

Predictors of Care Level Among British Columbia Seniors

by


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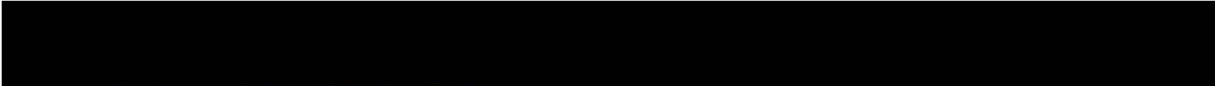
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ABSTRACT

Predictors of Care Level were examined from an intake assessment data base, in a group of 2989 British Columbia seniors, with a mean age 77.7 years and 60% women. Using a regression model, gender is related to Care Level, while marital status is not. For the Mental Health items, only the Mini-Mental Status Exam score is related to Care Level. The seriousness of medical diagnoses predicts Care Level, but the number of medications does not. Within the ADL/IADL items, the ability to independently ambulate, dress and transfer to the toilet, shop, travel and administer one's medications and treatments are predictive of Care Level. Last, the ability to handle one's business affairs and whether or not a senior receives Guaranteed Income Supplement are predictive of Care Level. However, this set of 10 predictors does not strongly discriminate between Care Level assignments, especially when the senior is assessed at the psycho-geriatric level.

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Chapter 1 - Introduction

The aging of North Americans is a phenomenon which has been extensively reported in the popular media and professional literature (McDaniel, 1986, p. 16). The number of people over 65 years is expected to double in the next 40 years (Denton, Feaver & Spencer, 1987; and Bergman, 1990). Further, there is recent evidence that, while Canadians are living longer, their health is actually poorer (Roos, Havens & Black, 1993), a phenomenon seen throughout North America (Verbrugge, 1984). For instance, many seniors have one or more chronic illness and/or disability which require various kinds of formal and informal support (Long Term Care Branch, 1988; Canada Health Survey, cited in Chappell, 1990, p. 18; and Forbes, Hayward & Agwani, 1991). Furthermore, almost 40% of Canadians over 65 years report problems with mobility, agility, sight or hearing (Forbes, et al., 1991, p. 241).

As a result of disabilities and chronic problems, seniors may have difficulty caring for themselves or receive inadequate care giving from others (Shapiro, 1995) and, therefore, may require intervention from health care professionals on behalf of the formal long term care (LTC) system. In British Columbia (B.C.), prior to instituting formal support, seniors must be "admitted" to LTC after the administration of a comprehensive assessment. The result of this process is usually a determination of eligibility for

care, an "Approved Care Level" (henceforth, known as Care Level) and an authorization for specific care services. Care Level can be seen as an indicator of the amount of care required to maintain quality of life and to meet specific health needs; conversely, it is also a measure of a senior's ability to care for him/herself and live independently.

Most seniors choose to remain at home as long as possible (Chappell, 1988, p. 78) and yet some may not be able to adequately dress or feed themselves, or to properly administer their medications. While there is some debate about the true nature and impact of increasing numbers of seniors on total health care costs (Evans, 1995), there are strong financial incentives for the government to keep seniors in their home environment as long as possible (Chappell, 1988 & 1995). Hence, supportive health services may be necessary which are generally supplied by an agent of the provincial health care system after some kind of assessment/intake procedure has been conducted.

In B.C., the assessment process results in the assignment of Care Level, which is used to determine the kinds and amount of care which will be funded by Continuing Care Division (CCD). Unfortunately, across all provinces and divisions of the LTC arena, there has been little consistency in LTC program objectives, eligibility criteria, services offered and shared definitions (Chappell, 1990; and Federal/Provincial/Territorial Subcommittee on Continuing

Care, 1991a).

The Research Question

Little rigorous evaluation has been carried out to determine how well the extensive data are collected and, in particular, how individual assessment items predict Care Level in B.C. (Gutman, Stark & Kliever, 1980). Therefore, the purposes of this study are to describe the intake assessment process of the B.C. LTC system and to determine which of the more than 100 questions asked during the intake process are predictive of Care Level. The main research question is: **In a sample of home-based B.C. seniors during initial CCD assessment, which variables, as recorded on the LTC-1 Form, are predictive of Care Level?**

Throughout Canada there has not been a commonly accepted definition of the LTC client. For purposes of this paper, the LTC client is one who, "for one reason or another, has never developed, or has lost, the capacity for self-care to such a degree that support or intervention will be needed for an indefinite period" (Federal/Provincial/Territorial Subcommittee on Long Term Care, 1992, p. ii). For B.C., the definition of the LTC client seems to be one who has, or is at significant risk of having, chronic disabilities that are primarily physical in nature or have a physical cause, and who has acute needs that can be met at home (Continuing Care Division, 1992). While this definition

is supported by the Continuing Care Act (Province of B.C., 1990), it does not seem to deal with seniors/clients who may have disabilities of a psychiatric origin and/or who may have disabilities that require institutional care.

The Current LTC Assessment System

In B.C., the CCD and Ministry Responsible for Seniors are responsible for the care of those needing LTC services. In the last four years there have been approximately 15,000 new clients admitted to Continuing Care long term care services each year (Continuing Care Division, 1993).

"Admission" to LTC implies that an individual:

- is eligible for home care, homemaker services, adult day care and/or institutional health services;
- has needs which have been specifically assessed by a CCD Case Manager or by other health care professionals within the CCD, such as Community Home Care Nursing or Community Rehabilitation Services, and;
- has a plan for services which has been designed (by CCD staff) to meet specific care needs.

Descriptive Care Level categories are used to guide Case Manager's recommendations for the amount of authorized care hours, the funding level for services provided, and the type of services which will be "approved". Eligibility, need and service availability are all considered in the assessment. Eligibility may be granted for a client who:

- 1) is at least 19 years of age;
- 2) has lived in B.C. continuously for 12 consecutive months prior to making application for services;
- 3) has had physical or emotional disabilities for at least three months, and;
- 4) requires formal intervention (Hollander & Pallan, 1995).

An initial component of the assessment is to determine if the client is eligible for services. Eligibility can be assessed over the telephone as part of the initial intake process or in person as a component of the LTC assessor's interview. Overall assessment is usually conducted by a nurse, but the assessor may be a social worker, physiotherapist or occupational therapist. Once the assessment is completed, eligibility, a Care Level and service authorization can be determined.

Like most other provinces, a complete assessment in B.C. involves asking about client demographics, medical diagnoses and medication use, diet, mental health or behaviour problems, activities of daily living, self-care capabilities and needs, communication strengths and deficits, mobility needs, housing situation, social support, and financial resources and needs. Not surprisingly, the input format varies considerably between B.C. and all other provinces. This lack of a standardized format makes it very difficult to compare clients across Canada. Since 1978, the

CCD in B.C. has used a form, (See Appendix, p. 138) called the LTC-1, that has undergone periodic minor revisions since its initial development. The LTC program in B.C. grew out of changes, in 1977, in the way federal dollars were used to fund local health services. The LTC-1 Form grew out of a need to have a single instrument for accomplishing complete assessments of LTC clients (Hollander & Pallan, 1995).

Flow and Format of the Thesis

To determine which variables listed on the LTC-1 are most predictive of Care Level for home-based B.C. seniors, Chapter 1 introduces the topic and frames the problem. Chapter 2 describes the process and outcomes of the assessment in B.C. A summary of relevant literature in Chapter 3 provides a broader perspective on issues related to assessment of seniors in general, and to predictors of care needs of seniors in particular. Specifically, key areas of the LTC-1 will be addressed in relation to other tools or procedures which the literature indicates are available for assessing seniors. Chapter 4 describes in detail the study and the methods, and Chapter 5 is a complete description of the sample. Chapter 6 presents all relevant findings of inferential statistics related to the research question. Chapter 7 discusses the conclusions of the findings from this study in the context of other literature and studies and makes recommendations based on those conclusions.

Chapter 2 - Background on the LTC Assessment in B.C.

Focus of the LTC-1

The primary purposes for the LTC-1 are to verify the need for services under the Continuing Care Act (Province of British Columbia, 1990) and the Hospital Act, Part II and III, to direct case management decisions related to service authorization, and to facilitate care planning. Given these purposes, the assessment process could be focused either upon client strengths or disabilities. The emphasis of the current set of LTC-1 questions tends to encourage Case Managers to focus on client deficits and not his/her strengths or capabilities, even though the current aging literature indicates that many seniors have shown an interest in maintaining and even improving their health practices (Maynard, 1990) rather than focusing on their illness needs. Other disciplines, such as social work, might focus on client strengths.

In B.C., there has been some interest in developing an inter-disciplinary form which will focus primarily on client self-care strengths and health promotion needs (Tornack, 1992), However, efforts in this regard have been put on hold as a result of province-wide regionalization initiatives. While the eventual outcome of aging is death, the focus on what can be done to improve and increase client capabilities is currently being pursued, even more aggressively, in order

to realize the cost savings of keeping clients in their homes longer and avoiding unnecessary institutionalization. In fact, Case Managers historically and currently are directed by policy and standards to promote client and family involvement in care planning and encourage family, friends and the client to take maximum responsibility for the client's health care, with CCD services put in place only to supplement the client and/or family's inability to meet specific needs (Continuing Care Division, 1992).

The Conduct and Outcomes of the Assessment

Most clients are assessed in their own homes, wish to stay at home (Chappell, 1988), and will receive services in the home. While 25% to 33% of seniors can expect to spend some time in a LTC institution prior to their death, at any given time only 6% to 21% of seniors reside in an institution (Statistics Canada data, cited in Chappell, 1988, p. 77). In B.C., the assessment manual for LTC specifically states that Case Managers should conduct their assessment with the goal of maintaining the client at home as long as possible. Home care services offered to LTC clients include homemaker services such as bathing, dressing and transferring between their bed and a chair, meal preparation and light house cleaning. Additional funded services which are offered to LTC clients can include chiropractic care, adult day care, mental health

counselling, physiotherapy/rehabilitation care, podiatry and/or osteopathy.

The outcome of a client assessment will have varying uses by health unit staff, formal care givers, facility staff, Ministry of Health (MOH) personnel, policy planners and researchers. Data on the LTC-1 provide a snapshot of the client at one particular point in time. Most items on the form do not request information on the prevalence or severity of a problem, and there is also no specific place to indicate whether a medical problem has been treated in some way and the success of that treatment.

Last, the assessment process can provide epidemiologic data on the kinds of problems long term clients have, thereby providing a regional and/or provincial perspective. However, comparison of clients would require that all LTC-1 information be properly coded and stored electronically. For several years, diagnostic information was collected centrally in B.C., and coded by Ministry staff into ICD-9-CM format. However, for budgetary reasons this procedure has not taken place for the last three years (Jennings, 1995). Currently, client demographic data, Care Level, approved services, prior CCD service use, financial and wait list data are stored electronically. These data are used to assist with care planning and for possible statistical analysis. Furthermore, clients who are known to be receiving community and rehabilitation services can also be compared

by services used and all direct care data for the period of time clients are known to LTC and direct care services concurrently.

Care Level

B.C. uses five levels of care, somewhat similar to levels described in early research relating to assessment of functional capabilities of the elderly (Katz, Ford, et al., 1963). The term "Personal Care" is used to designate an individual who is generally able to assume complete responsibility for his/her maintenance, with little involvement from health care professionals. More specifically, the person is independently mobile and able to do his/her own transfers with or without mechanical aids and without supervision; is able to toilet him/herself without reminders; has full mental function, though possibly some forgetfulness; has stabilized medical conditions which do not require daily professional intervention; and only requires minor assistance with meals and bathing (Continuing Care Division, 1992).

An Intermediate Care-1 (IC-1) client: may have difficulty communicating and may suffer from unremediated sensory losses; may need special aids for making transfers; may require assistance with activities of daily living (ADLs) and may require reminders for toileting to avoid incontinence; may need supervision/assistance with eating;

may be depressed, agitated or have difficulty with orientation; may require supervision and/or assistance with medications, dressings, or ostomy devices; may require regular review or services from a physician or other health care professional and may need assistance with getting to those services; and may need rehabilitation and social services.

An Intermediate Care-2 (IC-2) client will have the needs specified in IC-1, plus: he/she may wander or need considerable directional assistance or supervision for daily activities; may have medical problems which require a variety of extensive multiple disabilities and/or professional (medical, nursing or homemaker) services; may have incontinence of bowel and/or bladder; and may have chronic psychiatric problems.

A client with an Intermediate Care-3 (IC-3) designation will have the same problems as an IC-2 client, plus: may exhibit anti-social or destructive behaviour, endangering self or others, and may continually wander. The IC-3 level is primarily intended for the psycho-geriatric client, one who has definite physical needs, but whose overall care needs are greater, based upon concomitant psychiatric problems or deficits (Continuing Care Division, 1992).

