provided for the selection of this theoretical approach. A theoretical approach is needed to link population needs, nursing interventions and client outcomes (McNaughton, 2000).

With the exception of two studies (Hebert et al., 2001; Vetter et al., 1984), the level of subject compliance with the intervention was not reported. This focuses on whether or not subjects complied with the health care providers' recommendations and treatment. The level of subject compliance with the intervention is an important factor that can influence the effectiveness of a community intervention (Tugwell et al., 1985; van Haastregt et al., 2000). A low compliance can negatively influence the effectiveness of the intervention and/or reflect an inability to tailor the intervention to the clients' individual needs (van Haastregt et al.).

None of the studies reported on whether or not the study intervention was implemented according to plan. This refers to whether or not the health care providers complied with the study intervention. Health provider compliance is another important factor that can influence the effectiveness of a community intervention (Tugwell et al., 1985; van Haastregt et al., 2000). The lack of information regarding the theoretical approach and subject and health care provider compliance to the intervention makes it difficult to assess if the programmes were adequate in terms of design or delivery. Green (2000, p. 126) refers to this as a Type III error – “rejection of the effectiveness of a programme when the programme itself was inadequate in terms of design or delivery”.

Context of the Intervention

The generalizability of findings of studies in one setting to expected outcomes in other settings is difficult, since the effectiveness of in-home geriatric programs depends highly on what care elderly persons usually receive. For example, seven out of the

twelve studies included in this review were conducted in Europe: the United Kingdom (Pathy et al., 1992; Vetter et al., 1984), Denmark (Gunner-Svensson et al., 1984; Hendriksen et al., 1984), the Netherlands (van Rossum et al., 1993), Switzerland (Stuck et al., 2000), and Italy (Bernabei et al., 1998). Only two studies were conducted in the United States (Stuck et al., 1995; Zimmer et al., 1985) and three studies were conducted in Canada (Dalby et al., 2000; Hall et al., 1992; Hebert et al., 2001).

In several of these European countries, including the United Kingdom, Denmark, and Australia, home visits are an integral part of practising primary care and are generally conducted by community nurses (Byles, 2000; Newbury, Marley, & Beilby, 2001). For example, in Denmark, regular home visits to those 75 years and older (not receiving services) are compulsory, reflecting a national policy commitment to facilitating the elderly in remaining as long as possible in their homes. Similarly, regular health checks for people over 75 were introduced by the UK department of Health in 1990 as a contractual obligation of general practitioners (Fletcher & Bulpitt, 2000). In other countries, including Canada and the US, preventive home visit programmes operate more independently from primary care providers. Primary care systems are not funded to provide preventive home visits, and tend to focus on episodic care. The results of this review cannot therefore be translated to a Canadian context.

A number of different community care intervention models have been described in the literature and include “in-home prevention programs” and “designated home health care programs” (Fabacher et al., 1994). While such programs share the common goals to

identify unrecognised problems and individuals at increased risk, link identified clients to appropriate resources as well as to provide ongoing care (Rubenstein et al., 1991; Stuck et al., 1993a; Williamson, Burley, Smith, Donald, & Wright, 1987), clients of in-home prevention programs do not ordinarily receive direct treatment. Clients are referred for appropriate services when on-going treatment is necessary; the programs do not offer on-going treatment themselves. It is noteworthy that eight out of the twelve studies were based in a primary care setting (Dalby et al., 2000; Gunner-Svensson et al., 1984; Hebert et al., 2001; Hendriksen et al., 1984; Pathy et al., 1992; van Rossum et al., 1993; Vetter et al., 1984; Zimmer et al., 1985), which can be categorized as an “in-home prevention program”.

In contrast, clients of designated home health care programs focus on the substitution of home care for long-term care (Hedrick & Inui, 1986; Hedrick, Koepsell, & Inui, 1989; Hughes, 1985; Shapiro & Roos, 1989; Weissert, 1985; Weissert, Cready, & Pawelak, 1988). Only two studies were identified as designated home health care programs and examined the effectiveness of home based health promotion in the context of community support services (Bernabei et al., 1998; Hall et al., 1992).

Provider Type: Who are the people involved in the intervention?

The people involved in the intervention differed among the included trials. The majority of studies used a unidisciplinary approach. In these studies, the nurse was responsible for conducting the assessment and the follow-up intervention (Dalby et al., 2000; Gunner-Svensson et al., 1984; Hall et al., 1992; Hebert et al., 2001; Pathy et al.,

1992; Stuck et al., 2000; Vetter et al., 1984; van Rossum et al., 1993). In contrast, in other programmes, interdisciplinary approaches were used, with geriatricians or general practitioners that were directly involved with the intervention (Bernabei et al., 1998; Stuck et al., 1995; Zimmer et al., 1985). In one study a nurse or a physician were responsible for the intervention (Hendriksen et al., 1984).

In general, the education, background and scope of practice of the nurses involved in the intervention were poorly described. Several of the studies did not provide any description of the type of nursing personnel (Bernabei et al., 1998; Dalby et al., 2000; Gunner-Svensson et al., 1984; Hall et al., 1992; Hebert et al., 2001). For others, the type of nursing personnel was diverse and included home or health visitors (Hendriksen et al., 1984; Pathy et al., 1992; Vetter et al., 1984), nurse practitioners (Stuck et al., 1995; Zimmer et al., 1985), and Public Health Nurses (Stuck et al., 2000; van Rossum et al., 1993). One study suggested that aspects of the quality of the intervention could also be responsible for differences in programme effects. Stuck et al. (2000), in a subgroup analysis found major differences in outcomes between clients allocated to one nurse and those allocated to the other two nurses of the programme.

The importance of the nurse-client relationship and continuity of care for beneficial nursing care is extensively documented in the literature (McNaughton, 2000; Trojan & Yonge, 1993). In several of the trials, using one project nurse for all subjects (Dalby et al., 2000; Hall et al., 1992; Hebert et al., 2001; Pathy et al., 1992) provided continuity of care. In other trials, more than one nurse provided the study intervention but continuity

of provider was assured (Hendriksen et al., 1984; van Rossum et al., 1993; Vetter et al., 1984). Continuity of care was not reported for the remaining trials that utilized more than one nurse for the intervention (Bernabei et al., 1998; Gunner-Svensson et al., 1984; Stuck et al., 1995; Stuck et al., 2000; Zimmer et al., 1985). Questions remain regarding whether the type and quality of nursing involvement is responsible for differences in programme effects? It is noteworthy that none of the review articles examined the impact of the type of provider on programme effects.

Visit Intensity and Duration

The included trials differ significantly in terms of the length of follow-up, visit frequency, and visit duration. In most of the trials, the intervention lasted 3 years (Gunner-Svensson et al., 1984; Hall et al., 1992; Hendriksen et al., 1984; Pathy et al., 1992; Stuck et al., 1995; Stuck et al., 2000; van Rossum et al., 1993). In other trials, the intervention lasted 2 years (Vetter et al., 1984), 14 months (Dalby et al., 2000), and 1 year (Bernabei et al., 1998; Hebert et al., 2001). Only one trial had only a 6-month follow-up (Zimmer et al., 1985). With the exception of one trial (Hebert et al.), none of the studies provided rationale for the length of the follow-up period. Hebert et al. (2001, p. 148) stated “given the high probability of functional transitions within 1 year in this population, the outcome should be measured within a short interval. Using a longer interval increases the risk of measuring confounding factors”. It is interesting to note that two trials with a 3-year follow-up period (Hall et al.; Hendriksen et al.) reported a significant effect after only 1 ½ to 2 years.

The visit frequency ranged from 1.9 to 14.1 for the total follow-up period. Visit frequency was not reported in two studies (Dalby et al., 2000; Zimmer et al., 1985). The annual frequency of visits ranged from 1 to 6 visits per year, with a mean of 2 visits per year with the exception of two trials (Gunner-Svensson et al., 1984; Vetter et al., 1984), which only included one visit per year. These findings reflect the reality of limited nursing contact with clients for preventive care. The studies also differed in terms of how visit frequency was determined. In several studies, visit frequency was based on the needs of individual subjects (Gunner-Svensson et al., 1984; Hall et al., 1992; Hendriksen et al., 1984; Pathy et al., 1992; van Rossum et al., 1993; Vetter et al., 1984). Other studies had a set visit frequency with some flexibility in order to meet the needs of individual clients (Bernabei et al., 1998; Hebert et al., 2001; Stuck et al., 1995; Stuck et al., 2000). Stuck et al. (2000), in a meta-analysis of controlled trials, found reductions in nursing home admissions for preventive programmes with at least 5 follow-up visits.

In general, visit duration was poorly described in the included trials. In the only three trials that reported visit duration, the average length of each home visit ranged from 0.5 to 2 hours (Hendriksen et al., 1984; Stuck et al., 2000; van Rossum et al., 1993).

Summary of Studies Evaluating the Effectiveness of

Home Based Health Promotion and Preventive Care for Older People

In summary, published evidence supports the effectiveness of home based health promotion and preventive care, when compared with standard care, for older people.

However, the findings of the various studies failed to show a consistent pattern in terms

of whether the home visits could prevent or reduce functional decline, mortality, hospitalization, and nursing home admissions. This is likely related to the diversity of programme components, populations assessed, types of outcomes measured, and contexts among the studies (Rubenstein et al., 1991; Stuck et al., 1993a; Stuck et al., 2000). In addition, the majority of studies focus on preventive care (reflecting a biomedical approach), rather than the promotion of health. Studies are further limited by the lack of evidence for the effectiveness of a preventive intervention on emotional health outcomes such as depression, perceived social support, and a strong cost assessment.

No single set of programme features emerged as important in distinguishing highly effective programmes from those that are less effective. In addition, the relative contribution of each of these variables to programme success is unclear. Stuck et al. (2002) noted that factors associated with effects on mortality (mean age < 80 years), differed from those predicting effects on functional status (CGA and follow-up), and nursing home admissions (> 5 follow-up visits). These findings suggest different programme features and processes of care may be important in mortality and functional status outcomes (Stuck et al., 2002). One of the challenges of evaluating health promotion and preventive interventions in a community based setting is the difficulty of isolating the contribution of single elements of the intervention to any observed change in outcome (Holder, Treno, Saltz, & Grube, 1997). This problem is a result of the complex interaction between different parts of the intervention (Koelen et al., 2001).

The investigator tried to relate the findings of various studies to the characteristics of the intervention as outlined in Table 12 to identify the factors that distinguish highly effective programs from those of lesser effectiveness. Completion of an initial and ongoing assessment with an established assessment team, identification of the need for and co-ordination of community services, and an individualized and interdisciplinary approach to care seemed to be important elements for achieving favourable outcomes. These results are consistent with Rubenstein et al. (1991) who concluded that effective preventive programs have the following features: an established assessment team, appropriate targeting criteria, availability of careful follow-up after the assessment, and availability of rehabilitation services.

However, accumulation of empirical evidence alone is insufficient to direct practice. A theoretical approach is needed to provide direction to both the design and evaluation of health promotion programmes to allow for wider application (Green, 2000). In a review of the literature on the study of frail elderly people, Bowsher et al. (1993, p. 876) noted that “two commonly observed deficits in nursing research relating to frail elderly people are the absence of a clear theoretical base and the reliance on non-nursing models to provide a theoretical structure”.

When the results of the eight studies which had methodological scores > 70% (Bernabei et al., 1998; Dalby et al., 2000; Hall et al., 1992; Hebert et al., 2001; Pathy et al., 1992; Stuck et al., 1995; Stuck et al., 2000; Vetter et al., 1994) were compared with the other four studies, which had lower methodological scores (< 70%) (Gunner-

Svensson et al., 1984; Hendriksen et al., 1984; van Rossum et al., 1993; Zimmer et al., 1985), the outcome patterns were similar with the exception of health and functional status. None of the studies with lower methodological scores reported effects of the intervention on health and functional status. In contrast, two of the eight studies with higher methodological score showed positive effects on health status (Bernabei et al.; Pathy et al.), and three of the eight studies showed positive effects on functional status (Bernabei et al.; Stuck et al., 1995; Stuck et al., 2000). Similarly, Stuck et al. (2002), in a systematic review of randomized controlled trials evaluating the effectiveness of preventive home visits, found little evidence that the methodological quality of the trials influenced the results.

Common methodological problems may also account for some of the inconsistencies in the results of studies on the effectiveness of in-home preventive programmes. The main shortcomings were found in the areas of intention to treat analysis, reporting on co-interventions, the reliability and validity of the outcome measures, content, compliance with and cost of the intervention, blinding procedures, and handling of dropouts.

Discrepant results among review articles may be explained by differences in the number and type of studies included in the review. For example, several articles combined trials of in-home preventive programmes with trials of home based care for clients discharged from hospital (Elkan et al., 2001), trials involving screening and referral only (Stuck et al., 1993a; Stuck et al., 1993b), and trials of hospital and community based comprehensive geriatric assessment programmes (Rubenstein et al.,

1989). This observation reflects a lack of consensus in the literature regarding the definition and scope of in-home preventive programmes. The number of studies included in the analysis influenced the power of detecting programme effects and the difference in results. For example, Stuck et al. (2002) pooled the findings of 16 trials to study the impact on functional status whereas Elkan et al. (2001) pooled the findings of 7 trials.

A final limitation of the literature is related to the dearth of evidence for preventive home programmes in both a Canadian context and within the context of community support services, i.e. home care. Contextual or environmental variables are key variables to consider since models of health promotion and preventive care need to be developed in concert with local and regional resources.

Purpose of the Study

Thus, the purpose of this study was to implement and evaluate a new model for delivering services to frail seniors living at home, focussing on home based health promotion and preventive care provided by a Registered Nurse. The study was designed to address the conflicting findings, methodological difficulties and major omissions in the literature that limit the usefulness of the current research for informing policy and practice within a Canadian System of National Health Insurance by:

1. Developing an in-home health promotion and preventive care programme and providing evidence of its effectiveness in a Canadian home care context utilizing a rigorous study design (randomized controlled trial).

2. Providing evidence of the effectiveness of preventive home visits on costs using a strong cost assessment that includes the full range of health and social services.
3. Provide evidence of the effectiveness of preventive home visits on health related quality of life including depression.
4. Provide evidence of the effectiveness of preventive home visits on level of perceived social support.
5. Providing information on the health outcomes and costs associated with current policies regarding the provision of home care services for frail elderly clients and their caregivers.
6. Providing support for the role of a Registered Nurse in health promotion and preventive care a Canadian Home Care context.
7. Providing empirical support for a comprehensive theoretical approach to health promotion and preventive care within the context of home care services.

CHAPTER 5:

CONCEPTUAL FRAMEWORK FOR STUDY

Application of the Framework for the Study

The model of vulnerability (Rogers, 1997) provided the conceptual approach to the development; implementation and evaluation of a health promotion and preventive care intervention. Theory is essential to both the design and evaluation of health promotion programmes due to its explanatory and predictive capabilities, thereby enhancing the generalizability of the results (Green, 2000; Nutbeam, 1999). Operationalization of the model of vulnerability was a complex process that involved extensive research and preliminary groundwork that included:

- Evidence from the literature evaluating the effectiveness of home based health promotion and preventive care to identify gaps in the literature as well as ‘best’ practice.
- Evidence from the literature on risk factors for functional status decline.
- Operationalization of the concepts of health promotion and preventive care.
- Information on the current home care delivery system for this population including practice patterns.

Design of the Study Intervention

In a recent meta-analysis of home visiting programmes, Elkan et al. (2001) recommended that a greater focus be placed on the process of delivering care, including a

description of the components of the home visiting intervention. The vulnerability model provides a schema of the basic components of a health promotion and preventive care intervention for enhancing health. Specifically, the study intervention was designed to alter the level of vulnerability and, thus expenditure of use of health and social services, by bolstering personal resources and/or enhancing environmental supports - both of which are considered determinants of health (Rogers, 1997).

Bolstering Personal Resources

Proactively Identifying At Risk Frail Elderly Clients.

A key component of successful home visiting programmes for the elderly is a multidimensional assessment (Stuck et al., 1993b; Stuck et al., 2002). During the in-home visit, the RN conducted a functional health assessment of the client, emphasizing physical, psychological, and social functioning, and identified any emergent or predictable changes in the client's condition. This included assessing acquired and modifiable personal resources such as coping skills, trauma, presence of disease, lifestyle, and recent events (Rogers, 1997), in order to identify unrecognized problems and risk factors for functional decline.

In a systematic review of the literature, Stuck et al. (1999) identified several key risk factors for functional decline among community-living people that can be classified as personal resources: cognitive impairment, depression, disease burden (co-morbidity), increased and decreased body mass index, lower extremity functional limitation, low level of physical activity, no alcohol use compared to moderate use, poor self-perceived

health, smoking and vision impairment. This aspect of the intervention reflects both primary prevention (prevention of health problems from occurring in the first place)¹³, and secondary prevention (early detection of health problems)¹⁴ (Maville & Huerta, 2002). Assessment findings and the plan of care were documented using the existing documentation forms, which were unique to each community-nursing agency.

One of the limitations in the literature evaluating preventive home visits for elderly persons is the lack of focus on emotional health outcomes of clients such as depression. Depression has been identified as a key risk factor for functional status decline in community-dwelling elderly people (Murphy, 1982; Stuck et al., 1999). A recent Canadian report of home care explored the capacity of the home care system to meet the mental health needs of older persons. This report suggested that it is rare for home care services to focus on mental health issues. Home care providers have reported lack of knowledge or fears about mental illnesses, and uncertainty about the best ways to support people (Parent et al., 2000). One of the key standards that emerged from this report for meeting the needs of people with mental health issues was access to home care for people with serious mental illness. Any individual with a primary diagnosis of serious mental illness should have their mental health needs identified and assessed with a standardized tool (Parent et al.).

In a recent review of the literature on questionnaires for depression, Gilbody, House and Sheldon (2001), concluded that the recognition of depression seems to be increased only when there is some form of screening procedure, whereby an instrument is

administered, scored by someone other than the clinician, and the results of those with high scores only fed back to the clinician. This feedback is most effective when it is accompanied by an educational programme, and designated outside referral agencies that will assume responsibility for management (Gilbody et al., 2001). The recommendations from this review provided the framework for early detection of depressive symptoms in subjects and their caregivers.

The nurses utilized the Centre for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977) as a screening tool to assess the frequency of depressive symptoms. The CES-D was formally administered and scored by the study nurses on the second in-home visit. Following this, the nurses utilized the questions in the CES-D for ongoing assessment of depressive symptoms in both the frail elderly client and the caregiver. Respondents were asked to indicate how frequently they experienced 20 different symptoms within the past week on a scale of 0 (rarely) to 3 (most or all of the time). Total scores can range from 0 to 60 with higher scores indicating higher levels of depressive symptoms. The questions on the CES-D identified the presence of depressive symptoms but not the disorder (Depression Guideline Panel, 1993).

The CES-D should identify possible or probable cases of depression, without overwhelming the practitioner with too many false positives that could potentially lead to unnecessary or costly follow-up assessment and/or treatment. With this in mind, as well as the potential for stigma and resistance involved in the identification of depression, the cut-off score in this study was set at 21/60 in order to obtain the best balance of false

positives and negatives. The rationale for this cut-off score is described in detail in the following methodology chapter. If subjects scored 21 or more on the CES-D, they were referred to the Family Physician for further assessment and management. With the client's consent, the nurse documented the depressive symptoms that the client was displaying using a standard letter, which was sent directly to the family physician (see Appendix A for complete CES-D scale and letter to physicians). A copy of the letter was also given to the client and/or caregiver. The nurse also offered to contact the physician directly to book an appointment for follow-up. The appointment date, time, and physician's name was included in the letter. The success of this communication mechanism was dependent upon whether the nurse implemented the letter and whether the family physician complied with the recommendations.

Proactively Addressing Identified Problems.

Consistent with a participatory model of health promotion, identified risk factors or health issues were addressed through interventions that were developed, implemented, and evaluated together with individual clients and their caregivers. Clients and their caregivers were encouraged to be responsible for, and actively participate in, their own care. The main focus of the visit was on mutual identification of goals and the development of personal health skills, utilizing a problem-solving approach, with referral to appropriate community services. At each visit, the client and caregiver's health plan was reviewed, new problems were identified, healthy lifestyle behaviors were reinforced, existing problems were monitored, and encouragement was given.

The nurse helped each client devise a personal health plan based on his/her needs in the areas of health care or health problems addressing modifiable and acquired personal factors such as disease management, lifestyle modifications, and coping skills that can affect the level of vulnerability (Rogers, 1997). Specific short- and long-term goals were outlined in relation to each of these factors for this 6-month intervention. Specific strategies were implemented to avoid or reduce risk to health and well being. This approach is consistent with tertiary prevention, which seeks to address a combination of risks or factors (Hodgson, Abbasi, & Clarkson, 1996) to avoid further decline¹⁵ (Maville & Huerta, 2002).

Consistent with successful health promotion programmes (Hodgson et al., 1996), the nurse used a combination of intervention methods to empower individuals and to promote positive attitudes, knowledge, and skills to maintain and enhance health (Maville & Huerta, 2002). These methods included providing health education; encouraging subjects to be independent enhancing their independent decision-making skills, and ability to participate in self-care. Coping skills are one of the acquired personal factors that affect vulnerability (Rogers, 1997).

Bolstering Environmental Supports

Increasing Level of Perceived Social Support.

In a systematic review of the literature, Stuck et al. (1999) identified low frequency of social contacts as a key risk factor for functional decline among community-living people. Social support is a major determinant of vulnerability and increased levels of

support can bolster a client's environmental resources (Rogers, 1997). However, the literature evaluating the effectiveness of health promotion and preventive care interventions is limited by the lack of focus on perceived social support. One of the characteristics of a high quality health promotion intervention is that it includes the client's social network, i.e. caregiver (Hodgson et al., 1996). The role played by family caregivers in meeting the needs of the frail elderly has been extensively documented in the literature (Greene & Monahan, 1989). Therefore, in this study, the nursing intervention was designed to identify and address the needs of the caregiver as well as the frail elderly subject. Specifically, the nurse assessed the ability of the caregiver to cope with the everyday stress and problems associated with caregiving, and provided various types of supports as required.

Providing an Individualized and Interdisciplinary Approach to Care.

One of the key components of successful home visiting programmes for the elderly is an individualized and interdisciplinary approach to care with an established team, thus providing continuity of provider. The importance of developing trusting and caring relationships between clients and home care nurses to the delivery of effective nursing care has been well documented in the literature (McNaughton, 2000; Trojan & Yonge, 1993). In a review of the qualitative research on home visiting, McNaughton (2000) found that the success of specific interventions in a visit, such as health education, depends on the ability of the nurse to get to know and build a relationship with the client. Development of a trusting and caring relationship with the client is a complex and multi-

stage process that occurs over a period of time (McNaughton, 2000; Trojan & Yonge, 1993). Based on this, subjects were assigned a primary nurse who visited the client and caregiver (if applicable) during the entire intervention period.

In order to promote an individualized and interdisciplinary approach to care, formal mechanisms were put into place to promote a collaborative working relationship between the study nurses, the CCAC Case Manager, the primary personal support worker assigned to the study client, and the family physician.

Guidelines for communication between the nurse and case manager were reinforced and consistent with current home care practice. Subjects receiving personal support services through the CCAC had a minimum of two joint visits with their primary personal support worker (PSW) and the study nurse over the 6-months of the intervention. The joint visits occurred on the second and final in-home visit. The overall goal of the joint visits was to promote teamwork, continuity of care, and client autonomy, independence, and compliance with the plan of care. The framework for the joint visit is depicted in Figure 4. Between these two joint visits, additional joint visits were arranged as required. In order to promote the collaborative nature of the intervention, the nurses were expected to communicate and consult with the PSW on a regular basis during the study. The mode of communication between the nurse and the personal support worker was agency specific, and occurred through direct verbal communication or through documenting in the client record that remained in the home. The nurses reported any

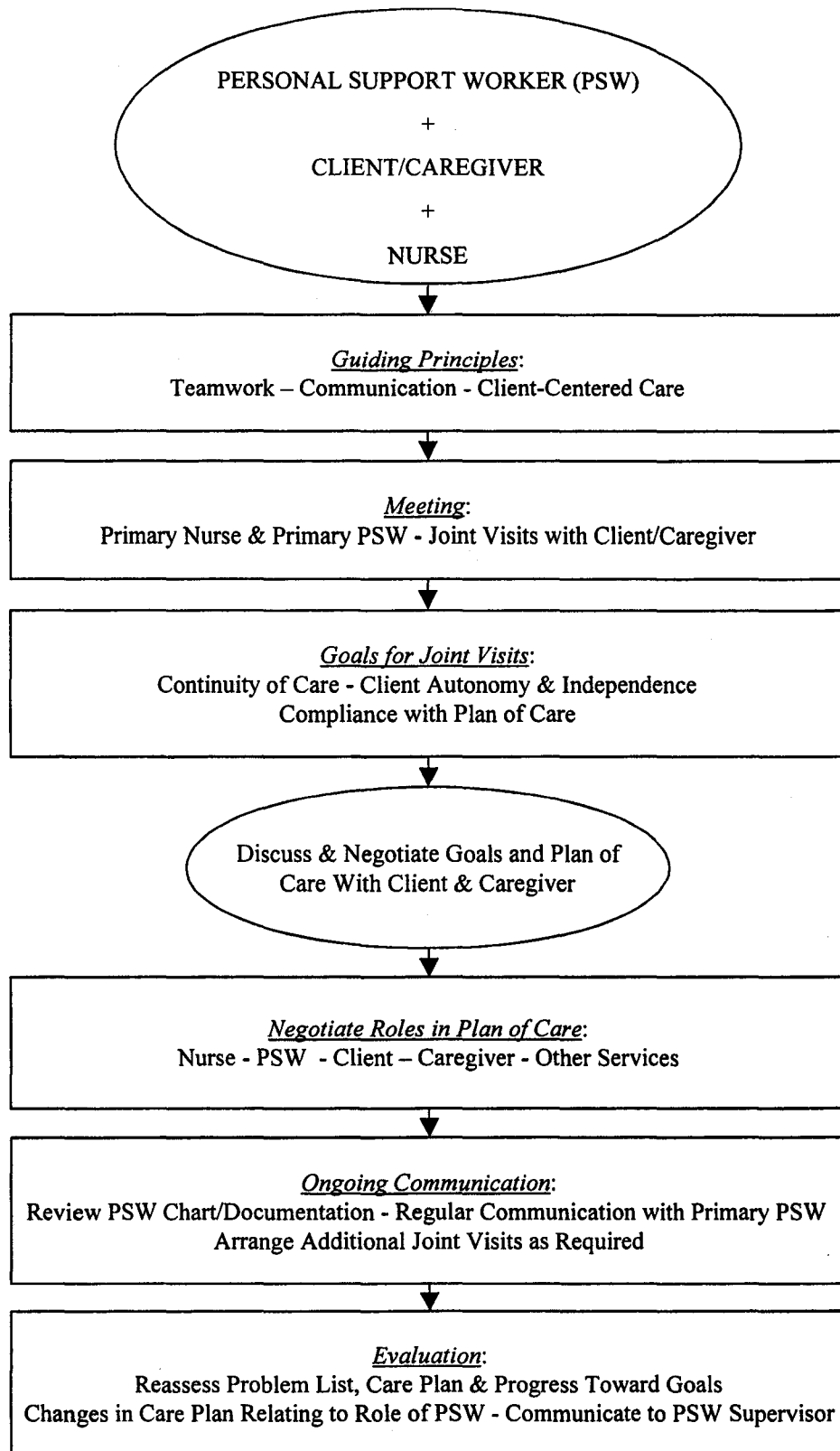


Figure 4. Guidelines for joint visit.

changes in the client care plan, related to the role of the personal support worker, to the homemaking supervisor.

A major challenge of in-home preventive programmes is their integration within the primary care system (Stuck et al., 1993a). In this Canadian home care setting, the nurses worked independent of the primary care physician. Therefore, the success of the programme was dependent upon whether or not the nurse communicated the detected problems and recommendations to the primary care physician and whether the primary care physician complied with the recommendations. The importance of communication between the study nurse and the family physician is highlighted by the fact that upon completion of the 6-month study period, it was expected that most of the clients would be discharged from formal home care to care provided by their primary care physician. One mechanism for promoting communication between the nurse and the Family Physician was the letter that identified clients as exhibiting depressive symptoms (see Appendix A for letter to physicians).

Coordinating Access to Community Services.

Another key component of successful home visiting programmes for the elderly and an important role of the nurse in health promotion is identification of the need for and coordination of community services. This included advocating for client's needs and facilitating access to services to address these needs. The success depended upon whether or not clients were able to access services within the current climate of fiscal constraint. Each nurse and study client receiving the RN augmented intervention was

given a directory of health and social services, which included a list of community mental health resources for this local region.

Study Variables

The conceptual framework and the literature guided the selection of study variables (see Figure 5). Although the study intervention focussed on both the client and caregiver as the recipients of care, measurement of outcomes in this study was confined to the frail elderly client alone. The main goal of the study intervention was to reduce the level of vulnerability and enhance health outcomes thereby reducing expenditure of use of health and social services for frail elderly home care clients. This was achieved through bolstering personal resources and environmental supports known to influence health and functional status. Therefore, the following personal resource and environmental support variables were selected to evaluate this proactive health promotion and preventive care intervention.

Personal Resources

Inborn Characteristics.

The following inborn characteristics were examined in this study: age, gender, and cognitive status. These biological characteristics are non-modifiable factors that interact with acquired personal factors and the environment to influence health (Rogers, 1997).

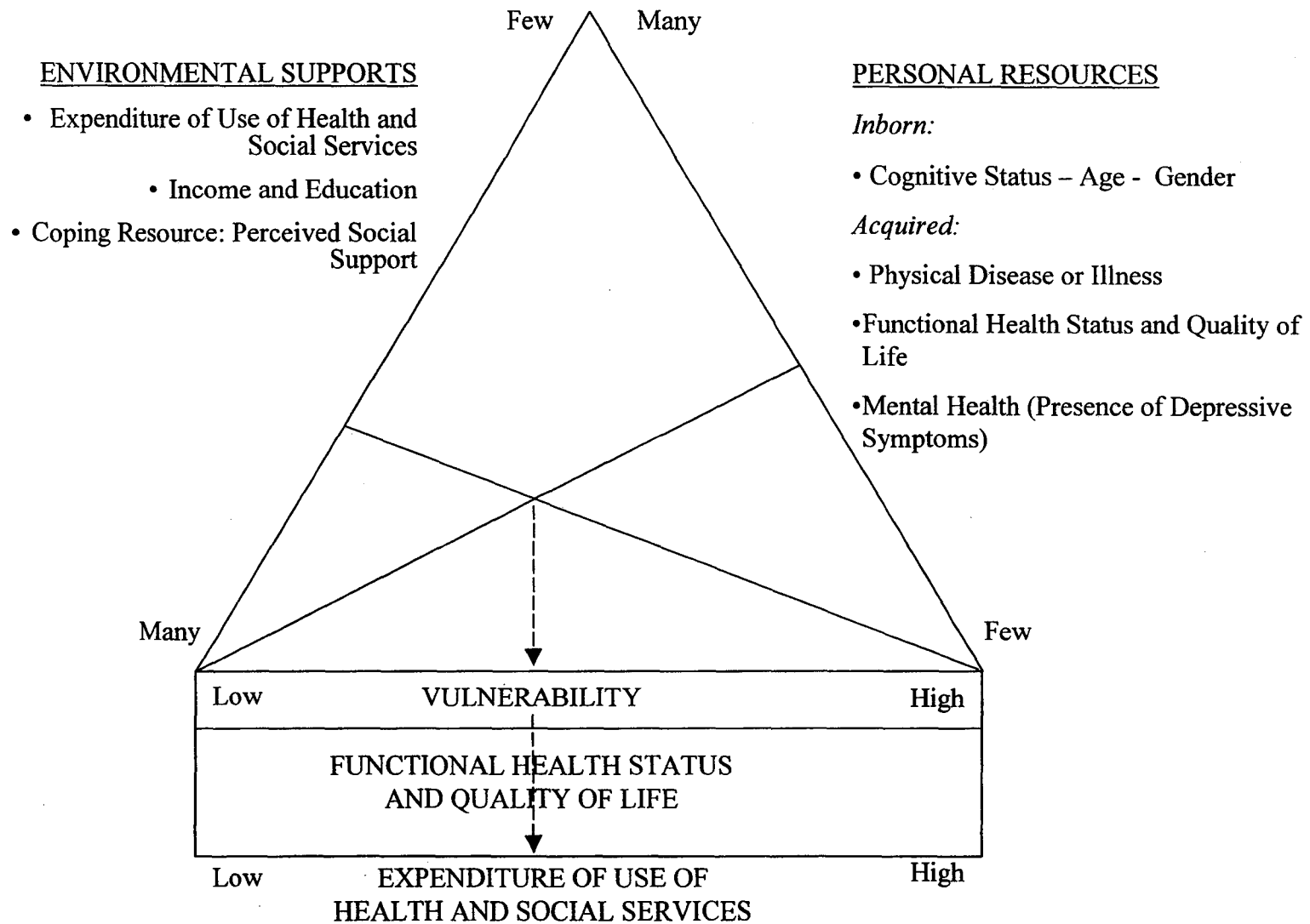


Figure 5. Model of vulnerability: Study variables (adapted from Rogers, 1997).

Acquired Characteristics.

Several modifiable acquired personal resources were examined in this study including functional health status and quality of life, physical disease/illness, and mental health (presence of depressive symptoms).

Functional health status and quality of life was chosen as the primary measure of effect of this proactive RN health promotion and preventive care intervention.

Vulnerable populations are defined as being at risk of poor physical, psychological and/or social health (Aday, 1993). Thus, the level of vulnerability affects physical, psychological and social functioning and, therefore, the level of health and quality of life (Rogers, 1997). As depicted in Figure 5, functional health status and quality of life is an acquired personal resource which influences and is influenced by the level of vulnerability.

Functional health status in this study is defined as the level of independence a person experiences in the performance of all activities people do in the normal course of their daily life, including activities of daily living, social activities, and activities related to role functions (Murdaugh, 1997). Functional health status as an outcome reflects the goals of the study intervention, which includes not only the management of illness or disease, but also the promotion of health and wellness. "It has the potential to be sensitive to nursing care because much of nursing practice is concerned with diagnosing and intervening in the patients' response to illness and its treatment" (Irvine et al., 2000, p. 45). Ramler, Kraus, Pringle Specht, and Titler (1996, p. 72) noted that "functional

health status has emerged as an important patient outcome because: a) it captures patients' perceptions of their day-to-day functioning, and b) it adds another perspective to more traditional outcomes such as adverse occurrences and physiological clinical data". The results of this study will inform practice by providing evidence of the type of functional outcomes that are possible and in which nurses can have a positive influence to considerable economic effect.

Mental Health (presence of depressive symptoms) was chosen as a secondary measure of effect of this proactive RN health promotion and preventive care intervention. Mental health is an acquired personal resource, which affects the level of vulnerability (Rogers, 1997). Depression has been identified as a key risk factor for functional decline in community dwelling elderly people (Murphy, 1982; Stuck et al., 1999), and increased use of expensive health services (Colenda et al., 1991; Roberts et al., 1999; Saravay et al., 1996). A major limitation of the literature is that few studies have included mental health promotion as part of the study intervention or as a measure of effectiveness of a home based health promotion and preventive care intervention. This gap in the literature is significant given the fact that the prevalence of depression among those receiving home care is estimated to be between 26% and 44% - at least twice that among elderly people in general (Banerjee, 1993; Harrison et al., 1990; Ilife et al., 1993).

Mental health as an outcome reflects the goals of the study intervention to promote mental health through the identification and management of depressive symptoms.

Mental health promotion is the process of enhancing the capacity of individuals to take

control over their lives and improve their mental health (Centre for Health Promotion (CHP), 1997). “Mental health promotion practice entails the fostering of resilience through the provision of both personal and environmental resources” (Joubert & Raeburn, 1998, p. 16).

Environmental Supports

The following environmental supports were examined in this study: expenditure of use of health and social services, income and education, and perceived social support. Income and education were considered non-modifiable factors that interact with acquired personal factors and biological factors to influence health (Rogers, 1997).

Perceived social support was chosen as a secondary measure of effect of this proactive RN health promotion and preventive care intervention. Social support is a major determinant of vulnerability and related health outcomes; increased levels of support can bolster a client’s environmental resources (Rogers, 1997). Low social support has been identified as a significant risk factor for functional decline in community-dwelling elderly people (Stuck et al., 1999). The role of social support in buffering the effects of stress is well documented, and studies have shown an association between low social support and higher rates of depression (Bazargan & Hamm-Baugh, 1995; Chu, 1995; Lamb, 1996; Steffens et al., 1996). A major limitation of the literature is that few studies have included social support as a measure of effectiveness of a home based health promotion and preventive care intervention. Perceived social support is a coping resource, derived from a social network: “a specific set of linkages among a

defined set of persons” (Lazarus & Folkman, 1984, p. 247). Perceived social support is an individual’s subjective evaluation of whether, and to what extent, a person’s social network is supportive in general or specific contexts. Perceived social support as an outcome reflects the goals of the study intervention to bolster environmental resources through increasing the client’s level of social support.

Expenditures of use of health and social services was chosen as a secondary measure of effect of this proactive RN health promotion and preventive care intervention. No published studies were found that included a comprehensive economic evaluation of a home based health promotion and preventive care intervention in a Canadian context. The hypothesis in this study was that health and social service utilization is an environmental factor that, in combination with personal resources, can influence (Rogers, 1997) (as well as be influenced by) the level of vulnerability. Within the current climate of fiscal constraints, even if preventive home visits demonstrate enhanced functional health status and quality of life, they are unlikely to be adopted without clear evidence of costs averted (Hirdes et al., 1994). As depicted in Figure 5, the relationship between personal resources, environmental supports and expenditures of use of health and social services will be examined in this study.

Issues Regarding Measuring Effectiveness of Health Promotion and Preventive Care Interventions

There are important theoretical differences between measuring the effectiveness of health promotion and preventive care. With preventive care, the object of evaluation is

mainly endpoint or outcome effectiveness versus health promotion where the object of evaluation is mainly on the process (Stachtchenko & Jenicek, 1990). In the preventive approach, outcomes usually relate to changes in knowledge, attitudes, or behaviours that can be objectively measured, quantified, and expressed in numerical terms. In health promotion, however, the outcomes are focussed on the process and include changes in autonomy or decision-making, which are more difficult to measure and express in numerical terms. In health promotion, outcomes also relate to changes at the social, political, and environmental level, which cannot easily be measured or expressed in numbers (Koelen et al., 2001). There is considerable debate in the literature surrounding the nature of evidence for the effectiveness of health promotion interventions (Green, 2000). However, it is beyond the scope of this paper to examine the complexity of issues concerning the definition and measurement of outcomes for evaluating the effectiveness of health promotion interventions.

Economic Evaluation

Economic analysis consisted of comparing both the effects and expense of usual home care services¹⁶ versus RN health promotion and preventive care for frail elderly home care clients with the goal of maximizing improvements in health and well-being using a fixed pool of available resources (Browne et al., 1999). An important part of any type of economic evaluation is the perspective or viewpoint taken. A study's viewpoint determines which costs are considered in an economic evaluation. The costs in this study were examined from a societal perspective. A societal perspective collects all costs,

regardless of who paid. The wider the perspective taken, the more applicable the study is to broad social policy decisions (Drummond et al., 1997). As depicted in Figure 6, Birch and Gafni (1996) identified nine possible outcomes of economic evaluation of health programmes. “This approach can be used to classify the main effects and expense of comparative community health interventions” (Browne et al., 1999, p. 2).

Technical efficiency relates to fewer resources consumed by a proposed programme when the benefits produced are the same as the current programme. If the resources consumed are the same in both programmes, the one with greater benefits is the technically efficient choice (Birch & Gafni, 1996).

Primary Research Questions

Questions for the study arose from the literature and the conceptual model:

1. Does proactive nursing health promotion and preventive care in addition to usual home care services¹⁶ improve the outcomes for a frail elderly home care population with respect to functional health status and quality of life?
2. What are the comparative expenditures for health and social service utilization at 6 months with nursing health promotion and preventive care versus usual home care services for a frail elderly home care population from a societal point of view?
3. Does proactive visiting nursing health promotion and preventive care in addition to usual home care services improve the outcomes for a frail elderly home care population with respect to mental status (presence of depression) and perceived social support?

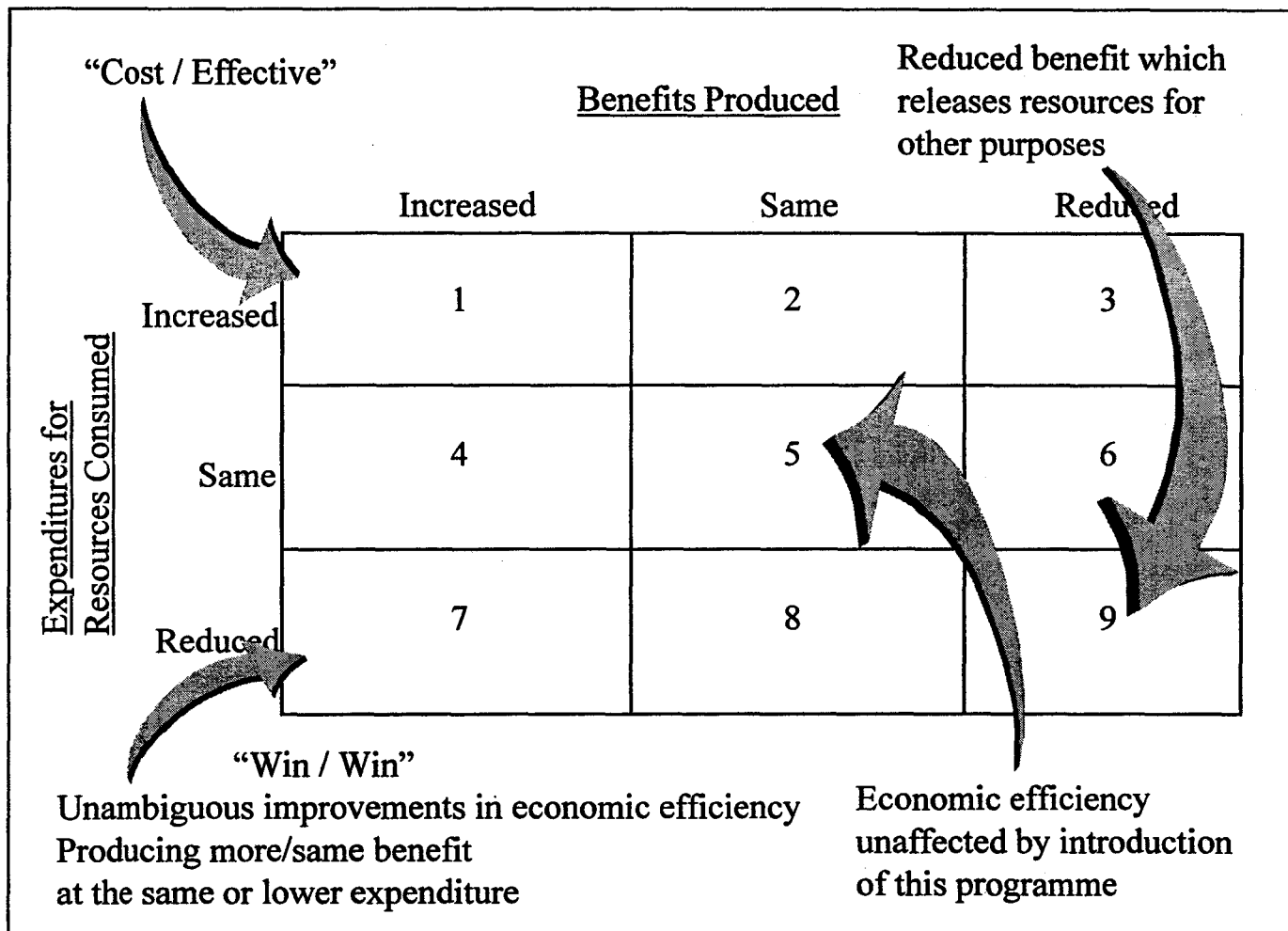


Figure 6. Framework for evaluating possible outcomes of economic evaluation of health care programmes (Birch & Gafni, 1996).

CHAPTER 6:

METHODOLOGY

Study Design

The study design is a randomized controlled trial of a RN health promotion and preventive care intervention compared to usual care, with baseline (pre-randomization) and 6-month follow-up for a frail elderly home care population eligible for personal support services.

Study Setting

This study has been a collaborative project between the CCAC of Halton, the System-Linked Research Unit (SLRU), McMaster University, the Ontario Ministry of Health and Long-Term Care (OMHLTC), and two non-profit visiting nursing agencies: the VON Halton Branch and SEN Community Health Care. Selected Registered Nurses provided the experimental intervention from both VON and SEN Community Health Care. Visiting nurses are organized by district. Therefore, the assignment of study clients to nurses was based on the geographical location of the clients as opposed to medical or diagnostic groupings. A selected group of nurses from each of the nursing agencies were trained to provide the study intervention in order to provide coverage for all of the districts within the Region of Halton. Case management services through the CCAC of Halton were part of both the control (usual care) and the experimental

intervention. This service consisted of intake, eligibility assessments, and regular ongoing eligibility assessments by the CCAC case manager.

Study Population

Subjects were those referred to the CCAC of Halton in Southern Ontario, Canada from acute care hospital, community and other institutional settings. For the purpose of this research project and this evaluation, “frail elders” are defined as persons aged 75 years and over who are living in their own homes, but who have been assessed and eligible for personal support services through the CCAC of Halton¹⁷. Subjects were selected based on evidence from the literature that suggests that preventive interventions are more effective for individuals 75 years and over (Hall et al., 1992; Hirdes et al., 1994; Newbury & Marley, 2000; Pathy et al., 1992; van Haastregt et al., 2000; van Rossum et al., 1993). Subjects were not selected on the basis of their risk status, due to the lack of consensus in the literature regarding the effectiveness of in-home preventive programmes with high risk versus low risk elderly persons.

Clients were considered *eligible* for the study if they met the following criteria:

- ≥75 years;
- newly referred to and eligible for personal support services⁵ through the CCAC from acute care hospital, community (including outpatient clinics), and other institutional settings, i.e. long-term care settings;
- client and/or caregiver communicates in English;

- expect to receive treatment and/or reside in the Halton Region for the 6 months of the study.

Clients and caregivers were considered *ineligible* for the study if they were:

- newly referred to the CCAC for nursing (RN level) services¹⁸.

Clients who are considered by the CCAC case manager to be ineligible for the study (based on the inclusion and exclusion criteria) were assigned the appropriate level of care provider and classified as ineligible. The reason(s) for this decision was documented. It was not necessary for a subject to have a family caregiver to participate in the study.

Study Groups: Models of Service Delivery

Case management services through the CCAC of Halton were part of both study groups. This service consisted of intake, eligibility assessments, and regular ongoing eligibility assessments by the CCAC case manager. Standard case management services, following admission, for the management of frail elderly clients receiving personal support services included in-home reassessment visits by the CCAC case manager:

- when clients' condition changes, e.g. when client is in unstable medical condition;
- when assessing the need for additional personal support or other in-home services due to an identified change in clients' condition;
- yearly thereafter to reassess service requirements and the care plan (Community.

Care Access Centre (CCAC) of Halton, 1998).

Control Group (Usual Care)

The control group represents the standard model of care for frail elderly clients who are assessed as eligible for personal support services through the CCAC in a Canadian setting. As standard routine, the CCAC Case Manager determined eligibility and priority level for home care services and decided the amount and level of personal support and other services required on admission to the programme and ongoing based on predefined criteria.

Experimental Group (RN Health Promotion and Preventive Care)

Clients receiving the RN augmented model of service delivery received standard care provided by the CCAC *plus* regular in-home or telephone contacts by a Registered Nurse. The primary goal of the intervention was early identification of unrecognized problems and risk factors for functional decline in order to prevent or delay the use of expensive health care resources such as acute hospitalization and institutionalization. The visit encompassed both health promotion and preventive care. Preventive care included primary prevention (prevention of problems from occurring in the first place), secondary prevention (early detection of health problems), and tertiary prevention (to avoid further decline) (Maville & Huerta, 2002).

Intensity, Duration and Cost of the Study Intervention

The literature suggests that both initial and ongoing home visits and follow-up is an important factor contributing to the success of health promotion and preventive care interventions. Based on this, the RN augmented group received a minimum of one

contact per month by a RN over a 6-month period (minimum 6 contacts). These contacts consisted mainly of in-home visits. In exceptional circumstances, the nurse telephoned the client in place of a home visit. The average time between randomization and the first nursing visit was 5 days. The initial assessment served as the basis for a personal health plan, which was developed jointly with the client. The second and final contacts were also home visits, which included a joint visit with the subject's primary personal support worker.

The type, frequency, and duration of the remaining nursing contacts were based on client needs and preferences. Between the visits, subjects could also contact the nurse by telephone to discuss problems or to ask for an extra visit. The average duration of the visits was 60 minutes. If subjects were institutionalized for less than two weeks during the intervention period, the visits continued as before. If a subject required more intensive nursing services during the intervention period (> 3 visits per month), the client was discharged from the study intervention, referred to CCAC nursing services, and interviewed at the 6-month follow-up period.

The estimated cost of the 6-month intervention was \$228.00 (Canadian) per client based on current CCAC Nursing rates or an initial investment of \$556.00 (Canadian) per person for 1 year.

Study Personnel

Initially, the study initially employed 9 Registered Nurses from two community nursing agencies that had current service contracts with the CCAC. Each nurse was

responsible for conducting the home visits in one geographical district within the Region of Halton. The study nurses level of experience with home visiting ranged from 2 to 30 years. The majority of the study nurses had a Nursing Diploma from a Community College. Only one nurse had a Bachelor of Science in Nursing (B.Sc.N.). Several of the nurses had additional education in areas such as physical assessment, palliative care, wound care, oncology, and foot care.

Study Procedures

Assessment of Setting

To understand the background in which the intervention was being delivered and if changes had occurred over the duration of the study, an environmental analysis of the CCAC of Halton was conducted prior to the initiation of the study and upon study completion.

Developing a Model of Collaborative Research

Operationalization of the model of vulnerability necessitated an understanding of the current home care delivery system for a frail elderly home care population, including practice patterns. This involved six organizations and their providers: the regional home care organization (CCAC of Halton), two visiting nursing agencies with the CCAC (VON Halton Branch and SEN Community Health Care), and three homemaking services provider agencies with the CCAC (VON Health Services Division - Halton Branch, Para-Med Home Health Care - Halton Branch, Canadian Red Cross Homemakers – Halton Branch). One of the criteria for determining the usefulness of the

results of a study to clinical practice is whether or not the intervention is feasible in a given context, and whether the intervention ‘fits’ within the existing system (Roberts & Bennett, 1997). Therefore, the study intervention was designed to fit within the existing Canadian home care delivery system for a frail elderly population.

A number of mechanisms were put into place to provide these organizations with information regarding the study progress, and opportunities for direct collaboration and participation in the research process. As depicted in Figure 7, the result was the development of a collaborative research model. This collaborative forum contributed to the design of a comprehensive health promotion and preventive care intervention, as well as confirm the ownership, commitment and legitimacy of the participating organizations to the goals and completion of the study - all essential principles of collaboration (LeGris et al., 2000).

The design and methods of the study, took into account what was known and considered feasible with respect to time, expected participation by staff and managers, and desired outcomes. Service and research role conflicts were addressed as anticipated. “Deliberate strategies ensured that the research requirements would not interfere with the service provision and, alternatively, that the rigor of the research would not be compromised” (LeGris et al., 2000, p. 70). While clinicians’ roles reflect values of relevance, realism and immediate applicability, researchers value the adherence to the

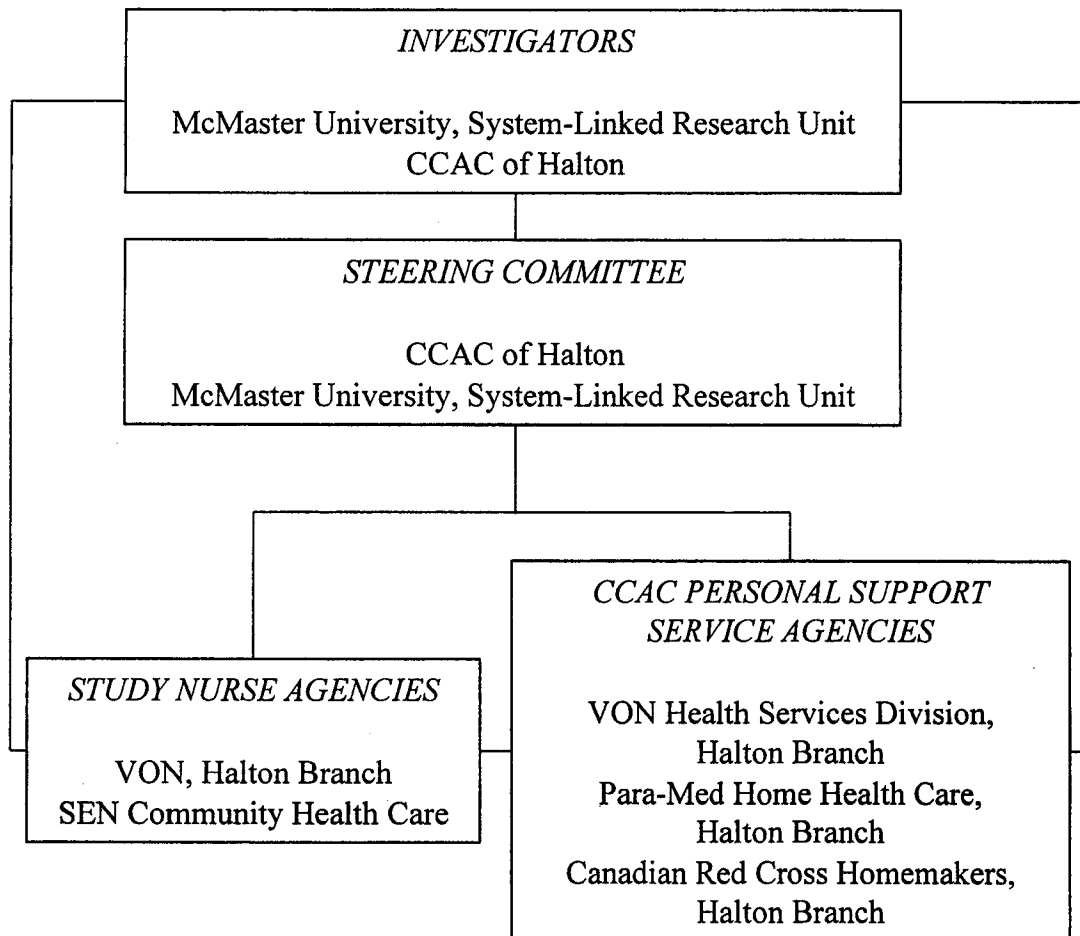


Figure 7. Collaborative research model.

rigour of the design, precise data gathering techniques and a clearly stated research problem (Baker, Boyd, Stasiowski, & Simons, 1989).

The development of this collaborative model was complex, involving extensive groundwork over a 5-month period prior to commencing the study. Briefly, the steps involved:

Initiation and Entry

- Identification of decision-makers at clinical, managerial and organizational levels for each of the participating organizations.
- Creating awareness of the study and initiate interest and involvement for all levels of the organizations through formal presentations, individual team meetings, and electronic mediums.
- Assessment of the organizational climate, including previous experience and knowledge of the research process, and human resource issues/capacities.
- Identify and help to blend clinician and researcher values and needs.

Development of the Study Intervention

- Scheduled problem-solving meetings with management and front-line staff at the CCAC to define the study process, the roles and responsibilities of Case Management staff in relation to the study, and resource requirements.
- Scheduled problem-solving meetings with the Community Nursing agencies involved in providing the study intervention to define the study intervention, the

roles and responsibilities of the nurse in relation to the study intervention, and resource requirements.

- Scheduled problem-solving meetings with management staff from the three CCAC homemaking service provider agencies to define the structure and process of the joint visit.

Development of Mechanisms for Ongoing Collaboration

- Establishment of a steering committee for the study that included management and front-line staff from the CCAC, the investigator, and the project co-coordinator. The steering committee provided a collaborative forum for the initiation, implementation, and completion of the study. The steering committee met monthly for the first year of the study, and then every two months for the remainder of the study. The specific responsibilities of the committee included: a) identifying and addressing issues related to service and research role conflicts, b) ensuring that the research requirements do not interfere with service provision and, alternatively, the rigour of the research is not compromised, c) easing access to decision-makers and ensure an ongoing collaborative problem-solving process, and d) monitoring the progress of the study, and address any issues related to the study in a proactive and timely manner.
- Development of guidelines and identification of mechanisms for ongoing communication between the investigator, the CCAC case management staff, and the Community Nursing and Homemaking service provider agencies with the CCAC.

- Regular (monthly) e-mail contact with management and front-line staff at the CCAC of Halton regarding the progress of the study.
- Regular (monthly) e-mail contact with management from the Community Nursing agencies and the CCAC homemaking service provider agencies regarding the progress of the study.
- Bimonthly meetings with management and front-line staff from the Community Nursing agencies with the CCAC who were directly involved in providing the study intervention.

Linkage with Decision-Makers at Local, Provincial, and National Levels

- Identifying, developing and maintaining ongoing linkage and exchange with local, provincial, and national decision-makers involved in community care of the elderly in order to maximize the potential impact of the research. The mechanisms for ongoing linkage and exchange include letters, teleconferences, e-mail, newsletters, poster presentation, formal presentations, and voicemail. Summaries of the agencies that were contacted, the mode of dissemination, and response (including letters of support) to the research are available upon request.

Study Nurses and CCAC Case Management Staff: Training

Scheduled orientation sessions were held with all CCAC health professional and clerical staff to provide a general overview of the study prior to its commencement. This was achieved through all staff meetings and individual meetings with each of the case management teams at the CCAC. The orientation focussed on the project goals,

expectations of professional and clerical Case Management staff with respect to the study, and addressing staff questions and concerns. Orientation booklets were developed in collaboration with the CCAC and distributed to all CCAC staff during the orientation. In addition, a study information/resource binder was developed and distributed to all CCAC case management teams. Study referral sheets and information sheets were distributed to each individual Case Management team.

A total of 9 nurses and 2 nursing supervisors from two community nursing agencies that had current service contracts with the CCAC initially underwent a period of training for the study. To standardize the intervention, the study nurses and their supervisors received the same training. In addition, the nurses were given written guidelines for the assessment. The assessment included both personal resources and environmental supports (Rogers, 1997). Additional information was given to enable them to assess for mood disorders, i.e. depression. The study nurses were also educated regarding the nature and management of depression, and given a list of various community mental health agencies within the Halton Region.

The investigator developed specific written guidelines for communication between the CCAC Case Manager, homemaking agency, and investigators. Guidelines for communication with the CCAC Case Manager were consistent with current CCAC policy. The framework for the joint visits was distributed to the study nurses and the personal support workers (see Figure 4). Information regarding the personal support

worker's scope of practice was also distributed to the study nurses. Recruitment and data collection commenced upon completion of this phase of the study.

Recruitment and Consent

Subjects were recruited from the CCAC of Halton, Ontario. Access to home care is initiated by referral to the CCAC by community, hospital, or self-referral. Following referral, clients are assigned to a case manager who determines eligibility for home care services, the type and amount of services required, and which service agency is appropriate for the care required.

Community Care Access Centre (CCAC) Case Managers reviewed new and eligible referrals for personal support services at the CCAC of Halton on a daily basis to identify potential subjects for the study. An eligibility screening form was used by the Case Managers to identify potential study participants. Case Managers were also given written guidelines for approaching potential subjects. Case Managers contacted potential participants (telephone and in-person) within 5 days of referral to the CCAC to introduce the study and obtain a verbal consent to participate. Within two or three days of obtaining a verbal consent, trained interviewers contacted potential participants to arrange an in-home interview.

At first contact with the potential participant, the interviewers explained the study in more detail including their rights regarding participation, safeguards to preserve confidentiality, and the risks and benefits of participation. The interviewers distributed an information sheet to eligible clients during this initial (baseline) interview. Potential

participants were told that they have a 50% chance of receiving nursing services in addition to their other homecare services. The interviewers obtained informed (written) consent from those clients that were willing to participate in two interviews at baseline and 6 months.

The client's primary care physician was contacted using a standard letter regarding the client's participation in the study, but not their group allocation (see Appendix B for study referral sheet, guidelines for obtaining verbal consent, information letter, consent form, and letter to physicians). When a client was not mentally capable to consent, the attorney for personal care as identified by the CCAC Case Manager was approached to obtain the written consent and answer questions on behalf of the client. The sampling and study flow diagram is depicted in Figure 8.

The investigators did not have direct contact with the subjects. All eligible subjects that consented to participate in the study were told that they were free to withdraw from the study at any time. The decision to withdraw either during or after the study did not impact on the standard care provided by the CCAC.

Randomization

Once an informed (written) consent was obtained, the participants were randomized to usual care or the RN health promotion and preventive care intervention using a computer generated schedule of randomization, which randomly assigns subjects to two groups. Participants who were living together were always allocated to the same group.

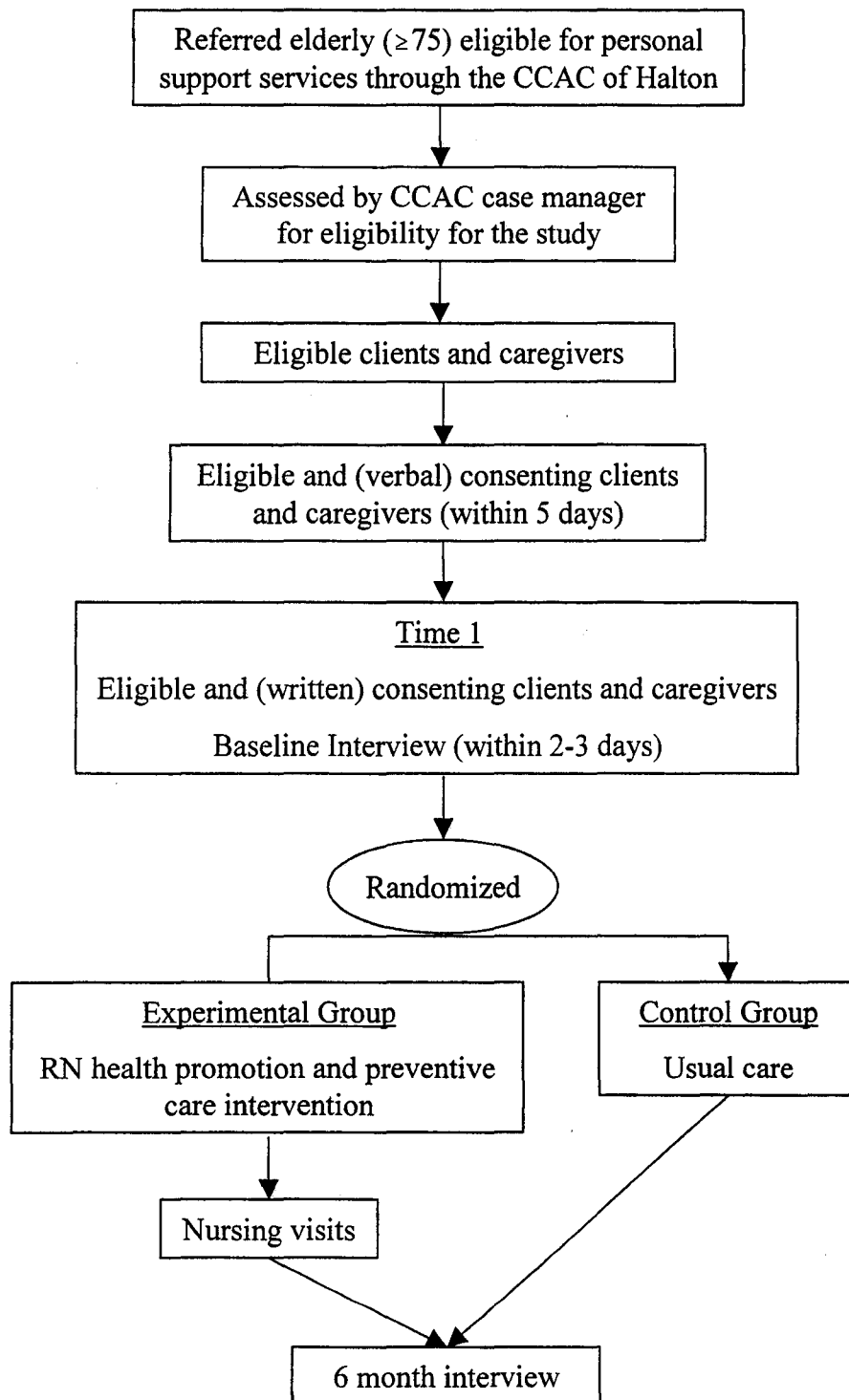


Figure 8. Study schema.

The subject was not aware of treatment assignment until after randomization, which was controlled centrally by the project coordinator keeping the nurses blind to the randomization schedule. Because of the nature of the intervention (that is, a change in the provision of care), all the CCAC Case Managers concerned were aware of the assignment of clients to the intervention group. A recent pilot study (Wishart et al., 1999) indicated that on average, 30 new eligible CCAC referrals for personal support services occurred in a month. Of these, it was expected that 40% would refuse randomization, resulting in the randomization of approximately 18 subjects per month.

Data Collection

Data were collected from participants at two points in time: upon receipt of an informed (written) consent (T1), and at six months (T2) following randomization. Information was obtained from a variety of sources including: a) a structured personal (in-home) interview with the client at baseline (before randomization) and 6 months following randomization, b) the CCAC admission assessment form, and c) monthly visit reports from the nurses. An in-home interview was utilized to obtain a high response rate and eliminate bias related to non-response. When an in-home interview was not feasible, interviews were conducted via the telephone.

The 10-item Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975) was administered (prior to randomization and at 6 months) as a screening mechanism to determine if a client was ineligible to complete the questionnaires for the study. The SPMSQ is short, easily administered and has been designed, tested, standardized and

validated. Test-retest correlations ranged between 0.82 and 0.83. Greater than 4 errors on the SPMSQ indicates some degree of intellectual impairment (Pfeiffer, 1975) (see Appendix C for complete SPMSQ). When a client was not mentally capable to consent (> 4 errors), the attorney for personal care (as identified by the CCAC Case Manager on the study referral sheet) was approached to obtain the written consent and answer the questions on behalf of the client. If the client was physically unable to participate in the interview, the attorney for personal care or caregiver was asked to respond on behalf of the client. When a proxy respondent was used, the reliability and completeness of self-reported data for subjective health measures such as depression, self-rated health, and perceived social support may have been limited.