The highest level of client need is labelled Extended Care (EC). This category extends to someone who may have the problems of an IC-3 client, and additionally, is generally

not mobile without significant mechanical or professional assistance; who must be cared for 24 hours a day and who may have significant dementia, disabilities or acute/chronic health problems, requiring constant professional intervention and nursing care (Continuing Care Division, 1992). The EC client generally will fail the "20 foot test". That is, he/she can **not** independently mobilize for 20 feet regardless of the use of assistive device(s) (Goodwin, 1994).

Background of the B.C. Intake System

The LTC program of B.C. was initiated in January of 1978 to integrate many fragmentary services related to care of the handicapped, infirm and elderly (Continuing Care Division, 1992). The name "Continuing Care Division" (CCD) was given to the total LTC program in 1983 in an effort to emphasize a focus on a "continuum of supportive health care services" (Continuing Care Division, 1992, p. 1). Control of the total program rests with the central office in Victoria, but services are decentralized and delivered through 21 different health units, under three different administrative structures. There are 16 district health units, four municipal health departments and one regional district (Victoria).

Based on the B.C. Royal Commission report (1991), significant changes in the B.C. health care system are

underway. Prior to generating their report, the Royal Commission heard testimony from every sector of B.C. society and made recommendations concerning virtually every aspect of the B.C. health care system. While supporting the five pillars of Canadian health care -- comprehensiveness, universality, portability, accessibility and public administration -- the report concludes that, for frail elderly, the care should have the goal of a maximum degree of autonomy for seniors and a continuum of care including the home, the community and, if necessary, institutions (B.C. Royal Commission on Health Care and Costs, 1991). The Royal Commission also recommended moving towards a regional basis for planning and delivering most health care services. Once the process of implementing the Royal Commission recommendations is completed, while most core services for clients will remain the same, control and oversight of services for LTC may differ somewhat from what currently exists. This move, then, towards more regional control and delivery of services will have a direct, but as yet unclear, impact on provincial LTC clients.

Previously, there have been three distinct aspects to the CCD in B.C.: case-management; community home care nursing; and community rehabilitation services. The mission of the CCD is to "provide care outside an (acute care) hospital to persons who have or who are at risk of having chronic disabilities and to enhance functional and social

independence" (Care Services, Continuing Care Division, 1993, p. 2; and Federal/Provincial/Territorial Subcommittee on Continuing Care, 1991a & b). Home Care is defined as that which must be delivered by registered nurses in the client's home and under a physician's order, whereas LTC services do not require a physician's order and constitute services such as homemaker (meals preparation and bathing) and adult day-care (Continuing Care Division, 1992 & 1993).

Three other government programs, not funded by CCD, round out the care for LTC clients. Extended Care, for clients who need around-the-clock observation and care, is funded and therefore controlled by the Hospital Programs Division, and the Mental Health Services Division funds community-based and in-patient mental health care. Last, the more recent Quick Response Team (QRT) is a pilot program in which nurses, social workers and homemakers facilitate temporary client or respite services for care givers such that individuals who might otherwise require acute or residential care can, with specific professional and non-professional assistance, be maintained in their homes. That is, the QRT seeks to increase coping and decrease crises, rather than admit the senior to or keep him/her in an acute care bed (Jennings, 1992b).

The LTC-1 Form

The LTC-1 Form (see Appendix, p. 138) is used to gather assessment data prior to instituting services covered under the Continuing Care Act (1990) for some, though not all, CCD clients. Community home care nurses and community rehabilitation therapists use different assessment forms more specific to their service, and not the LTC-1. The QRT may use specific QRT forms or combinations of the LTC-1 and other services assessment forms. For situations where a Case Manager is involved and the LTC-1 has been used, clients are reviewed on a regular basis. Policy recommends three types of reviews: within 30 days after discharge from an acute care facility, within 90 days of commencement of services; and annually (Care Services, Continuing Care Division, 1991). Reviews can be done routinely or at the request of clients, family care givers, service providers, or other health care professionals.

Once the assessment is completed, a "chart" is initiated, where all relevant paperwork is stored. A copy of the assessment is sent to the health care provider, generally via fax. Reassessments are done, as stated above, and that information will eventually be placed into the paper chart.

Case Managers determine eligibility for care, Care Level and which services are appropriate for each client. Once eligibility has been determined and the assessment

completed, then Care Level can be assigned and services planned. Of interest, the policy for determining Care Level has not been revised for more than 11 years (Allison, 1994). However, in a recent study of the LTC-1 intake process (Beebe, 1993), discussions with Case Managers revealed that some often do not refer to these policies in assigning Care Level. However, in reviewing Care Levels and the criteria in the policies, it was learned that, for the sample collected, assigning Care Levels generally reflects the intent, if not the letter, of those policies.

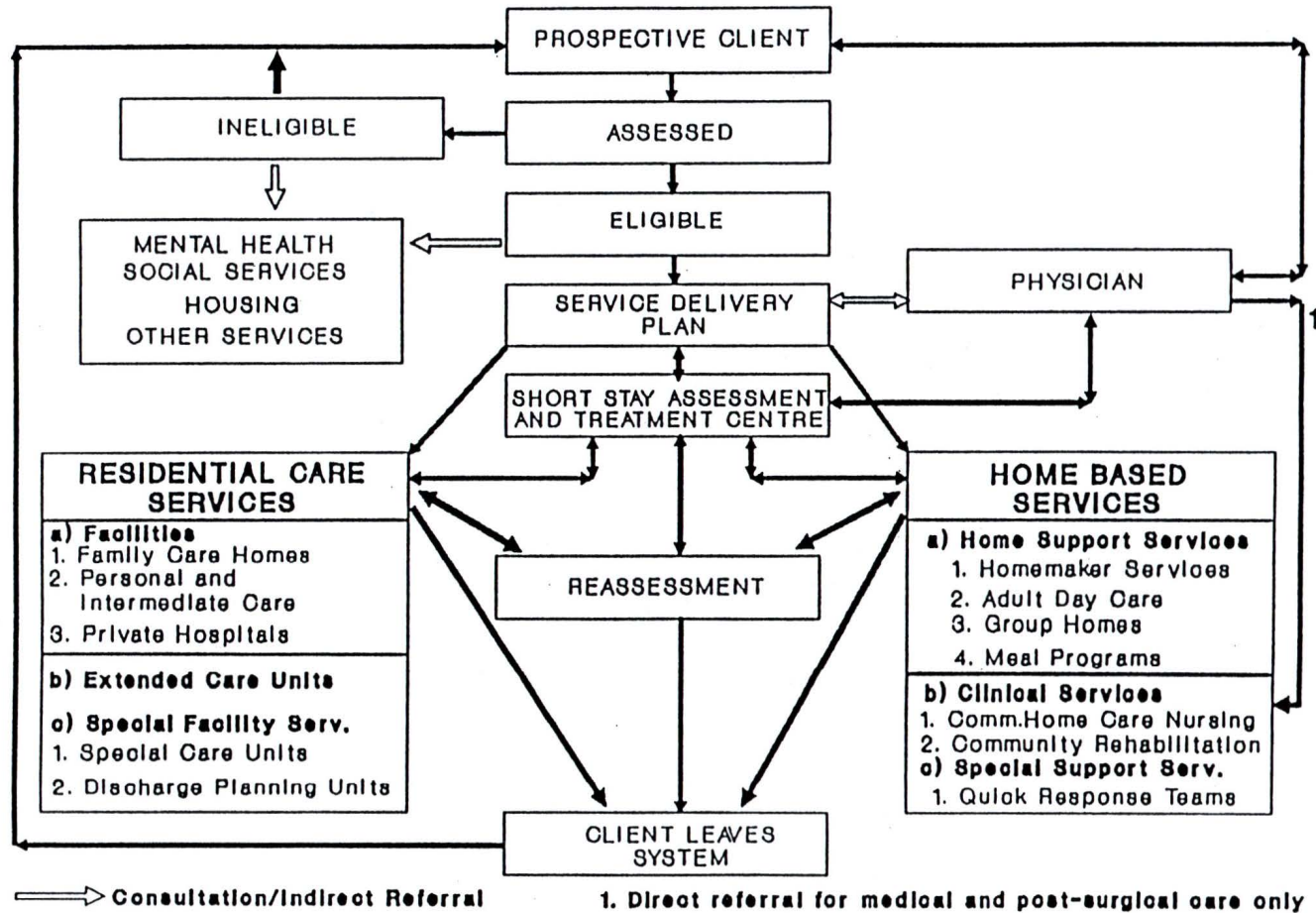
My exposure to the CCD staff during the course of data collection indicates that B.C. clients work in close partnership with local Case Managers. This relationship often goes on for years and means that the client and family care givers have a consistent presence throughout their time with the CCD. This includes the critical period of transition from home to facility care. In this context, the client has some choices relating to facility placement and CCD professionals working with them who they know and trust. Clearly, B.C.'s long term care system is client-centered (Jennings, 1992a).

In summary, the intake process for CCD clients is complex and will likely continue to undergo revision because of the Royal Commission Report recommendations and changes in organizational structure within the Ministry of Health in Victoria. Regardless of impending changes, clients currently

receive intake assessment and are directed to appropriate services or groups of services. In B.C., client care is managed by a Case Manager who resides and works in the same general area as the client, but who may also have responsibility for up to 600 other individuals. Virtually all decisions about care planning and services are made by the local Case Manager on behalf of, or funded by, the provincial CCD.

A graphical model for the intake system in B.C. can be seen in Figure 1, page 18 (Care Services, Continuing Care Division 1993; and Hollander & Pallan, 1995). This model is historically relevant for the period when the data for the present study were collected. However, reflecting on changes which have taken place within the Ministry of Health over the last three years, the model (Figure 1) is no longer completely accurate.

**FIGURE 1
THE CONTINUING CARE SERVICE DELIVERY SYSTEM**



Source: Care Services (Hollander, M.), The Delivery System of the Continuing Care Division of the British Columbia Ministry of Health and Ministry Responsible for Seniors, Victoria, B.C.: Care Services, Continuing Care Division of the British Columbia Ministry of Health and Ministry Responsible for Seniors, February, 1993, p. 8.

Chapter 3 - Review of the Literature

Introduction

The process of the assessment of seniors has been the subject of many hundreds of scholarly reports. However, only two papers could be located which deal specifically with predicting Care Level among B.C. seniors (Stark, et al., 1982 & Gutman, et al., 1980). In the context of geriatric assessment, others have studied patient risk (Fries, 1992), service utilization (Shapiro, 1986), various aspects of function (Martin, Morycz, et al., 1985; Tuokko, Crockett, et al., 1987; and Ford, Folmar, et al., 1988) and described instruments which facilitate a complete geriatric assessment such as that expected from the B.C. LTC-1 (George & Fillenbaum, 1985; Kane & Kane, 1981).

While the discussion in this chapter is **not** meant to be exhaustive, it will be approached from the standpoint of what others have found in relation to predictors of care needs or placement decisions for seniors. The discussion of key variables will occur in this review in an order similar to what is on the current LTC-1 Form, proceeding from demographics to diagnostic information and medications, mental health, dental health, communication problems, activities of daily living (ADL), housing, household companions and formal/informal support, self-care or instrumental ADL, financial resources, and ability to manage

one's affairs. The literature described in this chapter is included because it sheds light on how others have approached the process of assessing seniors and, in particular, those who are community-based where data are collected via interview and self-report (Ernst & Ernst, 1984). For some instruments, it may be important to recognize the approach taken and, for others, the types of items or individual item wording. Finally, some instruments may be important because of the response format used for specific sets of items. Some tools are intended to provide a global assessment (such as the OARS, Fillenbaum, 1988), whereas others have very specific purposes, such as the Katz, et al. (1963) tool for assessing ADL skills.

Two Studies of the B.C. - LTC-1 Form

Shortly after initiation of the LTC program in B.C., Gutman and her colleagues (1980) examined both new assessments and reviews for 1630 LTC clients (543 men and 1087 women) from two health unit areas for the fiscal year (FY) 78, that is, April 1, 1978 to March 30, 1979. Their purpose was to determine which of the items on the LTC-1 Form best predicted Care Level as operationalized by home versus facility placement. Multivariate analyses in the form of "automatic interaction detector", "theta automatic interaction detector" and discriminant analyses were used. Variables which proved to be predictive of Care Level were:

ability to independently dress, transfer, self-administer medications and treatments, ambulate and control bowel and bladder functions (Gutman, et al., 1980). Using two sub-samples of 125 subjects each, from one urban and one semi-rural area, a discriminant analysis found that, overall, the predictor variables classified 78.4% of the clients' Care Level correctly, but that, for Intermediate Care-3 (IC-3), the percent correct was only 20% and 14.3%, respectively, for the two sub-groups. However, there were only 14 total IC-3 clients for this secondary analysis, representing just over 5% of the sub-sample.