Trained interviewers who were blinded to the treatment assignment, scheduled a follow-up in-home interview with study participants 6 months after randomization. All subjects were contacted for the 6-month interview including those in hospitals and long-term care facilities. For participants in the RN augmented intervention, interviews were scheduled following completion of the final in-home nursing visit. Participants completed the questionnaires with the interviewers through a structured interview that appraised their functional status and quality of life, mental status (level of depression), perceived social support, and use of health and social services. With an elderly population, this method of data collection helped to avoid loss of data due to visual deficits, literacy problems or difficulties related to feeling too ill or fatigued.

Clients were measured (prior to randomization and at 6 months) in terms of their age, gender, education, culture, income, and living arrangements using a sociodemographic questionnaire developed by the investigator. Additional information was collected from the CCAC admission assessment form on the source of referral and the client's primary and secondary diagnoses (see Appendix C for complete sociodemographic questionnaire).

Outcome Measures

The extended vulnerability model guided the selection of outcomes and their measures. A summary of the constructs in the vulnerability model and the corresponding study variables and their measures is illustrated in Table 13. The primary measure of effect was functional health status and quality of life. The secondary measures of effect included expenditures for the reported use of health and social services, mental health (presence of depression), and perceived social support. Consistent with the model of vulnerability, the outcomes are context dependent, emphasizing the subjective perception of the individual. Therefore, in evaluating a proactive health promotion and preventive care intervention, a measure, which provides data on the subjective assessment of health outcomes, was considered appropriate.

The selection of outcome measures was also guided by recommendations from the literature regarding the study of frail elderly people (Bowsher et al., 1993). Two commonly reported reason for the unsuccessful use of available measures with elderly people is the low energy or high fatigue level of frail elderly people, and the inability to

Table 13

Construct, Variables and Their Measures

Vulnerability Model Construct	Variable	Measure	Time ¹	Analysis Range (Bad to Good)
<i>Personal resources:</i>				
Inborn Factors	Age	Sociodemographic questionnaire	(T ₁ , t ₂)	Chi-square
	Cognitive function (screen)	Short portable mental status questionnaire (SPMSQ) (Pfeiffer, 1975)	(T ₁ , t ₂)	Mean number of total errors Paired t-test (Range: 10-0: > 4 errors - some degree of impairment)
Acquired Factors	Physical disease/illness	CCAC admission assessment form: medical diagnoses	(T ₁)	Chi-square
	Mental health – presence of depression	Center for epidemiologic studies depression scale (CES-D) (Radloff, 1977)	(T ₁ , t ₂)	Total mean score Analysis of covariance (Scale range: 60-0: > 21 cut-off)
	Functional health status and quality of life	Version 2 of the medical outcome study short form (Sf-36) health survey (Ware, Kisinski, & Dewey, 2000)	(T ₁ , t ₂)	Mean physical and mental component summary scores Mean score for each of the eight subscales Analysis of covariance (Scale range: 0-100)
<i>Environmental Supports:</i>				
Social Support	Education	Sociodemographic questionnaire	(T ₁)	Chi-square
	Income	Sociodemographic questionnaire	(T ₁ , t ₂)	Chi-square
	Perceived social support (subjective)	Personal resource questionnaire 85 (part two) (Weinert & Brandt, 1987)	(T ₁ , t ₂)	Total mean score Analysis of covariance (Scale range: 25-175)
	Expenditures of use of health and social services	Health and social service utilization inventory (Brown et al., 1995)	(T ₁ , t ₂)	Mean utilization by service type Mann-whitney u test
	Dosage of nursing visits and telephone contacts	Nursing visit and telephone contact end of month report	(T ₂)	Mean number of nursing visits and calls Unpaired t-test

¹ note: (t₁) = baseline, (t₂) = 6 months

understand what is expected because of reduced cognitive abilities. This is particularly true for those with either acute or chronic illness (Bowsher et al., 1993). Therefore, outcome measures were also selected on the basis of their length, level of complexity of questions, and ease of administration.

Primary Outcome Measure: Functional Health Status and Quality of Life

In this study, functional health status and quality of life was chosen as the primary outcome. Functional health status and related quality of life is a modifiable acquired personal factor which influences, and is influenced by, the level of vulnerability (Rogers, 1997). This variable was measured using Version 2 of the Medical Outcome Study Short Form (SF-36) Health Survey (Ware et al., 2000) (see Appendix C for complete MOS SF-36 Health Survey). The SF-36 health survey was originally developed for the Medical Outcomes Study (Ware & Sherbourne, 1992).

The SF-36 has been widely tested and the development and validation of this instrument has been extensively documented in a variety of client populations, including the frail elderly (Stewart & Ware, 1992; McHorney, Ware, & Lu, 1993; McHorney, Ware, & Raczek, 1994; Ware, Snow, Kosinski, & Gandek, 1993). The SF-36 is a subjective and multidimensional measure of general health status that is consistent with the conceptual framework for this study (Rogers, 1997). A distinct advantage of the SF-36 over other generic measures of health is the fact that it can be administered in 10-15 minutes. However, there has been very limited research analysing the SF-36 as an outcome measure for evaluating nurses' contribution to client outcomes (Irvine et al.,

2000). In a comparison of the SF-36 with the Quality of Life Profile: Senior Version (QOLPSV) in a home health care setting, Irvine et al. (2000) found the SF-36 to be more sensitive to changes over time, and more sensitive to several nursing variables including skill mix and the intensity of the client's health status than the QOLPSV.

The SF-36 is a multi-dimensional 36-item instrument that consists of a set of eight multi-item scales with 2-10 items and two summary measures. The scales measure the following dimensions of health: physical functioning (10 items), role limitations related to physical problems (4 items), bodily pain (2 items), general health perception (5 items), energy/vitality (4 items), social functioning (2 items), role limitations related to emotional problems (3 items), and mental health (5 items) (Ware & Gandek, 1998).

There is an additional single item asking respondents about health change over the past year. Each of these eight scales is scored separately on a scale of 0 to 100 - the higher the score, the more favourable the health status (McHorney et al., 1993).

These eight scales contribute to two summary scores, the Physical Health Component Summary (PCS), and the Mental Health Component Summary (MCS), which were used in this study. The Physical Health Component Summary measure includes the physical functioning, role limitations related to physical health, bodily pain, and general health perception scales. A sixth item is included in this domain but is not included in the score: amount of change in general health status over a 1-year period. The mental health component summary measure includes the energy/vitality, social functioning, role limitations related to emotional health, and mental health scales (Ware & Kosinski,

2000). Figure 9 provides a graphic summary of the items and corresponding scales and summary measures for the SF-36 as described by Ware and Kosinski (2001, p. 6). Scores for each of the eight scales and the two summary measures were calculated in this study.

After data entry, items, scales, and summary measures were scored in 3 steps as recommended by Ware (1993):

1. Item recoding: Data was checked for out of range values and the following 10 items were reverse scored: 9 (d & h), 6, 9 (a & e), 1, 11 (b & d), 7 & 8.
2. Compute raw scale scores.
3. Transform raw scale scores to a 0 (worst possible health state) to 100 (best possible health state) transformed scale score.

The original 8 dimensions on the SF-36 health survey were reduced to these two summary measures in order to lower the number of statistical comparisons, and thus reduce the role of chance in obtaining statistically significant differences in comparisons (McHorney et al., 1994). The PCS and MCS summary measures were identified through factor analysis. The summary measures have been shown to be reliable and to provide results that reflect those of the eight dimensions (Jenkinson, Layte, & Lawrence, 1997). To date, several studies utilizing the SF-36 have established content, concurrent, construct, criterion, and predictive validity of the measure (Ware & Gandek, 1998).

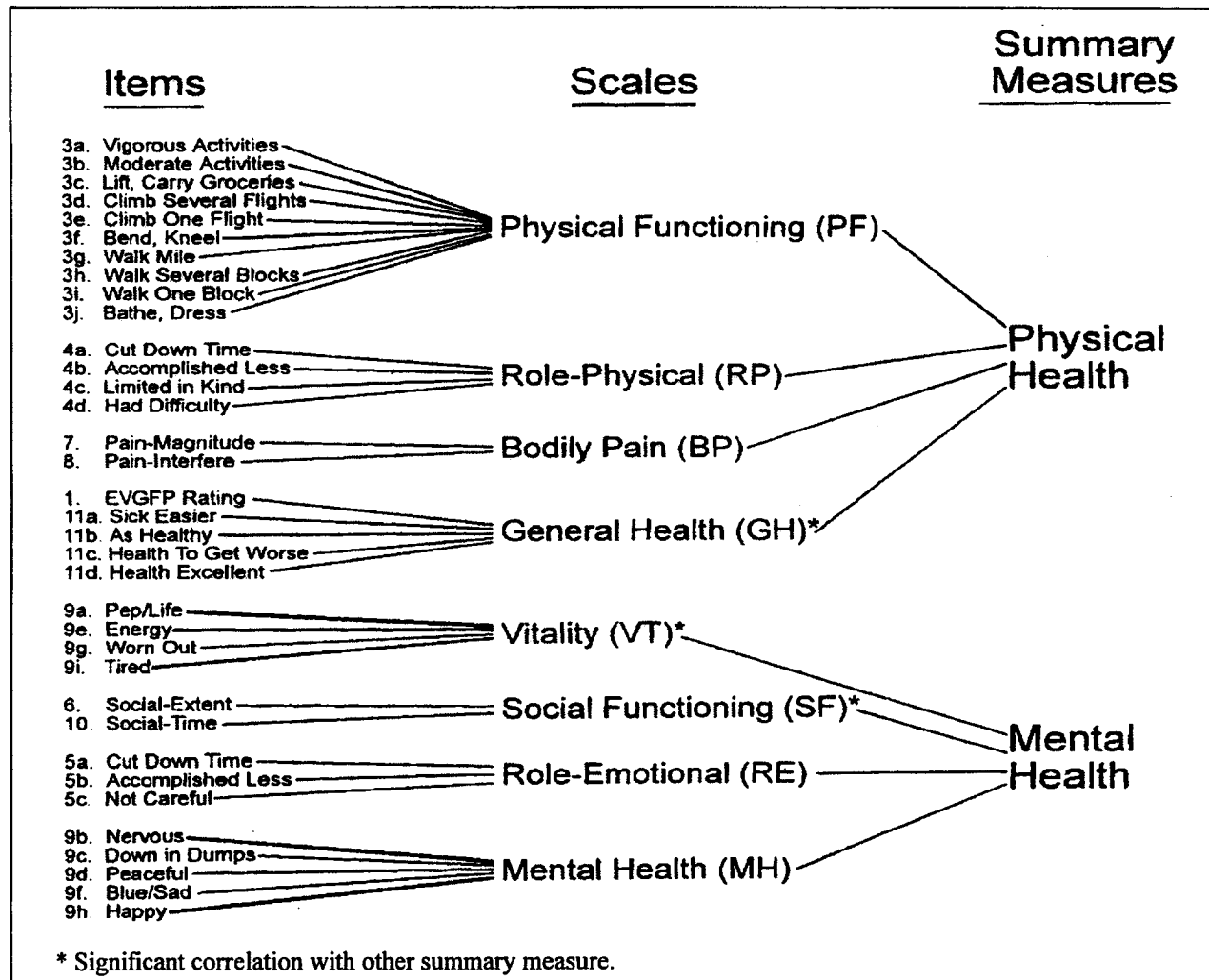


Figure 9. SF-36 measurement model (Ware & Kosinski, 2001, p. 6).

Secondary Outcome Measures

Expenditures for the Use of Health and Social Services

The economic evaluation consisted of an assessment of the use and expenditures for acute hospitalization and other health and social services during the 6-month follow-up period. The hypothesis in this study was that health and social service utilization is an environmental factor that can influence (Rogers, 1997), as well as be influenced by, the level of vulnerability. Expenditures for the use of health and social services were measured using the Health and Social Service Utilization Inventory (Browne et al., 2001). It consists of questions about the respondent's use of eight categories of direct health care services: primary care, emergency room and specialists, hospital episodes and days, emergency room, and use of seven types of other health professionals, and laboratory services. Inquiries are restricted to the reliable duration of recall span as demonstrated through a Canadian study. The reliable recall is restricted to six months for remembering a hospitalization, emergency room visit, and visit to a physician, and 2 days for the consumption of a prescription medication. To calculate annual utilization measures, the various spans of time are extended to yield an annual rate of utilization per category of health service and multiplied times the 2001 unit charges for each service to yield a measure of expenditures for health and social service.

This inventory was also designed to assess direct out of pocket expenditures, e.g. the number and type of medications and indirect costs, e.g. number of days off work. Cash transfer effects of people's circumstances are assessed by multiplying the amount by the

number of cheques received in the previous 2 weeks, e.g. unemployment. This measure has been previously tested and assessed for reliability and validity. High levels of observed agreement (.72 - .99) between the clients' report and the clinic record were recently reported (Browne et al., 2001) (see Appendix C for complete Health and Social Service Utilization Inventory). In over 17 studies, the use of the health and social service utilization inventory distinguishes groups (palliative care, illnesses with and without depression or poor adjustment, and treated and untreated groups) (Browne et al., 1999).

Mental Health (Presence of Depression)

Mental health (presence of depression) was measured using the Center for Epidemiological Studies in Depression Scale (CES-D) (Radloff, 1977). Mental status is a potentially modifiable acquired personal factor that affects the level of vulnerability (Rogers, 1997). The CES-D scale is a 20-item self-reported questionnaire that assesses current frequency of depressive symptoms. Respondents are asked to indicate how frequently they experienced 20 different symptoms within the past week on a scale of 0 (rarely) to 3 (most or all of the time). Total scores can range from 0 to 60; the higher the score, the more depressed. The items on this scale form four subscales assessing: a) depressed mood (7 items), b) psychomotor retardation (7 items), c) lack of well being (4 items), and d) interpersonal difficulties (2 items) (Schein & Koenig, 1997).

Reliability coefficients obtained on the CES-D have been high (0.85 – 0.91) (Himmelfarb & Murrell, 1983), and factor structures are stable (see Appendix A for complete CES-D scale). The four-item factors have been shown to be highly

intercorrelated which justifies the use of the total CES-D score on empirical as well as conceptual grounds (Hertzog, van Alstine, Usala, Hultsch, & Dixon, 1990). This measure of mental status reflects a multidimensional perspective of mental health that is consistent with the conceptual framework for this study (Rogers, 1997).

The CES-D has been shown to be an appropriate tool to measure depressive symptoms in the frail elderly (Davidson, Feldman, & Crawford, 1994; Irwin, Artin, & Oxman, 1999) and has been extensively used in research among older adults (Blazer, Burchett, Service, & George, 1991; Davidson et al., 1994; Roberts, Kaplan, Shema, & Strawbridge, 1997). The CES-D demonstrates good internal consistency (Cronbach's $\alpha=.84$) for the general population (Corcoran & Fisher, 1987) and correlates strongly ($R=.87$) with the Beck Depression Inventory (Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995). Another advantage of the CES-D for a frail elderly population is its ease of administration (Radloff & Teri, 1986).

Radloff (1977) suggested that a cut-off score of 16 on the CES-D could discriminate between depressed versus non-depressed clients. Using a cut off of ≥ 16 , the CES-D scaled had high sensitivity and specificity for depressive symptoms in the previous month in a community based sample of older adults (Beekman et al., 1997). However, other studies have questioned the use of the standard cut-off score of 16 to determine 'caseness', claiming that this score is too low (Himmelfarb & Murrell, 1983; Husaini, Neff, Harrington, Hughes, & Stone, 1980). Several alternative cut-off scores have been suggested in the literature for depressed versus non-depressed clients. Shulberg et al.

(1985) found that in a group of primary care outpatients that the use of the standard cut-off score yielded nearly perfect sensitivity but very poor specificity as compared to DIS classification of depression. As a result of their findings, these researchers suggested an alternative cut-off score of 27, which was found to substantially reduce the rate of false-positives without sacrificing the sensitivity of the instrument.

Himmelfarb & Murrell (1983) compared cut-off scores of 20 and 23 and concluded that a cut-off score of 20 yielded the optimal balance between false positives to false negatives for older adults. Similarly, Schein & Koenig (1997) found that a cut-off score of 20 provided the most accurate diagnostic score in the absence of other information. The standard cut-off score of 16 was found to produce an unacceptably high false-positive rate (Schein & Koenig). Other authors have suggested a cut-off score of 23 (Husaini et al., 1980).

Schein & Koenig (1997) suggest that the reason for the need for a higher cut-off score for the older adult is the influence of co-morbidity on depressive symptoms. Individuals with chronic conditions may score high on the somatic items in the CES-D because they represent symptoms of current medical problems rather than depressive symptoms. Mills (2001) examined the relationship between self-reported depressive symptoms and chronic illness among older adults. They found that self-reports of depressive symptoms were greater among those individuals reporting chronic conditions compared to those who did not. Based on this review of the literature, the investigator

chose a cut-off score of $\geq 21/60$ to distinguish between depressed and non-depressed elderly clients.

Perceived Social Support

Perception of social support (subjective) was measured using the Personal Resource Questionnaire 85 (Part Two) (Weinert & Brandt, 1987). Perceived social support is a potentially modifiable environmental factor that affects the level of vulnerability (Rogers, 1997). The PRQ85 – Part Two is a 25-item scale that measures perceived social support along the following dimensions: a) provision for attachment/intimacy, b) social integration: being an integral part of a group, c) opportunity for nurturing behaviour, d) reassurance of worth as an individual and in role accomplishments, and e) the availability of informational, emotional, and material help. These dimensions were derived from Weiss's (1974) model of relational functions. The scale ranges from 1 to 7 indicating low to high degree of agreement with 1 being the lowest and 7 the highest. One item within each dimensional subscale (d, g, j, p, & x) is negatively worded and was recoded to reflect the positive direction of the other twenty items (Weinert & Brandt) (see Appendix C for complete PRQ85 – Part Two Questionnaire).

The maximum score that can be attained is 175 - the greater the score, the greater the perception of social support. Previous studies reported reliability coefficients for the total scale, which ranged from .86 to .93 using Cronbach's Alpha. Reliability coefficients for the subscales ranged from .54 to .90 (Weinert, 1987). Construct and content validity for the PRQ85-Part Two were assessed as good on the basis of three

separate studies involving older adults (Brandt & Weinert, 1981; Weinert, 1987; Weinert & Brandt, 1987). The basic premise is that the PRQ85-Part Two measures the multidimensional construct of social support. The idea is not to delineate subscales, but to measure it as a global construct (Weinert & Brandt, 1987). Therefore, the total scale score was calculated and reported for each frail elderly subject. The PRQ85- Part Two is based on a subjective conceptualization of social support that is consistent with the conceptual framework for this study.

Description and Dose of the Nursing Intervention

The study nurses completed a monthly report, which identified the frequency of in-home visits and telephone contacts with each subject randomized to the nursing health promotion and preventive care intervention. Engagement was defined as at least one home visit or telephone contact for treatment.

Recruitment and Retention Strategies

Retention is defined as “the continued involvement of research participants over the projected study duration” (Davis, Broome, & Cox, 2002, p. 47). A 6-month follow-up period is realistic since attrition rates for the frail elderly are higher than for younger subjects (Bowsher et al., 1993). Several strategies were used to enhance recruitment and retention of eligible subjects. In a review of the literature, Davis et al. (2002) identified a number of suggestions for increasing both recruitment and retention of eligible subjects in community based clinical trials. Several of these strategies were incorporated into the study:

- *Establish a project identity.* Study participants are more likely to participate in the study if they can identify and describe it (Davis et al., 2002). A study information sheet and staff business cards printed with the CCAC of Halton and McMaster University logo were distributed to all study participants to establish study visibility and legitimacy with participants.
- *Emphasize study significance.* Participants are more likely to remain in a study if they understand the importance and relevance of the study (Davis et al., 2002). The study purpose and significance was explained to each subject by both the recruiters (prior to obtaining informed written consent) and the interviewers. After informed consent was secured, the study nurses reinforced the significance of the study and the expectations for participation in order to enhance subject retention. The project coordinator and the investigator were also available to participants if they had any further questions or concerns regarding their involvement in the study.
- *Provide interpersonal skill training for project staff.* Several studies have concluded that well trained staff is a critical factor in high retention studies (Bowsher et al., 1993; Davis et al., 2002). The project coordinator and the investigator provided individualized orientation sessions to all project staff including the recruiters, interviewers, and study nurses. In addition, orientation packages were developed which outlined the study objective, process, role expectations, and communication guidelines. The development of positive communications with subjects has been identified as a key factor for increasing retention in longitudinal studies of frail

- elderly people (Given, Keilman, Collins, & Given, 1990). This included verbal expressions of appreciation from members of the research team which has also been shown to enhance retention (Given et al., 1990).
- *Individualize data collection.* Respect for subject's time and flexibility in data collection procedures are factors that have been shown to increase retention (Bowsher et al., 1993; Davis et al., 2002). Recruiters and interviewers approached eligible subjects at a time that was convenient to the subject. A time frame of 5-7 days was allotted between identifying eligible subjects and obtaining a verbal consent. This time frame was implemented because the majority (70%) of new and eligible referrals for personal support services originate from an acute care hospital setting. Clients were often too unwell and/or overwhelmed to be contacted. In some cases, a telephone interview was conducted in place of an in-home interview to help keep participants in the study. A time frame of 2 weeks was allotted between the 6-month post-randomization time and completion of the final 6-month interview. If participants were physically unable to participate in the interview at the designated 6-month follow-up time, they were contacted again within the two-week period to reschedule to help keep these participants in the study.
 - *Use a participant-tracking database.* A participant-tracking plan was initiated in a hierarchical manner: first, with repeated telephone calls, second, by communicating with alternate contacts (i.e. family, friends), and third, by contacting the CCAC of

Halton. An average of three contacts was made before dropping a participant from the study.

Study Quality Control

Protocol and Data Collection

The procedures for screening for eligibility, recruitment and consent, intervention delivery and monitoring, data tracking, interviewing procedures, data entry and management were delineated in the study protocol and used by the investigator and study staff. All potential participants were recorded and explanations were noted if they did not enter the study. These included reasons for refusal and why specific eligibility criteria were not met.

The nurses involved in the study were monitored on a regular basis and feedback was given to ensure adherence to the intervention protocol. In addition, the study nurses and designated nursing supervisors met together with the investigator and the project coordinator every two months to discuss the study progress and any problems, share information, and to compare experiences. During the meetings, the investigators reinforced aspects of the intervention and addressed any learning needs related to the intervention, i.e. depression screening, assessment of risk factors for functional status decline, communication with the interdisciplinary team. Relevant literature related to the intervention was given to each nursing agency on an on-going basis based on their identified learning needs. Between the meetings, the nurses could contact the project coordinator or the principal investigator by telephone with any questions or concerns. The

principal investigator also kept in regular contact with managers of the four-homemaking agencies that had current service contracts with the CCAC.

Study outcome data were collected from participants by trained interviewers who were independent from those providing the intervention. Every effort was made to schedule the same interviewer for both the baseline and 6-month follow-up interview. At each point in data collection, the project coordinator scrutinized the questionnaires for any missing or questionable responses. This way, problems could be corrected immediately with the interviewer and subject if needed. The project co-ordinator used a computer programme to track the study status of participants throughout the project. In addition, the interviewers met with the project coordinator and the investigator on a regular basis to discuss the study progress and any problems. Strategies for recruitment and retention of study participants were evaluated and reinforced on a regular basis with the CCAC Case Manager recruiters, interviewers, and study nurses during the regularly scheduled meetings.

Database

Data were entered into SPSS/PC (Version 11) on a Pentium computer. Where possible, upper and lower limits on response categories were set for each individual variable. Logical errors were detected by the programme and highlighted for the research assistant responsible for data entry to clarify before proceeding with further data entry or analysis. Following data entry, the investigator scrutinized the data for out of

range values, any missing or questionable responses, and items that need to be recoded due to reverse scoring.

Statistical Analysis

Representativeness

The characteristics of those deemed ineligible and who were lost to follow-up at any decision point of the study were compared, in aggregate form, to those who completed the study. Statements about the representativeness of the sample were made and the direction of the bias associated with those subjects lost to follow-up was also highlighted. The geographical location of clients enrolled in the study was compared to the geographic location of all clients referred to the CCAC. The critical level of significance for all tests was $p < 0.05$.

Comparability

Participants who completed the 6-month follow-up in both control and experimental groups were compared on their baseline characteristics to determine the equivalence of the groups at baseline using chi-square tests. A paired t-test was utilized to compare the mean number of total errors on the SPMSQ in the two groups at 6 months.

Test of Hypotheses Using Two Group Comparisons

Primary Null Hypothesis

The investigator tested the null hypothesis that there would be no difference in the level of health related quality of life and function over a period of 6-months on the basis of exposure/non-exposure to RN augmented to usual care.

Primary Analysis

An analysis of covariance (with pre-intervention scores as covariates) was utilized to compare the mean scores for the two summary measures in the SF-36 health survey between the two groups at 6 months. Analysis of covariance (ANCOVA) is a statistical procedure used to test mean differences among groups on the mean scores on the SF-36, while controlling for pre-intervention scores on the SF-36 (covariate) (Polit, Beck & Hungler, 2001).

Secondary Analysis

An analysis of covariance was utilized to compare the mean scores on the CES-D and Personal Resource Questionnaire. The non-parametric Mann-Whitney U test was used to compare the mean expenditures for use of health and social services by service type between the two groups because utilization data is typically in a skewed distribution. Missing responses were assigned a 0 value in the analysis.

Description and Dose of the Study Intervention

The mean number of nursing visits and telephone calls were calculated. Mean differences were compared by using the independent t-test.

Justification of Sample Size

The sample size estimation was based on detecting a clinically important difference between the two groups in the SF-36 mental health component summary measure. Since the mental health component summary measure defines many more levels of health than any of the SF-36 scales alone and has been shown to be as reliable or more reliable, one

can assume that this summary measure has greater statistical power in detecting differences in mental health (Ware & Kosinski, 2001). Therefore, the mental health component summary score was used to calculate the sample size.

In a similar randomized controlled trial of the effectiveness of an in-home preventive programmes, Stuck et al. (1993a) defined improvement in functional status as a change that exceeded $\frac{1}{4}$ to $\frac{1}{2}$ of the standard deviation of that function measure at the time of randomization. According to this, with a standard deviation of 18.48 at baseline, the sample size was calculated to detect a difference between 5 and 10 in change scores between groups. Based on published tables by Ware & Kosinski (2001), for a probability of a type 1 error of 0.05 and power of 80%, 64 subjects per group were required to detect a 5-point difference in the mental health component summary change scores (with pre-intervention scores as covariates). For a probability of a type 1 error of 0.05 and power of 80%, 17 subjects per group were required to detect a 10-point difference in the mental health component summary scores. These differences used a standard deviation of 10 for the change scores based on estimates from general population studies in the United States (Ware & Kosinski). Therefore, with an expected 10% dropout rate, 63 subjects per group were allocated to each group for a total of 126 subjects.

Efforts to Minimize Bias

A randomized controlled trial with concealment was utilized in order to minimize bias. Interviewers assessing baseline and follow-up outcome measures were masked to

the type of care the client received in order to achieve a single blind trial. It was anticipated that there would not be differential interventions between the groups. However, all interventions (including home care services, medications and health provider visits) for all study participants were monitored and recorded. Dropout events after randomization were recorded and the direction and impact of any difference or biases on the results were highlighted.

The analysis was completed on an intention to treat basis. This means that all the study participants who completed the questionnaires at follow-up were included in the analysis as part of the groups to which they were randomized regardless of whether they adhered to the interventions or not (Jadad, 1998). The CCAC Case Managers were blind to subjects allocated to the usual care (control) group. However, because of the nature of the intervention (that is, a change in the provision of care), the CCAC Case Managers were aware of the assignment of subjects to the intervention group. Family physicians were aware of the client's participation in the study but not the type of care that the client received. Finally, a statistician/data analyst independent of the investigator performed the analysis.

Ethical Implications

In accordance with the ethics of human research, subjects' consent, confidentiality, and protection of rights were adhered to in the study. Subjects were under no obligation to participate in the study. Study participants were assured that their decision to participate in the study would in no way affect the care they would receive from the

CCAC. Subjects were assured that they would not be identified individually in any verbal or written reports of the study. They were informed that they could withdraw from the study at any time for any reason, that information collected during the study would be kept confidential, and used only for the purposes of the study analysis.

Confidentiality was assured by assigning code numbers to study participants. Only the project co-ordinator had access to data that linked subject's names with study identification numbers. The original data and the identifying code numbers with participants' and nurses' names were kept by the project coordinator in a locked filing cabinet in the McMaster University SLRU. Computer data were accessible only to the principal investigator, project co-ordinator and other designated research staff of the SLRU at McMaster University. The project co-ordinator and the principle investigator supervised access to the data to ensure that confidentiality was maintained. Data were analysed by group without the ability to identify specific patients.

Ethical approval for the study was obtained from the McMaster University, Research and Ethics Board and renewed yearly as required. Prior to commencement of the study, administrative approval was received from each of the participating agencies (CCAC of Halton; VON of Nurses, Halton Branch; and SEN Community Health Care) (see Appendix D for letters of ethical approval).

Limitations of the Study

The major limitations of the study related to conducting the study in the “real world” within the usual setting of care with the usual providers. Specifically, the limitations were as follows:

1. Subject attrition related to death, functional deterioration, and relocation.
2. Shorter follow-up period (6 months versus other studies reporting 1-3 years).
3. Not truly possible to blind interviewers to subject assignment at Time 2, because information suggesting the presence or absence of nursing involvement would likely be mentioned inadvertently by the subject.
4. Due to the nature of the intervention (that is, a change in the provision of care), the CCAC Case Managers were not blinded to subject assignment to the RN augmented intervention.
5. Recruitment was completed using predominantly telephone contacts versus in-person contacts. A lower rate of refusal may have been obtained if all clients could have been approached in person regarding participation in the study.
6. Proxy interviews were conducted for frail elderly subjects who were unable to participate due to functional limitations. When a proxy respondent was used, the reliability and completeness of self-reported data for subjective health measures such as depression, self-rated health, and perceived social support may have been limited.
7. Subjects and Family Physicians were aware of the study.

CHAPTER 7:

RESULTS

Descriptive Statistics

Study Environment

The study was conducted under the auspices of the CCAC of Halton, a partner agency with McMaster University, SLRU on Health and Social Service Utilization. As in Table 14, the characteristics of the environment were examined for the fiscal year prior to and upon completion of the study (1999-2000 compared to 2001-2002). The most notable change over the course of the study was related to the number of clients 75 years and older accessing personal support services through the CCAC. Despite the 17% increase in the number of clients 75 years and older eligible for personal support services, only 56.4% of these clients accessed services and consumed 20% fewer hours of personal support services than those using services in 1999-2000. Noteworthy, is that over the course of the study, access to other professional CCAC services reduced by 31% for clients accessing personal support services.

These data reflects provincial changes in admission and access to CCAC services in general. Access to CCAC services was restricted beginning in August 2001 as a cost saving strategy in response to restrictions on funding imposed by the Ontario Ministry of Health, Long-Term Care (S. Shadwick, personal communication, February 13, 2001).

Table 14

Study Environment Characteristics Pre- and Post-Study

	Pre-Study (1999-2000)	Post-Study (2001-2002)
<i>CCAC Client Population:</i>		
Number of Clients \geq 75 years Eligible for Personal Support Services	3,520	4,124 \uparrow
Number of Clients \geq 75 years Accessing Personal Support Services	3,520	2,327 \downarrow
Number of Personal Support Service Hours Provided to Clients \geq 75 years (% of total number of hours provided by CCAC)	388,824 (66%)	309,837 (71.3%) \downarrow
Number of Clients \geq 75 years Accessing Personal Support Services Alone (% of total number of clients accessing personal support services)	1,000 (28.4%)	1,399 (60%) \uparrow
Average Caseload for CCAC Case Manager	1:150	1:134

Clients were prioritized based on their needs and waiting lists were implemented in order to restrict and delay access to all CCAC services including personal support services.

Although these restrictions affected both groups, this change in policy had a significant impact on the ability of the study nurse to access needed CCAC services for participants randomized to the nursing group, often resulting in service delays or reductions in service. Therefore, any differences found will be an underestimate of the real differences.

*Eligible Population**Applicability*

All individuals 75 years and older and eligible for personal support services through the CCAC of Halton, were screened for eligibility for the study. Between February 2001 and December 2001, 342 individuals 75 years and older and eligible for personal support

services were screened for eligibility for the study. Once screened, 206 of those individuals (60%) met the eligibility criteria for the study and 126 individuals subsequently entered the study (38.8% refusal rate). The flow of the population through the study is illustrated in Figure 10. The most common reason for ineligibility (96%) was that individuals were also eligible for nursing services through the CCAC.

Representativeness of Frail Elderly Subjects

Of 126 frail elderly clients eligible for the study who were randomly allocated at baseline to receive proactive RN health promotion and preventive care or not, 94 or 74.6% were retained in the 6 month follow-up period. A total of 32 frail elderly clients were lost to follow-up at 6 months. There was a slightly higher retention of participants randomized to receive usual home care services (78%) when compared with those randomized to receive RN care (70.9%). Reasons for lost to follow-up for the 126 clients randomized to receive RN health promotion and preventive care or usual care included death (10%), missed (11.9%), and refusal to participate (2.4%). One subject failed the Short Portable Mental Status Questionnaire and did not have an available caregiver to respond on her behalf. Participants who were missed were either not located or too ill to participate. There were a higher proportion of missed participants randomized to receive RN care (7.9%) compared to usual care (4.0%).

In Table 15, study completers in the 6-month follow-up analysis (n = 94) were compared to those who were lost to follow-up (n = 32) on their demographic, social and clinical characteristics at baseline, to assess if dropping out affected the

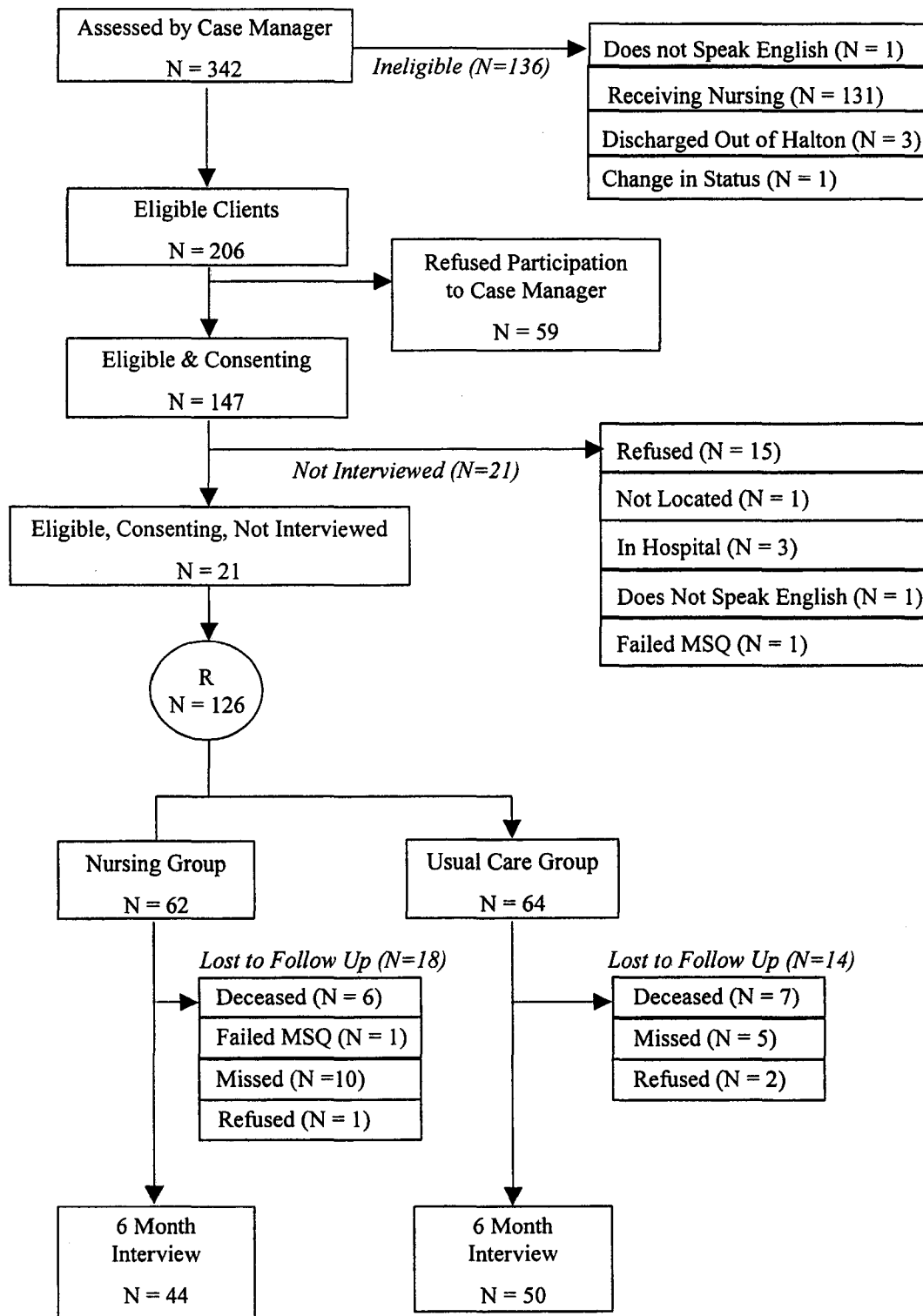


Figure 10. Study flow diagram (February 1, 2001 – June 30, 2002).

Table 15

Comparison of Descriptive Variables Between the Study Completers and Non- Completers at Baseline

Characteristics	Total (N = 126)						Test Statistics	
	Total (N=126)		Completers (N=94)		Drop-outs (N=32)			
	n	%	n	%	n	%	x 2	p-value
Age								
75-80	43	34.1%	35	37.2%	8	25.0%		
81-85	41	32.5%	24	25.5%	17	53.1%		
86-90	28	22.2%	25	26.6%	3	9.4%		
91 & Up	14	11.1%	10	10.6%	4	12.5%		
Gender								
Male	30	23.8%	15	16.0%	15	46.9%	12.58	< 0.001*
Female	96	76.2%	79	84.0%	17	53.1%		
Respondent								
client answered for self	110	87.3%	84	89.4%	26	81.3%	1.417	0.234
caregiver answered	16	12.7%	10	10.6%	6	18.8%		
Cognitive Status								
0-4 errors (Intellectually intact)	113	92.8%	87	95.6%	26	83.8%	4.66	0.03*
5-7 errors (Moderately impaired)	6	4.8%	4	4.4%	2	6.5%		
8-10 errors (Severely impaired)	3	2.4%	0	0.0%	3	9.7%		
Type of Accommodation								
House or Apartment	94	74.60%	70	74.50%	24	75.00%	0.00	0.95
Senior's House	32	25.40%	24	25.50%	8	25.00%		
Marital Status								
Married	42	32.50%	29	30.90%	13	37.50%	1.03	0.31
Other	84	67.50%	65	69.10%	19	62.50%		
Education								
Grade school	28	22.60%	22	23.70%	6	19.40%	4.416	0.11
High School	52	41.90%	37	39.80%	15	48.40%		
Post-Secondary	44	35.50%	34	36.60%	10	32.30%		
Ethnic/cultural group								
Canadian	92	73.00%	67	71.30%	25	78.10%		
Other	34	27.00%	27	28.70%	7	21.90%		
Living Arrangements								
With Others	60	47.60%	42	44.70%	18	56.30%	1.281	0.258
Alone	66	52.40%	52	55.30%	14	43.80%		
Relationship to Caregiver								
Spouse	38	63.30%	25	59.50%	13	72.20%	0.87	0.35
Other	21	36.70%	17	40.50%	5	27.80%		
Income								
Below \$40,000	108	85.71%	84	89.36%	24	75.00%	4.02	0.04*
Over \$40,000	18	14.29%	10	10.64%	8	25.00%		

Table 15 continued

Characteristics	Total (N = 126)						Test Statistics	
	Total (N=126)		Completers (N=94)		Drop-outs (N=32)			
	n	%	n	%	n	%	x 2	p-value
Severity of Illness Factor								
Presence of Depression								
Depressed: CESD > = 21	32	25.60%	21	22.34%	11	35.48%	2.114	0.146
Not Depressed: CESD < 21	93	74.40%	73	77.66%	20	64.52%		
Primary Diagnosis								
Cancer	3	2.38%	3	3.19%	0	0.00%		
Injuries, Falls and Fractures	22	17.46%	20	21.28%	2	6.25%		
Cardiovascular	14	11.11%	9	9.57%	5	15.63%		
Neurological, i.e. dementia	24	19.05%	18	19.15%	6	18.75%		
Musculoskeletal, i.e. arthritis	18	14.29%	14	14.89%	4	12.50%		
Respiratory	12	9.52%	7	7.45%	5	15.63%		
Gastrointestinal	7	5.56%	4	4.26%	3	9.38%		
Sensory	3	2.38%	2	2.13%	1	3.13%		
Integumentary	2	1.59%	2	2.13%	0	0.00%		
Weakness/Frailty	14	11.11%	9	9.57%	5	15.63%		
Other	7	5.56%	6	6.38%	1	3.13%	4.28	0.831
Number with >1 Illness	69	54.70%	50	53.20%	19	59.30%	41.896	0.306
Number of Medications Taken Daily								
< 4 Medications	21	16.67%	14	14.89%	7	21.88%		
4-9 Medications	76	60.32%	59	62.77%	17	53.12%	1.139	
10 or More Medications	29	23.00%	21	22.34%	8	25.00%		0.566
Number with >1 Hospital Admission	80	63.05%	62	66.00%	18	56.30%	0.971	0.325
	Mean	SD	Mean	SD	Mean	SD		
Age	84.04	5.7	84.1	5.8	83.7	5.5	0.363	0.72
Education in Years	12.1	3.5	12.1	3.6	12.1	3.2	0.059	0.953

representativeness of the respondent group on important study variables. If case dropout events rendered the groups non-comparable in any way, adjustments for these imbalances at baseline would need to be made when testing the hypothesis of differences associated with a 6-month exposure to a proactive RN health promotion intervention.

The demographic and social profile of study completers versus those lost to follow-up is similar with the exception of gender, cognitive status (as measured by the number of errors obtained on the SPMSQ), and income. A greater proportion of completers were female (84%) compared to those lost to follow-up (53.1%. $p < 0.001$) and intellectually

intact (< 5 errors on the SPMSQ) (95.7% compared with 83.8%, $p = 0.02$). In addition, a greater proportion of completers had an income below \$40,000 (89.4%) compared to those lost to follow-up (75.0%, $p = 0.04$).

The results of the chi-square test showed that completers were similar to those lost to follow-up in their average age (84.1 years), the 30.9% who were married, and the 69.1% who were either widowed, single, separated or divorced. Similarities also existed in the 74.5% who lived in a house or apartment, the 25.5% who lived in a Retirement Home, the 71.3% who were Canadian ethnic identity, and the 28.7% who were from other ethnic backgrounds. Completers were also similar to those lost to follow-up in the 44.7% who lived with someone who could help if needed, the 59.5% who identified this individual as their spouse, and the 40.5% who identified this individual as either their child, sibling, or friend. Similarities also existed in the 36.6% that had more than High School education. In addition, completers were the same to those lost to follow-up in the 89.4% of frail elderly subjects who were able to respond to the questionnaires themselves.

Clinically, completers were similar to those lost to follow-up in severity of illness indicators which included the 53.2% who had at least one other illness, the 22.3% who were depressed as indicated by a score of ≥ 21 on the CES-D, the 71% who reported taking 4-9 prescription medications daily, and the 21.5% who reported taking 10 or more medications daily. Completers were also similar to those lost to follow-up in their reported primary diagnosis:

- 21.3% had injuries, falls, or fractures;

- 19.2% had neurological problems, including dementia;
- 14.9% had musculoskeletal problems, including arthritis;
- 9.6% had cardiovascular problems;
- 9.6% reported weakness or frailty.

Other diagnoses included cancer (3.19%), respiratory (7.5%), gastrointestinal (4.3%), sensory (2.1%), integumentary (2.1%), and other (6.4%).

Description and Dose of the Study Intervention

A visiting nurse engaged 83.9% of those frail elderly participants who were randomly allocated to the RN health promotion intervention at baseline (n = 62). Engagement was defined as at least one home visit or telephone contact for treatment. Subjects randomized to the RN health promotion group received an average of 3.74 visiting nursing home visits during the 6-month follow-up. Elements of the intervention were tracked for compliance with implementation as indicated in Table 16. Overall, compliance with the intervention was high with the exception of visiting participants within 1 week of sending the referral to the nursing agency (52%). This was related to missing information, difficulties contacting participants, as well as workload issues for those nurses providing the intervention. In addition, there was some turnover of nursing staff providing the study intervention. Over the course of the study, a total of 3 out of the 9 original nurses left the study and 2 nurses arrived.

Table 16

Engagement Rate and Compliance with RN Health Promotion Intervention

Elements of Intervention	RN Health Promotion and Preventive Care (N=62)	Usual Care (N=64)
Engagement Rate:		
Number of clients who received at least one home visit or telephone contact.	83.9%	
Mean number of nursing visits over 6 month follow-up.	3.74	
Compliance Rate:		
CCAC notified of study participation.	100%	100%
Primary nurse assigned on admission to RN group.	93.6%	
Primary nurse visits minimum 1 week (7 consecutive days) following sending referral to nursing agency.	52.0%	
Primary nurse contacts client minimum of once per month while receiving the nursing intervention.	86.5%	
Primary nurse visits minimum 3 times for clients who completed the 6 month intervention.	91.9%	

Study Participants

The study population of 94 consenting CCAC clients presented as a fairly elderly group. Greater than 60% of the participants were over 80 years of age with a mean age of 84.1 years. There were a significantly higher proportion of women (84%) compared to men (16%). The majority of individuals were widowed, separated or single (67%) and over half the sample (55%) lived alone. Noteworthy, is that at baseline, 92.5% of the sample reported that they were limited a lot in moderate activities of daily living, and

68% were limited to some degree in bathing or dressing. Over half of the sample (61%) reported that their health was fair to poor and 67% indicated that they had difficulty performing work or other activities most of the time or all of the time. Over half of the sample (53.2%) had more than one illness and 22% exhibited depressive symptoms. Over half of the sample (66%) reported a hospital admission in the previous 6 months, and 84.9% reported taking more than 4 prescription medications daily. However, the majority of the study participants were intellectually intact (95.6%), and 89.4% were able to respond to the questionnaires by themselves.

A proxy respondent was utilized for 10.6% of the total study population due to limitations in cognition, physical health or language. A total of 5 telephone interviews were conducted in place of a personal in-home interview (4 at baseline and 1 at 6 months). Almost one quarter (21.3%) of the study participants had experienced an injury, fall, or fracture, and 31.9% reported neurological or musculoskeletal problems.

The geographical area of residence of the 126 clients randomly allocated at baseline was compared to the geographical area of all clients eligible for personal support services through the CCAC of Halton (as of December 31, 2001). These 126 clients were similar to all clients referred to the CCAC for personal support services in the 61% who lived in Burlington, the 29% who lived in Oakville, and the 10% who lived in North Halton (Georgetown, Acton, Halton Hills, Campbellville, Milton) (see Table 17).

Table 17

Geographical Area of Residence of Eligible and Consenting Study Participants Compared to CCAC Clients Eligible for Personal Support Services

Geographical Area	Study Participants (n=126)		CCAC Clients		Test Statistic	
	n	%	n	%	x ²	p-value
Burlington	77	0.61	924	0.528		
Oakville	37	0.29	566	0.323		
North Halton	12	0.1	244	0.139		
Other	0	0	17	0.01	4.25	0.191
Total	94	1	1751	1		

Primary Research Questions: General Effectiveness of Intervention

Comparability of Groups

Even though randomization was used as a means of ensuring comparable groups at the onset of the study, dropout events after randomization may have rendered study groups non-equivalent on characteristics known to affect the outcome. At baseline, the comparison of clinical, social and demographic characteristics between those randomized to usual care and those in the RN health promotion group are displayed in Table 18. Group comparisons on baseline variables of frail elderly home care clients retained in the 6-month follow-up period showed that there was no statistically significant difference in the baseline characteristics between experimental and control study participants. Thus, any 6-month differences between groups cannot be attributed to differences in baseline clinical, social or demographic characteristics.

Table 18

Comparison of Demographic, Clinical and Social Characteristics Between Groups at Baseline

Characteristics	Total (N= 94)		Nursing group (N=44)		Usual care group (N=50)		Test Statistic	
	n	%	n	%	n	%	χ^2	p-values
Gender								
Male	15	16.00%	8	18.20%	7	14.00%	0.31	0.58
Female	79	84.00%	36	81.80%	43	86.00%		
Age								
75-80	35	37.20%	18	40.90%	17	34.00%	1.91	0.59
81-85	24	25.50%	9	20.50%	15	30.00%		
86-90	25	26.60%	11	25.00%	14	28.00%		
91 & Up	10	10.60%	6	13.60%	4	8.00%		
Respondent								
client answered for self	84	89.40%	38	86.40%	46	92.00%	0.30	0.58
caregiver answered	10	10.60%	6	13.60%	4	8.00%		
Cognitive Status								
0-4 errors (Intellectually intact)	87	95.60%	42	95.50%	45	95.70%		
5-7 errors (Moderately impaired)	4	4.40%	2	4.50%	2	4.30%		
8-10 errors (Severely impaired)	0	0.00%	0	0.00%	0	0.00%	0.01	0.95
Type of Accommodation								
House or Apartment	70	74.50%	34	77.30%	36	72.00%	0.34	0.56
Senior's House	24	25.50%	10	22.70%	14	28.00%		
Marital status								
Married	29	30.90%	15	34.10%	14	28.00%	0.41	0.52
Other	65	2.10%	29	2.30%	36	2.00%		
Education								
Grade school	22	23.70%	11	25.00%	11	22.40%	0.23	0.89
High School	37	39.80%	18	40.90%	19	38.80%		
Post-Secondary	34	36.60%	15	34.10%	19	38.80%		
Ethnic/Cultural Group								
Canadian	67	71.30%	30	68.20%	37	74.00%		
Other	27	28.70%	14	31.80%	13	26.00%		
Living Arrangements								
With Others	42	44.70%	23	52.30%	19	38.00%	1.93	0.17
Alone	52	55.30%	21	47.70%	31	62.00%		
Relationship to Caregiver								
Spouse	25	59.50%	11	47.80%	14	73.60%	2.89	0.09
Other	17	40.50%	12	52.20%	5	26.40%		
Income								
Below \$40,000	84	89.36%	41	93.20%	43	86.00%	1.27	0.26
Over \$40,000	10	10.64%	3	6.80%	7	14.00%		

Table 18 continued

Characteristics	Total (N= 94)		Nursing group (N=44)		Usual care group (N=50)		Test Statistic	
	n	%	n	%	n	%	χ^2	p-values
Severity of Illness Factors								
Presence of Depression								
Depressed: CESD \geq 21	21	22.30%	9	20.50%	12	24.00%	0.17	0.68
Not Depressed: CESD $<$ 21	73	77.70%	35	79.50%	38	76.00%		
Primary Diagnosis								
Cancer	3	3.19%	2	4.55%	1	2.00%		
Injuries/Falls/Fractures	20	21.3%	10	22.7%	10	20.0%		
Cardiovascular	9	9.6%	5	11.4%	4	8.0%		
Neurological	16	17.0%	7	15.9%	9	18.0%		
Musculoskeletal	14	14.9%	5	11.4%	9	18.0%		
Respiratory	6	6.4%	4	9.1%	2	4.0%		
Gastrointestinal	4	4.3%	1	2.3%	3	6.0%		
Weakness/Frailty	10	10.6%	6	13.6%	4	8.0%		
Sensory	2	2.1%	1	2.3%	1	2.0%		
Integumentary	2	2.1%	1	2.3%	1	2.0%		
Other	8	8.5%	2	4.5%	6	12.0%	5.54	0.85
Number with $>$ 1 Illness	50	53.20%	21	47.70%	29	58.00%	32.37	0.45
Number of Medications Taken Daily								
$<$ 4 Medications	14	14.9%	7	16.0%	7	14.0%		
4-9 Medications	59	62.8%	29	66.0%	30	61.0%		
10 or More Medications	21	22.3%	8	18.0%	12	25.0%	0.55	0.76
Number with $>$ 1 Hospital Admission	62	66.0%	27	61.40%	35	70.00%	0.78	0.38
Age (mean)	84.14	5.8	83.92	6.08	84.35	5.59	-0.36	0.72
Education in years	12.14	3.62	12.2	3.43	12.08	3.81	0.16	0.87

Primary Research Question: Effectiveness of Proactive RN Health

Promotion and Preventive Care on Functional Health Status and Related Quality of Life

1. *Does proactive nursing health promotion and preventive care in addition to usual home care services improve the outcomes for a frail elderly population with respect to functional health status and related quality of life?*

Health related quality of life and function outcomes as measured by the SF-36

Health Survey were compared over time from baseline (pre-randomization) (T1) and 6 months (post-randomization) (T2) with the 94 valid and completed cases. Pre-

intervention scores were entered as covariates, in order to control for differences in pre-intervention functioning. Scores for the two MCS and PCS summary measures and each of the eight scales were calculated in this study.

Overall, this study population of 94 consenting CCAC clients reported poor health related quality of life and function scores on the SF-36 Health Survey in comparison with published norms for the general U.S. population of females ≥ 75 years (Ware, 1993). Table 19 provides a comparison of the total mean scores obtained by the study participants compared to normative data (for females aged 75 and over) to give a sense of where individuals fell in relation to the general population at baseline. Results from the SF-36 health survey indicated that study participants ($n = 94$) scored below the mean for all of the SF-36 dimensions of health related quality of life with the exception of role functioning related to emotional health. Noteworthy, is that the health of the study participants compared to the general population was particularly compromised in the areas of physical functioning (23.4 vs. 53.2), role functioning related to physical health (36.7 vs. 45.3), social functioning (54.3 vs. 73.9), and energy/vitality (33.6 vs. 50.4). These data provide a meaningful picture of the health related quality of life and function of the study participants.

The mean scores and standard deviation for the two summary measures and each of the scales and on the SF-36 at baseline (Time 1) and 6-months (Time 2) were compared between the two groups as illustrated in Table 20. The mean change scores (delta for individual participants) from baseline to 6 months (T1-T2) for the eight SF-36 scale

Table 19

Comparison of Mean SF-36 Scores Between Study Completers and Norms for Females > 75 At Baseline (Ware and Kosinski, 2001)

SF-36 Subscales	Study Completers (N=94)	Norms for Females ≥ 75 years	Difference (Study Completers - Norms)
	Mean Score (Range 0-100)	Mean Score (Range 0-100)	
<i>Physical Health Component Summary Measure:</i>			
Physical Functioning	23.40	53.2	-29.80
Role-physical	36.70	45.28	-8.58
Bodily Pain	53.20	60.88	-7.68
General Health Perception	55.30	56.66	-1.36
<i>Mental Health Component Summary Measure:</i>			
Energy/Vitality	33.60	50.41	-16.81
Social Functioning	54.30	73.89	-19.59
Role-emotional	78.90	63.18	15.72
Mental Health	69.48	73.99	-4.51

scores and the physical (PCS) and mental health component (MCS) summary scores were analyzed (using repeat measures ANOVA) to understand individual improvements over time. Improvements in SF-36 scores were calculated accounting for baseline scores (T1-T2, divided by T1). As in Table 20, analysis of covariance (ANCOVA) was also calculated using Time 1 (pre-intervention) scores as a covariate in order to control for differences in pre-intervention functioning.

Table 20

Comparison of Usual Care and Proactive RN Health Promotion and Preventive Care Groups: Health Related Quality of Life and Function (SF-36 Health Survey) Using Repeat Measures ANOVA and Analysis of Covariance

	Group Total			Group						Test Statistics			
	Count	Mean	S.D.	Nursing Group			Usual care group			T-test	p-values	F-value	p-values
				Count	Mean	S.D.	Count	Mean	S.D.				
SF-36 Physical function Score (0-100)													
Time 1	94	23.40	17.80	44	24.70	17.40	50	22.10	18.20	0.700	0.486		
Time 2	94	32.30	25.80	44	39.20	27.40	50	26.30	22.80	2.480	0.015		
Time 1 - Time 2	94	-8.90	25.09	44	-14.50	26.77	50	-4.20	22.70	2.014	0.047	5.63	0.020
SF-36 Role - Physical Score (0-100)													
Time 1	94	36.70	38.80	44	36.50	41.40	50	36.90	36.80	-0.046	0.964		
Time 2	94	63.50	39.10	44	70.50	36.40	50	57.40	40.80	1.631	0.106		
Time 1 - Time 2	94	-26.80	52.30	44	-34.00	51.30	50	-20.50	52.87	-1.248	0.215	2.67	0.105
SF-36 Bodily Pain Score (0-100)													
Time 1	94	53.20	33.70	44	57.70	32.80	50	49.30	34.40	1.215	0.228		
Time 2	94	58.80	36.40	44	61.10	35.90	50	56.80	37.00	0.566	0.573		
Time 1 - Time 2	94	-5.60	39.60	44	-3.40	44.06	50	-7.50	-2.60	0.508	0.613	0.02	0.892
SF-36 General Health Perception Score (0-100)													
Time 1	94	55.30	22.10	44	58.50	23.60	50	52.40	20.60	1.337	0.184		
Time 2	94	60.00	23.50	44	64.40	22.40	50	56.10	24.00	1.710	0.091		
Time 1 - Time 2	94	-4.70	19.88	44	-5.90	20.20	50	-3.70	19.74	-0.518	0.606	1.23	0.270
SF-36 Vitality Score (0-100)													
Time 1	94	33.60	22.80	44	32.20	23.00	50	34.80	22.80	-0.529	0.598		
Time 2	94	43.90	24.20	44	47.40	24.00	50	40.80	24.10	1.346	0.182		
Time 1 - Time 2	94	-10.30	24.54	44	-15.20	24.31	50	-6.00	24.16	-1.837	0.069	3.21	0.076

Table 20 continued

	Group												
	Group Total			Nursing Group			Usual care group			Test Statistics			
	Count	Mean	S.D.	Count	Mean	S.D.	Count	Mean	S.D.	T-test	p-values	F-value	p-values
SF-36 Social Functioning Score (0-100)													
Time 1	94	54.30	35.20	44	64.50	34.50	50	45.30	33.60	2.735	0.007		
Time 2	94	72.90	35.40	44	80.40	31.30	50	66.30	37.80	1.961	0.053		
Time 1 - Time 2	94	-18.60	41.39	44	-15.90	38.16	50	-21.00	44.28	0.593	0.555	1.45	0.232
SF-36 Role - Emotional Score (0-100)													
Time 1	94	78.90	30.70	44	74.40	32.90	50	82.80	28.40	-1.328	0.188		
Time 2	94	86.30	26.00	44	93.90	13.50	50	79.50	32.00	2.910	0.005		
Time 1 - Time 2	94	-7.40	34.15	44	-19.50	32.84	50	3.30	31.90	-3.416	0.001	11.46	0.001
SF-36 Mental Health Score (0-100)													
Time 1	94	69.48	20.80	44	66.05	21.38	50	72.50	20.01	-1.549	0.125		
Time 2	94	74.95	20.84	44	78.64	16.82	50	71.70	23.51	1.625	0.108		
Time 1 - Time 2	94	-5.47	18.38	44	-12.59	15.94	50	0.80	18.25	-3.795	<0.001	11.47	0.001
SF-36 Physical Health Component Summary Score (0-100)													
Time 1	94	40.79	17.43	44	42.82	17.62	50	39.01	17.25	1.06	0.292		
Time 2	94	52.28	22.75	44	57.71	21.77	50	47.5	22.72	2.216	0.029		
Time 1 - Time 2	94	-11.49	22.41	44	-14.89	23.24	50	-8.49	21.43	-1.386	0.169	3.74	0.056
SF-36 Mental Health Component Summary Score (0-100)													
Time 1	94	59.07	18.48	44	57.96	19.13	50	60.04	18.03	-0.54	0.590		
Time 2	94	68.20	19.51	44	73.25	15.2	50	63.75	21.83	2.472	0.015		
Time 1 - Time 2	94	-9.13	16.47	44	-15.29	14.37	50	-3.71	16.42	-3.614	<0.001	13.45	<0.001

At 6 months, both the usual care and the nursing group had improved in individual change scores on the PCS, MCS, and six out of eight of the subscale scores. However, for participants receiving the RN intervention there were both statistically and clinically significant improvements in individual change scores within six of the eight SF-36 scales and the overall summary scores for mental and physical health.

At the 6-month follow-up, there was both a clinically important and statistically significant improvement in the summary score for mental health for the nursing group (26.3%) vs. a 6.2% improvement in the usual care group (see Table 20 and Figure 11). This eleven-point difference in mean change scores (15.29 vs. 3.71) was statistically significant ($F = 13.45, p < 0.001$).

Within the subscales that contribute to the physical health component summary in the SF-36, the most noteworthy improvement was in the physical functioning subscale. Physical functioning is defined as the capacity to perform physical activities normal for people in good health, such as self-care activities (bathing, dressing), activities related to mobility (getting around indoors, outdoors and in the community), and physical activities (walking, bending, lifting, climbing stairs, and running) (Ware, 1993). As illustrated in Table 20 and Figure 12, there was a clinically and statistically significant percentage improvement in physical functioning in the nursing group (58.7%) versus a 19.0% improvement in the usual care group ($F = 5.63, p = 0.02$).

There was also a clinically significant percentage improvement in role functioning related to physical health in the nursing group (93%) versus a 55.56% improvement in

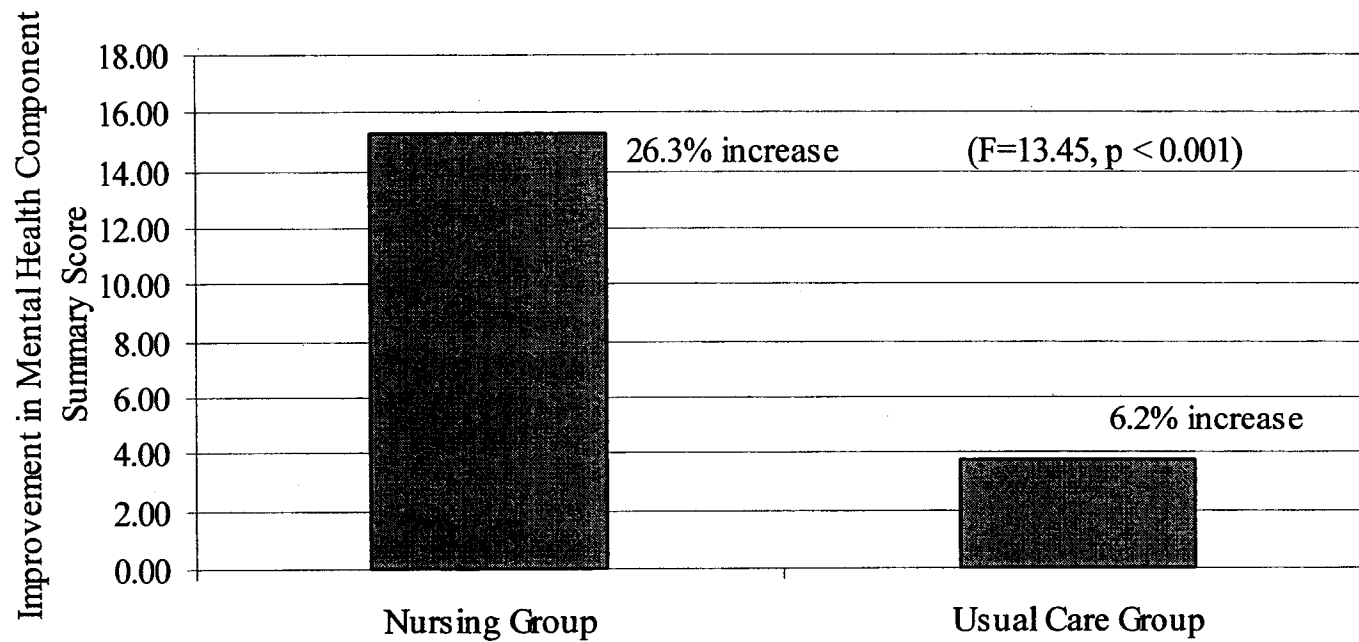


Figure 11. Percent improvement (T1-T2) in the SF-36 mental health component summary score with RN health promotion and preventive care compared to usual care.

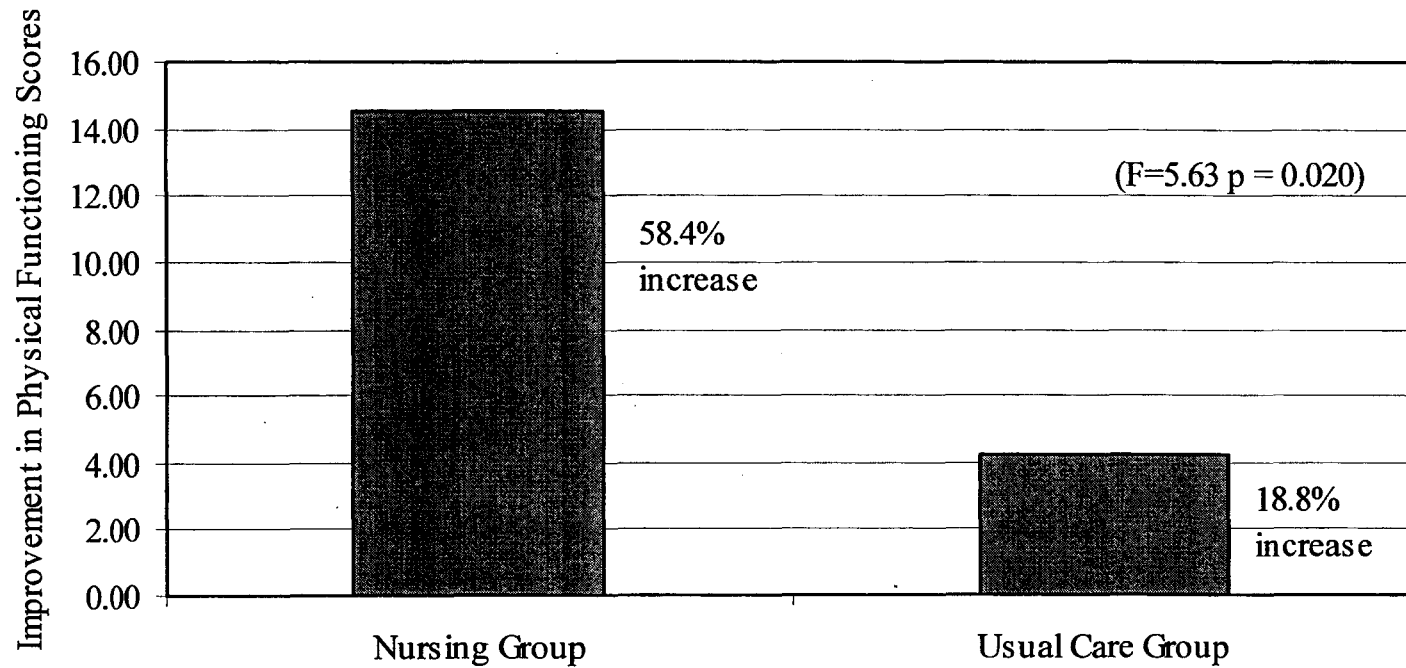


Figure 12. Percent improvement (T1-T2) in SF-36 physical functioning score with RN health promotion and preventive care compared to usual care.

the usual care group. A mean change score difference of 13.50 between the groups is clinically important. However, due to the large standard deviation, the power to detect the difference of 13.50 was less than 50% and not statistically significant ($F = 2.67$, $p = 0.105$). Role functioning can be defined as the degree to which an individual performs, or has the capacity to perform, activities typical for a specified age and social responsibilities (Sherbourne, Stewart, & Wells, 1992). An advantage of the SF-36 is that it distinguishes between physical and mental causes of role limitations, which are often missed with other instruments (Ware & Sherbourne, 1992).