In a later analysis, Stark, et al., (1982) tested the reliability of Care Level decisions of 47 initial assessments and 199 reviews, where each of the LTC clients was assessed by another nurse one week after being assessed by the CCD Case Manager. Using a similar sampling design to the study described above, for the urban sample the two groups of assessors agreed in 72% of initial assessments and 76.5% of the reviews. For the semi-rural sample there was agreement for 63.6% of initials and 84.5% of the reviews. Care Levels usually differed by only one level. Stark and her colleagues (1982) postulated that differences in Care Level could be attributed to the objectivity with which the research nurses (as opposed to the regular Case Managers) were able to carry out their assessments, since research nurses' Care Level decisions would have no impact on the

types or amount of services offered to the client.

These two studies are of particular value since they deal with B.C. data and attempt to answer the same research questions posed in this study. They also provide strategies for analysis of the data in the present study and raise questions as to whether any changes have occurred in the LTC-1 Form or the assessment process so as to improve the ability of the data to predict Care Level, especially for psycho-geriatric clients.

Related Geriatric Assessment Tools

Overall health status has been estimated in a number of studies by utilizing a fairly consistent set of strategies. Like the B.C. LTC-1, the goal of most instruments is to be an effective tool for understanding what is needed when providing services to older persons (Morris, Buckwalter, et al., 1990). However, most comprehensive tools have their limitations: 1) they fail to represent all the important functions that need to be assessed, for instance, environmental factors; 2) there is usually incomplete use of psychometric scaling techniques (this particular problem has already been identified in the Mental Health Scale of the B.C. LTC-1, Beebe, 1993); 3) the assessment is heavily based upon interviewers' skills and judgement; 4) the usefulness of many tools is limited by the inordinate length and time required to complete them (Lawton, Moss, et al., 1982); and

5) few tools take into account the degree of social support available to the client (Alberta Health, 1989).

These problems notwithstanding, the necessity for complete assessment of seniors to establish needs and plan care still exists and has proven value for decreasing the incidence of institutionalization and morbidity in seniors (Martin, Morycz, et al., 1985). Despite the limitations mentioned above, a number of comprehensive tools are in common use throughout North America.

In the United States, a uniform comprehensive assessment protocol was mandated by federal and state Medicare/Medicaid prospective reimbursement programs which took effect in 1987 and have undergone further refinement since that time (Bowe, 1990). The assessment uses the concept of a "minimum data set" and is composed of thirteen modules of: medically defined conditions and prior medical history; medical status measurement; functional status; sensory and physical impairments; nutritional status and requirements; special treatments and procedures; psychological status; discharge potential; dental condition; rehabilitation potential; cognitive status, and drug therapy (Bowe, 1990). Using a standardized form, new nursing home residents must be assessed within four days of initial admission. Of interest, all the same concepts in the U.S. assessment protocol can also be found in the B.C. LTC-1 Form.

A home health care classification nursing model has

been developed (Saba & Zuckerman, 1992) for home care in the U.S. The classification provides for the assessment of: 10 socio-demographic variables; medical diagnoses and surgical procedures using the ICD-9-CM (Health Care Financing Administration, 1991) codes which are then grouped into 20 mutually exclusive categories; functional status (using a set of ADL and IADL items); 147 (possible) nursing diagnoses, three possible expected outcome goals (improved, stabilized or deteriorated); 166 possible nursing interventions (all of which fit into four possible types: assess, care, teach and manage); and assignment to one of three management cohorts (home care expected to last 30 days or less, 30 to 120 days and greater than 120 days). Using the cohort model, it was assumed that, during the first 30 days, five to seven nursing visits would be provided for short term cases, versus nine to 14 for the intermediate case and nine visits (only) for long term cases (Saba, 1992).

Of the tools which generate global assessment, the OARS (Older Americans Resources and Services) from Duke University (Fillenbaum & Smyer, 1981; and Fillenbaum, 1988) is probably the most well known. This instrument grew out of a request in 1972 to Duke University Center for the Study of Aging and Human Development by the Administration on Aging. The request was to "structure and conceptualize an approach to understanding a persistent issue of special relevance in

an aging society - alternatives to institutionalization" (Center for the Study of Aging and Human Development, 1978, p. 3). The OARS multi-dimensional functional assessment questionnaire (MFAQ) requires approximately 90 minutes to complete and is designed to collect data on impairment(s) and current service utilization, though not necessarily **need**, which relies on different sets of decision making (Center for the Study of Aging and Human Development, 1978).

The five scales of social and economic resources, mental health, physical health, and ADL, have all demonstrated high inter-scale correlations among home-based, clinic and institutionalized samples (Center for the Study of Aging and Human Development, 1978; and George & Fillenbaum, 1985). Moreover, by generating an overall assessment of impairment (or lack of it) in all five dimensions, it is possible to calculate a Cumulative Impairment Score (CIS) which has a range of 5 (unimpaired) to 30 (totally impaired). The CIS allows for a reduction of a large data set into a single score. Of interest to the present study, the MFAQ has check-off lists for common diagnoses and commonly used medications, with one "other" question for each area so that respondents indicate diagnoses or drugs not on the list.

Further, for the diagnosis questions, the response format is such that a yes/no answer indicates the presence or absence of the disease and another check box for each

question asks how much each diagnosis "interferes with your activities": not at all, a little, or a great deal (Center for the Study of Aging and Human Development, 1978). The OARS-MFAQ has been subjected to extensive scrutiny but, despite some apparent limitations, is widely used for comprehensive geriatric assessments (George & Fillenbaum, 1985; and Whitelaw & Liang, 1991).

A shorter version of the OARS-MFAQ, which may be more practical in a home-based assessment environment, is also available, requires only 30 minutes to complete, is basically "a distillate of the OARS methodology" and still generates a cumulative impairment rating (Pfeiffer, 1991). The Functional Assessment Inventory (FAI) has undergone testing in clinical settings and was found to be reliable and valid (Pfeiffer, Johnson & Chiofolo, 1981).

Another comprehensive multidimensional functional instrument is the Iowa Self-Assessment Inventory (ISAI) (Morris, et al., 1990), which grew out of work by Morris and Boutelle (1985). Factor analysis was used to develop a 56 item inventory with six scales: mental health (which comprises the three sub-scales of anxiety, depression and alienation), social support, economic resources, physical health, mobility and cognitive status. The ISAI is uniquely designed to be self-administered, requiring about 15 minutes to complete. However, this also means that it is intended for relatively well seniors who are living independently and

who have little or no sensory deficits.

In Canada, Roos, Havens and Black (1993) used subjective self-report of health, report of needed assistance with ADLs, number of health problems, mental status scores (from each respondent via the Mini-Mental Status exam and from the interviewer via a subjective assessment of the respondent's "state of mind"). Additionally, a history of hospitalization in the last five years with a high risk diagnosis is used to compare between different age groups and data collected in Manitoba for 1971 and 1983. It was noted that the number of health problems had increased dramatically between the two data collection periods, leading Roos, et al. (1993) to conclude that, while people in Manitoba live longer, their overall health is poorer (than comparable groups in other provinces), even when holding age constant. Health was measured in terms of ability to perform ADLs, number of health problems reported, mental status and rate of hospitalization for co-morbid conditions. For those clients who died within one year after the interview, having five or more health problems and needing help with ADLs appeared to be the strongest predictors of subject demise. Last, these findings are particularly interesting when considering that physician supply increased markedly in Manitoba between the 1971 and 1983 data collection periods (Roos, et al. 1993).

In another Canadian study, Tuokko, Crockett, et al. (1987) describe the use of the Multifocal Assessment Scale

(MAS), originally developed by Coval, Crockett, et al. (1985). The MAS' three rating and five performance subscales are, respectively, social behaviour skills, receptive language skills (oral and visual), expressive language skills, mental status, orientation, mood, accessibility and sensory abilities. Using factor analysis, Tuokko, et al. (1987) note that all dimensions, except mood, load on to one factor. Discriminant analysis was significant in that mood, mental status, accessibility and receptive language (visual and auditory stimulus) accounted for more than 80% of the variance and allowed for differentiation between three groups of seniors: a community-based sample, those attending an assessment clinic and residents within an extended care unit. Using the five scales just described, the community residents were classified most accurately at 94.8%.

Demographics - Age and Gender

While the hallmark of a senior may be his or her age, in fact, it is a poor indicator of functional capacity (Ernst & Ernst, 1984). Despite this relationship between age and functionality, age and gender are related in that mortality rates are higher for men than women, across all age groups and for all leading causes of death (Verbrugge, 1983). By contrast, elderly women have a higher probability of poorer general health, as well as limitations of vigorous activities and ADLs (Rahman, Straus, et al., 1994), and more

than twice the incidence of Alzheimer's dementia which increases dramatically with age (Canadian Study of Health and Aging Working Group, 1994).

Medical Diagnoses and Severity of Illness

There is some debate as to whether the exact nature and severity of medical problems will affect overall health, or Care Level, and, therefore, service utilization for seniors (Kane & Kane, 1981). However, most seniors have multiple diagnoses, many of which may be inaccurately recorded. Further, within a single disease category, there can be wide variations in severity of illness and therefore differences in care requirements (Stassen & Bishop, 1983; Bay, Leatt & Stinson, 1982; Fries & Cooney, 1985; and Charles & Schalm, 1991a).

Despite these concerns, when attempting to make statistical comparisons between medical diagnoses and other assessment variables, it is necessary to assign a meaningful weight to each individual diagnosis. A number of researchers have tackled this issue. Horn and Horn (1986) propose a Severity of Illness (SOI) Index, primarily designed for assessing hospitalized patients, that has seven dimensions: stage of principal diagnosis at admission, complications (from the principal diagnosis), interactions (other problems, not necessarily related to their principle diagnosis), dependency (degree to which patient requires

more than minimal expected level of care for the principal diagnosis), non-operating room procedures, rate of response to therapy and remission of acute symptoms.

They state that the tool is useful for comparing care outcomes between different hospitals for similar types of patients. However, calculating the SOI score assumes that all the information specified by Horn and Horn (1986) is available. This later model built on earlier work by Horn (1981) who had proposed an SOI index model which included the variables of age, number of organ systems involved, number of complications and response to therapy (on a four point scale).

Wyler, Masuda and Holmes (1968 & 1970) developed a list of 125 common medical problems and gave the list to two groups (medical doctors and laypersons) to have each problem assigned a weight, with peptic ulcers assigned 500 as a starting point. The two groups ranked dandruff the lowest with a weight score of 21, and leukemia the highest, with a score of 1080. A fixed number of diagnoses could then be summed to calculate a cumulative score. Because Wyler and his colleagues' (1968) list did not include a number of diagnoses related to seniors, McAuley, Travis and Taylor (1987), and later Travis and McAuley (1990), added 11 more diagnoses and used two gerontological nurses to generate comparable weights for those diagnoses. Unfortunately, the list of diagnoses from McAuley's work still does not include

many of the diagnoses found in seniors (McAuley, 1995). By contrast, Kenneally-Nichols (1993) used eight marker illness groups (heart, lung, neurologic, kidney, diabetes, arthritis, depression and cancer) to arrive at a simple score, which generated illness scores ranging from zero to four.

Besdine (1988) has noted eight nonspecific problems which, by themselves or in combination, are often indicative of "impaired function": cessation of eating or drinking, falling, urinary incontinence, dizziness, acute confusion, new onset or worsening of previously mild dementia, weight loss and/or failure to thrive. Besdine (1988) hypothesizes that these problems are symptoms of disruption of homeostasis and will be expressed in the most vulnerable and delicately balanced systems of previously independent and functional seniors. However, these symptoms may or may not have a specific disease origin noted in the assessment and it would be difficult to assign SOI scores to them.

Medication Use by Seniors

The use of drugs and drug problems among seniors has been described at length in the professional literature (Ebersole & Hess, 1985; Green, Mullen & Stainbrook, 1986; Everitt & Avorn, 1986; Lewis, Ellis & Wagner, 1992; and Bloom, Frank, et al., 1993). Tuominen (1988) examined the number of prescriptions filled by individual seniors in

three provinces across Canada in 1984 and found fairly comparable rates: approximately 12 per person per year in Saskatchewan, Ontario and B.C. She found that seniors consume 25-30% of all prescriptions.