There was also a slight improvement in the subscale score for general health perception in the nursing group (10.1%) versus the usual care group (7.1%). However, due to the small sample size and limited statistical power (< 50%), a 2.20 difference in mean change scores between the groups was not statistically significant ($F = 1.23$, $p = 0.27$). General health perceptions are the participant's personal beliefs and evaluations of their health status which accounts for differences in health preferences, values, needs, and attitudes and are considered good predictors of utilization of medical and mental health services (Stewart, Hays, & Ware, 1988).

Improvements in the subscales relating to physical health observed at the 6-month follow-up were also captured by a clinically important percentage improvement in the summary score for physical health for the nursing group (34.8%) vs. a 21.8% improvement in the usual care group. A mean change score difference of 6.40 between the groups is thought to be clinically important. However, due to the large standard

deviation, the power to detect a 6.40 difference in change scores between the groups was less than 50% and not statistically significant ($F = 3.74$, $p = 0.056$).

As expected, improvements in the subscale scores contributing to overall physical health in the nursing group resulted in notable improvements in two of the subscales contributing to the mental health component summary measure: emotional role and mental health functioning. There was both a clinically and statistically significant percentage improvement in mental health for the nursing group (19.1%) vs. a 1% drop in the usual care group ($F = 11.47$, $p = 0.001$). Mental health is assessed by exploring psychological distress and well being as they pertain to feeling happy, peaceful, anxious, depressed or blue (Sherbourne et al., 1992). The SF-36 includes measures for anxiety, depression, loss of behavioral or emotional control, and psychological well being (Ware & Sherbourne, 1992).

There was a clinically and statistically significant percentage improvement in role functioning related to emotional health for the nursing group (26.2%) versus a 3.98% drop in the usual care group ($F = 11.46$, $p = 0.001$). Role functioning is defined as the degree to which an individual performs or has the capacity to perform activities typical for a specified age and social responsibility (Sherbourne et al., 1992). This subscale of the SF-36 refers to emotional causes of role limitations.

In addition, there was a clinically important improvement in energy/vitality for the nursing group (47.2%) vs. a 17.2% improvement in the usual care group. This difference of 9.2 in change scores between the groups is thought to be clinically important.

However, due to the large standard deviation, the power to detect the difference of 9.2 was less than 50% and not statistically significant ($F = 3.21$, $p = 0.076$). Vitality is difficult to define but conceptually it can be represented as having two entities: a positive state (energy) and a negative state (fatigue), which are distinct from depression, positive affect, cognitive functioning, and sleep problems (Stewart et al., 1992).

Because the two summary scales take into account the correlations among the eight scales, they help to clarify that the study intervention resulted in improvements in both physical and mental health. However, the major improvement at the 6-month follow-up was concentrated in the mental dimension of health. The importance of these findings is illustrated in studies of empirical validity of the SF-36 - that is, scales that relate highest to the physical component are most responsive to treatments that change physical morbidity, whereas scales that relate highest to the mental component respond most to therapies that target mental health (Ware & Gandek, 1998). Noteworthy, is that the three scales (general health, vitality, mental health) are bipolar in nature and measure a wide range of health states. High scores on these scales indicate not only that respondents are free of limitations or disability, but also that they rate their general health, energy level and mental health very positively (Ware, 1993).

Secondary Research Question: Proactive RN Health Promotion and

Preventive Care on Health and Social Service Expenditures and Utilization

2. *What were the comparative expenditures for health and social service utilization at 6 months with nursing health promotion and preventive care versus usual care for a frail elderly home care population from a societal point of view?*

Health and social service utilization outcomes as measured by the Health and Social Services Utilization Inventory (Browne et al., 2001) were compared over time from baseline (pre-randomization) (T1) and 6 months (post-randomization) (T2) with the 94 valid and completed cases. To calculate annual utilization measures, the various spans of time are extended to yield an annual rate of utilization per category of health service and multiplied times the 2001 unit charges for each service to yield a measure of expenditures for health and social service. Unit charges or costs for each service, as outlined in Table 21, were based on averages for Ontario, Canada, as reported by Browne et al. (2001) and current CCAC of Halton rates (S. Shadwick, personal communication, July 10, 2002). When study participants were unwilling to report their range of income on the demographic questionnaire, their income was estimated based on their response to the question regarding the amount of income received through government cheques in the past 6 months.

As illustrated in Table 22, the mean costs and standard deviation for health and social service utilization at baseline (T1) and 6 months (T2) were compared between the two groups with the 94 valid and completed cases. The few missing responses were

Table 21

Summary of Calculated Averages for Charges for Health and Social Services (Browne et al., 2001; CCAC of Halton, 1998).

Services	Average Cost (per visit)
Family physician or walk-in clinic	\$29.44
Physician specialist	\$45.32
Emergency room	\$195.76
Physiotherapy	\$75.70
Psychiatrist	\$56.74
Psychologist	\$162.00
Occupational therapy	\$93.63
Social work	\$119.59
Family counselor	\$105.00
Probationary services	\$99.67
Nutritionist	\$103.08
Naturopath/homeopath	\$65.80
Public health nurse	\$43.84
Visiting nurse (VON, SEN, Para-med)	\$40.54
Chiropractor	\$28.28
Homemaker	\$23.08 (assuming 1 hour per visit)
Speech and language pathologist	\$95.84
Meals on wheels	\$4.25 per meal
Other Health Care Providers/Services	
Dentist	\$127.27 per visit
Massage	\$60.00 per hour
Rehabilitation	\$56.74
Acupuncturist/chiropracist	\$30.00
Other unpaid providers/helpers	\$19.95
911	\$23.32
Ambulance	\$245.00
Hospital	\$816.35
Laboratory Tests	
Blood	\$39.72
Specimens	\$11.69
Urine	\$9.94
Throat swab	\$9.62
Other	\$15.52
Scopes (i.e. endoscopy, bronchoscopy)	\$112.80
X-Rays	\$34.80
Scans (i.e. ultrasound, CT scan)	\$90.90
Breathing tests (i.e. spirometry)	\$20.10
ECG (heart monitoring)	\$19.38
EEG (brain waves)	\$56.04
EMG (muscles)	\$149.10

Table 21 continued

Services	Average Cost (per visit)
Other tests	\$52.26
Bone scan	\$156.05
Stress testing	\$90.55
Echocardiogram	\$68.90
Colon barium enema	\$72.65
Bone density	\$52.40

assigned a 0 value in the analysis. The total annualized direct utilization cost of health and social services was high for both groups. At Time 2, the average total per person direct cost of health and social services (including hospitalization) for both groups was \$17,280.01. As expected with this frail elderly home care population, the majority of the costs were related to acute hospital stays (62.7%) and medications (12.9%). However, only 20.2% of the participants reported one or more hospital admissions over the 6 months of the study. Another interesting finding was that on average, participants reported an average use of only 30.24 hours of personal support services over 1 year. In this frail and functionally limited study population, this finding probably reflects the reality of reduced access to home care services rather than a lack of need.

Out of the 30 items in the Health and Social Service Utilization Inventory, the main cost differences between the two groups was found in five items which included: utilization of medications, physiotherapy, use of supplies, aids or devices, use of acute hospitalization, and visiting nursing services. However, the only statistically significant difference between the groups was utilization of visiting nursing services. As expected, the RN health promotion group had a higher statistically significant utilization of visiting nursing services (\$515.90) vs. usual care (\$462.10) ($\chi^2 = -3.918$, $p < 0.001$).

Table 22

Comparison of Usual Care and Proactive RN Health Promotion and Preventive Care Groups: Annual Per Person Expenditures of Use for Health and Social Services

	Group Total			Nursing Group (N=44)			Usual Care group (N=50)			Test Statistic		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	MW	Z	p-values
1. Family Physician or walk-in clinic												
Time 1	94	\$270.60	\$185.66	44	\$258.27	\$191.41	50	\$281.45	\$181.69	993.5	-0.822	0.411
Time 2	94	\$256.82	\$209.17	44	\$266.30	\$247.37	50	\$248.47	\$170.85	1032.5	-0.520	0.603
2. Physician specialist												
Time 1	94	\$142.71	\$170.99	44	\$140.08	\$174.24	50	\$145.02	\$169.82	1057.0	-0.338	0.735
Time 2	94	\$189.96	\$259.82	44	\$203.94	\$291.34	50	\$177.65	\$230.88	1098.0	-0.016	0.988
3. Emergency room												
Time 1	94	\$329.04	\$310.80	44	\$311.44	\$333.28	50	\$344.54	\$292.13	1001.0	-0.834	0.404
Time 2	94	\$145.78	\$286.98	44	\$151.27	\$350.35	50	\$140.95	\$220.34	1006.0	-0.922	0.357
4. Physiotherapist												
Time 1	94	\$446.15	\$1,262.49	44	\$313.12	\$900.97	50	\$563.21	\$1,510.92	999.0	-0.971	0.332
Time 2	94	\$698.11	\$1,704.04	44	\$385.38	\$983.06	50	\$973.30	\$2,120.86	930.0	-1.613	0.107
4. Physiotherapist - private paid												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$9.36	90.77	44	\$0.00	0.00	50	\$17.60	124.45	1078.0	-0.938	0.348
5. Psychiatrist												
Time 1	94	\$16.90	122.24	44	\$0.00	0.00	50	\$31.77	166.97	1034.0	-1.642	0.101
Time 2	94	\$26.56	125.01	44	\$28.37	140.86	50	\$24.97	110.64	1092.0	-0.143	0.886
6. Psychologist												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$3.45	33.42	44	\$7.36	48.84	50	\$0.00	0.00	1075.0	-1.066	0.286
7. Occupational therapist												
Time 1	94	\$33.86	145.20	44	\$55.32	191.88	50	\$14.98	83.22	994.5	-1.652	0.098
Time 2	94	\$121.51	430.41	44	\$119.15	493.07	50	\$123.58	371.81	1091.5	-0.107	0.915

Table 22 continued

	Group Total			Nursing Group (N=44)			Usual Care group (N=50)			Test Statistic		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	MW	Z	p-values
7. Occupational therapist - private paid												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
8. Social worker												
Time 1	94	\$2.54	24.67	44	\$5.44	36.06	50	\$0.00	0.00	1075.0	-1.066	0.286
Time 2	94	\$5.09	49.34	44	\$0.00	0.00	50	\$9.57	67.65	1078.0	-0.938	0.348
8. Social worker - private paid												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
9. Family counselor												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
10. Probationary services												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
11. Nutritionist												
Time 1	94	\$2.19	21.26	44	\$0.00	0.00	50	\$4.12	29.15	1078.0	-0.938	0.348
Time 2	94	\$17.54	130.59	44	\$28.11	186.47	50	\$8.25	40.81	1082.0	-0.448	0.654
11. Nutritionist - private paid												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
12. Naturopath/homeopath												
Time 1	94	\$1.40	13.57	44	\$2.99	19.84	50	\$0.00	0.00	1075.0	-1.066	0.286
Time 2	94	\$1.40	13.57	44	\$2.99	19.84	50	\$0.00	0.00	1075.0	-1.066	0.286
13. Public health nurse												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$8.39	60.35	44	\$17.92	87.76	50	\$0.00	0.00	1050.0	-1.516	0.130

Table 22 continued

	Group Total			Nursing Group (N=44)			Usual Care group (N=50)			Test Statistic		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	MW	Z	p-values
14. Visiting nurse (VON, SEN, Para-med)												
Time 1	94	\$59.51	293.19	44	\$62.64	281.85	50	\$56.75	305.65	1068.0	-0.533	0.594
Time 2	94	\$487.28	1,688.34	44	\$515.90	978.34	50	\$462.10	2,137.47	653.5	-3.918	0.000
14. Visiting nurse (comcare, para-med) - private paid												
Time 1	94	\$36.22	351.19	44	\$0.00	0.00	50	\$68.10	481.53	1078.0	-0.938	0.348
Time 2	94	\$12.07	117.06	44	\$25.80	171.10	50	\$0.00	0.00	1075.0	-1.066	0.286
15. Chiropractor												
Time 1	94	\$11.43	105.11	44	\$23.14	153.48	50	\$1.13	8.00	1096.5	-0.106	0.916
Time 2	94	\$22.86	152.56	44	\$30.85	204.64	50	\$15.84	85.54	1082.0	-0.448	0.654
16. Homemaker												
Time 1	94	\$275.49	781.21	44	\$371.38	978.29	50	\$191.10	550.38	966.5	-1.168	0.243
Time 2	94	\$698.12	1,346.41	44	\$716.67	1,199.65	50	\$681.78	1,475.51	1000.0	-0.794	0.427
16. Homemaker - private paid												
Time 1	94	\$15.21	64.65	44	\$19.13	74.29	50	\$11.76	55.35	1089.5	-0.188	0.851
Time 2	94	\$245.20	1,080.58	44	\$157.47	504.08	50	\$322.40	1,407.18	1083.5	-0.216	0.829
17. Meals on wheels												
Time 1	94	\$12.48	79.39	44	\$5.02	30.80	50	\$19.04	105.06	1082.5	-0.341	0.733
Time 2	94	\$2.53	18.01	44	\$3.86	24.35	50	\$1.36	9.62	1072.0	-0.697	0.486
17. Meals on wheels - private paid												
Time 1	94	\$0.81	5.58	44	\$0.77	5.13	50	\$0.85	6.01	1097.5	-0.076	0.940
Time 2	94	\$1.09	10.52	44	\$0.00	0.00	50	\$2.04	14.42	1078.0	-0.938	0.348
18. Other health care providers/services												
Time 1	94	\$0.49	\$4.76	44	\$1.05	\$6.96	50	\$0.00	\$0.00	1075.0	-1.066	0.286
Time 2	94	\$101.80	\$763.93	44	\$4.23	\$28.03	50	\$187.66	\$1,044.45	1058.5	-0.899	0.369
18. Other health care providers/services - private paid												
Time 1	94	\$35.94	\$131.46	44	\$19.75	\$75.02	50	\$50.18	\$165.58	1042.0	-0.861	0.389
Time 2	94	\$134.74	\$393.43	44	\$119.23	\$368.46	50	\$148.38	\$417.42	1085.0	-0.174	0.862

Table 22 continued

	Group Total			Nursing Group (N=44)			Usual Care group (N=50)			Test Statistic		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	MW	Z	p-values
19. Other unpaid providers/helpers												
Time 1	94	\$95.84	\$740.47	44	\$5.32	\$24.65	50	\$175.50	\$1,013.06	1016.5	-1.182	0.237
Time 2	94	\$14.52	\$83.27	44	\$15.07	\$94.12	50	\$14.04	\$73.39	1094.0	-0.130	0.897
20. 911												
Time 1	94	\$21.83	30.36	44	\$16.96	28.61	50	\$26.12	31.48	914.0	-1.637	0.102
Time 2	94	\$10.92	29.36	44	\$10.60	34.65	50	\$11.19	24.13	1016.0	-1.000	0.317
21. Ambulance												
Time 1	94	\$245.00	327.32	44	\$189.32	302.90	50	\$294.00	342.93	909.0	-1.661	0.097
Time 2	94	\$114.68	299.96	44	\$89.09	338.70	50	\$137.20	262.66	945.0	-1.798	0.072
<u>Laboratory Outpatient Cost</u>												
1. Blood work												
Time 1	94	\$162.26	207.06	44	\$167.91	202.87	50	\$157.29	212.61	1007.0	-0.728	0.467
Time 2	94	\$266.21	485.21	44	\$324.98	542.00	50	\$214.49	428.02	1013.0	-0.680	0.496
2. Specimens (i.e. urine, throat swabs)												
Time 1	94	\$7.96	15.92	44	\$5.85	13.46	50	\$9.82	17.73	973.5	-1.276	0.202
Time 2	94	\$13.93	31.48	44	\$10.63	26.42	50	\$16.83	35.36	995.0	-1.013	0.311
3. Scopes (i.e. endoscopy, bronchoscopy, sigmoidscopy)												
Time 1	94	\$7.20	39.87	44	\$15.38	57.52	50	\$0.00	0.00	1025.0	-1.867	0.062
Time 2	94	\$12.00	60.71	44	\$5.13	34.01	50	\$18.05	76.81	1058.5	-0.899	0.369
4. X-rays												
Time 1	94	\$32.58	59.25	44	\$26.89	52.46	50	\$37.58	64.76	1030.0	-0.647	0.517
Time 2	94	\$25.17	49.85	44	\$25.31	49.99	50	\$25.06	50.23	1072.5	-0.267	0.789
5. Scans (ie. ultrasound, CT scan)												
Time 1	94	\$38.68	99.30	44	\$45.45	97.03	50	\$32.72	101.85	1011.0	-1.060	0.289
Time 2	94	\$30.94	98.46	44	\$16.53	52.87	50	\$43.63	124.88	1040.0	-0.815	0.415
6. Breathing test (e.g. spirometry)												
Time 1	94	\$3.85	18.71	44	\$5.48	25.41	50	\$2.41	9.64	1089.5	-0.188	0.851
Time 2	94	\$2.57	9.88	44	\$1.83	8.47	50	\$3.22	11.02	1062.0	-0.680	0.496

Table 22 continued

	Group Total			Nursing Group (N=44)			Usual Care group (N=50)			Test Statistic		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	MW	Z	p-values
7. ECG												
Time 1	94	\$12.37	25.55	44	\$14.09	32.47	50	\$10.85	17.58	1063.0	-0.369	0.712
Time 2	94	\$11.55	21.89	44	\$13.21	23.56	50	\$10.08	20.43	1037.5	-0.632	0.528
8. EEG (brain waves)												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$1.19	11.56	44	\$0.00	0.00	50	\$2.24	15.85	1078.0	-0.938	0.348
9. EMG (muscle)												
Time 1	94	\$3.17	30.76	44	\$0.00	0.00	50	\$5.96	42.17	1078.0	-0.938	0.348
Time 2	94	\$6.34	61.51	44	\$13.55	89.91	50	\$0.00	0.00	1075.0	-1.066	0.286
10. Other tests												
Time 1	93	\$16.79	59.75	44	\$5.05	33.10	50	\$26.89	74.42	972.5	-1.727	0.084
Time 2	94	\$17.89	60.62	44	\$11.92	46.28	50	\$23.15	70.96	1058.5	-0.650	0.516
Laboratory test cost												
Time 1	94	\$284.68	302.40	44	\$285.98	279.55	50	\$283.54	324.00	1056.0	-0.335	0.738
Time 2	94	\$387.80	534.83	44	\$423.09	587.61	50	\$356.74	487.64	1088.5	-0.088	0.930
Supplies, aids or devices cost												
Time 1	94	\$648.33	\$1,543.65	44	\$840.79	\$2,066.72	50	\$478.96	\$843.65	1095.0	-0.039	0.969
Time 2	94	\$397.32	\$1,330.52	44	\$91.95	\$201.95	50	\$666.04	\$1,779.52	986.5	-1.000	0.317
Mileage												
Time 1	94	\$17.90	\$41.45	44	\$22.58	\$48.22	50	\$13.77	\$34.41	1016.5	-0.723	0.469
Time 2	94	\$52.96	\$364.71	44	\$20.71	\$74.37	50	\$81.34	\$495.83	1037.0	-0.643	0.520
Parking												
Time 1	94	\$17.07	\$60.39	44	\$23.65	\$64.55	50	\$11.28	\$56.50	1012.0	-1.195	0.232
Time 2	94	\$19.04	\$67.80	44	\$30.93	\$87.26	50	\$8.58	\$42.48	971.0	-1.915	0.056
Medication cost												
Time 1	94	\$2,042.45	\$1,711.43	44	\$1,781.57	\$1,371.29	50	\$2,272.02	\$1,947.83	971.0	-0.977	0.328
Time 2	94	\$2,235.65	\$1,807.82	44	\$1,916.55	\$1,470.91	50	\$2,516.46	\$2,032.82	925.0	-1.326	0.185

Table 22 continued

	Group Total			Nursing Group (N=44)			Usual Care group (N=50)			Test Statistic		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	MW	Z	p-values
Direct cost excluding hospital												
Time 1	94	\$5,066.08	\$4,145.76	44	\$4,755.73	\$4,808.03	50	\$5,339.19	\$3,488.80	913.0	-1.417	0.156
Time 2	94	\$6,441.66	\$4,511.27	44	\$5,382.59	\$3,576.45	50	\$7,373.64	\$5,050.56	866.0	-1.773	0.076
Hospital stay cost												
Time 1	94	\$28,155.39	\$38,137.71	44	\$23,340.19	\$38,263.61	50	\$32,392.77	\$37,902.30	917.5	-1.411	0.158
Time 2	94	\$10,838.35	\$35,018.21	44	\$9,647.77	\$35,655.78	50	\$11,886.06	\$34,775.94	1016.5	-0.902	0.367
Direct cost												
Time 1	94	\$33,221.47	\$38,975.35	44	\$28,095.92	\$39,763.33	50	\$37,731.96	\$38,095.70	914.0	-1.409	0.159
Time 2	94	\$17,280.01	\$35,937.38	44	\$15,030.36	\$36,430.79	50	\$19,259.69	\$35,748.75	912.0	-1.425	0.154
Cash Transfer Cost												
a. Worker's compensation												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$70.98	688.16	44	\$151.64	1,005.84	50	\$0.00	0.00	1075.0	-1.066	0.286
b. Old age security												
Time 1	94	\$4,992.64	2,097.86	44	\$4,970.18	1,980.75	50	\$5,012.40	2,215.65	1063.5	-0.279	0.780
Time 2	94	\$4,772.60	2,124.36	44	\$4,638.55	2,043.83	50	\$4,890.56	2,206.64	962.0	-1.054	0.292
c. Disability pension private												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
d. Canada pension												
Time 1	94	\$3,866.07	2,973.76	44	\$3,578.45	2,810.54	50	\$4,119.17	3,116.51	972.5	-0.986	0.324
Time 2	94	\$3,632.78	2,629.86	44	\$3,445.03	2,671.83	50	\$3,798.00	2,608.16	948.0	-1.176	0.239
e. Canada pension disability												
Time 1	94	\$90.89	624.59	44	\$109.09	723.63	50	\$74.88	529.48	1096.5	-0.106	0.916
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
f. GAINS												
Time 1	94	\$52.60	223.12	44	\$22.64	150.15	50	\$78.96	270.52	1037.5	-1.218	0.223
Time 2	94	\$108.40	623.02	44	\$187.14	885.91	50	\$39.12	193.63	1019.0	-1.348	0.178

Table 22 continued

	Group Total			Nursing Group (N=44)			Usual Care group (N=50)			Test Statistic		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	MW	Z	p-values
g. Veteran's pension												
Time 1	94	\$387.43	\$2,460.96	44	\$444.00	\$2,747.03	50	\$337.66	\$2,206.14	1086	-0.273	0.785
Time 2	94	\$233.62	\$1,894.68	44	\$444.55	\$2,747.21	50	\$48.00	\$339.41	1072	-0.697	0.486
h. Survivor's benefit (CPP)												
Time 1	94	\$554.04	1,924.48	44	\$111.55	739.91	50	\$943.44	2,493.67	950.0	-2.226	0.026
Time 2	94	\$431.74	1,570.42	44	\$232.36	944.40	50	\$607.20	1,957.30	1060.5	-0.618	0.536
i. Unemployment												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
j. Welfare												
Time 1	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
Time 2	94	\$0.00	0.00	44	\$0.00	0.00	50	\$0.00	0.00	1100.0	0.000	1.000
k. Other government cheque												
Time 1	94	\$1,345.32	4,026.52	44	\$581.51	2,172.25	50	\$2,017.47	5,064.15	932.0	-1.854	0.064
Time 2	94	\$1,217.99	4,419.65	44	\$1,091.24	3,209.26	50	\$1,329.54	5,292.26	1099.5	-0.006	0.995
l. Private insurance												
Time 1	94	\$19.36	153.20	44	\$32.73	217.09	50	\$7.60	53.74	1096.5	-0.106	0.916
Time 2	94	\$4.04	39.19	44	\$0.00	0.00	50	\$7.60	53.74	1078.0	-0.938	0.348
Total cash transfer cost												
Time 1	94	\$11,308.35	\$5,494.98	44	\$9,850.15	\$4,918.01	50	\$12,591.58	\$5,700.31	692.5	-3.092	0.002
Time 2	94	\$10,417.90	\$4,808.62	44	\$10,074.58	\$5,055.27	50	\$10,720.02	\$4,610.93	919	-1.373	0.17

Also as expected, those participants receiving RN health promotion and preventive care were slightly higher users of family physicians, physician specialists, emergency room, psychiatrists, psychologists, nutritionists, public health nurses, chiropractor, homemakers, meals on wheels, parking and laboratory test costs compared to the usual care group. As part of the RN intervention, participants would have been appropriately referred to these services based on their needs. However, these differences in mean utilization were not statistically significant.

Higher expenditures of use of these services were offset by a lower clinically statistically significant utilization of medications (\$1,916.55) vs. usual care (\$2,516.46, $p = 0.185$). There was also a clinically significant lower use of physiotherapy (\$385.38) vs. the usual care group (\$973.30) and supplies or aids (\$91.95) vs. the usual care group (\$666.04). Noteworthy, is that after 6 months; the nursing group used fewer hospital days (5.91) vs. 7.28 in the usual care group. In addition, fewer participants in the nursing group reported one or more hospital admissions (15.9%) compared to the usual care group (24.0%). This difference of 1.37 hospital days after 6 months or 2.74 days after 1 year is thought to be economically and administratively important. However, due to the large standard deviation, the power to detect the difference of 1.37 days was less than 50%. While hospital costs were lower in the nursing group (\$9,647.77) vs. the usual care group (\$11,886.06) ($\chi^2 = -0.902$, $p = 0.367$), as well as a slightly lower use of occupational therapists, social workers, 911 and ambulance services, diagnostic tests, and

mileage in the nursing group compared to the usual care group, these differences were not statistically significant.

Noteworthy, is that there was no statistical difference between the RN and the usual care group in total annual per person direct expenditures (including hospitalization). Even when the cost of an RN health promotion intervention was added to the total cost, it was no more expensive to augment usual care with nursing visits ($\chi^2 = -1.425$, $p = 0.154$) (see Figure 13). Participants in the RN group expended fewer dollars for the total direct use of health and social services (including hospitalization) compared with those in the usual care group. Although these differences were not statistically significant, they are economically and administratively important in a system of national health insurance.

Secondary Research Question: Proactive RN Health Promotion and
Preventive Care On Mental Status and Perceived Social Support

3. *Does proactive visiting nursing health promotion and preventive care in addition to usual home care services improve the outcomes for a frail elderly home care population with respect to mental status (presence of depression) and perceived social support?*

Mental Health (Level of Depression)

Mental status (level of depression) outcomes, as measured by the Centre for Epidemiological Studies in Depression Scale (CES-D), was compared over time from baseline (pre-randomization) (T1) and 6 months (T2) with 91 valid and completed cases. Three of the 94 study completers were unable to respond to the CES-D questionnaire due

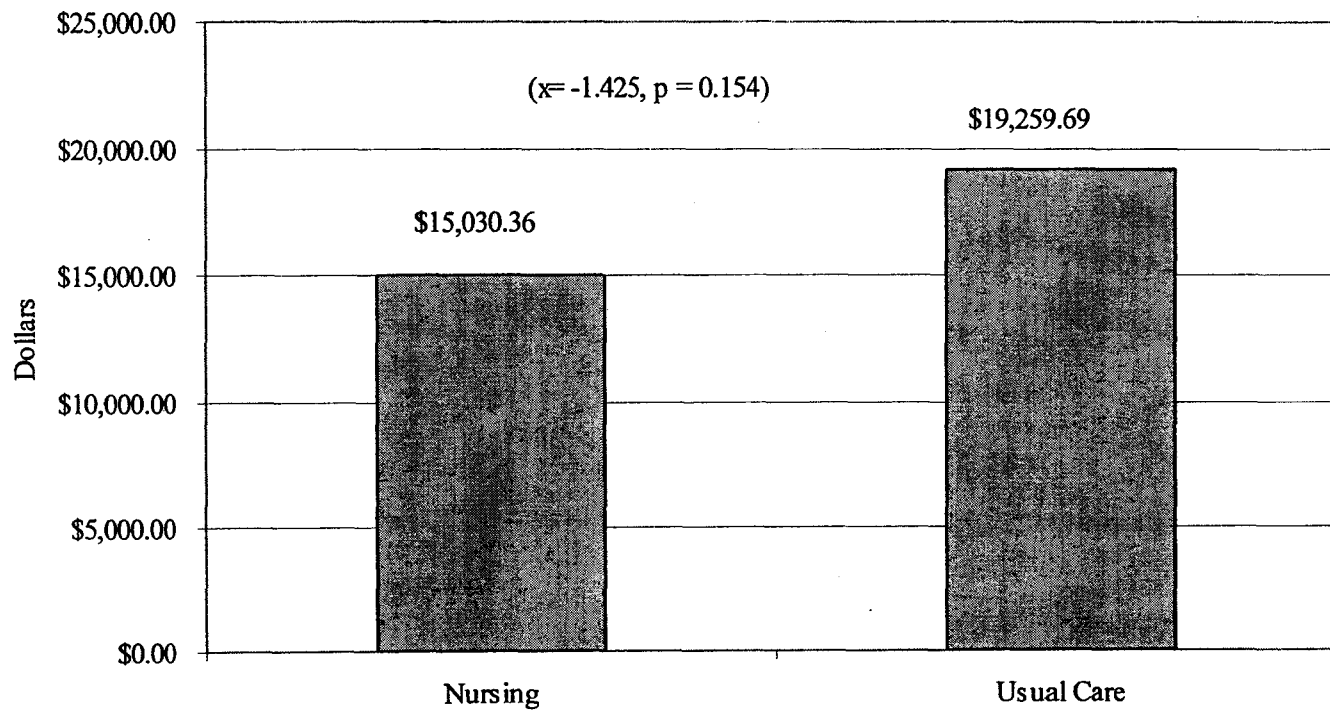


Figure 13. Total annual per person direct expenditures for use of health and social services by group.

to poor physical health, therefore, they were not included in the analysis for this outcome measure. Analysis of covariance was calculated using pre-intervention scores as covariates in order to control for differences in pre-intervention functioning. Based on a review of the literature, the investigator chose a cut-off score of $\geq 21/60$ to distinguish between depressed and non-depressed elderly clients.

The mean score and standard deviation for the total CES-D score at baseline (T1) and 6 months (T2) were compared between the two groups as illustrated in Table 23. The change score (delta for individual participants) from baseline to 6 months (T1-T2) for the total CES-D score was analyzed to understand individual improvements over time. Improvements in the mean score for the CES-D were calculated and accounted for baseline scores (T1-T2, divided by T1). As in Table 23, analysis of covariance (ANCOVA) was also calculated using Time 1 (pre-intervention) scores as a covariate in order to control for differences in pre-intervention functioning.

As expected, with an improvement in physical and mental functioning in both groups, there was a concomitant reduction in individual CES-D change scores at 6 months in both groups, indicating a lower level of depression. As illustrated in Table 23 and Figure 14, there was a clinically and statistically significant percentage reduction in the level of depression in the nursing group (38.5%) versus a 9.06% reduction in the usual care group ($F = 6.64, p = 0.012$). The groups were compared using a cut-off score of ≥ 21 to distinguish between depressed and non-depressed participants. At 6 months, status was maintained in 77% of the participants in both groups; however, there was a

Table 23

Comparison of Usual Care and Proactive RN Health Promotion and Preventive Care Groups: Mental Status (CES-D) and Perceived Social Support (PRQ 85 - Part Two) Using Repeat Measures ANOVA and Analysis of Covariance

	Group Total			Nursing Group			Usual Care			Test Statistic			
	n	Mean	S.D.	n	Mean	S.D.	n	Mean	S.D.	t-test	p-value	F-value	p-value
<i>CES-D Depression Score (0-60)</i>													
Time 1	94	14.00	9.00	44	14.00	9.00	50	15.00	9.00	-0.14	0.89		
Time 2	91	11.21	10.19	43	8.61	6.98	48	13.64	12.04	-2.45	0.02		
Time 1-Time 2	91	2.79	9.60	43	5.39	8.49	48	1.36	10.18	2.21	0.03	6.643	0.012
<i>Perceived Social Support (25-175)</i>													
Time 1	94	129.11	21.85	44	130.26	19.70	50	128.09	23.72	0.479	0.633		
Time 2	91	127.87	23.11	43	131.70	18.53	48	124.28	26.4	1.543	0.126		
Time 1-Time 2	91	1.24	15.00	43	-1.44	14.16	48	3.81	15.29	-2.007	0.05	4.619	0.034

clinically and statistically significant percentage increase in the number of clients who became depressed within the usual care group (8.5%) between baseline and 6 months ($\chi^2 = 0.035$, $p = 0.035$). These findings provide further support for the effectiveness of the study intervention on improving mental health for the frail elderly.