In a U.S. study, it was noted that seniors are given 15.2% of all prescriptions (Solomon, Baumgartner, et al., 1974), whereas more recent data indicate the rate may actually be twice that number (Everitt & Avorn, 1986), making the U.S. and Canada comparable in patterns of prescribing to seniors. Of equal importance, these same authors (p. 2394) report that "60% of all drugs taken by seniors are over-the-counter medications that are frequently not reported to a physician or nurse, even when a careful drug history is taken". The drugs most often taken by seniors are (in order from most to least commonly used) cardio-vascular, tranquilizers, diuretics, sedative-hypnotics, antibiotics, analgesics, anti-inflammatories, antidiabetics and anti-spasmodics (U.S. Department of Health Education & Welfare, 1968).

Risk of Falling

One major outcome of a senior's assessment could be to determine the client's risk of falls. The LTC-1 does not specifically solicit such information. Hale, Delaney and McGaghie (1992) used 16 aspects of balance and 12 aspects of gait to generate a mobility score for estimating risk of

falls in a home-based sample (N=120) of seniors in North Carolina. While there were no significant differences between the mobility scores of those who were later found to have fallen and those who had not, the authors attribute this finding in part to a common tendency of patients to forget falls and not report them, even when asked by a health professional (Cummings, Nevitt & Kidd, 1988). Regardless of the possible reasons, it is common for those who have fallen not to report these events to health care professionals or other authorities (Gallagher & Scott, 1995), hence the need for careful history taking during a geriatric assessment.

Using regression models, Campbell, Spears and Borrie (1990) found that women fall significantly more often than men and that age, use of psychotropic drugs, inability to rise from a chair without using one's arm and living alone were also related to a higher incidence of falls. Similarly, fallers are more likely to have more problems with mobility and daily living, a more frequent history of stroke and heart disease, more episodes of vertigo, double vision, and black-outs, and a more frequent history of cognitive impairment than non-fallers (Prudham & Grimley Evans, 1981).

More recent studies also confirm that women fall more often and are more likely to sustain an injury as a result of the fall (Gallagher & Scott, 1995). Jarnlo (1991)

analyzed hospital admission data from several cities in Sweden and found that two-thirds of hip fracture patients had fallen, most of whom were women. Other data from Sweden (Sjogren & Bjornstig, 1989) indicates that 70% of unintentional injuries to seniors were from falls, accounting for 80% of all in-patient treatment costs for seniors. In terms of gender, this same study also found that women seniors had a higher injury rate and seriousness of injuries, along with longer and more costly hospital stays than men. The natural conclusion of this study was that prevention of falls in seniors, especially women, is of the utmost importance for their quality of life and to prevent injuries related to falling. The information in the literature clearly demonstrates the deleterious impact of falls on seniors which suggests, then, that good history-taking about previous falls and possible hazards (which might be eliminated) is important in the process of a complete assessment.

Cognitive Assessment

It is known that mental function declines unevenly with age (Tuokko, Crockett & Holliday, 1987). Cognitive impairment, makes it probable that the senior will not have the ability to properly care for himself/herself which places him/her at risk for injury to self or others (Robertson, 1988; MacBeath, 1988; and Donnelly, 1988). In terms of

assessing cognitive impairment in seniors, Ramsdell, Rothrock, et al. (1990) suggest four guidelines or goals: 1) to recognize cognitive impairment in the context of the patient's other medical problems; 2) to classify the disorder as dementia, delirium or depression (or some mixture of the three); 3) to determine a specific working diagnostic category; and 4) to determine the extent to which the patient's impairment may interfere with his or her ability to function.

The MMSE was designed to be a thorough measure of cognitive status. It requires only five to ten minutes to administer and, because its' items are so similar to those of a clinical exam, its relevance is immediately apparent (Kane & Kane, 1981). The MMSE assesses seven different dimensions of cognitive function: *orientation* to location and time; *registration* by immediate recall of three words; *attention* and *calculation* by ability to count or spell backwards; *short-term memory* by recall of the three words in the registration item; *language* by the ability to name two objects, repeat a sentence, follow a three-stage command, read a sentence and write a sentence; and *visuospatial ability* by performance on a task that requires the senior to copy a design (Folstein, et al., 1975). Fields, Fulop, et al. (1992) found that the MMSE is an appropriate screening tool for assessing global cognitive skills among acutely ill geriatric patients. It has also been found to be related to

intelligence and found useful in screening seniors with dementia (Farber, Schmitt & Logue, 1988). A brief review of the literature indicates that the MMSE has been used in hundreds of published studies, probably for the reasons stated above (Kane & Kane, 1981; and Applegate, Blass & Williams, 1990). Hence, its use along with the LTC-1 mental health scale has probable validity in assessing B.C. seniors for cognitive deficits.

The MMSE is not appropriate, however, for some senior populations whose primary language is not English or who have had minimal formal education, for instance less than 9th grade. For B.C., the Case Manager's Guidebook (Continuing Care Division, 1992) mandates that the MMSE not be administered to clients who display a lack of communication skills, do not speak English or who can not read or write.

The Mini-Mental Status Exam (MMSE) (Folstein, Folstein & McHugh, 1975) is useful for documenting cognitive impairment (Ramsdell, et al., 1990), and for planning nursing care (Dellasega & Morris, 1993), but is most helpful when interpreted in conjunction with other clinical data (Beattie, 1988). Similarly, when considering seniors for possible psycho-geriatric placement Gilfillan, Drummond and Currie (1991) list seven criteria or problem areas: mobility, dressing (skills), feeding (skills), continence (urine and feces), wandering, noisy (aggressive or otherwise

disruptive). These authors recommend considering these issues, along with deficits documented by the MMSE, when determining which type of care is most appropriate for each patient.

Activities of Daily Living (ADL)

ADL skills generally include, though not necessarily in order of importance: toileting, eating, dressing, grooming, ambulating and bathing (Kane & Kane, 1981; and Schrim, 1989). A classic instrument for assessing ADL skills which is used in many studies is that developed by Katz and his colleagues (1963). In addition to the six categories mentioned above, the term "independence" is carefully defined within eight levels of independence (Katz, et al., 1963). Understanding the seven categories (the eighth is 'other') is important to further discussions about functioning in seniors. These categories are listed in Figure 2, below.

The Katz Scale has been used to predict patient outcomes, measure the effectiveness of restorative interventions, and orient the medical care of frail seniors towards aspects relevant to their independence and dignity (Katz, 1983). Note the progression of loss of functions from bathing to dressing, going to the toilet and transferring. Katz, et al. (1963) believed that their instrument was based upon primary biological and psychosocial developmental

functions, reflecting the adequacy of organized neurological and locomotor responses as an organizing framework for the ADL assessment. In completing the instrument, an evaluator can check one of three choices along a continuum of "no assistance", "some assistance" and "extensive assistance", in each of six functional areas. Increasing dependence is related to increased need for monitoring and for assistance with important daily functions.

Figure 2, Levels of Independence

Level	Independence with: (Katz, et al., 1963, p. 915)
A	all six functions
B	all but one function
C	all but bathing and one additional function
D	all but bathing, dressing and one additional function
E	all but bathing, dressing, going to toilet and one additional function
F	all but bathing, dressing, going to toilet, transferring and one additional function
G	dependent in all six functions
Other	dependent in at least two functions, but not classifiable as C, D, E or F

Katz, et al. (1963) believed that functions would be lost prior to admission to acute care, but that some might subsequently return. With a sample of 1,001 subjects, they found that dependence with regard to "going to the toilet" was the strongest predictor of overall performance, and discriminated between those requiring significant amounts of

care and those who did not.

Instrumental Activities of Daily Living (ADL)

Self-care skills, or IADL skills, relate to a range of activities more complex than those needed for personal care (Kane & Kane, 1981), and are generally considered to include: use of the telephone, shopping, meal preparation, housekeeping, doing laundry, travelling, properly taking medications and money management (Schrim, 1989). Quite naturally, an IADL scale is generally more appropriate in a home care setting or when determining the possible need for institutionalization, since those already residing in a facility will not normally report that they shop independently, prepare their own meals or even administer their own medications. A number of IADL instruments are in common use (Kane & Kane (1981). For instance, the OARS-MFAQ (Fillenbaum & Smyer, 1985) for community-based seniors when observation is impractical, the PGAP (Pilot Geriatric Arthritis Project Functional Status Measure - Denniston & Jette, 1980) for those with arthritis and the PGC Instrumental Activities of Daily Living (Lawton, 1972) for women.

Social Support

Most clinicians recognize the importance of the senior's social support network along with the medical and functional components of an assessment (Broe and Kurrle,

1992). This recognition is based upon the common knowledge that seniors are most likely to draw initially upon family and friends for assistance before seeking formal agency support (Chappell, 1985; and Chappell & Havens, 1985). Using two definitions from Shapiro (1979, cited in Chappell, 1995, p. 162) informal social support may be "basic (necessary for the maintenance of the person and include assistance, for example, with preparing food or bathing) or supportive (helping the individual to cope with indirect effects of illness such as providing personal attention, company, or reassurance)". In B.C., on the LTC-1, the question "Lives with care giver?" provides some indication of informal support which may be available to a senior, as does the question which requests a list of supportive relationships.

Unfortunately, the "lives with care giver" question was not in common use on the LTC-1 until FY 92 and gives no indication about whether the support is informal or formal (i.e. paid). The question about supportive relationships was left blank for 16.4% (N=489) of the seniors, even though other data from the LTC-1 indicates that almost half of those report living with a spouse or some other individual. More importantly, no indication is requested as to the competency or helpfulness of the care giver or support person, contrary to what is done during LTC intake assessment in other provinces, such as Alberta (Alberta Health, 1989), where the competency of care giver in

providing physical or social support is recorded.

Summary

The two papers which deal specifically with assessment data from B.C. seniors (Gutman, et al., 1980; and Stark, et al., 1982) shed some light on key variables which can be expected to predict Care Level and describe how well those variables predict individual designations.

Based upon the total set of literature cited in this chapter, it would seem that a number of indicators should be expected to predict Care Level in the present study:

- age and gender (Verbrugge, 1983; Shapiro, 1986; and Rahman, et al., 1994);
- a severity of medical illnesses index (Horn & Horn, 1986; McAulley, et al., 1987; and Roos, et al., 1993), which accounts for the co-morbidity of disease (Martin, et al., 1985);
- cognitive ability (Folstein, et al., 1975; Tuokko, et al., 1987; and Mangione, Seddon, et al., 1993);
- a measure of ADL/IADL competencies, especially the ability to independently transfer to or carrying out toileting (Katz, et al., 1963; Gutman, et al., 1982; and Falconer, et al., 1992), and;
- social support (Shapiro, 1986; and Chappell, 1992).

Alongside the study of individual predictors of functioning, questions related to comprehensive geriatric

assessment have been discussed at length in the gerontology literature (Fretwell, 1988). A number of different issues and approaches have been studied, such as patient risk (Fries, 1992), service utilization (Shapiro, 1986), and various aspects of function (Martin, Morycz, et al., 1985; Tuokko, Crockett, et al., 1987; and Ford, Folmar, et al., 1988). While clinicians and researchers seem to agree that geriatric assessment has value for seniors, some believe that length and quality of life can be increased with a comprehensive assessment as part of the geriatric intervention (Wolf-Klein, 1989; Miller, Morley, et al., 1990; and Robertson, 1992). Of all the instruments described in the literature (Kane & Kane, 1981; Law & Letts, 1989; and Applegate, Blass & Williams, 1990), the OARS-MFAQ (Fillenbaum & Smyer, 1985) is probably most similar to the LTC-1 in concept and design, although notable differences exist between the two.

Chapter 4 - Study Design and Methods

Study Design

This descriptive study was cross-sectional in nature in that data were collected at only one point in time (Burns & Grove, 1987). The study also has an evaluative dimension in that the analyses will allow for understanding which variables predict Care Level and are therefore critical when conducting initial assessments of B.C. seniors (Skodol Wilson, 1989).

For most CCD clients, re-evaluations, called "reviews" are mandated at specified intervals (Continuing Care Division, 1992). Without question, it would have been preferable to collect data from these re-assessments and perform a longitudinal analysis of expected changes over time, with (expected) changes in Care Level. Such procedures would allow for examining causal relationships while more effectively controlling the impact of a number of different variables upon Care Level (Singleton, Straits & Miller-Straits, 1993). However, during the subsequent CCD assessments of B.C. seniors, much of the initial data collection are **not** repeated, thereby limiting the numbers of variables which could be compared over time. As such, a decision was made to collect only the initial assessment, since this particular data set has consistently proven to be the most complete.

Additionally, it would have been informative to capture more data about service utilization and hospitalization of the seniors subsequent to the initial assessment (Chappell & Blandford, 1987). However, gathering such information was beyond the scope of the present study.

This study has been conducted using a subset of the 4538 individuals who received their initial CCD assessment during FY 91 and 92, the data for which were transcribed into an SPSS/PC+ data base. The data collection process took place from June through September of 1993 when the principal investigator and a four-person transcription team visited five health units throughout B.C.: Upper Island (Courtenay), the Capital Regional District (C.R.D.) which is the Greater Victoria area, Prince George or Northern Interior, Kamloops which is the South Central area, and Richmond.

Selection and Representativeness of the Sample

The five health units were selected by a manager at the Victoria central office CCD staff (Sue Rothwell) as representative of all areas of B.C., and therefore clients for this sample originated from both rural and urban areas of the province. Also taken into account were the health units for whom the data collection visit would not be disruptive to their daily work. For instance, the Richmond health unit was visited late in the data collection process, due to their relocation to a new site. All five health units

were also central repositories for charts from many of the sub-units within their immediate geographic area. As a result, data for this study have been recorded for clients who reside in 42 different health units throughout B.C.

Subsequently, in comparing Care Level, gender, age, income and marital status between the study sample and provincial percentages for all new CCD assessments for the same variables and time frame, a high degree of consistency was noted, with few exceptions. The study sample had slightly over 4% more Personal Care clients, less than 4% fewer IC-3 clients, 4% more clients age 65 to 79.9 years, over 7% fewer clients receiving GAIN (Guaranteed Available Income for Need), slightly more than 3% fewer were receiving the Guaranteed Income Supplement (GIS) and just over 4% more clients who were married in the study sample as compared with provincial statistics (Planning and Administration Branch, 1995).

For four of the health units visited (all but the C.R.D.), efforts were made to record information from all charts for those clients who had their initial CCD assessment during FY 91 and 92 and whose charts are stored at that health unit. Recording systems maintained by the staff at each health unit were used to locate clients from the two FYs to include in the data base.

Despite these efforts, not all charts were located and transcribed. The capture rates for each area were: Upper

Island = 52%, South Central = 87%, Northern Interior = 78%, and Richmond = 50%. For Upper Island, the data collection team was not able to secure all the charts from Campbell River, hence the low rate for that area. Moreover, the Richmond health unit staff had just moved into a new building the week prior to data collection, which meant many charts were impossible to locate and probably explains the low capture rate for that area.

By contrast, because the C.R.D. was known to have such a large client base, a decision was made to collect a systematic random sample instead of the almost 3500 charts for the two FYs. As a result, a list of new clients was generated by Victoria CCD central office for the two FYs and was used to capture every third person. Moreover, within all five health units, charts of deceased clients are generally kept in a special container or location making them easier to locate. As such, the charts were located and transcribed for those clients who had died subsequent to their initial CCD assessment for the two FYs.

By transcribing virtually all charts for those C.R.D. clients who had died, along with every third chart from the list provided by central office, the end result is that data have been collected on approximately 46% of all C.R.D. clients who were initially assessed during FY 91 and 92. As data collection began, the decision to make efforts to record charts from all deceased clients from all five health

units for the two FYs, was primarily one of convenience.

That is, charts for deceased were generally easy to access and it was thought that clients whose demise had occurred within a short time after their initial CCD assessment would provide interesting data for further research, even though not specifically within the realm of the present study. As a result, it is important to recognize that capturing all clients who had died may have skewed the sample towards those individuals who were more ill, in need of care, and at higher Care Levels at the point of initial assessment. However, despite including most deceased clients, demographic comparisons indicate that the sample for this study was very similar to provincial characteristics for all those whose initial CCD occurred from April 1, 1991 to March 31, 1993.

Data Cleaning and Outliers

Within any study it is important to ascertain that data are accurate, especially when dealing with individuals for whom inaccurate information could lead to inappropriate Ministry of Health policy decisions. First, three of the five individuals whose task it was to input the data, are registered nurses with experience with seniors and with previous data input experience. One of the nurses has worked extensively with Barer, et al., (1988) coding and keypunching data for the FY 80 and 87 LTC-1 data sets, and

as such was a resource to our team. While two of those doing data input were not nurses, one of these two individuals had extensive data input experience. Both of these individuals had training before beginning data input, their work was closely supervised by the principal investigator.

To ensure clean data, at the end of each day of data collection, frequencies were run on the data and inappropriate or possible incorrect values were verified and corrected. This same procedure was again employed before leaving each site. Once all data were loaded into one file this procedure was used again, while the investigator was on-site at C.R.D., allowing for the checking of some values via the Ministry of Health Information Management System (IMS). Those values which still appeared to be incorrect and which could not be verified, generally representing fewer than 3% of non-missing responses, were then coded as missing data.

Missing data proved to be a significant challenge in conducting this study. Discussions of missing data related to specific variables and the possible impact on results and study conclusions will be found throughout this thesis and, therefore, will not be repeated here. Few variables, such as age and Care Level, had complete information. Some of the financial and social support items had an inordinate amount of missing data, many over 50% of the cases, for reasons which are not perfectly clear to this researcher. After

working with this data for two years, I believe items were left blank because Case Managers did not need the information for determination of eligibility or Care Level, or for care planning, or if the answer to a question was "normal" or "no". Similar to procedures described just above, efforts were undertaken at each site and using the CCD IMS to data missing from client charts, prior to beginning data analysis. Moreover, when conducting statistical analyses, those cases with missing data, relating to the specific variables being examined, were always dropped from the analysis.

Outliers are values which fall outside the normal and expected range for any particular variable. Of note, only two items were continuous (ratio data) and therefore could be examined for outliers: age and the severity of illness (SOI) score. Based on procedures described by Tabachnick and Fidell (1989), two strategies were used to identify outliers. First, box plots of age and then SOI score by Care Level identified seven and 19 outliers, respectively. However, a more rigorous method was also used.

After generating z-scores for all seniors for each of the two variables, a check was made to determine whose individual values were greater than three standard deviations from the mean (of zero). This strategy identified 10 for age and 12 different individuals for the severity of illness score. This group of 22 seniors represents less than

1% of the sample (N=2989) used for most multivariate analyses. As a result, all further analyses (in particular regression and discriminant analyses) were calculated both with and without inclusion of these subjects. Using this strategy, I found that leaving these 22 individuals in the analyses had no impact on the final results.

Location of Client Assessment

At the time of data collection, discussions took place between the principal investigator and Case Managers which revealed that clients assessed at home would generally be expected to have very different characteristics than those residing in a LTC facility or a hospital. By contrast, those in hospital would not report the same level of self-care, among other characteristics, as those living at home, thereby dramatically changing their overall assessment picture. Such circumstances could skew the presentation of their assessment data, making it more difficult to assess the relationship between ADL/IADLs, as well as other data with Care Level. As a result, a decision was made to include **only** those clients who were assessed at home. Despite this fact, Table 1, below, gives the frequency and percentages of the location where **all** 4538 clients, from the original database, were assessed. However, there are 24 charts for whom those data were not recorded.

Table 1

 Location Where Assessment was Completed (N=4538)

Location:	N	(%)
Home	3573	78.7
Facility	26	.6
Hospital	844	18.6
Other	71	1.6
Unknown	24	0.5
	----	-----
Total	4538	100.0

Assumptions About Assigning Care Level

Efforts to determine which variables predict Care Level are based on several assumptions about the Case Managers and how the assessments were carried out. First, the statistical tests assume that all seniors were CORRECTLY assigned Care Levels based on the same provincial criteria, previously discussed (Long Term Care Program, 1983), and applied similarly across all subjects. Unfortunately, using the data we currently have, there is no way to verify this assumption. Stark and her colleagues (1982), had "study" nurses review 246 seniors one week after their assessment by CCD nurses. Inconsistencies were found between Care Levels by the two groups of nurses, especially at the IC-3 level. We do know that, for the final sample used in the present study, initial assessments were conducted in 36 different health units by 190 different Case Managers, with a mean number of assessments of 15.73 (Sd=20) and a range of 1 to 94. However, their training, experience level and

educational background is unknown.

Most, but not all, Case Managers are registered nurses. Unfortunately, we have little specific data about this issue. Conversations with Case Managers at the five health units and central office verified that academic preparation could impact how assessments were carried out and therefore the data collected (Skodol Wilson, 1989). As part of this study, Case Managers were given the opportunity to voluntarily provide information about themselves to the research team, but most chose not to do so. CCD health unit managers would not provide any information about the assessors without their signed permission. As such, it will not be possible to evaluate the effect of assessor background on Care Level or other inter-rater reliability statistics with this data (Stark, et al., 1982; and Singleton, et al., 1993).

Protection of Human Subjects

Prior to instituting the data collection, a complete human subjects review packet was generated and submitted, with the contract proposal, to the CCD. During data collection, name, address, and phone number of the client, next of kin and physician names were **not** recorded into the electronic data base. However, birth date, health unit, personal health number (PHN) and CCD client number were recorded. These latter two pieces of data proved to be very

helpful for data cleaning and verifying key information on some CCD clients. Additionally, maintaining PHN and client number within the data base have allowed the CCD staff to access and cross reference the data used in this study with other information about their clients, such as more complete service utilization data and date of death of their clients.

Subsequent to collecting and cleaning the data, a copy of the complete data set, with PHN and CCD client number, has been given to CCD, but not to anyone else, and otherwise is kept in a locked office. Furthermore, identifying a person by name from our data would require access to the CCD IMS, which is currently limited to C.R.D. and CCD personnel. In sum, while we continue to have the file with some identifying data in place, its security and therefore the privacy of sample data, has been maintained.

Chapter 5 - Description of the Sample

Demographics - Page 1, LTC-1

Since the focus of this study is on which characteristics are predictive of Care Levels for seniors, the final sample for analysis of the LTC-1 has also been limited by age. Table 2 (below) lists the standard distribution of age by common groupings (less than 65 years, 65 through 79.9 years, and 80 years plus) for all 4538 clients from the original sample. According to CCD data, this distribution is very similar to provincial percentages for these same two FYs (Jennings, 1995). Therefore, by including only those clients 65 years of age and older, all of whom are assessed at home, a final sample of 2989 individuals has been selected for all further analyses.

Table 2

Age Groupings of Subjects, Regardless of Where Their Assessment Took Place (N=4538)

Age Group	N	(%)
Less than 65 Years	768	16.9
Age 65 to 79.9 Years	2341	51.6
Age 80+ Years	1429	31.5
	-----	-----
Total	4538	100.0

The breakdown of this sample by age group and gender is found in Table 3, below, which includes ONLY those subjects

used for all subsequent analyses. Just under two-thirds (63.4%, n=1985) of the sample are 65 to 79.9 years of age. Furthermore, while there are 609 more women than men in this sample, a chi square test comparing gender with these age groupings was not significant, implying that there are no gender differences between age groups.

Table 3

Age Groupings of Subjects by Gender (N=2989)

Age Group	Males		Females		Total	
	N	(%)	N	(%)	N	(%)
65 to 79.9 Years	746	(62.7)	1149	(60.6)	1895	(63.4)
80+ Years	444	(37.3)	650	(36.1)	1094	(36.6)
	-----		-----		-----	
Total	1190	(100)	1799	(100)	2989	(100)

Marital status may also be a key variable which could assist in predicting Care Level. Therefore, using the sample with which all future analyses will be calculated (N=2989), Table 4, below, is a breakdown of marital status by gender. Note that almost 50% of both men and women are married, and that slightly more men are married than women. However, more than three times as many women are widowed than men, a significant difference.

When collecting the data, we found that those in the "other" category were consistently listed as being in "common-law" living situations. To understand the possible interaction of marital status and gender, marital status was

recoded to include those married or in common-law relationships versus those not married, regardless of the reason. Note that there is a virtually equal split for the total sample between those married and those not married, but that almost three times as many women than men are not married. Not surprisingly, this comparison is also statistically significant.