Perceived Social Support

Perceived social support outcomes, as measured by the Personal Resource Questionnaire (PRQ85) – Part Two, were compared over time from baseline (pre-randomization) (T1) and 6 months (post-randomization) (T2) with 91 valid and completed cases. Analysis of covariance (ANCOVA) was calculated using Time 1 (pre-intervention) scores as a covariate in order to control for differences in pre-intervention functioning. Three of the 94 study completers were unable to respond to the PRQ85 questionnaire due to poor physical health, therefore they were not included in the analysis for this outcome.

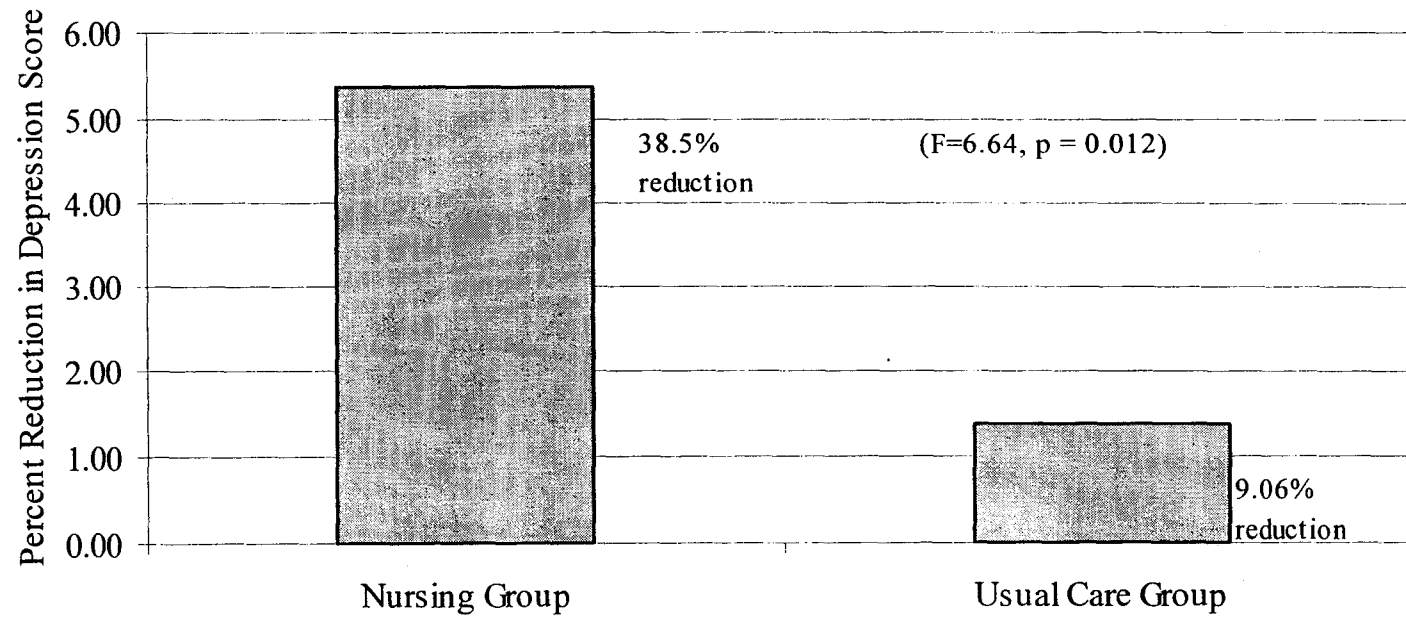


Figure 14: Percent reduction (T1-T2) in the CES-D depression score with RN health promotion and preventive care.

The mean score and standard deviation for the total PRQ 85-Part Two score at baseline (T1) and 6 months (T2) were compared between the two groups as illustrated in Table 23. The change score (delta for individual participants) from baseline to 6 months (T1-T2) for the total PRQ 85 – Part Two score was analyzed to understand individual improvements over time. Changes in the mean PRQ 85 – Part Two scores were calculated and accounted for baseline scores (T1-T2, divided by T1). As in Table 23, analysis of covariance was calculated using pre-intervention scores as covariates. At 6 months, the level of perceived social support was high in both groups. However, there was a small statistically significant percentage increase in the level of perceived social support in the nursing group (1.1%) versus a 2.97 % reduction in the usual care group (F = 4.62, p = 0.034).

CHAPTER 8:

DISCUSSION

Summary

Proactive RN Health Promotion and Preventive Care Intervention

This is the first Canadian randomized controlled trial to evaluate the effect and expense of an RN health promotion and preventive care intervention for frail elderly home care clients. Out of 126 subjects eligible for personal support services and randomized to either usual care or the RN health promotion and preventive care intervention, 94 (74.6%) were retained in the 6-month follow-up. Eligible subjects were lost to follow-up as a result of death (10%), missed (not located or physically unable to participate) (11.9%), or refusal to participate (2.4%). The 94 frail elderly home care clients (84% women) in this study who were retained in the 6-month follow-up had a higher level of cognitive functioning and a lower income (below \$40,000) than those lost to follow-up. Thus, a potential limitation of this study may be that study completers were more cognitively intact compared to those who were lost to follow-up, which may have influenced their ability and willingness to participate.

Frail elderly participants were clinically and statistically similar in both experimental and control groups on all baseline variables including gender, age, cognitive status, marital status, living arrangement, ethnic/cultural group, relationship to caregiver, level of education, income, cognitive status, and severity of illness factors.

This study provides insight and a profile of an elderly home care population assessed as eligible for personal support services. Clinically, the study participants presented as a fairly elderly group, predominantly female (84%), with a mean age of 84.1 years. The majority were functionally limited with 92.5% reporting some level of limitation in performing activities of daily living (and fairly ill) with 66% reporting a hospital admission in the previous 6 months, 53.2% reporting more than one illness, 22% exhibiting depressive symptoms, and 84.9% taking more than 4 prescription medications daily. The majority of the sample was widowed, separated or single (67%), and over half (55%) lived alone. The health of the study participants, as reported on the SF-36 health survey, was particularly compromised in the areas of physical functioning, role functioning related to physical health, social functioning, and energy/vitality, compared to published norms (Ware, 1993).

A visiting nurse engaged 83.9% of those frail elderly participants who were randomly allocated to the RN health promotion and preventive care intervention at baseline (n = 62). Subjects randomized to the RN group received an average of 3.74 nursing visits during the 6-month follow-up. Overall, compliance with the intervention by the study nurses was high with the exception of not visiting participants within one week of sending the referral to the nursing agency. This was related to missing information, difficulties contacting participants, as well as workload issues for those nurses providing the intervention.

Functional Health Status and Quality of Life

Both approaches to care resulted in improvements in functional health status and quality of life at 6 months. However, proactive RN health promotion and preventive care resulted in several clinically and statistically significant improvements in both physical and mental health functioning, compared to usual care. In terms of the physical health component summary in the SF-36, there was a clinically and statistically significant 59% improvement in the physical functioning subscale in the nursing group versus a 19% improvement in the usual care group. In addition, the proactive RN intervention had a clinically important impact on the subscales related to physical role functioning and general health perception. Improvements in the subscales relating to physical health at the 6-month follow-up were also captured by a clinically important percentage improvement in the overall summary score for physical health in the SF-36 for the nursing group (34.8%) versus a 21.8% improvement in the usual care group. The finding that home based health promotion and preventive care enhances physical functioning amongst older adults is consistent with the literature (Bernabei et al., 1998, Pathy et al., 1992; Stuck et al., 1995; Stuck et al., 2000).

As expected, improvements in physical health in the proactive RN group resulted in several clinically and statistically significant improvements in mental health functioning. Proactive RN health promotion and preventive care had a clinically and statistically significant impact on both emotional role and mental health functioning. In addition, there was a clinically important impact on energy/vitality for the nursing group.

Improvements in the subscales relating to mental health at the 6-month follow-up were also captured by both a clinically and statistically significance improvement in the summary score for mental health for the nursing group (26.3%) versus a 6.2% increase in the usual care group. This is the first study to provide strong evidence for the effectiveness of a proactive RN health promotion and preventive care intervention on mental health outcomes. Although Bernabei et al. (1998) also suggested mental health benefits, the intervention was provided by a multidisciplinary geriatric team; thus, it was difficult in this study to isolate the contribution of the RN to any observed change in outcome.

The overall conclusion from this present study results is that proactive RN health promotion and preventive care results in measurable gains in both mental and physical functioning for frail elderly home care clients eligible for personal support services. Of note, is that the major improvement at the 6-month follow-up was concentrated in the mental dimension of health.

Mental Health and Perceived Social Support

As expected, with an improvement in physical and mental health functioning in both groups, there was a concomitant reduction in the level of depression in both groups. Specifically, there was a clinically and statistically significant percentage reduction in the prevalence of depression in the nursing group (38.5%) versus a 9.06% reduction in the usual care group. This finding provides further support for the effectiveness of a

proactive nursing intervention on improving mental health for the frail elderly and improved quality of life.

At 6 months, the level of perceived social support was relatively high in both groups. However, there was a small statistically significant percentage increase in the level of perceived social support in the nursing group compared to a small reduction in the usual care group.

Expenditures for Use of Health and Social Services

This is the first Canadian study that combines both a strong research design and a cost assessment to evaluate the impact of a health promotion and preventive care intervention within the context of home care services.

Not only was a proactive RN health promotion and preventive care intervention more effective but also these benefits were produced at no additional expense to society as a whole. There was no statistically significant difference between the two groups in total annual per person direct expenditures (including the cost of the RN visits). However, on average, elderly participants receiving the proactive RN intervention, in a system of national health insurance, expended fewer dollars for their total annual direct use of health and social services (\$15,030), compared with the cost of elderly clients receiving usual home care services (\$19,259). This difference is considered to be both economically and administratively important within a system of national health and social insurance. Even when the cost of an RN health promotion intervention was added to the total cost, it was no more expensive to augment usual care with nursing visits.

As depicted in Figure 6, Birch and Gafni (1996) identified nine possible outcomes of economic evaluation of health programmes. From an economic perspective, the outcome of this study is favourable and illustrates outcome #4, where increased effects are achieved with one approach over another at equivalent expenditures (Birch & Gafni). This is the first study to provide strong evidence for the effectiveness of a proactive RN health promotion and preventive care intervention on the use and costs of a full range of health and social services from a societal perspective. Although other studies of this type have suggested cost benefits, they have been limited to the costs of institutional care such as reduction in nursing home (Bernabei et al., 1998; Stuck et al., 1995; Stuck et al., 2000) and hospital admissions (Bernabei et al., Hendriksen et al., 1984; Zimmer et al., 1985), have not addressed the full range of services and were not conducted in a Canadian System of National health insurance.

Evaluation of a Collaborative Model of Research

One of the strengths of the project has been the participation of key decision-makers in the development, implementation, and evaluation of the project. This involved collaboration with administrators, managers and front line staff of the participating organizations. The establishment of a steering committee and the resources, both financial and human, provided by the agencies involved was critical to the initiation, implementation and completion of the study. The combined perspective of front line staff, management, and researchers helped to identify and address issues related to implementation of the study, while creating unique opportunities for innovation.

Another key factor contributing to the successful implementation of the study was the scheduling of regular meetings with the investigator and the Registered Nurses providing the study intervention for mutual problem solving and support. Through this forum, opportunities were provided to staff for support, further education and skill enhancement. "Collaboration is not an end in itself but a means to other ends such as improved practice, expanded knowledge, increased productivity, and increased quality of education" (Browne, Arpin, Fitch, & Corey, 1988, p. 76). A useful measure of outcome to assess the effectiveness of collaboration is a positive change in clinical practice (Browne et al., 1988). Several themes emerged from the interactions between the investigator and the study nurses, which suggest that the implementation of this collaborative study had a positive impact on practice:

- *Developing trusting, caring relationships: Study nurses and frail elderly clients:*
This included identifying and sharing strategies for developing a trusting and caring relationship and establishing open communication with frail elderly clients and their caregivers. This issue was critical and time intensive for the nurses in the earlier stage of the intervention. Communication skills and making a good impression during the initial contact were identified as essential because they influence whether or not the nurse is allowed to enter and/or return to the home. The development of a trusting and caring relationship with the client is a complex process that occurs over a period of time (McNaughton, 2000; Trojan & Yonge, 1993).

- *Acquiring knowledge, skills and attitudes related to mental health promotion:* This included initial and on-going education and support related to depression screening. Together clients and nurses negotiated completion of the depression screening tool and set goals to promote mental health, while facilitating client independence. Nurses identified their role in relation to mental health promotion and what resources were available to help.
- *Providing a collaborative and interdisciplinary approach to care:* This involved the development and ongoing evaluation of mechanisms to promote an individualized and interdisciplinary approach to care. Nurses worked collaboratively with the client's primary homemaker, case manager, family physician, caregiver and/or other home care providers to coordinate the development, implementation, and evaluation of the plan of care. This involved creating alliances with other agencies using both written and verbal communication.
- *Acknowledging and describing clinical knowledge:* Nurses acquire clinical knowledge over time; however, it is often difficult to capture (Benner, 1984). One of the side benefits of the interactions between the investigator and the RN's in this study was that nurses began to recognize and share their clinical knowledge and relate these to positive client outcomes. The nurses were asked to describe actual client care episodes, including their intentions and interpretations of the events as well as a description of the action and outcomes. The strength of this approach to identifying nursing competencies is twofold: "1) actual performance demands,

resources, and constraints are described rather than hypothetical ones, and 2) this method provides a rich description of nursing practice” (Benner, 1984, p. 45). Thus, the meetings provided a forum for peer mentoring, support and learning.

Study Implications

Nursing Practice Implications

This study demonstrated the immediate 6 month benefits of a proactive RN health promotion and preventive care intervention with respect to improving physical and mental health functioning (including reducing the level of depression), and increasing levels of perceived social support at no additional cost to society as a whole. The majority of the literature evaluating the effectiveness of home based preventive programmes focuses on prevention of functional decline or disease specific care rather than health promotion. This unique study provides evidence for a cost-efficient model of service delivery for frail elderly home care clients through the use of both health promotion and preventive care strategies combined with an evidence-based approach.

This study supports and extends the findings of Browne et al. (1999) in a review of 12 studies involving clients in community settings in Southern Ontario, Canada, suffering from a variety of chronic physical and mental health conditions. Browne et al. concluded that it is as, or more effective, and as, or less expensive, in the same year to offer complete and proactive community health services to vulnerable persons living with chronic circumstances than to provide reactive, on-demand, and piecemeal care in a system of national health insurance.

The findings are also consistent with other studies evaluating proactive services. Browne et al. (2001a), in a randomized controlled trial, found that proactive co-interventions with sole-support parents were more effective in promoting parent economic adjustment than any intervention alone, including self-directed care. In a sub-analysis of this study, Markle-Reid, Browne, Roberts, Gafni, & Byrne (2002), found that, after 2 years, sole support parents who received a proactive, public health nursing case management intervention were less depressed and better adjusted than those who received the usual self-directed care. Not only was this approach more effective, but also these benefits were produced at no additional cost to society as a whole, and costs were averted due to a 12% difference in non-use of social assistance in the previous 12 months.

This study provides empirical support for the synergistic effects of personal resources and environmental supports on health outcomes and the use of scarce health care resources. Pawson & Tilley (1997) stated that realistic evaluations of multi-faceted community interventions require understanding of contextual factors and the mechanisms by which interventions work in addition to measuring outcomes. The model of vulnerability in this study helps to explain how and why this health promotion and preventive care intervention resulted in improved health outcomes and decreased costs, as well as what contextual components were necessary to its success. The process of bolstering personal resources (physical and mental health functioning) and environmental supports (level of perceived social support) resulted in significant improvements in health

status and reductions in expenditure of use of health care resources. In summary, the model of vulnerability provides a comprehensive theoretical approach for directing the future design and evaluation of a proactive health promotion and preventive care programme.

Elkan et al. (2001), in a review of the literature, recommended that a greater focus be placed on the process of delivering care, including a description of the components of a home visiting intervention. This study supports and extends the literature regarding the features that distinguish highly effective programmes from those that are less effective. That is, in order to be effective, a preventive care and health promotion intervention must involve an initial and comprehensive assessment or screening combined with regular home visits (Elkan et al.; Jensen, 1997; Stuck et al., 1993b; Stuck et al., 2002), identification of the need for and coordination of community services, and an approach that is individualized, flexibly responsive, and interdisciplinary (Rubenstein et al., 1991).

This study provides evidence of the type of functional outcomes that are possible and in which nurses can have a positive influence, including considerable economic benefit. In this study, the RN intervention had a positive impact on both physical and mental health functioning with the major improvement at the 6-month follow-up concentrated in the mental dimension of health. Few studies have demonstrated the use of the SF-36 Health Survey as an outcome measure for evaluating nurses' contribution to client outcomes (Irvine et al., 2000). This study extends and supports the findings of Irvine et al. (2000) who compared the SF-36 with the Quality of Life Profile: Senior Version

(QOLPSV) in a home health setting. Irvine et al. (2000) concluded that the SF-36 was more sensitive to changes over time, and more sensitive to several nursing variables including the client's health status than the QOLPSV.

Finally, the results of this study provide evidence for the effectiveness of aiming a preventive, health promotion intervention at the general population of elderly home care clients aged 75 and over, without specific selection criteria. This approach is consistent with health promotion, which is aimed at the population at large in its total environment (Stachtchenko & Jenicek, 1990). Further research with larger sample sizes is needed to determine the characteristics of clients that benefit most from this proactive RN intervention.

Implications for Policy

An assumption underlying the integrated homemaking model is that reducing access to professional nursing services saves the system money. For the first time, in the context of a national system of health and social insurance, this study demonstrates that this assumption is incorrect and untenable. In fact, it is no more expensive to provide this vulnerable frail elderly home care population with proactive RN health promotion and preventive care than usual reactive home care services. The additional cost of nursing visits was offset by a lower and more appropriate use of other health and social services compared to the usual care group.

Not only is it no more expensive to provide RN health promotion and preventive care, but this service is associated with considerable cost savings to society that resulted

from a 2.74 day difference in non-use of acute hospitalization in the previous year for those in the nursing group, compared to usual care. A 2.74-day difference in the rate of acute hospitalization in the previous 12 months, translates into an annual cost saving of \$200,879 within 1 year for every 100 elderly home care clients. Although this difference was not statistically significant, it is considered to be both economically and administratively important within a system of national health and social insurance.

Thus, the results of this study provide strong evidence for the effectiveness and efficiency of a visiting nurse in providing health promotion and preventive care within the existing Canadian home care setting compared to the usual on-demand and piecemeal services. The policy implications are significant given the current national trend toward reducing the extent to which preventive home care functions are provided by Registered Nurses in favor of providing nursing services to those with acute care needs (Boyle, 2001; CNA, 1998). The results of this study provide scientific support for a national home care programme that provides a continuum of services including health promotion, prevention, curative, rehabilitation and palliative services (CNA). Costs averted due to non-use of acute hospitalization need to be directed toward health promotion and preventive care functions of home care. Re-investment of professional nursing services in the care of chronic and vulnerable elderly home care populations must become a priority. The results provide scientific evidence to support policy decisions regarding the prioritization and allocation of home care resources for a growing elderly population in a climate of acute health care resource constraints.

These findings add to the accumulating evidence that regardless of age, chronic illness or circumstance, geographic setting or specific intervention, proactive and comprehensive care early in the trajectory is both more effective and less expensive in a system of national health insurance (Browne et al., 2001b). The costs of the added intervention pay for themselves in the same year.

The findings from this study also highlight the complex interactions among different levels of care in the health system and the fact that making changes in one part of the health care system may affect other parts of the system. That is, decisions that are made in one part of the system (such as reducing professional nursing services for chronic, frail and vulnerable seniors), to deal with fiscal constraints and a growing elderly population, need to be evaluated for their impact on the larger whole (Hollander & Tessaro, 2001).

This is the first study to provide strong evidence for the effectiveness and efficiency of a visiting nurse in mental health promotion for a frail elderly home care population, 22% of whom are depressed. Despite the fact that the prevalence of depression among those receiving home care is estimated to be at least twice that among elderly people in general (Banerjee, 1993; Harrison et al., 1990; Ilife et al., 1993), it is rare for home care services to focus on mental health issues - access to home care services depends upon the presence of a physical illness or disability (Parent et al., 2000). Unrecognized, untreated and undertreated mood disorders such as depression increase the risk of functional decline (Murphy, 1982; Stuck et al., 1999) and the use of expensive health care resources (Colenda et al., 1991; Murphy; Stuck et al.).

Improvements in mental health outcomes for frail elderly home care clients receiving proactive RN health promotion and preventive care, at no additional expense, provides convincing evidence for the prioritization and reallocation of professional nursing services toward mental health promotion for frail elderly home care clients. Home care programmes should collaborate with nursing and other mental health agencies in order to overcome barriers to services access, and provide effective care and support for clients with mental health issues. Comprehensive education that increases knowledge and skills in the early detection of depression and increases awareness of the broad range of services and supports available to people with mental health issues and their families must be carried out.

In summary, from a societal point of view, in the context of a national system of national health and social insurance, this study documents that it is immediately more costly to under serve this population of frail elderly home care clients, 92% of whom are functionally limited, 53% of whom have two or more health conditions and 22% of whom are depressed. The potential for positive outcomes can be achieved for elderly home care clients when society pays for a proactive RN health promotion and preventive care intervention.

Implications for Future Research

- Conduct further research with larger sample sizes to identify the characteristics of elderly clients that benefit most from this proactive RN health promotion and preventive intervention. For example, do client characteristics such as age, living

arrangement, or functional status, at baseline work independently or in combination with each other to explain improvements in health outcomes or cost following a 6-month intervention? This information will help to target scarce health care resources to those clients most likely to benefit.

- Extend the time frame for follow-up to a minimum of 1 year to better understand the long-term impact of the intervention. In this study the immediate 6-month gains in health outcomes and costs may have continued - to greater economic effect.
- Evaluate the impact of the RN health promotion and preventive care intervention on caregiver outcomes such as physical and mental health and the expenditure of use of health and social services.
- Develop enhanced tracking strategies to increase follow-up or to achieve follow-up of a least 80% of those subjects randomized to usual care or the RN health promotion and preventive care intervention.
- Conduct a process evaluation using a qualitative study design in order to further explain how, and why, this health promotion intervention was effective. For example, did the study intervention have a positive influence on autonomy or decision-making abilities?

Conclusion

In conclusion, under the current home care delivery system, this study demonstrates that it is more effective and less expensive to provide proactive RN health promotion and preventive care to a general population of frail seniors living with chronic circumstances

than to provide professional services on a reactive and piecemeal basis. Re-investment of professional nursing services in health promotion and preventive care for chronic and vulnerable elderly home care populations must become a priority. The results of this study provide scientific evidence to support policy decisions regarding the prioritization and allocation of home care resources for a growing elderly population in a climate of acute health care resource constraints.

ENDNOTES

¹ Community based services refers to services provided in the home, community or long-term care institution that are paid for with public or private funds. These services include homemaking, personal care support services, in-home nursing services, adult day programs, and/or caregiver support services (OMHLTC, 1999).

² Resource allocation can be defined as the distribution of resources among competing programs or persons (McKneally, Dickens, Meslin, & Singer, 1997).

³ Preventive care (or health protection) is “behaviour motivated by a desire to actively avoid illness, detect it early, or maintain functioning within the constraints of illness” (Pender et al., p. 7). Any intervention may be classified as preventive if it reduces the chance that a disease or disorder will affect an individual, if it interrupts or slows the progress of the disorder or if it reduces disability (Stachtchenko & Jenicek, 1990).

⁴ Health promotion is the process of enabling individuals and communities to increase control over the determinants of health and thereby improve their health (Epp, 1986). Health promotion is “behaviour motivated by the desire to increase well-being and actualize human health potential” (Pender et al., 2002, p. 7).

⁵ In the delivery of home care services, homemakers/personal support workers are considered unregulated health care providers whereas others, (i.e. nurses, nutritionists,

physiotherapists, occupational therapists, and speech and language pathologists) are regulated under the Ontario Regulated Health Profession Act (OMHLTC, 1999).

⁶ The term personal support workers will be used throughout the paper to describe those who provide personal support services as defined by the OMHLTC Act (1999).

The following are personal support services:

1. Personal hygiene activities.
2. Routine personal activities of living.
3. Providing prescribed equipment, supplies or other goods.
4. Services prescribed as personal support services.

⁷ Professional home care services include: nursing services, occupational therapy services, physiotherapy services, social work services, speech-language pathology services, and dietetics (OMHLTC, 1999).

⁸ A chronic patient is expected by home care to require more than 30 visits to meet their care requirements (O'Brien-Pallas et al., 1998).

⁹ Cost-effectiveness is often used to refer to all types of economic evaluation. However, it is a specific type of evaluation that compares the costs of inputs per unit of output. Program outcomes are measured in a variety of ways such as improved patient well-being or life years gained. Cost-effectiveness studies often report the additional cost of the change in outcome, such as dollars per life year gained (HSURC, 1996).

¹⁰ In Ontario, the eligibility criteria for home care is as follows:

1. Valid Ontario health care.
2. The person requires service because of physical illness, physical disability, diminished physical ability, cognitive impairment, mental illness (18+), injury, post-surgical condition, or a pre or post partum condition.
3. Place of service suitable and adequate for provision of service.
4. No significant risk of harm to service provider.
5. Person not more appropriately served by another approved agency of MOH community based service OR service immediately provided from other more appropriate source not sufficient.
6. Caregiving and support exceeds capability of relatives, friends, or other community resources (CCAC, 1998).

¹¹ “Case management is a service consisting of interrelated activities designed to support clients in their efforts to achieve their optimal health and well-being in a complex health and social environment where resources are finite” (Carefoote, 1998, p. 3).

¹² Vulnerability is defined as susceptibility to health and/or social problems, harm or neglect (Rogers, 1997).

¹³ Primary prevention: Activities that decrease the probability of occurrence of specific illness or dysfunction in an individual, family, group, or community and reduce incidence of new cases of disorder in the population by combating harmful forces that

operate in the community and by strengthening the capacity of people to withstand these forces (Murray & Zentner, 1997).

¹⁴ Secondary prevention: Early diagnosis and treatment of the pathogenic process, thereby shortening disease duration and severity and enabling the person to return to normal function as quickly as possible (Murray & Zentner, 1997).

¹⁵ Tertiary prevention: Restoring the individual to optimal functioning through rehabilitation and within the constraints of the problem when an abnormality or disability is fixed, stable or irreversible (Murray & Zentner, 1997).

¹⁶ Usual home care services under the current home care delivery system consisted of:

1. Standard case management services including intake eligibility assessments, and regular ongoing eligibility assessments by a CCAC Case Manager.
2. Newly referred to and eligible for personal support services through the CCAC.
3. Newly referred to and eligible for other professional home care services⁸ with the exception of nursing (RN level) services.

¹⁷ Clients are eligible for personal support if: the client is assessed as requiring assistance with personal care. Personal care may be provided either by a caregiver that lives inside or outside of the home or a personal support worker contracted by the CCAC. Clients who live in rest/retirement homes are entitled to receiving personal support services if they meet the eligibility criteria (CCAC, 1998). Effective August 2001, services were restricted to personal care only; assistance with housekeeping was no

longer provided. Service levels were capped at 60 hours for regular clients and 80 hours for palliatives. This change in policy was in response to restrictions on funding levels for the CCAC's in Ontario for the 2001-02 fiscal year (CCAC of Halton, August 2001).

¹⁸ Clients eligible for other professional CCAC services (with the exception of nursing services) were considered eligible for the study.

REFERENCES

- Aday, L. A. (1993). *At risk in America: The health and health care needs of vulnerable population in the United States*. San Francisco: Jossey-Bass.
- Alessi, C. A., Stuck, A. E., Aronow, H. U., Yuhas, K. E., Bula, C. J., Madison, R., Gold, M., Segal-Gidan, F., Fanello, R., Rubenstein, L. Z., & Beck, J. C. (1997). The process of care in preventive in-home comprehensive geriatric assessment. *Journal of the American Geriatrics Society*, 45, 1044-1050.
- Anderson, M., & Parent, K. (2000). *Care in the home: Public responsibility-private role*. Toronto: Department of Rehabilitation Medicine, Queen's University.
- Aronson, J. (2002). Frail and disabled users of home care: Confident consumers or disempowered citizens? *Canadian Journal on Aging*, 21, 11-25.
- Aronson, J., & Neysmith, S. M. (1996). The work of visiting homemakers in the context of cost cutting in long-term care. *Canadian Journal of Public Health*, 87, 422-425.
- Baker, C., Boyd, J., Stasiowski, S., & Simons, B. (1989). Inter-institutional collaboration for nursing excellence: Part 1. Creating the partnership. *Journal of Nursing Administration*, 19, 8-12.
- Banerjee, S. (1993). Prevalence and recognition rates of psychiatric disorder in the elderly clients of a community care service. *International Journal of Geriatric Psychiatry*, 8, 125-131.
- Barber, J. H., & Wallis, J. B. (1976). Assessment of the elderly in general practice. *Journal of Collaborative General Practice*, 26, 106-114.
- Barusch, A. S., Rogers, A., & Abu-Bader, S. H. (1999). Depressive symptoms in the frail elderly: Physical and psychosocial correlates. *International Journal of Aging and Human Development*, 49, 107-125.
- Bazargan, M., & Hamm-Baugh, V. (1995). The relationship between chronic illness and depression in a community of urban Black elderly persons. *Journals of Gerontology-Series B-Psychological Sciences and Social Sciences*, 50B, S119-S127.

- Becker, G. (1994). The oldest old: Autonomy in the face of frailty. *Journal of Aging Studies, 8*, 59-76.
- Beekman, A. T. F., Deeg, D. J. H., Van Limbeek, J., Braam, A. W., De Vries, M. Z., & Van Tilburg, W. (1997). Criterion validity of the center for epidemiological studies depression scale (CES-D): Results from a community-based sample of older subjects in the Netherlands. *Psychological Medicine, 27*, 231-235.
- Benner, P. (1984). *From novice to expert: Excellence and power in clinical nursing practice*. Menlo Park, California: Addison-Wesley Publishing Company.
- Bergman, H., Beland, F., Lebel, P., Contandriopoulos, A. P., Tousignant, P., Brunelle, Y., Kaufman, T., Leibovich, E., Rodriguez, R., & Clarfield, M. (1997). Caring for Canada's frail elderly population: Fragmentation or integration? *Canadian Medical Association Journal, 157*, 1116-1120.
- Berkman, B., Foster, L. W., & Campion, E. (1989). Failure to thrive: Paradigm for the frail elder. *The Gerontologist, 29*, 654-659.
- Bernabei, R., Landi, F., Gambassi, G., Sgadari, A., Zuccala, G., Mor, V., Rubenstein, L. Z., & Carbonin, P. (1998). Randomized trial of impact of model of integrated care and case management for older people living in the community. *British Medical Journal, 316*, 1348-1351.
- Birch, S., & Gafni, A. (1996). Prevalence and correlates of family dysfunction and poor adjustment to chronic illness in specialty clinics. *Journal of Clinical Epidemiology, 43(4)*, 373-383.
- Blazer, D. G., Burchett, B., Service, C., & George, L. K. (1991). The association of age and depression among the elderly: An epidemiological exploration. *The Journals of Gerontology-Medical Sciences, 46*, M210-M215.
- Bortz, W. M. (1993). The physics of frailty. *Journal of the American Geriatrics Society, 41*, 1004-1008.
- Bowsher, J., Bramlett, M., Burnside, I. M., & Gueldner, S. H. (1993). Methodological considerations in the study of frail elderly people. *Journal of Advanced Nursing, 18*, 873-879.
- Boyle, T. (2001, June 12). Cash crisis threatens home care. *The Toronto Star*.

- Brandt, P., & Weinert, C. (1981). PRQ: A social support measure. *Nursing Research, 30*, 277-280.
- Brocklehurst, J. C. (1985). The geriatric service and the day hospital. In J. C. Brocklehurst (Ed.), *Textbook of geriatric medicine and gerontology* (3rd ed., pp. 982-995). London, England: Churchill.
- Brody, K. K., Johnson, R. E., & Reid, D. (1997). Evaluation of a self-report screening instrument to predict frailty outcomes in aging populations. *The Gerontologist, 37*, 182-191.
- Brown, I., Renwick, R., & Raphael, D. (1995). Frailty: Constructing a common meaning, definition, and conceptual framework. *International Journal of Rehabilitation Research, 18*, 93-102.
- Brown, K., Boot, D., Groom, L., & Williams, E. I. (1997). Problems found in the over-75s by the annual health check. *British Journal of General Practice, 47*, 31-35.
- Browne, G., & Roberts, J. (1999, November). *Depression and its link to caregivers use of available community support services*. Paper presented at the 28th Annual Scientific and Educational Meeting of the Canadian Association on Gerontology, Ottawa, Ontario.
- Browne, G., Arpin, K., Fitch, M., & Corey, P. (1988). University/hospital collaboration in research: One model. *Nursing Connections, 1*(1), 69-80.
- Browne, G., Byrne, C., Roberts, J., Gafni, A., & Whittaker, S. (2001a). When the bough breaks: Provider-initiated comprehensive care is more effective and less expensive for sole-support parents on social assistance. *Social Science and Medicine, 53*, 1697-1710.
- Browne, G., Gafni, A., Roberts, J., Whittaker, S., Wong, M., & Prica, M. (2001, March). *Approach to the measurement of costs (expenditures) when evaluating health and social programs* (Working Paper Series 01-03). Hamilton, Ontario: McMaster University, System-Linked Research Unit on Health and Social Service Utilization.
- Browne, G., Roberts, J., Byrne, C., Gafni, A., Weir, R., & Majumdar, B. (2001b). The costs and effects of addressing the needs of vulnerable populations: Results of 10 years of research. *Canadian Journal of Nursing Research, 33*, 65-76.