Table 4

 Marital Status by Gender (N=2989)

Marital Status	Males		Females		Total	
	N	(%)	N	(%)	N	(%)
Single	63	(5.3)	101	(5.6)	164	(5.5)
Married	794	(66.7)	682	(37.9)	1476	(49.4)
Widowed	250	(21.0)	882	(49.0)	1132	(37.9)
Divorced	44	(3.7)	92	(5.1)	136	(4.6)
Separated	29	(2.4)	33	(1.8)	62	(2.1)
Other	10	(.8)	9	(.5)	19	(.6)
	-----		-----		-----	
Total	1190	(100)	1799	(100)	2989	(100)

$$X^2 = 274.73, p < .00001$$

 Classification of Subjects into Two Groups

Marital Status	Males		Females		Total	
	N	(%)	N	(%)	N	(%)
Not Married	386	(32.4)	1108	(61.6)	1494	(50.0)
Married	804	(67.6)	691	(38.4)	1495	(50.0)
	-----		-----		-----	
Total	1190	(100)	1799	(100)	2989	(100)

$$X^2 = 273.49, p < .00001$$

As previously mentioned, the original sample has been drawn from 42 sub-health units which were subsequently collapsed into five health units. But by limiting the final sample to those 65 years and older, and only to those who have been assessed at home, the final sample includes individuals from 36 of the original 42 sub-health units (See Table 5, below).

Table 5

 Health Unit of Origin of Clients (N=2989)

Health Unit	N	%
South Central	546	18.3
Upper Island	265	8.9
Northern Interior	244	8.2
Richmond	327	10.9
C.R.D.	1607	53.8
	----	-----
Total	2989	100

The dependent variable for this study and one of the two main outcomes of an assessment is Care Level. The other important outcome is the amount and type of approved services recommended for the senior. Table 6 is a breakdown of Care Level by gender. Table 7 is a breakdown by age grouping and Care Level. The chi square calculations were significant for both Tables 6 and 7, below. Note that while the percentages of men and women in Table 6 are very similar by Care Level, the overall numbers of women are considerably higher than those of men. For Table 7, again the,

percentages are very similar. Note, that there are just under three times as many 65 to 79.9 year olds in extended care as those 80+ years old.

Table 6

Care Level by Gender (N=2989)

Care Level	Males		Females	
	N	(%)	N	(%)
Personal Care	519	(43.6)	1033	(57.4)
Intermediate 1	340	(28.6)	481	(26.7)
Intermediate 2	162	(13.6)	150	(8.3)
Intermediate 3	57	(4.8)	62	(3.5)
Extended Care	112	(9.4)	73	(4.1)
Total	1190	(100)	1799	(100)

$$X^2 = 82.79, p < .00001$$

Table 7

Care Level Subjects by Age Groups (N=2989)

Care Level	65-79.9 Years		80+ Years		All	
	N	(%)	N	(%)	N	(%)
Personal Care	1016	(53.6)	536	(49.0)	1552	(51.9)
Intermediate 1	491	(25.9)	330	(30.2)	821	(27.5)
Intermediate 2	177	(9.3)	135	(12.3)	312	(10.4)
Intermediate 3	77	(4.1)	42	(3.8)	119	(4.0)
Extended Care	134	(7.1)	51	(4.7)	185	(6.2)
Total	1895	(100)	1094	(100)	2989	(100)

$$X^2 = 19.99, p < .0005$$

To understand this sample further, a breakdown of Care Level by Health Unit of Origin is included in Table 8, above. Note that the C.R.D. has more than twice as many clients as any other health unit and many more clients in

Extended Care than the other four health units combined, primarily due to large numbers of seniors and the availability of long term care beds in the Victoria area. Thus, the chi square statistic is significant.

Table 8

Care Level Subjects by Health Unit of Origin (N=2989)

Care Level	South Central N (%)	Northern Interior N (%)	Richmond N (%)	C.R.D. N (%)	Upper Island N (%)
Personal Care	275 (50)	93 (38)	167 (51)	852 (53)	165 (62)
Intermediate 1	192 (35)	97 (40)	86 (26)	384 (24)	62 (23)
Intermediate 2	53 (10)	42 (17)	60 (18)	130 (8)	27 (10)
Intermediate 3	12 (2)	7 (3)	12 (4)	83 (5)	5 (2)
Extended Care	14 (3)	5 (2)	2 (1)	158 (10)	6 (2)
	-----	-----	-----	-----	-----
Total	546 (100)	244 (100)	327 (100)	1607 (100)	265 (100)

$\chi^2 = 178.23, p < .00001$

Along with Care Level, Case Managers, sometimes with the assistance of their supervisors, must determine what services will be approved. Table 9, below, is a listing of approved services by age groupings. Note that more than 94% of the seniors were approved for home care.

Table 9

Types of Services Approved by Age Groups (N=2957)

Type of Services Approved	65-79.9 Years N (%)	80+ Years N (%)
Home Care	1797 (95.4)	988 (92.1)
Facility Care	86 (4.6)	86 (7.9)
	-----	-----
Total	1883 (63.5)	1074 (36.5)

$\chi^2 = 14.28, p < .001, 32$ cases are missing.

Two additional data items on page one of the LTC-1 ask whether or not the client lives with his/her care giver, providing some measure of the availability of informal support, and the client's preference as to the location of his/her care subsequent to the assessment. In terms of living with the care giver, two important facts impact this issue. One, this question was only added to page one of the LTC-1 as of the beginning of FY 92; and two, there is generally no indication of how supportive or competent the care giver relationship is. Table 10, below, lists the answers to this question by age groups and for all clients. Note that the small total N is because the responses are primarily from FY 92. While the chi square is significant, in fact, the two age groups are quite similar as to whether or not they live with their care giver. Overall, more than 70% of the clients, who answered this question, responded that they do live with their care giver.

Table 10

 Lives with Care Giver by Age Groups (N=1255)

Lives with Care Giver?	65-79.9 Years		80+ Years	
	N	(%)	N	(%)
Yes	573	(72.4)	311	(67.0)
No	218	(27.6)	153	(33.0)
	-----		-----	
Total	791	(63.0)	464	(37.0)

 $X^2 = 4.12, p < .05, N = 1255, (1734 \text{ cases are missing})$

The last question on page one, of interest for this study, was client's preferred location of care. Table 11, below, provides a breakdown of those preferences by age groupings. This item was left blank for 551 of the clients. However, based on comments from Case Managers, those clients where the item was left blank likely had a preference for home care. Moreover, the vast majority of clients (95.5%) for whom data was entered also specified a preference for home care. Another cross tabulation, not shown here, demonstrated a high degree of consistency (96.6%) between client preference for home care services and Case Manager authorization for home care.

Table 11

Preference for Care Location by Age Groupings (N=2438)

Care Location Preference	65-79.9 Years		80+ Years	
	N	(%)	N	(%)
Home	1507	(96.2)	820	(94.0)
Facility	59	(3.8)	52	(6.0)
	-----		-----	
Total	2327	(64.2)	111	(35.8)

$X^2 = 6.21, p < .02, N = 2438, (551 \text{ cases are missing})$

Medical Diagnoses of the Clients - Page 2, LTC-1

During the assessment process, all clients were asked about current and past significant health problems. The block on page 2 has spaces to indicate five diagnoses. We

found that less than .1% of clients had five or more medical diagnoses listed on their charts. As a result, all diagnoses have been collapsed into one of four possible categories. Subsequently, all medical diagnoses have been encoded using the International Classification of Diagnoses, Version 9 with Clinical Modifications (ICD-9-CM) system (Health Care Financing Administration, 1991). While other coding schemes exist (Shortliffe & Barnett, 1990), the ICD-9-CM system was employed for this study because the Ministry of Health has been using the same mechanism for many years and it was also used by Barer, Miller & Hollander (1988) in their transcription and coding of LTC-1 data for FY 80 and 87, the results of which have yet to be published.

Diagnosis may or may not be an important predictor of resource utilization for seniors (Fries & Cooney, 1985). However, Cameron (1985) found that patients with severe neurologic disease, such as paralysis, quadriplegia and other extrapyramidal diseases, required significantly more work units of nursing care than did a similar group without neurological problems. Similarly, those with a diagnosis of Alzheimer's disease can be expected to require a great deal of care resources as their disease progresses (Harrell, 1991).

Despite considerable effort, not all diagnoses were readable or interpretable so that they could be coded into standard ICD-9-CM format. Only three individuals had no

health problems listed. Table 12, below, lists the number of diagnoses recorded for the clients, in addition to the number of diagnoses which are not interpretable.

Table 12

Number of Medical Diagnoses (N=2989)

Number of Diagnoses	N	(%)	Uninterpretable Diagnoses
No Health Problems	3	(.001)	N/A
One Diagnosis	193	(6.5)	2
Two Diagnoses	615	(20.6)	4
Three Diagnoses	876	(29.3)	7
Four Diagnoses	1302	(43.6)	7
	-----		----
Total	2989	(100)	23

A total of 9362 diagnoses have been coded into 414 different ICD-9-CM categories. In terms of the exact diagnoses, the most prevalent medical condition is arthritis, reported by 930 people (31.1%). Probably the most serious medical condition is cancer, which 569 individuals (19%) have in some form, including leukemia. One hundred and thirty-six (4.6%) of these same individuals have metastases of their cancer to one or more other sites. The frequency of the most prevalent medical/surgical diseases is included in Table 13, below. Note that because each senior could have up to four diagnosis, it is not appropriate to sum the percents listed in Table 13.

Table 13

Common Medical Diagnoses, with Number of Clients and Percent (N=2989)

Diagnosis	Number of Clients	Percent
Arthritis (Osteo & Rheumatoid)	930	31.1
Cardiac Diseases	929	31.1
Hypertension	633	21.2
Psychiatric Illnesses	610	20.4
Cancer of Any Type	433	14.5
Chronic Lung Diseases	337	11.3
CVA - TIA & Other	335	11.2
Diabetes Mellitus	334	11.2
Cataracts (past & present)	278	9.3
History of Fall(s)	189	6.3
Depression	112	3.8
Glaucoma	83	2.8
Alzheimer's Dementia	71	2.4
Alcohol & Other Drug Dependency	61	2.0
Seizure Disorders	57	1.9

It is important to recall that each senior could have up to four different diagnoses and therefore might have four completely different health problems, reflected in the frequencies in Table 12. Procedures described by Wyler, Masuda and Holmes (1968 & 1970) and further refined by McAuley, Travis and Taylor (1987), and Travis and McAuley (1990), were used in calculating a seriousness of medical illness score for each senior. In this way each diagnosis was given a seriousness rating (numeric value) and the ratings were summed to allow for later comparison with a total seriousness score for each senior against Care Level. The mean seriousness of medical diagnoses for all 2989 seniors in this study was 1718.44 (Sd=676.49), with a range

of zero (three seniors listed no health problems) to 5103.

Some caution about the seriousness of illness score is in order. Based upon original information from the assessors, specific indications about the recency or currency of each diagnosis is not recorded in a consistent manner. For only approximately 40% of the diagnoses, Case Managers indicated the year when the disease/injury had occurred, or when the diagnosis was originally made. As a consequence, it is not possible to determine how current or relevant this particular information was in attempting to assign a seriousness score. For the purpose of this study, it was assumed that if a diagnosis was mentioned on the chart, it had clinical significance to the senior and his/her care and, therefore, should be included in the score.

History of Falls

As previously stated, the LTC-1 Form does not specifically request information about falls, which are known to be a significant cause of injury to, and predictor of, care need for seniors (Sjorgen & Bjornstig, 1989). In the present study 16% of the falls information was recorded as an anecdotal comment and not included in any formal way in the diagnosis information box on page two of the LTC-1. Similar to the literature just cited, 67% of our fallers were women. However, fallers did not have higher seriousness

of medical diagnoses scores than those with no recorded history of falls. Last, those with a history of a fall did have significantly higher Care Levels than those without such a history ($p < .001$).

Medications Used by Seniors - Page 2, LTC-1

More than 92% of the seniors (N=2767) report using one or more prescription or over-the-counter (OTC) medications, amounting to a total of 16197 drugs taken by all 2989 subjects. Unfortunately, it was not always clear whether the drug had been prescribed or was OTC and therefore voluntarily selected by the senior or his/her care giver. In the same light, because drugs could have been entered under more than one name, it would be extremely difficult to determine how many different drugs have been reported by the total group of seniors. During data collection, we noted that less than 3% of seniors were taking seven or more drugs, and that the seventh and eighth drugs were likely to be a vitamin or other common OTC item. As a result, a decision was made to collect information on only six drugs, listed on the top of page 2 of the LTC-1 Form. Similarly, the dosages and frequency of drug use were recorded quite inconsistently on the LTC-1 and usually were very difficult to read. As a result, no effort was made to capture these two particular pieces of information.

Table 14, below, lists the frequency and percent of

seniors taking each number of drugs. The mean number of drugs reported being taken is 3.44 (Sd=1.93). Similar to the medical diagnoses, it proved very difficult to interpret the exact name of some drugs listed on the LTC-1. Furthermore, drugs were listed by either chemical or trade name with numerous variations in spelling. Therefore, the number of unreadable drugs is also included in Table 14.