- Browne, G., Roberts, J., Gafni, A., Byrne, C., Weir, R., Majumdar, B., & Watt, S. (1999). Economic evaluations of community-based care: Lessons from twelve studies in Ontario. *Journal of Evaluation in Clinical Practice*, 5, 1-19.
- Browne, G., Roberts, J., Watt, S., Gafni, A., Stockwell, M., & Alcock, S. (1994). Community rehabilitation: Strategies, outcomes, and expenditures. *Canadian Journal of Rehabilitation*, 8, 9-22.
- Brubaker, T. H. (1990). A contextual approach to the development of stress associated with caregiving in later life families. In M. Stephens, J. Crouther, S. Hobfall, & D. Tennebaum (Eds.), *Stress and coping in later life families* (pp. 29-47). New York: Hemisphere Publishing Corporation.
- Buchner, D. M., & Wagner, E. H. (1992). Preventing frail health. *Clinics in Geriatric Medicine*, 8, 1-17.
- Bula, C. J., Berod, A. C., Stuck, A. E., Alessi, C. A., Aronow, H. U., Santos-Eggimann, B., Rubenstein, L. Z., & Beck, J. C. (1999). Effectiveness of preventive in-home geriatric assessment in well functioning, community-dwelling older people: Secondary analysis of a randomized trial. *Journal of the American Geriatrics Society*, 47, 389-395.
- Burnside, I. (1990). The frail elderly: Those 85 and over. *Nursing Administration Quarterly*, 14, 37-41.
- Byles, J. E. (2000). A thorough going over: Evidence for health assessments for older persons. *Australian and New Zealand Journal of Public Health*, 24(2), 117-123.
- Campbell, A. J. & Buchner, D. M. (1997). Unstable disability and the fluctuations of frailty. *Age and Ageing*, 26, 315-318.
- Canadian Association on Gerontology. (2001). Canadian association on gerontology policy statement on health promotion for individual seniors. *Canadian Journal on Aging*, 20, i-viii.
- Canadian Home Care Association. (1999, August 13). *Canadian home care information*. Retrieved February 2000, from <http://www.cdnhomecare.on.ca/e-care.html>
- Canadian Institute for Health Information. (2000). *Health care in Canada: A first annual report*. Ottawa, Ontario: Statistics Canada.

- Canadian Nurses Association. (1998). *National home and community care for Canadians*. Ottawa, Ontario: Author.
- Canadian Study of Health and Aging. (1999). *The Canadian study of health and aging: From research to policy and practice*. Ottawa, Ontario: University of Ottawa.
- Carefoote, R. L. (1998). Health care issues: Managing services and people in home care: Today's challenge. *Canadian Journal of Nursing Administration*, 77-94.
- Carlson, J. E., Zocchi, K. A., Bettencourt, D. M., Gambrel, M. L., Freeman, J. L., Zhang, D., & Goodwin, J. S. (1998). Measuring frailty in the hospitalized elderly: Concept of functional homeostasis. *American Journal of Physical Medicine and Rehabilitation*, 77(3), 252-257.
- Carpenter, G. I., & Demopoulos, G. R. (1990). Screening the elderly in the community. *British Medical Journal*, 300, 1253-1256.
- Caulfield, P. A., Frank, J. W., McMurray, L., Henderson, M., & Hutchison, B. (1986). A pilot home-based geriatric health screening project in primary care. *Geriatric Medicine and Social Policy*, 2, 85-97.
- Centre for Health Promotion. (1997). Proceedings from the international workshop on mental health promotion, University of Toronto. In C. Willinsky & B. Pape (Eds.), *Mental health promotion*. Toronto: Canadian Mental Health Association National Office.
- Chichin, E. (1989). Community care for the frail elderly: The case of non-professional home care workers. *Health and Well-Being*, 93-104.
- Chin A Paw, M. J. M., Dekker, J. M., Feskens, E. J. M., Schoutens, E. G., & Kromhout, D. (1999). How to select a frail elderly population? A comparison of three working definitions. *Journal of Clinical Epidemiology*, 52(11), 1015-1021.
- Chu, I. (1995). Mental health of the old-old in Hong Kong. *Clinical Gerontologist*, 15, 31-44.
- Ciliska, D., Hayward, S., & Thomas, H. (1996). A systematic overview of the effectiveness of home visiting as a delivery strategy for public health nursing interventions. *Canadian Journal of Public Health*, 87(3), 193-198.

- Clark, J. (2001). Preventive home visits to elderly people: Their effectiveness cannot be judged by randomized controlled trials. *British Medical Journal*, *323*, 708.
- Clark, R. (1996). Home and community-based care: The U.S. example. *Canadian Journal on Aging*, *15*, 91-102.
- Clayman, A. (1990). Determinants of frailty [Abstract]. *Gerontologist*, *30*, 105A.
- Cochrane, J. J., Goering, P. N., & Rogers, J. M. (1997). The mental health of informal caregivers in Ontario: An epidemiological survey. *American Journal of Public Health*, *87*, 2002-2007.
- Coleman, E. A., Giotheus, L. S., Sandhu, N., & Wagner, E. H. (1999). Chronic care clinics: A randomized controlled trial of a new model of primary care for frail older adults. *Journal of the American Geriatrics Society*, *47*, 908-909.
- Colenda, C. C., Trinkle, D., Hamer, R. M., & Jones, S. (1991). Hospital utilization and readmission rates for geriatric and young adult patients with major depression: Results from a historical cohort study. *Journal of Geriatric Psychiatry and Neurology*, *4*, 166-172.
- Colin, L. (1999). *A portrait of seniors in Canada* (Rep. No. 89-519). Ottawa, Ontario: Statistics Canada.
- Community Care Access Centre of Halton. (1998). *Services manual* (Volume 2: Case Management). Burlington, Ontario: Author.
- Cook, D. J., Sackett, D. L., & Spitzer, W. O. (1995). Methodological guidelines for systematic reviews of randomized control trials in health care from the Potsdam consultation on meta-analysis. *Journal of Clinical Epidemiology*, *48*, 167-171.
- Corcoran, K., & Fisher, J. (1987). *Measures for clinical practice: A source book*. New York: Free Press.
- Cox, C. (1993). Defining frailty. In C. Cox (Ed.), *The frail elderly: Problems, needs, and community responses* (pp. 19-38). Westport, Connecticut: Auburn House.
- Cox, C. (1997). Findings from a statewide program of respite care: A comparison of service users, stoppers, and nonusers. *Gerontologist*, *37*(4), 511-517.

- Coyte, P. C., & Young, W. (1999). Regional variations in the use of home care services in Ontario, 1993/95. *Canadian Medical Association Journal*, *161*, 376-380.
- Creditor, M. C. (1993). Hazards of hospitalization of the elderly. *Annals of Internal Medicine*, *118*, 219-223.
- Currie, G., MacNeil, R. M., Walker, J. G., Barnie, E., & Mudie, E. W. (1974). Medical and social screening of patients aged 70 to 72 by an urban general practice health team. *British Medical Journal*, *2*, 108-111.
- Dalby, D. M., Sellors, J. W., Fraser, F. D., Fraser, C., van Ineveld, C., & Howard, M. (2000). Effect of preventive home visits by a nurse on the outcomes of frail elderly people in the community: A randomized controlled trial. *Canadian Medical Association Journal*, *162*, 497-500.
- Davidson, H., Feldman, P. H., & Crawford, S. (1994). Measuring depressive symptoms in the frail elderly. *Journal of Gerontology*, *49*(4), 159-164.
- Davis, L. L., Broome, M. E., & Cox, R. P. (2002). Maximizing retention in community-based clinical trials. *Journal of Nursing Scholarship*, *34*(1), 47-53.
- Dayhoff, N. E., & Suhrheinrich, J. (1998). Balance and muscle strength as predictors of frailty among older adults. *Journal of Gerontological Nursing*, 18-27.
- Depression Guideline Panel. (1993). *Depression in primary care: Volume 1. Detection and diagnosis: Clinical practice guideline, Number 5*. (AHCPR Publication No. 93-0550) Rockville, MD: US Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research.
- Desjardins, B. (1993). *Population ageing and the elderly: Current demographic analysis* (Rep. No. 91-533E). Ottawa, ON: Statistics Canada, Demography Division.
- Dietrich, P. J., McWilliam, C. L., Ralyea, S. F., & Schweitzer, A. T. (1999). Mother-loss: Recreating relationship and meaning. *Canadian Journal of Nursing Research*, *31*, 77-101.
- Drummond, M. F., O'Brien, B., Stoddart, G. L., & Torrance, G. W. (1997). *Methods for the economic evaluation of health care programmes* (2nd ed.). Toronto: Oxford University Press.

- Ebersole, P., & Hess, P. (1998). *Toward healthy aging: Human needs and nursing response*. St. Louis: Mosby.
- Eggar, M. (2001). Commentary: When, where, and why do preventive home visits work? *British Medical Journal*, *323*, 8-9.
- Elkan, R., Kendrick, D., Dewey, M., Hewitt, M., Robinson, J., Blair, M., Williams, D., & Brummell, K. (2001). Effectiveness of home-based support for older people: Systematic review and meta-analysis. *British Medical Journal*, *323*, 1-8.
- Epp, J. (1986). *Achieving health for all: A framework for health promotion*. Ottawa, ON: Health and Welfare Canada.
- Estes, C. L., Linkins, K. W., & Binnery, E. A. (1995). The political economy of aging. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social science* (4th ed., pp. 346-361). Toronto: Academic Press.
- Fabacher, D., Josephson, K., Pietruszka, F., Linderborn, K., Morley, J. E., & Rubenstein, L. Z. (1994). An in-home preventive assessment program for independent older adults: A randomized controlled trial. *Journal of the American Geriatrics Society*, *42*, 630-638.
- Fassbender, K. (2000). *An economic evaluation of home care as an alternative to institutionalization* (Working Paper No. 00-6). Edmonton, AB: Departments of Public Health Sciences, University of Alberta, Institute of Health Economics.
- Fawcett, J. (Ed.). (1989). *Analysis and evaluation of conceptual models of nursing* (2nd ed.). Philadelphia: F.A. Davis Company.
- Ferguson, G. (1995). Home care. In E. Sawyer & M. Stephenson (Eds.), *Continuing the care: The issues and challenges for long-term care* (pp. 115-134). Ottawa: CHA Press.
- Flaskerud, J. H., & Winslow, B. J. (1998). Conceptualizing vulnerable populations in health related research. *Nursing Research*, *47*, 69-78.
- Fletcher, A., & Bulpitt, C. (2000). Preventive home visits to elderly people in the community: Studies reviewed have methodological flaws. *British Medical Journal*, *321*, 513-514.

- Fried, L. P. (1994). Frailty. In W. R. Hazzard, E. L. Bierman, J. P. Blass, W. H. Ettinger, & J. B. Halter (Eds.), *Principles of geriatric medicine and gerontology* (4th ed., pp. 1149-1156). New York: McGraw-Hill.
- Fried, L. P., & Guralnik, J. M. (1997). Disability in older adults: Evidence regarding significance, etiology, and risk. *Journal of the American Geriatrics Society, 45*, 92-100.
- Gagnon, A. J., Schein, C., McVey, L., & Bergman, H. (1999). Randomized controlled trial of nurse case management of frail older people. *Journal of the American Geriatrics Society, 47*, 1118-1124.
- Gealey, S. G. (1997). Quantification of the term frail as applied to the elderly client. *Journal of the American Academy of Nurse Practitioners, 9*(11), 505-510.
- George, M. V., Norris, M. J., Nault, F., Loh, S., & Dai, S. I. (1994). *Population projections for Canada, provinces and territories 1993-2016*. (Rep. No. 91-520). Ottawa: Demography Division, Population Projections Section, Canada.
- Gilbody, S. M., House, A. O., & Sheldon, T. A. (2001). Routinely administered questionnaires for depression and anxiety: Systematic review. *British Medical Journal, 322*, 406-409.
- Gingold, R. (1993). Prevention of health problems in later life. *Medical Journal of Australia, 159*, 682-690.
- Given, B., Keilman, L., Collins, C., & Given, C. (1990). Strategies to maximize attrition in longitudinal studies. *Nursing Research, 39*, 184-186.
- Green, J. (2000). The role of theory in evidence-based health promotion practice. *Health Education Research, 15*, 125-129.
- Greene, V. L., & Monahan, D. J. (1989). The effect of a support and education program on stress and burden among family caregivers to frail elderly persons. *The Gerontologist, 29*, 472-477.
- Gruenberg, L., Tomplins, C., & Porell, F. (1990). *Capitation rates for the frail elderly*. Waltham, MA: Florence Heller Graduate School for Advanced Studies in Social Welfare.

- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 105-117). UK: Sage Limited.
- Gunner-Svensson, F., Ipsen, J., Olsen, J., & Waldstrom, B. (1984). Prevention of relocation of the aged in nursing homes. *Scandinavian Journal of Primary Health Care*, 2, 49-56.
- Guralnik, J. M., & Simonsick, E. (1993). Physical disability in older Americans. *The Journals of Gerontology*, 48, 3-10.
- Gutman, G. M., Milstein, S., Killam, J., Lewis, D., & Hollander, M. J. (1993). Adult day care centres in British Columbia: Models, characteristics and services. *Health Reports*, 5, 189-207.
- Gwyther, L., Ballard, E., & Hinman-Smith, E. (1990). *Overcoming barriers for appropriate service use: Effective individualized strategies for Alzheimer's care*. Durham, NC: Duke University, Centre for Study of Aging and Human Development.
- Haase, J. E., & Myers, S. T. (1988). Reconciling paradigm assumptions of qualitative and quantitative research. *Western Journal of Nursing Research*, 10(2), 128-137.
- Hadley, E. C., Ory, M. G., Suzman, R., & Weindruch, R. (1993). Forward. *Journal of the American Geriatrics Society*, 48, vii-viii.
- Hall, N., De Beck, P., Johnson, D., Mackinnon, K., Gutman, G., & Glick, N. (1992). Randomized trial of a health promotion program for frail elders. *Canadian Journal on Aging*, 11, 72-91.
- Hallfors, D., Leutz, W., Capitman, J., & Ritter, G. (1994). Stability of frailty in the social/health maintenance organization. *Health Care Financing Review*, 15, 105-115.
- Hamerman, D. (1999). Toward an understanding of frailty. *Annals of Internal Medicine*, 130, 945-950.
- Hanger, H. C., & Sainsbury, R. (1990). Screening the elderly: A Christchurch study. *New Zealand Medical Journal*, 103, 473-475.
- Harrison, R., Savla, N., & Kaftez, K. (1990). Dementia, depression and physical disability in a London borough: A survey of elderly people in and out of residential care and implications for future developments. *Age and Ageing*, 19, 97-103.

- Harrison, S., Martin, E., Rous, S., & Wilson, S. (1985). Assessing the needs of the elderly using unsolicited visits by health visitors. *Journal of the Royal Society of Medicine*, 78, 557-561.
- Hay, W. I., Browne, G., Roberts, J., & Jamieson, E. (1995). Prospective care of elderly patients in family practice. Part 3: Prevalence of unrecognized treatable health concerns. *Canadian Family Physician*, 41, 1695-1710.
- Health and Welfare Canada. (1991). *The national issues on long-term care report*. Ottawa, ON: Minister of Supply and Services Canada.
- Health Canada. (1996). *National health expenditures in Canada 1975-1994* (Rep. No. No. H21-99/1994-92). Ottawa, ON: Minister of Supply and Services Canada.
- Health Canada. (1999, May). *Provincial and territorial home care programs: A synthesis for Canada*. Ottawa, ON: Minister of Supply and Services Canada.
- Health Services Utilization and Research Commission. (1996). *The cost-effectiveness of home care: A rigorous review of the literature*. Saskatoon, Saskatchewan: Author.
- Health Services Utilization and Research Commission. (1998). *Hospital and home care study* (Report No. 10). Saskatoon, Saskatchewan: Author.
- Health Services Utilization and Research Commission. (2000). *The impact of preventive home care and seniors housing on health outcomes*. Saskatoon, Saskatchewan: Author.
- Hebert, R. (1997). Functional decline in old age. *Canadian Medical Association Journal*, 157, 1037-1045.
- Hebert, R., Brayne, C., & Spieghalter, D. (1997). Incidence of functional decline and improvement in a community-dwelling, very elderly population. *American Journal of Epidemiology*, 145, 935-944.
- Hebert, R., Robichaud, L., Roy, P. M., Bravo, G., & Voyer, L. (2001). Efficacy of a nurse-led multidimensional preventive programme for older people at risk of functional decline: A randomized controlled trial. *Age and Ageing*, 30, 147-153.
- Hedrick, S. C., & Inui, T. S. (1986). The effectiveness and cost of home care: An information synthesis. *Health Services Research*, 20, 851-880.

- Hedrick, S. C., Koepsell, T. D., & Inui, T. (1989). Meta-analysis of home care effects on mortality and nursing home placement. *Medical Care, 27*, 1015-1026.
- Helt, E. H., & Jelinek, R. C. (1988). In the wake of cost cutting, nursing productivity and quality improve. *Nursing Management, 19*, 36-38.
- Hendriksen, C., Lund, E., & Stromgard, E. (1984). Consequences of assessment and intervention among elderly people: A three-year randomized controlled trial. *British Medical Journal, 289*, 1522-1524.
- Hendriksen, C., Lund, E., & Stromgard, E. (1989). Hospitalization of elderly people: A 3-year controlled trial. *Journal of the American Geriatrics Society, 37*, 117-122.
- Hersch, C., Sommers, L., Olsen, A., Mullen, L., & Hutner Winograd, C. (1990). The natural history of functional morbidity in hospitalized older patients. *Journal of the American Geriatrics Society, 38*, 1296-1303.
- Hertzog, C., van Alstine, J., Usala, P. D., Hultsch, D. F., & Dixon, R. (1990). Measurement properties of the center for epidemiological studies depression scale (CES-D) in older populations. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 2*(1), 64-72.
- Himmelfarb, S., & Murrell, S. A. (1983). Reliability and validity of five mental health scales in older persons. *Journal of Gerontology, 38*, 333-339.
- Hirdes, J. P., Naus, P. J., & Young, J. E. (1994). The use of preventive home visits among frail elderly persons: Evidence from three European countries. *Canadian Journal on Aging, 13*, 499-509.
- Hodgson, R., Abbasi, T., & Clarkson, J. (1996). Effective mental health promotion: A literature review. *Health Education Journal, 55*, 55-74.
- Holder, H. D., Treno, A. J., Saltz, R. F., & Grube, J. W. (1997). Summing up: Recommendations and experiences for evaluation of community-level prevention programs. *Evaluation Review, 21*, 268-277.
- Hollander, M. J. (1999). *Substudy 1: Comparative cost analysis of home care and residential care services. Preliminary Findings* Victoria, BC: Health Canada.

- Hollander, M., & Tessaro, A. (2001). *Evaluation of the maintenance and preventive model of home care*. Ottawa, Ontario: Health Canada, Home Care/Pharmaceuticals Division, Policy and Communications Branch.
- Hu, T., Huang, L., & Cartwright, W. S. (1986). Evaluation of the costs of caring for the senile demented elderly: A pilot study. *Gerontologist, 26*, 158-163.
- Hughes, S. L. (1985). Apples and oranges? A review of evaluations of community-based long-term care. *Health Services Research, 20*, 461-488.
- Hum, D., & Simpson, W. (2002). Disability onset among Canadians: Evidence from panel data. *Canadian Journal on Aging, 21*, 117-136.
- Husaini, B. A., Neff, J. A., Harrington, J. B., Hughes, M. D., & Stone, R. H. (1980). Depression in rural communities: Validating the CES-D scale. *Journal of Community Psychology, 8*, 20-27.
- Illife, S., Haynes, A., Gallivan, S., Booroff, A., Goldenberg, E., & Morgan, P. (1993). Assessment of elderly people in general practice. IV. Depression, functional ability and contact with services. *British Journal of General Practice, 43*, 371-374.
- Irvine, D., O'Brien-Pallas, L., Murray, M., Cockerill, R., Sidani, S., Laurie-Shaw, B., & Lochhaas-Gerlach, J. (2000). The reliability and validity of two health status measures for evaluating outcomes of home care nursing. *Research in Nursing and Health, 23*, 43-54.
- Irwin, M., Artin, K. H., & Oxman, M. N. (1999). Screening for depression in the older adult: Criterion validity of the 10-item center for epidemiological studies depression scale (CES-D). *Archives of Internal Medicine, 159*, 1701-1704.
- Jadad, A.R. (1998). *Randomized controlled trials: A user's guide*. London: BMJ Books.
- Jarrett, P. G., Rockwood, K., Carver, D., Stolee, P., & Crossway, S. (1995). Illness presentation in elderly patients. *Archives of Internal Medicine, 155*, 1060-1064.
- Jenkinson, C., Layte, R., & Lawrence, K. (1997). Development and testing of the SF-36 summary scale scores in the United Kingdom: Results from a large scale survey and clinical trial. *Medical Care, 35*, 410-416.
- Jensen, G. R. (1997). Preventive home visits to the elderly. An evaluation of controlled interventional studies. *Ugeskrift Laeger (Danish), 159*, 6358-6361.

- Jones, S. R. (1990). Infections in frail and vulnerable elderly patients. *American Journal of Medicine*, 88, 30S.
- Joubert, N., & Raeburn, J. (1998). Mental health promotion: People, power and passion. *International Journal of Mental Health Promotion, Inaugural Issue*, 15-22.
- Kaufman, S. R. (1994). The social construction of frailty: An anthropological perspective. *Journal of Aging Studies*, 8, 45-58.
- Kennie, D., & Warshaw, G. (1989). Health maintenance and health screening in the elderly. In W. Reichel (Ed.), *Clinical aspects of aging* (3rd ed., pp. 13-25). Baltimore: Williams and Wilkins.
- Kennie, D. C. (1986). Health maintenance of the elderly. *Clinical Geriatric Medicine*, 2, 53-83.
- Kline, M. K. (1995). Frailty research: A review of the FICSIT trials. *Topics in Geriatric Rehabilitation*, 11, 61-70.
- Koelen, M. A., Vaandrager, L., & Colomer, C. (2001). Health promotion research: Dilemmas and challenges. *Journal of Epidemiology and Community Health*, 55, 257-262.
- Kravitz, R. L., Reuben, D. B., Davis, J. W., Mitchell, A., Hemmerling, K., Kington, R. S., & Siu, A. L. (1994). Geriatric home assessment after hospital discharge. *Journal of the American Geriatrics Society*, 42, 1229-1234.
- Lamb, V. L. (1996). A cross-sectional study of quality of life factors associated with patterns of elderly disablement. *Social Science and Medicine*, 42, 363-377.
- Lawton, M. P. (1991). A multi-dimensional view of quality of life in frail elders. In J. Birren, J. Lubben, J. Rowe, & D. Deutchman (Eds.), *The concept and measurement of quality of life in the frail elderly* (pp. 4-23). New York, NY: Academic.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer Publishing Company.
- LeGris, J., Weir, R., Browne, G., Gafni, A., Stewart, L., & Easton, S. (2000). Developing a model of collaborative research: The complexities and challenges of implementation. *International Journal of Nursing Studies*, 37, 65-79.

- Leutz, W., Capitman, J., MacAdam, M., & Abrahams, R. (1992). *Care for frail elders: Developing community solutions*. Westport, CT: Auburn House.
- Levine, C. (1999). Sounding board: The loneliness of the long-term caregiver. *New England Journal of Medicine*, 340(20), 1587-1590.
- Lindsay, C. (1999). *A portrait of seniors in Canada* (3rd ed.). Ottawa, Ontario: Statistics Canada (Catalogue No: 89-519-XPE).
- Lofland, J., & Lofland, L. H. (1995). *Analyzing social settings: A guide to qualitative observation and analysis*. Belmont, California: Wadsworth Publishing Company.
- MacAdam, M. (2000). Home care: It's time for a Canadian model. *Hospital Quarterly and Healthcare Papers*, 1, 9-36.
- MacAdam, M., Capitman, J., Yee, D., Prottas, J., Leutz, W., & Westwater, D. (1989). Case management for frail elders: The Robert Wood Johnson foundation's program for hospital initiatives in long-term care. *Gerontologist*, 29, 737-744.
- MacKnight, C. (1999). Frailty and successful aging: What do we mean? *Proceedings of the Workshop on the Canadian Study of Health and Aging: From Research to Policy and Practice* (pp. 25-26). Ottawa, Ontario: University of Ottawa.
- Markle-Reid, M., Browne, G., & Roberts, J. (1998). Home care: Client characteristics and patterns of service utilization predictive of acute hospitalization. *Canadian Journal of Rehabilitation*, 12, 39-51.
- Markle-Reid, M., Browne, G., Roberts, J., Gafni, A., & Byrne, C. (2002). The 2-year costs and effects of a public health nursing case management intervention on mood-disordered single parents on social assistance. *Journal of Evaluation in Clinical Practice*, 8, 45-59.
- Marshall, V. W. (1995). The state of theory in aging and the social sciences. In R. H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (pp. 12-26). Toronto: Academic Press.
- Martin, S., Stuck, A. E., Minder, C. E., & Beck, J. C. (2000). Health service utilization of elderly Swiss: Evidence from panel data. *Health Economics*, 9, 533-545.
- Maville, J. A., & Huerta, C. G. (2002). *Health promotion in nursing*. Canada: Delmar.

- McDougall, G. J., & Balyer, J. (1998). Decreasing mental frailty in at-risk elders. *Geriatric Nursing, 19*, 220-224.
- McEwan, R. T., Davison, N., Forster, D. P., Pearson, P., & Stirling, E. (1990). Screening elderly people in primary care: A randomized controlled trial. *British Journal of General Practice, 40*, 94-97.
- McHorney, C. A., Ware, J. E., & Lu, J. F. R. (1993). The MOS 36 item short-form survey. III. Tests of data quality, scaling assumptions and reliability across diverse patient groups. *Medical Care, 32*, 40-66.
- McHorney, C. A., Ware, J. E., & Raczek, A. E. (1994). The MOS 36 item short-form health survey. II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. *Medical Care, 31*, 247-263.
- McKneally, M. R., Dickens, B. M., Meslin, E. M., & Singer, P. A. (1997). Bioethics for clinicians: 13. Resource allocation. *Canadian Medical Association Journal, 157*, 163-167.
- McNamee, P., Gregson, B. A., Buck, D., Bamford, C. H., Bond, J., & Wright, K. (1999). Costs of formal care for frail older people in England: The resource implications study of the MRC cognitive function and ageing study. *Social Science and Medicine, 48*, 331-341.
- McNaughton, D. B. (2000). A synthesis of qualitative home visiting research. *Public Health Nursing, 17*, 405-414.
- McWilliam, C. L., Stewart, M., Brown, J. B., Desai, K., & Coderre, P. (1996). Creating health with chronic illness. *Advances in Nursing Science, 18*(3), 1-15.
- McWilliam, C. L., Stewart, M., Brown, J. B., McNair, S., Desai, K., Patterson, M. L., Del Maestro, N., & Pittman, B. J. (1997). Creating empowering meaning: An interactive process of promoting health with chronically ill older Canadians. *Health Promotion International, 12*(2), 111-123.
- Miller, C. (1995). *Nursing care of older adults: Theory and practice*. Philadelphia: J.B. Lippincott.
- Mills, T. L. (2001). Comorbid depressive symptomatology: Isolating the effects of chronic medical conditions on self-reported depressive symptoms among community dwelling older adults. *Social Science and Medicine, 53*, 569-578.

- Minister for Senior Citizen Affairs Seniors Secretariat. (1985). *Elderly residents in Ontario: The experiences of those who are frail*. Author.
- Minister of Long-Term Care with Responsibility for Seniors. (1999). *Ontario's strategy for Alzheimer's disease and related dementias*. Toronto, Ontario: Government of Ontario.
- Minkler, M. (1990). Aging and disability: Behind and beyond the stereotypes. *Journal of Aging Studies*, 4, 245-260.
- Morris, J. N., Sherwood, S., & Morris, V. (1984). An assessment tool for use in identifying functionally vulnerable persons in the community. *Gerontologist*, 24, 373-379.
- Morris, S. A., Sherwood, S., & Morris, J. N. (1996). A dynamic model for explaining changes in use of IADL/ADL care in the community. *Journal of Health and Social Behavior*, 37, 91-103.
- Murdaugh, C. (1997). Health-related quality of life as an outcome in organizational research. *Medical Care*, 35(Suppl.), NS41-NS48.
- Murphy, E. (1982). Social origins of depression in old age. *British Journal of Psychiatry*, 141, 135-142.
- Murray, R. H., & Zentner, J. P. (1997). *Health assessment promotion strategies through the lifespan* (6th ed.). Stamford, Connecticut: Appleton & Lange.
- National Advisory Council on Aging. (1999) *Positions, recommendations and policy statements on caregiving*. Retrieved February 1999, from <http://www.hc-sc.gc.ca>
- Newbury, J., & Marley, J. (2000). Preventive home visits to elderly people in the community. *British Medical Journal*, 321(7259), 512.
- Newbury, J. W., Marley, J. E., & Beilby, J. J. (2001). A randomized controlled trial of the outcome of health assessment of people aged 75 and over. *Medical Journal of Australia*, 175(July 16), 104-107.
- Nutbeam, D. (1999). The challenge to provide 'evidence' in health promotion. *Health Promotion International*, 14, 99-101.

- O'Brien-Pallas, L., Baumann, A., & Lochhass-Gerlach, J. (1998). Health human resources: A preliminary analysis of nursing personnel in Ontario. Unpublished manuscript, Nursing Effectiveness, Utilization and Outcomes Research Unit, University of Toronto at Toronto and McMaster University at Hamilton.
- Okta, J. S. (1985). Maintaining independent living for the impaired elderly: The role of community support groups. *Aging*, 14-18.
- Ontario Ministry of Health. (1993). *Partnerships in long-term care*. Toronto, Ontario: Queen's Printer for Ontario.
- Ontario Ministry of Health and Long-Term Care. (1998). *Long-term care act*. Toronto, Ontario: Queen's Printer for Ontario.
- Ory, M. G., Schechtman, K. B., Miller, P. S., Hudley, E. C., Fiatorone, M. A., Province, M. A., Arfken, C. L., Morgan, D., Weiss, S., & Kaplan, M. (1993). Frailty and injuries in later life: The FICSIT trials. *Journal of the American Geriatrics Society*, 41(3), 283-296.
- Oxman, A. D., Cook, D. J., & Guyatt, G. H. (1994). Users' guides to the medical literature. VI. How to use an overview. Evidence-based medicine working group. *Journal of the American Medical Association*, 272, 1367-1371.
- Parent, K., Anderson, M., & Neuwelt, B. (2000). *Home care and people with psychiatric disabilities: Needs and issues*. Toronto, Ontario: Queen's University, Department of Rehabilitation Medicine and Canadian Mental Health Association, National Office.
- Pathy, M. S. J., Bayer, A., Harding, K., & Dibble, A. (1992). Randomized trial of case finding and surveillance of elderly people at home. *The Lancet*, 340, 890-893.
- Pawlson, L. G. (1988). Hospital length of stay of frail elderly patients. Primary care by general internists versus geriatricians. *Journal of the American Geriatrics Society*, 36, 202-208.
- Pawson, R., & Tiley, N. (1997). *Realistic evaluation*. London: Sage.
- Payette, H., Coulombe, C., Boutier, V., & Gray-Donald, K. (1999). Weight loss and mortality among free-living frail elders: A prospective study. *Journals of Gerontology*, 54, M440-M445.

- Pederson, A., O'Neil, M., & Rootman, I. (1994). *Health promotion in Canada: Provincial, national & international perspectives*. Toronto, Ontario: W. B. Saunders Canada.
- Pender, N. J., Murdaugh, C. L., & Parsons, M. (2002). *Health promotion in nursing practice* (4th ed.). Upper Saddle River, New Jersey: Pearson Education, Inc.
- Pfeiffer, E. (1975). A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *Journal of the American Geriatrics Society*, 23, 433-441.
- Picard, A. (1999, December 11). Home Health Care: Only if you can afford it. *The Globe and Mail*.
- Polit, D. F., Beck, C. T., & Hungler, B. P. (2001). *Essentials of nursing research: Methods, appraisal, and utilization* (5th ed.). Philadelphia: Lippincott.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
- Radloff, L. S., & Teri, L. (1986). Use of the Center for epidemiological studies - depression scale with older adults. *Clinical Gerontology*, 5, 119-136.
- Ramler, C. L., Kraus, V. L., Pringle Specht, J., & Titler, M. G. (1996). MOS SF-36: Clinical and administrative implications for nurses. In K. Kelly & M. Maas (Eds.), *Outcomes of effective management practice* (pp. 71-93). Thousand Oaks, CA: Sage Publications.
- Ramsdell, J. W., Swart, J., Jackson, J. E., & Renvall, M. (1989). The yield of a home visit in the assessment of geriatric patients. *Journal of the American Geriatrics Society*, 37, 17-24.
- Raphael, D., Cava, M., Brown, I., Renwick, R., Heathcote, K., Weir, N., Wright, K., & Kirwan, L. (1995). Frailty: A public health perspective. *Canadian Journal of Public Health*, 86, 224-227.
- Registered Nurses Association of Ontario. (1999). *Reclaiming a vision: Making long-term care community services work*. Ontario: Author.