Table 14

 Number of Medications Reported (N=2989)

Number of Medications	N	(%)	Unreadable Medications
No Medications Listed	222	(7.4)	N/A
One Med	352	(11.8)	6
Two Meds	448	(15.0)	16
Three Meds	522	(17.5)	9
Four Meds	440	(14.7)	19
Five Meds	337	(11.3)	21
Six Meds	668	(22.2)	8
	-----		---
Total	2989	(100)	79

Using the American Hospital Formulary System (Commission on Professional and Hospital Archives, 1980) all drugs have been coded into 151 possible major classes of drugs, some of which have sub-classes associated with them. Table 15, below, lists some of the classes of drugs which seniors would typically acknowledge taking (Lewis, Ellis & Wagner, 1992). Note from Table 15 that seniors are often using more than one drug within each major classification, similar to what Tuominen (1988) found in an earlier study of

prescription drug use among B.C. seniors. Contrary to the seriousness of illness scores which could be applied to the medical diagnoses, no scoring system for drugs was found in the literature. Therefore, only the total number of drugs used by each senior will be used for further analysis. Non-steroidal anti-inflammatories (NSAID) are the most commonly used drugs; not a surprising finding since arthritis is the most common of the ailments reported (see Table 13, page 63). Note also that over 4% of the seniors are taking three or more NSAIDs, apparently concurrently, raising strong concerns about possible deleterious effects from such drug use patterns (Fries, 1992).

Table 15

Classes of Commonly Used Medications with Number and Percents of Seniors Taking 1, 2 and 3+ Per Day Within Each Class (N=2989)

Medication Class	Taking 1		Taking 2		Taking 3+	
	N	(%)	N	(%)	N	(%)
NSAIDS	950	(31.8)	449	(15.0)	131	(4.4)
Aspirin of all kinds	378	(12.6)	90	(3.0)	1	(.003)
Opiates/Narcotics	222	(7.4)	128	(4.3)	8	(.3)
All Psychotropics	918	(30.7)	400	(13.4)	104	(3.5)
Benzodiazepines	227	(7.6)	240	(8.0)	25	(.8)
Cardiac Drugs	625	(20.9)	429	(14.4)	374	(12.5)
Diuretics	609	(20.4)	75	(2.5)	8	(.3)
Antidiabetic Drugs	611	(20.4)	100	(3.3)	7	(.2)
H ² Blockers/GI Drugs	444	(14.9)	55	(1.8)	4	(.1)
Adrenals (cortisones)	294	(9.8)	34	(1.1)	0	
Thyroid/Antithyroid	234	(7.8)	2	(.1)	0	
Respiratory Smooth Muscle Relaxants	208	(7.0)	50	(1.7)	6	(.2)
Antibiotics/ Antiinfectives	111	(3.7)	76	(2.5)	9	(.3)

NSAID = Non-steroidal Anti-inflammatory Drug

Smoking and Alcohol Consumption - Page 2, LTC-1

Four questions on page two of the LTC-1 inquire about whether or not the client smokes or drinks and the "degree of problem", a term which is defined on the back of the LTC-1 as "whether each behaviour creates a problem for the client". Table 16, below, lists the numbers who smoke, with an indication (from the Case Manager) as to the degree of the problem. Table 17, below, lists the number who drink alcohol, also with the degree of problem this behaviour creates.

Just over 16% of the seniors are reported to be smokers, where 270 of these clients are listed as having a moderate or major problem. The degree of problem is specifically defined on the LTC-1 Form as a "degree (likelihood) of possible fire hazard". Just over a third of seniors are reported to drink alcohol, where only 175, or 5.8% of the total sample, have a moderate or major problem with alcohol. The definition of an alcohol problem on the LTC-1 is one that would cause a "behaviour problem". The differences between the numbers on the two yes/no items versus the degree of the problem for smoking and drinking are explainable, at least in part, by missing data. Why Case Managers chose to leave so many charts blank on these four items is not clear.

Table 16

Number Who Smoke and Degree of the Problem (N=2842)

Number Who Smoke	Yes		No		Missing Responses
	N	(%)	N	(%)	
	460	(16.2)	2382	(83.8)	147
Degree of Problem	N (%)				
None	149	(35.6)			
Moderate	167	(39.9)			
Major	103	(24.6)			

Total	419	(100)			41

Table 17

Number Who Drink Alcohol and Degree of the Problem (N=2667)

Number Who Drink	Yes		No		Missing Responses
	N	(%)	N	(%)	
	1023	(38.4)	1644	(61.6)	322
Degree of Problem	N (%)				
None	676	(79.4)			
Moderate	116	(13.6)			
Major	59	(6.9)			

Total	851	(100)			172

Mental Health Scale - Page 2, LTC-1

The mental health scale includes ten items which ask about: attitude, appearance, self direction, (abnormal) behaviours, affect, thought content, perception, cognition, insight and judgement (see Appendix, p. 139). The level of measurement for the response for the ten items is either ordinal or nominal data. Further, for eight of the items

there were multiple responses on between 1% and 6% of the charts. Therefore, before conducting reliability analysis or determining which of the items predict Care Level, it was necessary to convert all responses to a weighted score, which could be based upon some calculation of staff time required to care for an individual with the problems indicated within each mental health item (Charles & Schalm, 1991b). Furthermore, based upon conversations with Case Managers and CCD staff, it was clear that resource utilization would be quite different for those seniors who would be cared for at home versus those who were approved (as a result of their assessment) to be institutionalized. Therefore, in weighting of mental items location of approved services would need to be controlled for.

In order to calculate standardized weights for these items, one expert in home care from CCD (Phil Jennings) and one expert, also from CCD, in facility care (Sherry Goodwin) was asked to rate all possible responses on each of the ten items and give a score of zero (indicating no additional care required) to 100 (indicating almost constant supervision necessary). Using the information from these two experts, all responses, for all seniors, were coded into new weighted mental health variables for each of the ten items. The descriptive statistics for those items are listed in Table 18, below, along with valid numbers of cases for each item. Note that the mean values are ten or less for seven of

the items since, for most seniors, the weighted score on each item was zero, indicating no abnormality for that item and therefore no need for additional care.

Table 18

Means, Standard Deviation, Range and Valid N of Weighted Mental Health Items, Sorted from Lowest to Highest Mean

Variable	Mean	Std Dev	Minimum	Maximum	Valid N
Thought	1.19	5.57	0	70	2869
Perception	1.85	9.37	0	100	2849
Appearance	3.95	5.18	0	30	2904
Behaviour	5.21	16.64	0	100	2866
Self- Direction	5.48	13.68	0	100	2924
Affect	5.73	11.95	0	80	2911
Cognition	9.94	18.76	0	100	2850
Attitude	10.87	7.56	0	100	2906
Insight	15.22	26.90	0	100	2876
Judgement	20.15	31.61	0	100	2848

One other parameter requested on page two is the Mini-Mental Status exam (MMSE) score (Folstein, Folstein & McHugh, 1975). Of 2989 clients, MMSEs were recorded for only 630 seniors (21.1%). In accordance with C.R.D. policy, assessors and Case Managers reported that MMSEs were carried out on those clients for whom there was an obvious cognitive deficit and, therefore, a pressing clinical reason for obtaining a score. Hence, one might assume that the mean group scores, noted below in Table 19, would be artificially low. Note that, in general, the MMSE scores decrease as mean Care Level increases, which is statistically significant.

However, the group sizes for IC-3 and Extended Care are very small. Furthermore, the lowest MMSE group score is for those at the IC-3 level, a logical finding since IC-3 is the psycho-geriatric designation.

Table 19

Comparison of MMSE Scores by Care Level with Univariate F Value and Eta Statistic (N=630)

Care Level	Mean (Sd)	N
All	23.71 (6.42)	630
Personal Care	26.44 (4.17)	271
Intermediate 1	23.60 (5.92)	226
Intermediate 2	19.04 (6.81)	103
Intermediate 3	15.38 (8.50)	16
Extended Care	16.36 (10.35)	14

F = 48.52, p <.0001, Eta = .487

Dental Status - Page 3, LTC-1

Only limited items from page three of the LTC-1 will be discussed in this section. The two main scales of "communication" and ADL will be dealt with, in detail, in Chapter 6. Table 20, below, provides information about the seniors' dental status. Over 80% of seniors use dentures of some kind. Most report being able to chew effectively and very few indicate any problems with their teeth. Like many of the other questions, there was many missing cases for these items.

Table 20

Dental Status

Dental Question	Yes		No		Missing Responses
	N	(%)	N	(%)	
Current Problems?	256	(12.2)	1847	(87.8)	886
Under Care of Dentist?	505	(30.5)	1150	(83.8)	1334
Able to Chew Efficiently?	2113	(92.8)	163	(7.2)	713
Use Dentures?	2052	(81.5)	497	(19.5)	440

Communication - Page 3, LTC-1

The beginning of the communication scale includes questions about wearing glasses, using a hearing aid and languages spoken. The first two questions give some indication of sensory deficits which may affect health for these seniors (Abrahams & Lamb, 1988 and Campbell & Thompson, 1990). Table 21, below, provides information about the use of eye glasses and hearing aids. Over 98% of the seniors wear glasses, while a smaller number (13.8% of those who answered the question) use hearing aids.

Table 21

Use of Eye Glasses and Hearing Aids (N=2742)

	Yes	Missing
	N	Responses
	(%)	
Wears Glasses Only?	2362	(86.1)
Uses Hearing Aid Only?	31	(1.1)
Uses Both?	349	(12.7)

Total	2742	(100) 247

The language question is the only indicator in this data set concerning ethnicity. Such information might provide insights into possible informal support available to a senior (MacLean & Bonar, 1995). Table 22, below, indicates the primary language spoken by the seniors. In fact, just over 10% of the sample spoke two or more languages.

Table 22

Primary Language Spoken by Seniors (N=2093)

	N	(%)	Missing Responses
English	1643	(78.6)	
French	175	(8.4)	
Chinese	24	(1.1)	
Italian	16	(.7)	
Russian	13	(.6)	
Other (e.g. German)	222	(10.6)	

Total	2093	(100)	896

Housing and Household Composition - Page 4, LTC-1

Table 23, below, lists the current housing situation. However, note the large number of responses in the "other" category. A "condominium" or "trailer" was often pencilled in when "other" was checked, implying ownership. Therefore, we see from the rent/own section of Table 23 that 65.5% of the seniors live in housing they own. Almost half of the seniors live with their spouse, almost 40% live alone and just over 12% live with other adults or their children. In

completing this item, the seniors give a myriad of responses (such as spouse and adult children or friends), implying many different living situations. By collapsing the data related to living companions, the information from this table provides some indication of the informal support which may be available to this particular group of seniors (Lubben, 1984 & 1988).

Table 23

Current Housing Status and Companions Lived With

	N	(%)	Missing Responses
House	1565	(54.0)	
Apartment	1073	(37.0)	
Room	28	(1.0)	
Facility	10	(.3)	
Other	224	(7.7)	

Total	2900	(100)	89
Own	1643	(65.5)	
Rent	866	(34.5)	

Total	2509	(100)	480
Spouse	1410	(48.3)	
Lives Alone	1153	(39.5)	
Other Adults	340	(11.5)	
Children	23	(.7)	

Total	2926	(100)	63

Question A-3 on page four of the LTC-1 asks the assessor to list supportive relationships available to the senior. Such information could allow the calculation of a social network score (Lubben, 1988). In building the database for this data, two fields were allocated to the responses for this item, such that two different individuals and/or groups could be listed as support. From this information, a "support score" was computed. In creating this variable, it was noted that the item was left completely blank in 489 (16.4%) of the cases and, for 61 additional seniors, remarks were entered, generally implying that no supportive relationships existed or that family or friends' support may have been somewhat negative in nature. Therefore, for a total of 550 seniors, a support score of zero was assigned.

For many of the seniors (37.9%), a single individual is listed and the support score is set at one. For others, plural terms such as family, friends or an organization were used and, in these cases, the support score is increased by two. The decision is based upon the assumption that, within a family or any one organization, the typical senior would not generally experience more than two supportive relationships. For some seniors (16%), specific numbers of individuals are listed, in which case the support score is increased by that number. Using these strategies, the mean support score of all seniors in this sample is 1.49

(Sd=1.17), with a mode and median of 1 and a range of 0 to 12.

Religious Affiliation - Page 4, LTC-1

The last question on page four of the LTC-1, which may provide another indication of social support, relates to "relevant cultural and religious factors". Again, two database fields have been allocated for this data. Unfortunately, the notations about cultural influence and support were minimal. The responses are included in Table 24, below.