- Reiger, D. A., Hirschfeld, R. M., Goodwin, F. K., Burke, J. D., Lazar, J. B., & Judd, L. L. (1988). The NIMH depression awareness, recognition and treatment programme: Structure, aims, and scientific basis. *The American Journal of Psychiatry*, *145*, 1351-1357.
- Rich, M. W., Beckham, V., Wittenberg, C., Leven, C. L., Freedland, K. E., & Carney, R. M. (1995). A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *The New England Journal of Medicine*, *333*, 1190-1195.
- Richardson, B. (2000). Implementing home care in Canada: Four critical elements. *Hospital Quarterly and Healthcare Papers*, *1*, 67-73.
- Roberts, J., & Bennett, K. J. (1997). *Evidence based nursing care: How to critically appraise a research article determining effectiveness of a health care intervention*. (Working Paper 97-9). Hamilton, Ontario: McMaster University, System-Linked Research Unit on Health and Social Service Utilization.
- Roberts, J., Browne, G., Milne, C., Spooner, L., Gafni, A., Drummond-Young, M., LeGris, J., Watt, S., LeClair, K., & Beaumont, L. (1999). Problem solving counseling for caregivers of the cognitively impaired: effective for whom? *Nursing Research*, *48*(3), 162-172.
- Roberts, R. E., Kaplan, G. A., Shema, S. J., & Strawbridge, W. J. (1997). Prevalence and correlates of depression in an aging cohort: The Alameda county study. *The Journals of Gerontology - Social Sciences*, *52B*(5), S252-S258.
- Rockwood, K., Fox, R. A., Stolee, P., Robertson, D., & Beattie, L. (1994). Frailty in elderly people: An evolving concept. *Canadian Medical Association Journal*, *150*, 489-495.
- Rogers, A. C. (1997). Vulnerability, health and health care. *Journal of Advanced Nursing*, *26*, 65-72.
- Rogers, A. C. (2000). *An exploratory study of the experiences of surgical nurses caring for elderly patients with acute confusion*. Unpublished master's thesis, The University of New Brunswick, Fredericton, New Brunswick, Canada.
- Roos, N. P., & Shapiro, E. (1981). The Manitoba longitudinal study on aging: Preliminary findings on health care utilization by the elderly. *Medical Care*, *19*, 644-657.

- Rose, M. H., & Killien, M. (1983). Risk and vulnerability: A case for differentiation. *Advances in Nursing Science, 5*, 60-73.
- Rubenstein, L. Z., & Stuck, A. E. (2001). Preventive home visits for older people: Defining criteria for success. *Age and Ageing, 30*, 107-109.
- Rubenstein, L. Z., Aronow, H. U., Schloe, M., Steiner, A., Alessi, C. A., Yuhus, K. E., Gold, M., Kemp, M., Raube, K., Nisenbaum, R., Stuck, A., & Beck, J. C. (1994). A home-based geriatric assessment, follow-up and health promotion program: Design, methods, and baseline findings from a 3-year randomized controlled trial. *Aging Clinical Experimental Research, 6*, 105-120.
- Rubenstein, L. Z., Siu, A. L., & Wieland, D. (1989). Comprehensive geriatric assessment: Toward understanding its efficacy. *Aging, 1*(2), 87-98.
- Rubenstein, L. Z., Stuck, A. E., Siu, A. L., & Wieland, D. (1991). Impacts of geriatric evaluation and management programs on defined outcomes: Overview of the evidence. *Journal of the American Geriatrics Society, 39*, 8S-16S.
- Santor, D. A., Zuroff, D. C., Ramsay, J. O., Cervantes, P., & Palacios, J. (1995). Examining scale discriminability in the BDI and the CES-D as a function of depressive severity. *Psychological Assessment, 7*, 131-139.
- Saravay, S. M., Pollack, S., Steinberg, M. D., Weinschel, B., & Habert, M. (1996). Four-year follow-up of the influence of psychological comorbidity on medical rehospitalization. *American Journal of Psychiatry, 153*, 397-403.
- Schein, R. L., & Koenig, H. G. (1997). The center for epidemiological studies - depression (CES-D) scale: Assessment of depression in the medically ill elderly. *International Journal of Geriatric Psychiatry, 12*, 436-446.
- Schulberg, H. C., Saul, M., McClelland, M., Ganguli, M., Christy, W., & Frank, R. (1985). Assessing depression in primary medical and psychiatric practices. *Archives of General Psychiatry, 42*, 1164-1170.
- Schulz, R., & Williamson, G. M. (1993). Psychosocial and behavioral dimensions of physical frailty. *Journals of Gerontology, 48*, 39-43.
- Shapiro, E., & Roos, N. P. (1989). Predictors and patterns of nursing home and home care use. In M. D. Petersen & D. L. White (Eds.), *Health care of the elderly: An information sourcebook* (pp. 127-166). Newbury Park, CA: Sage.

- Sherbourne, C. D., Stewart, A. L., & Wells, K. B. (1992). Role functioning measures. In A. L. Stewart & J. E. Ware (Eds.), *Measuring functioning and well-being: The Medical Outcomes study approach* (pp. 205-219). Durham, NC: Duke University Press.
- Sorenson, K. H., & Sivertsen, J. (1988). Follow-up three years after intervention to relieve unmet medical and social needs of old people. *Comprehensive Gerontology Bulletin*, 2, 85-91.
- Somers, A. R. (1984). Why not try preventing illness as a way of controlling medical costs? *New England Journal of Medicine*, 311, 853-856.
- Speechley, M., & Tinetti M. (1991). Falls and injuries in frail and vigorous community elderly persons. *Journal of the American Geriatrics Society*, 339, 46-52.
- Stachtchenko, S., & Jenicek, M. (1990). Conceptual differences between prevention and health promotion: Research implications for community health programs. *Canadian Journal of Public Health*, 81, 53-59.
- Statistics Canada. (2000). *Approved beds in institutions per 1,000 population by type of care*. Ottawa: Author.
- Steffens, D. C., Hays, J. C., George, L. K., Krishnan, K. R. R., & Blazer, D. G. (1996). Sociodemographic and clinical correlates of number of previous depressive episodes in the depressed elderly. *Journal of Affective Disorders*, 39(2), 99-106.
- Stewart, A. L., Hays, R. D., & Ware, J. E. (1988). The MOS short-form general health survey: Reliability and validity in a patient population. *Medical Care*, 26(7), 724-735.
- Stewart, C. D., & Ware, J. E. (1992). *Measuring functioning and well-being*. London: Duke University Press.
- Stuck, A. E., Aronow, H. U., Steiner, A., Alessi, C. A., Bula, C. J., Gold, M. N., Yuhas, K. E., Nisenbaum, R., Rubenstein, L. Z., & Beck, J. C. (1995). A trial of annual in-home comprehensive geriatric assessments for elderly people living in the community. *The New England Journal of Medicine*, 333(18), 1184-1189.

- Stuck, A. E., Egger, M., Hammer, A., Minder, C. E., & Beck, J. C. (2002). Home visits to prevent nursing home admission and functional decline in elderly people: Systematic review and meta-regression analysis. *Journal of the American Medical Association*, 287, 1022-1028.
- Stuck, A. E., Mayer-Oakes, A., & Rubenstein, L. Z. (1993a). Geriatric in-home preventive programs: Facts and challenges. *Facts and Research in Gerontology*, 7, 357-365.
- Stuck, A. E., Minder, C. E., Peter-Wuest, I., Gillman, G., Egli, C., Kesselring, A., Leu, R. E., & Beck, J. C. (2000). A randomized trial of in-home visits for disability prevention of community-dwelling older people at low and high risk for nursing home admission. *Archives of Internal Medicine*, 160, 977-986.
- Stuck, A. E., Siu, A. L., Wieland, D., & Rubenstein, L. Z. (1993b). Comprehensive geriatric assessment: A meta-analysis of controlled trials. *The Lancet*, 342, 1032-1036.
- Stuck, A. E., Walthert, J. M., Nikolaus, T., Bula, C. J., Hohmann, C., & Beck, J. C. (1999). Risk factors for functional status decline in community-living elderly people: A systematic literature review. *Social Science and Medicine*, 48, 445-469.
- Tennstedt, S., Cafferata, G. L., & Sullivan, L. (1992). Depression among caregivers of impaired elders. *Journal of Aging and Health*, 4, 58-76.
- Tennstedt, S. L., Sullivan, L. M., McKinlay, J. B., & D'Agostino, R. B. (1990). How important is functional status as a predictor of service use by older people? *Journal of Aging and Health*, 2, 439-461.
- Trojan, L., & Yonge, O. (1993). Developing trusting, caring relationships: Home care nurses and elderly clients. *Journal of Advanced Nursing*, 18, 1903-1910.
- Tsuji, I., Whalen, S., & Finucan, T. E. (1995). Predictors of nursing home placement in community-based long-term care. *Journal of the American Geriatrics Society*, 43, 761-766.
- Tugwell, P., Bennett, K. J., Sackett, D. L., & Haynes, R. B. (1985). The measurement iterative loop: A framework for the critical appraisal of need, benefits and costs of health interventions. *Journal of Chronic Disease*, 38, 339-351.

- Tulloch, A. J., & Moore, V. (1979). A randomized controlled trial of geriatric screening and surveillance in general practice. *Journal of the Royal College of General Practitioners*, 29, 733-742.
- van Haastregt, J. C. M., Diederiks, M., van Rossum, E., de Witte, L. P., Voorhoeve, P. M., & Crebolder, F. J. M. (2000). Effects of a programme of multifactorial home visits on falls and mobility impairments in elderly people at risk: A randomized controlled trial. *British Medical Journal*, 321, 994-998.
- van Rossum, E., Frederiks, C. M. A., Philipsen, H., Portengen, K., Wiskerke, J., & Knipschild, P. (1993). Effects of preventive home visits to elderly people. *British Medical Journal*, 307, 27-32.
- van Tulder, M. W., Assendelft, W. J., Koes, B. W., & Bouter, L. M. (1997). Method guidelines for systematic reviews in the Cochrane collaboration back review group for spinal disorders. *Spine*, 22, 2323-2330.
- Vaupel, J. W., Manton, K. G., & Stallard, E. (1979). The impact of heterogeneity in individual frailty on the dynamics of mortality. *Demography*, 16, 439-454.
- Verbrugge, L. M. (1991). Survival curves, prevalence rates and dark matters therein. *Journal of Aging and Health*, 3, 217.
- Vetter, N. J., Jones, D. A., & Victor, C. R. (1984). Effect of health visitors working with elderly patients in general practice: A randomized controlled trial. *British Medical Journal*, 288, 369-372.
- Walker, L. O., & Avant, K. C. (1983). *Strategies for theory construction in nursing*. Norwalk, Connecticut: Appleton Century Crofts.
- Walston, J., & Fried, L. P. (1999). Frailty and the older man. *Medical Clinics of North America*, 83, 1173-1194.
- Ware, J. E. (1993). *SF-36 health survey: Manual and interpretation guide*. Boston, Massachusetts: The Health Institute, New England Medical Centre.
- Ware, J. E., & Gandek, B. (1998). Overview of the SF-36 health survey and the international quality of life assessment (IQOLA) project. *Journal of Clinical Epidemiology*, 51(11), 903-912.

- Ware, J. E., & Kosinski, M. (2001). *SF-36 physical and mental health summary scales: A manual for users of version 1* (2nd ed.). Lincoln, Rhode Island: Quality Metric Inc.
- Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-item short-form health survey (SF-36): Conceptual framework and item selection. *Medical Care, 30*, 473-481.
- Ware, J. E., Kosinski, M., & Dewey, J. E. (2000). *How to score version 2 of the SF-36 health survey (Standard and acute forms)* (2nd ed.). Lincoln, Rhode Island: Quality Metric Incorporated.
- Ware, J. E., Snow, K. K., Kosinski, M., & Gandek, B. (1993). *SF-36 health survey: Manual and interpretation guide*. Boston, Massachusetts: The Health Institute, New England Medical Centre.
- Weinberger, M., Gold, D. T., Divine, G. W., Cowper, P. A., Hodgson, L. G., Schreiner, P. J., & George, L. K. (1993). Expenditures in caring for patients with dementia who live at home. *American Journal of Public Health, 83*(3), 338-341.
- Weinert, C. (1987). Commentary on social support: Critique, retrenchment, and refinement. *Western Journal of Nursing Research, 9*, 76-78.
- Weinert, C., & Brandt, P. (1987). Measuring social support with the PRQ. *Western Journal of Nursing Research, 9*, 589-602.
- Weir, R., & Browne, G. (1989). A study of role performance in specialty outpatient clinics. *The Canadian Journal of Nursing Research, 21*, 45.
- Weiss, R. (1974). The provision of social relationship. In D. Rubin (Ed.), *Doing unto others* (pp. 17-26). Englewood Cliffs, New Jersey: Prentice-Hall.
- Weissert, W. G. (1985). Seven reasons why it is so difficult to make community-based long-term care cost-effective. *Health Services Research, 20*, 423-433.
- Weissert, W. G., Cready, C. M., & Pawelak, J. E. (1988). The past and future of home- and community-based long-term care. *Milbank Quarterly, 66*, 309-388.
- Whall, A. L. (1989). The influence of logical positivism on nursing practice. *Image: Journal of Nursing Scholarship, 21*, 243-245.
- Wilkins, K., & Park, E. (1998). Home care in Canada. *Health Reports, 10*, 29-37.

- Williams, F. M., Wynne, H., Woodhouse, K. W., & Rawlins, M. D. (1989). Plasma aspirin esterase: The influence of old age and frailty. *Age and Ageing*, 18, 39-42.
- Williamson, J., Burley, L. E., Smith, R., Donald, A., & Wright, B. (1987). Prevention, screening and case finding in primary care. In J. M. B. Williamson, R. G. Smith, & L. E. Burley (Eds.), *Primary care of the elderly: A practical approach* (pp. 141-157). Bristol, UK: Wright Publications.
- Williamson, J. (1981). Screening, surveillance and case finding. In T. Arie (Ed.), *Health care of the elderly* (pp. 194-213). Baltimore, Maryland: The John Hopkins University Press.
- Winograd, C. H., Gerety, M. B., Chung, M., Goldstein, M. K., Dominguez, F., Jr., & Vallone, R. (1991). Screening for frailty: Criteria and predictors of outcomes. *Journal of the American Geriatrics Society*, 39, 778-784.
- Winograd, C. H., Gerety, M. B., Brown, E., & Kolodny, V. (1988). Targeting the hospitalized elderly for geriatric consultation. *Journal of the American Geriatrics Society*, 36, 1113-1119.
- Wishart, L., Richardson, J., Roberts, J., Browne, G., Gafni, A., Wilkins, S., & Shadwick, S. (1999). *The effects and expense of an early health promotion/rehabilitation intervention in an elderly home care population*. Hamilton, Ontario: McMaster University, System-Linked Research Unit on Health and Social Service Utilization.
- Wolf, S. L., Barnhart, H. X., Kutner, N. G., McNeely, E., & Coogler, C. (1996). Reducing frailty and falls in older persons: An investigation of Tai Chi and computerized balance training. *Journal of the American Geriatrics Society*, 44, 489-497.
- Woodhouse, K. W., & O'Mahony, M. S. (1997). Frailty and ageing. *Age and Ageing*, 26, 245-246
- Zimmer, J. G., Groth-Juncker, A., & McCusker, J. (1985). A randomized controlled study of a home health care team. *American Journal of Public Health*, 75, 134-141.

LIST OF APPENDICES

- APPENDIX A: Depression Screening Tools
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Information Letter, Consent Form, and Letter to Physicians
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APPENDIX A

Depression Screening Tool (Centre for Epidemiologic Studies Depression Scale (CES-D), Radloff, 1977)

Name: _____

Date: _____

Instructions for questions: Below is a list of the ways you might have felt or behaved recently. Please circle the answer which best describes how often you have felt this way during the past week.

<i>During the past week:</i>		Rarely or None of the Time (less than 1 day)	Some or A Little of the Time (1-2 Days)	Occasionally or Moderate (3-4 Days)	Most or All of the Time (5-7 Days)
1.	I was bothered by things that usually don't bother me . . .	0	1	2	3
2.	I did not feel like eating; my appetite was poor	0	1	2	3
3.	I felt that I could not shake off the blues even with help from my family and friends	0	1	2	3
4.	I felt that I was just as good as other people	0	1	2	3
5.	I had trouble keeping my mind on what I was doing .	0	1	2	3
6.	I felt depressed	0	1	2	3
7.	I felt that everything I did was an effort	0	1	2	3
8.	I felt hopeful about the future	0	1	2	3

<i>During the past week:</i>		Rarely or None of the Time (less than 1 day)	Some or A Little of the Time (1-2 Days)	Occasionally or Moderate (3-4 Days)	Most or All of the Time (5-7 Days)
9.	I thought my life had been a failure	0	1	2	3
10.	I felt fearful	0	1	2	3
11.	My sleep was restless	0	1	2	3
12.	I was happy	0	1	2	3
13.	I talked less than usual	0	1	2	3
14.	I felt lonely	0	1	2	3
15.	People were unfriendly ...	0	1	2	3
16.	I enjoyed life	0	1	2	3
17.	I had crying spells	0	1	2	3
18.	I felt sad	0	1	2	3
19.	I felt that people dislike me	0	1	2	3
20.	I could not get "going"	0	1	2	3

TOTAL SCORE: _____
60

Instructions for Question 21:

Here is a line which represents your mood. Please place a cross on the line at the point which represents the way you feel at the present time.

21. How have you been feeling ?

Poor _____ Excellent



Appointment Date: _____

With Dr. _____

Re Patient: _____

DOB: _____

I have had the pleasure of meeting your patient as part of the Augmented Homemaking Study with McMaster University and the CCAC of Halton. During one of our monthly visits and/or phone calls, this patient displayed or endorsed some of the following symptoms and behaviours:

- | | | |
|---|---|---|
| <input type="checkbox"/> Isolation/Loneliness | <input type="checkbox"/> Sadness/Crying | <input type="checkbox"/> Irritability |
| <input type="checkbox"/> Poor Self Esteem | <input type="checkbox"/> Worry | <input type="checkbox"/> Guilty |
| <input type="checkbox"/> Anger | <input type="checkbox"/> Trouble Focusing | <input type="checkbox"/> Lack of Energy |
| <input type="checkbox"/> Disorganized | <input type="checkbox"/> Indecisive | <input type="checkbox"/> Procrastinates |
| <input type="checkbox"/> Trouble Sleeping | <input type="checkbox"/> Over/Under Eating | <input type="checkbox"/> Weight Gain/Loss |
| <input type="checkbox"/> Substance Use | <input type="checkbox"/> Feels Misunderstood/Victimized/Picked On | |

He/she felt this way:

- More days than not
- More of the day than not

For the last _____ weeks / months / years

Your consideration of a diagnosis and appropriate medication will be most appreciated.

Sincerely,

Nurse's Name: _____

Nursing Agency: _____

Phone Number: _____

Date: _____

APPENDIX B
Study Referral Sheet

Sheet Completed by: _____ Date: _____

Initials of Client: _____ Referral Source: _____

**CLIENTS WHO ARE 75 YEARS AND OLDER AND RECEIVING CCAC
HOMEMAKING SERVICES ARE ELIGIBLE IF:**

client **and/or** caregiver communicate in English Yes No

AND

client will be receiving treatment and/or residing
in Halton for the next 6 months Yes No

CLIENTS ARE INELIGIBLE IF:

referred for nursing services Yes No

**DOES ELIGIBLE CLIENT CONSENT TO BE CONTACTED
BY A MCMASTER RESEARCH ASSOCIATE? YES NO**

IF APPLICABLE, DOES ELIGIBLE CLIENT ALSO AGREE
TO GIVE THE NAME AND NUMBER OF A TREATMENT OR
CONTACT PERSON TO A MCMASTER RESEARCH
ASSOCIATE? Yes No

IF YES - PLEASE FILL IN INFORMATION BELOW:

Client Name: _____

Client Phone Number: _____
(Please indicate if client has a treatment address other than their home residence.)

Contact Name/Substitute Decision-Maker: _____

Contact/Sub. Decision Maker Phone Number: _____

PLEASE FAX THIS FORM TO KAREN AULD AT: (905) 528-5099

APPENDIX C
Short Portable Mental Status Questionnaire (SPMSQ) (Pfeiffer, 1975)

Questions	✓	X
1 What is the date today (m/d/y)?		
2 What day of the week is it?		
3 What is the name of this place?		
4 What is your telephone number? (If no phone go to 4a)		
4a What is your street address?		
5 How old are you?		
6 When were you born?		
7 Who is the Prime Minister of Canada?		
8 Who was the Prime Minister before him/her?		
9 What was your mother's maiden name?		
10 Subtract 3 from 20 and keep subtracting 3 from each new number you get, all the way down. (Correct answer: 17, 14, 11, 8, 5, 2)		
11 Total number of errors		

Scoring Key:

0 - 2 errors = intellectually intact
 5 - 7 errors = moderately impaired

3 - 4 errors = mildly impaired
 8 - 10 errors = severely impaired

Sociodemographic Questionnaire

1. Respondent: 1. Client
2. Significant Other

2. Are you: 1 Male
2 Female

3. What is your date of birth?

yy

mm

dd

4. What type of accommodation do you live in?

- 1 House
2 Apartment
3 Senior's Home

5. What is your present marital status?

- 1 Married (once)
2 Living together/common-law
3 Separated
4 Divorced/Annulled
5 Widowed
6 Remarried (2 or more marriages)
7 Never married

6. How many years of education have you completed (circle one)

Grade School
1 2 3 4 5 6 7 8

High School
9 10 11 12 13

Training School
14 15 16 17 18 19 20

7. What ethnic/cultural group do you most identify with

1. African
2. Australian
3. Asian

5. European
6. Latin American
7. Middle Eastern

8. North Amer. Indigenous
9. American
10. Canadian

11. Caribbean

8. Is there someone who lives with you and helps you out?

- 1 Yes
- 2 No

9. If yes, what is your relationship with this individual?

- 1 Spouse
- 2 Sibling
- 3 Friend
- 4 Child
- 5 Grandchild
- 6 Other

10. Do you have adequate income to support you?

- 1 Yes
- 2 No

11. What is your range of income?

- 1 Below \$10,000
- 2 \$10,000 - \$20,000
- 3 \$20,000 - \$30,000
- 4 \$30,000 - \$40,000
- 5 \$40,000 - \$50,000
- 6 over \$50,000

MOS SF-36 Health Survey (Ware, Kosinski, & Dewey, 2000)

1. In general, would you say your health is: [Mark an in the one box that best describes your answer.]

Excellent	Very good	Good	Fair	Poor
.
<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

2. Compared to 6 months ago, how would you rate your health in general now?

Much better now than 6 months ago	Somewhat better now than 6 months ago	About the same as 6 months ago	Somewhat worse now than 6 months ago	Much worse now than 6 months ago
.
<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

3. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much? [Mark an in a box on each line.]

	Yes, limited a lot	Yes, limited a little	No, not limited at all
a <u>Vigorous activities</u> , such as running, lifting heavy objects, participating in strenuous sports	.	.	.
b <u>Moderate activities</u> , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
c Lifting or carrying groceries	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
d Climbing <u>several</u> flights of stairs	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
e Climbing <u>one</u> flight of stairs	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
f Bending, kneeling, or stooping	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
g Walking <u>more than a mile</u>	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
h Walking <u>several hundred yards</u>	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
i Walking <u>one hundred yards</u>	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃
j Bathing or dressing yourself	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃

4. During the past week, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time

a Cut down on the <u>amount of time</u> you spent on work or other activities	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
b <u>Accomplished less</u> than you would like	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
c Were limited in the <u>kind</u> of work or other activities	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
d Had <u>difficulty</u> performing the work or other activities (for example, it took extra effort)	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

5. During the past week, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time

a Cut down on the <u>amount of time</u> you spent on work or other activities	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
b <u>Accomplished less</u> than you would like	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
c Did work or other activities <u>less carefully than usual</u>	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

6. During the past week, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

Not at all	Slightly	Moderately	Quite a bit	Extremely
.
<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

7. How much bodily pain have you had during the past week?

None	Very mild	Mild	Moderate	Severe	Very severe
□ ₁	□ ₂	□ ₃	□ ₄	□ ₅	□ ₆

8. During the past week, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
□ ₁	□ ₂	□ ₃	□ ₄	□ ₅

9. These questions are about how you feel and how things have been with you during the past week. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past week...

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a Did you feel full of life?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
b Have you been very nervous?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
c Have you felt so down in the dumps that nothing could cheer you up?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
d Have you felt calm and peaceful?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
e Did you have a lot of energy?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
f Have you felt downhearted and depressed?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
g Did you feel worn out?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
h Have you been happy?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
i Did you feel tired?	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅

10. During the past week, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
□ ₁	□ ₂	□ ₃	□ ₄	□ ₅

11. How TRUE or FALSE is each of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a I seem to get sick a little easier than other people	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
b I am as healthy as anybody I know	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
c I expect my health to get worse	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅
d My health is excellent	□ ₁	□ ₂	□ ₃	□ ₄	□ ₅

Health and Social Service Utilization Inventory
(Browne et al., 2001)

HS1. In the last 6 months, how many visits have you had with a:

	CCAC	Private Paid
1. Family Physician or walk-in clinic	<input type="checkbox"/> <input type="checkbox"/>	
2. Physician specialist	<input type="checkbox"/> <input type="checkbox"/>	
3. Emergency room	<input type="checkbox"/> <input type="checkbox"/>	
4. Physiotherapist	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
5. Psychiatrist	<input type="checkbox"/> <input type="checkbox"/>	
6. Psychologist	<input type="checkbox"/> <input type="checkbox"/>	
7. Occupational Therapist	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
8. Social Worker	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
9. Family Counselor	<input type="checkbox"/> <input type="checkbox"/>	
10. Probationary Services	<input type="checkbox"/> <input type="checkbox"/>	
11. Nutritionist	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
12. Naturopath/homeopath	<input type="checkbox"/> <input type="checkbox"/>	
13. Public Health Nurse	<input type="checkbox"/> <input type="checkbox"/>	
14. Visiting Nurse (VON, SEN, Para-med)	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
15. Chiropractor	<input type="checkbox"/> <input type="checkbox"/>	
16. Homemaker	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>

17. Meals on Wheels

18. Other health care providers/services

Please specify providers:

19. Other unpaid providers/helpers
(ie. priest, neighbour)

20. 911

21. Ambulance

HS2.

a) Have you had a hospital admission in the past 6 months? Y N

b) How many hospital admissions in the last 6 months

c) Total number of days in the hospital (6 months)

HS3.

a) Have you had any out-patient tests done in the past 6 months? Y N

b) If yes, please tell me how many times for each of the following tests:

1. Blood

2. Specimens (ie. urine, throat swab)

3. Scopes (ie. endoscopy, bronchoscopy, sigmoidoscopy)

4. X-rays

5. Scans (ie. ultrasound, CT scan)

- 6. Breathing tests (ie. spirometry)
- 7. ECG (heart monitoring)
- 8. EEG (brain waves)
- 9. EMG (muscles)
- 10. Other tests

Please specify test:

HS4.

- a) Have you taken any medications over the past 2 days? Y N
- b) If yes, please list any medications that you have taken:
(including prescription medications, over-the-counter drugs, etc.)

Drug name & dose _____

of pill/doses _____

Cost coded later .

Drug name & dose _____

of pill/doses _____

Cost coded later .

Drug name & dose _____

of pill/doses _____

Cost coded later .

Drug name & dose _____

of pill/doses _____

Cost coded later .

Drug name & dose _____

of pill/doses _____

Cost coded later .

Drug name & dose _____

of pill/doses _____

Cost coded later .

HS5.

a) Have you used any supplies, aids or devices in the past 6 months (ie. wheelchairs, syringes, walker, crutches, dressings, pillows, etc.) Y N

b) If yes, please specify what supplies, aids or devices you have used:

Item description _____

Cost to nearest \$.

Item description _____

Cost to nearest \$.

Item description _____

Cost to nearest \$.

Item description _____

Cost to nearest \$.

HS6. Due to your health, in the last 2 weeks, did you:

a) receive household help Y N hours: _____

HS7. In the last 2 weeks, did you:

a) travel to receive health care services Y N cost: _____
(cost at \$0.30/km if by car)

b) pay for parking while receiving services Y N cost: _____

HS8. In the last 6 months, did you receive any government cheques from:

				How many	Amount of
				cheques?	each cheque
a)	Worker's Compensation	Y	N	_____	_____
b)	Old Age Security	Y	N	_____	_____
c)	Disability Pension, private	Y	N	_____	_____
d)	Canada Pension	Y	N	_____	_____
e)	Canada Pension, disability	Y	N	_____	_____
f)	GAINS	Y	N	_____	_____
g)	Veteran's Pension	Y	N	_____	_____
h)	Survivor's Benefits (CPP)	Y	N	_____	_____
i)	Unemployment Insurance	Y	N	_____	_____
j)	Welfare	Y	N	_____	_____

k) Other _____ Y N _____

HS9. Due to your health in the last 6 months, did you receive any other cheques:

*from private insurance Y N _____

*Interviewer: this refers to income from private insurance. It does not include insurance that compensates for costs ie. dental insurance, etc.

HS10. How would you describe your income compared to others?

1 2 3 4 5 6 7
 low medium high

Personal Resource Questionnaire (PRQ85-PART TWO) (Weinert & Brandt, 1987)

The next set of questions are about the support you receive in your life. The questions give you a situation and you mark how you feel about the situation. Please read each statement and circle the response most appropriate for you. There is no right or wrong answer.

	Statements	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
a.	There is someone I feel close to who makes me feel secure	1	2	3	4	5	6	7
b.	I belong to a group in which I feel important	1	2	3	4	5	6	7
c.	People let me know that I do well at my work (job, homemaking)	1	2	3	4	5	6	7
d.	I can't count on my relatives and friends to help me with problems	1	2	3	4	5	6	7
e.	I have enough contact with the person who makes me feel special .	1	2	3	4	5	6	7
f.	I spend time with others who have the same interests that I do	1	2	3	4	5	6	7
g.	There is little opportunity in my life to be giving and caring to another person	1	2	3	4	5	6	7
h.	Others let me know that they enjoy working with me (job, committees, projects) .	1	2	3	4	5	6	7
i.	There are people who are available if I needed help over an extended period of time	1	2	3	4	5	6	7

	Statements	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
j.	There is no one to talk about how I am feeling	1	2	3	4	5	6	7
k.	Among my group of friends we do favours for each other	1	2	3	4	5	6	7
l.	I have the opportunity to encourage others to develop their interests and skills	1	2	3	4	5	6	7
m.	My family lets me know that I am important for keeping the family running . . .	1	2	3	4	5	6	7
n.	I have relatives or friends that will help me out even if I can't pay them back	1	2	3	4	5	6	7
o.	When I am upset there is someone I can be with who lets me be myself	1	2	3	4	5	6	7
p.	I feel no one has the same problems as I . . .	1	2	3	4	5	6	7
q.	I enjoy doing little "extra" things that make another person's life more pleasant	1	2	3	4	5	6	7
r.	I know that others appreciate me as a person	1	2	3	4	5	6	7
s.	There is someone who loves and cares about me	1	2	3	4	5	6	7
t.	I have people to share social events and fun activities with	1	2	3	4	5	6	7

	Statements	Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree
u.	I am responsible for helping provide for another person's needs	1	2	3	4	5	6	7
v.	If I need advice there is someone who would assist me to work out a plan for dealing with the situation	1	2	3	4	5	6	7
w.	I have a sense of being needed by another person	1	2	3	4	5	6	7
x.	People think that I am not as good a friend as I should be	1	2	3	4	5	6	7
y.	If I got sick there is someone to give me advice about caring for myself	1	2	3	4	5	6	7

Guidelines for Obtaining Verbal Consent

1. **Determine Eligibility:**

If a New Referral is 75 years old and older and eligible for CCAC personal support services, use the “Study Referral Sheet” to decide whether they are eligible for the study or not.

2. **If Eligible:**

Obtain verbal consent from the client to be contacted by a McMaster Research Associate. The following script can be used as a guideline:

“You are eligible for a study that the CCAC of Halton is doing with McMaster University. We are trying to identify better ways of providing services to clients and their families so that they can live at home more effectively. Would you agree to be contacted by an interviewer from McMaster University? The interviewer would come to your home twice over a 6-month period to ask you some questions about your overall health and the health care services you are receiving. The interview will take about 30-40 minutes”.

A lot of questions?

You can give the client and/or caregiver the phone number of the project coordinator, Karen Auld, (905) 525-9140, ext. 27237 or the Principal Investigator, Maureen Markle-Reid, (905) 525-9140, ext. 22293. Please give the client and/or their caregiver an “Information letter” to take home.

**Remember, verbal consent can be obtained within 5 days of referral to the CCAC.*

If the client consents to be contacted by a McMaster Research Associate:

Circle “Yes” on the “Study Referral Sheet” and write the client’s name and phone number in the spaces provided. Ask the client for an alternate contact name and phone number. Fax the sheet to the Project Coordinator, Karen Auld, at (905) 528-5099.

3. **If Ineligible:**

If both the client and their caregiver cannot communicate in English, if the client will not be receiving CCAC services in the Region of Halton, if they do not consent to be contacted by a McMaster Research Associate, or if they are referred for nursing services, then the client is not eligible for the study. Circle “No” on the “Study Referral Sheet” and fax the sheet to the Project Coordinator, Karen Auld, at (905) 528-5099.

Note: Please send the completed “Study Referral Sheets” for all clients whether eligible or ineligible (both consenting and refusing) to the Project Coordinator.