Table 24

Religious Affiliation (N=954)

	N	(%)	Missing Responses
Anglican	226	(23.7)	
United	207	(21.7)	
Roman Catholic	196	(20.5)	
Protestant	128	(13.4)	
Baptist	48	(5.0)	
Presbyterian	44	(4.6)	
Lutheran	38	(4.0)	
Jewish	14	(1.5)	
Eastern	12	(1.3)	
Islamic	8	(1.0)	
Agnostic	1	(.1)	
Other	32	(3.4)	

Total	954	(100)	2035

In more than two-thirds of the cases, no church information was recorded and, in a few cases, it was

specifically indicated that the senior was not active in a church. Whether the percentages listed above are representative of the total group or whether those with no indication of religious affiliation in fact have none is unclear.

Financial Information - Page 5, LTC-1

Page five of the LTC-1 has a number of questions relating to the client's financial affairs, his/her ability to manage such matters, and half a page for assessor free-form comments. Table 25, below, lists responses to financial status questions.

Table 25

Financial Status

	Yes N	(%)	No N	(%)	Missing or N/A
Receiving GAIN?	182	(7.1)	2376	(92.9)	431
Receiving GIS?	1069	(37.5)	1778	(62.5)	142
Receiving War Veterans Allowance?	91	(5.8)	1473	(94.2)	1425
Indication of Need for Per Diem & Personal Needs	106	(13.6)	676	(86.4)	2207
Receiving OASP?	2232	(88.7)	284	(11.3)	473
Eligible for Single Person's OASP Rate?	170	(44.4)	213	(55.6)	2606
Has Client been Advised to Apply for OASP?	136	(43.2)	179	(56.8)	2674

While all Canadian citizens or legal residents 65 years of age and over are eligible for Old Age Security Pension (OASP) (Ministry of Social Services, 1994), only 88.7% of

the seniors in this study report receiving it. Legal residents may qualify for OASP depending on their years of residence in Canada and whether or not Canada has a reciprocal International Social Security Agreement with their country of origin. Unfortunately, data on the LTC-1 concerning citizenship is incomplete. In fact, a more important variable might be length of residency in Canada, which is also not recorded on the LTC-1. Such information could help explain why not all seniors in this sample were receiving OASP.

Just over a third of the sample were receiving Guaranteed Income Supplements (GIS), a program specifically designed to provide additional financial support for Canadian seniors already receiving OASP, but with little additional support, to bring their income to a minimum set level (Income Security Programs, 1995). Just over 7% receive Guaranteed Available Income for Need (GAIN), this income supplement program being primarily for those who have chronic disabilities, or for those seniors who meet specific income eligibility criteria (Ministry of Social Services, 1994). Finally, out of the 485 (16%) individuals who indicated on page one of the LTC-1 that they were veterans, only 19% (N=91) were receiving war veterans' allowance.

A key piece of information about each senior's financial status is the amount of "client (monetary) contribution" to their care. This amount is calculated by

the assessor or Case Manager and is generally indicated on page one of the LTC-1. Unfortunately, this information was not recorded into the research database, placing some limits on any attempt to determine the impact of financial status on Care Level. As a result, the GIS was judged to be the best available indicator of income and is regressed against Care Level.

The last group of questions on the LTC-1 relate to a determination of the client's ability to manage his/her (primarily financial) affairs. Table 26, below, provides data from three questions which relate to management of client affairs and responsibility for "comforts". This latter term relates to petty cash which is kept in trust for the senior by the management of an institution while that senior is a resident there. The money is used for purchases, generally totalling less than \$300 per month, for pharmaceuticals and other "comfort" items, such as cigarettes.

Results from this yes/no question are included on Table 26 and relate to whether or not the assessor believes there should be a change in how the senior's affairs are managed. An affirmative answer to this item would likely indicate that the senior is presently legally responsible for his/her affairs but that perhaps a change is necessary to protect the senior. The assessors reported that there was a need for a change for only 64 seniors (2.6%). Of this group, 43

(71.7% of those for whom a change is suggested) were presently managing all their own financial affairs. Nine of that same sub-group were listed as "comprehension doubtful".

Table 26

 Management of Client Affairs

	Who Manages Affairs?		Who is Responsible for Comforts?	
	N	(%)	N	(%)
Client	1621	(56.7)	1250	(50.5)
"Contact"	525	(17.7)	502	(20.3)
Client & Other	61	(2.1)	701	(28.3)
Other	653	(22.8)	22	(.8)
	-----		-----	
Total	2860	(100)	2475	(100)
Missing Responses	129		514	
Is there a need to change who manages client affairs?	Yes		No	
	N	(%)	N	(%)
	64	(2.6)	2362	(97.4)
Missing Responses	563			
Is client independent in managing his/her affairs?	N	(%)		
Independent	1696	(61.6)		
Independent with Transport	437	(15.9)		
Needs Advice	254	(9.2)		
Has Power-of-Attorney	194	(7.0)		
Comprehension Doubtful	174	(6.3)		

Total	2755	(100)		
Missing Responses	234			

In Table 26, above, we see that more than half the seniors were able to manage their own affairs. However,

viewed from another perspective, almost half have another person managing their affairs and/or providing "comforts", implying a reliance on others for support in these areas. Unfortunately, there was also a large number of missing values for each of these three questions.

Summary

The subjects for this descriptive cross-sectional study were 2989 seniors who have been assessed in their homes and are from 36 sub-health units located in five distinct health units of B.C., Canada. Within each of the five units, the initial CCD data for 46% to 87% of all clients who have been assessed during FY 91 and 92 have been recorded into an electronic data base. For the C.R.D., a representative sample (approximately 1/3 of all charts) for FY 91 and 92 also were recorded, along with efforts to collect data from all clients who had died subsequent to their intake assessment, resulting in a collection rate of 46%.

The sample used in this study was 60% female and 63% for men and women in the age range of 65 to 79.9 years. While all five Care Levels are represented, just over half (N=1552, 52%) have been judged to be at the Personal Care level. Just over half the seniors are from the C.R.D., as are the vast majority (N=158, 85%) of those judged to be at the Extended Care level. Exactly half the seniors are married and, while data only exist for 42% of the seniors

concerning whether or not they live with their care giver, of those who answered that question, just over 70% (N=884) answered affirmatively. Furthermore, more than 95% of those who specified a preferred care location listed "home" as their preference.

Only three clients list no health problems and over 43% have four diagnoses. The most common conditions are arthritis, cardiac disease, hypertension, psychiatric illnesses and cancer of all types. While over 7% (N=222) have no medications listed, just over 22% (N=668) take six medications. The most commonly used medications are the non-steroidal anti-inflammatories, psychotropics, cardiac and diuretic drugs and H² (gastric acid) blockers.

Only 16.2% (N=460) smoke, and 270 (59%) of those who smoke have moderate or severe problems because of their smoking; 38.4% (N=1023) drink alcohol, and 175 (17%) of those who drink have a moderate or severe problem with alcohol. Of the 630 of these seniors who have been administered the MMSE, the mean score is 23.71 out of a possible 30. In general, the scores diminish with higher Care Levels, with statistically significant differences between the groups.

Most seniors (81.5%) use dentures, but very few (12.2%) have problems with their teeth or dentures. Almost all seniors (98.8%) wear glasses and almost 19% (N=380) use hearing aids.

Most seniors (78.6%) speak English, with the second largest group (8.4%) listing French as their primary language. Most seniors (54%) live in a house, and the next largest group (37%) live in apartments. Most (65.5%) own their own dwelling. Almost half (48.3%) live with their spouse, and the next largest group (39.5%) live alone. Three hundred and thirty-seven (11.5%) live with other adults and only 23 (.7%) live with one or more of their children. The average senior lists 1.5 people in his/her social support network, with a range of 0 to 12. Only 31.9% (N=954) report a church affiliation as another potential source of social support, where Anglican, United and Roman Catholic are listed most often.

Most seniors (88.7%, n=2232) are receiving OASP, with fewer (37.5%, N=1069) receiving GIS and only 7.1% (N=182) receiving GAIN. Most seniors (56.7%) manage their own affairs, 50.5% were responsible for their own "comforts" and 87.5% have been judged to be independent in managing their affairs either on their own or with transport assistance. Only 368 (13.3%) have either power-of-attorney or there are concerns listed regarding the senior's ability to comprehend his/her (financial) affairs.

Conclusions about the characteristics of the seniors in this study could be clarified by answering two questions: 1) Are they representative of all seniors who had an initial CCD assessment during the two FYs; and 2) Are these seniors

similar to other groups of community-based seniors found in the literature? Based upon information available on five key variables, the answer to the first question is a definite, yes, although there are slight differences between the two groups. While the study sample had virtually equal percentages with the total CCD intake population on gender, the sample had slightly more seniors age 65 to 79.9 years and slightly less at 80 + years; slightly more who were married and slightly less who were single or widowed; more Personal Care clients and fewer IC-2s and IC-3s; fewer seniors who were receiving GAIN and GIS, but more veterans who received WVA than the total population of all seniors with an initial CCD assessment during FY 91 and 92.

This sample of seniors is also similar to other groups. For instance, the average age of a group of 800 community-based seniors undergoing multi-dimensional assessment in western Pennsylvania was 75 years (Martin, et al., 1985), compared with 77.7 years in our study. For this same (Pennsylvania) group, the prevalence of medical conditions was similar to our sample except for a considerably higher percentage of seniors with depression and dementia and a dramatically lower percentage with arthritis (Martin, et al., 1985).

Some contrasts of our data with other Canadian samples are also possible. For instance, Roos and his colleagues (1993) collected data from a province-wide (Manitoba) survey

of seniors and their health status and found that considerably more seniors in his study reported no health problems, whereas we have only three seniors with no reported health problems. In an earlier study of community-based B.C. seniors and medication use, Tuominen (1988) found that seniors received 13.1 prescriptions in one year (1984) which was very similar to Saskatchewan, much less than Ontario (22.2 per person), but more than the present sample who report taking an average of 3.48 drugs. This discrepancy between previous (Tuominen, 1988) and present B.C. data may be explained by the fact that the two variables are not necessarily equivalent in that the number of prescriptions given to a senior within a year might be much more than the number of drugs being taken at any one point in time, as was the case with the present sample. In another study of a small group (N=47) of randomly selected community-based Ontario seniors' medication use practices, the average number of medications being taken was 6.0, with a range of zero to 14, whereas our group maximum was truncated to a maximum of six different drugs.

These comparisons suggest that this sample is similar to all seniors who had an initial CCD assessment during FY 91 and 92 and that our sample also has characteristics, which are common to other seniors' groups found in the Canadian and U.S. literature. Overall, the study sample appears similar to other groups used to test and validate

comprehensive assessment instruments (Fillenbaum & Smyer, 1981; Lawton, Moss, et al., 1982; Agbayewa, 1990; and Falconer, Naughton, et al., 1992).

Chapter 6 - Findings

A simultaneous model of multiple regressions will determine which variables predict Care Level. Subsequently, a discriminant analysis will indicate how well significant variables actually predict "membership" among Care Level groups. While the number of subjects in the sample allows for simply placing all variables into one multiple regression formula, the number of missing cases on many different items prompted the decision to run separate regressions for each logical set of variables within the LTC-1.

Furthermore, since we know that significance levels are to some extent an artifact of sample size (Knoke & Bohrnstedt, 1991) and because there were more than 2400 subjects for most analyses in this study, unless otherwise specified, a probability threshold of .001 is used for determining which variables are significant. Additionally, to arrive at the most parsimonious solution, only those items which are at, or roundable to, 1% r-square change are left in the analysis for final calculations. In this case, parsimony refers to the smallest possible number of items that are found to be significant in predicting Care Level. A final regression analysis determines which of those initially significant variables still predict Care Level when controlling for all other sources of variance. The

discussion of the analyses is based upon the order of how the variables appear in the LTC-1 Form.

Demographics - Page 1, LTC-1

To examine the possible effect of age, sex and marital status/group on Care Level, a regression analysis was conducted, the results of which are included in Table 27, below, with only those variables which meet the inclusion criteria ($p < .001$) shown in the table. Note that marital group, entered as a dichotomous variable (see Table 4 and related discussion), and gender, are significant. Using a univariate ANOVA model to compare mean Care Level scores, there are minimal differences in mean Care Levels by age, but those who are married, and men, have significantly higher Care Levels. In the regression analysis below however, each explains little of the variance.

Table 27

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with Age, Marital Group and Gender Entered into the Equation as the Independent Variables (N=2985)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Marital Group	.12	6.42	.000	.014
Gender	-.13	-6.76	.000	.017

Adjusted R-Square = .03, F = 40.69, Sig of F = .000

Medical Diagnoses and Number of Drugs - Page 2, LTC-1

The calculation of the severity of illness score has been previously discussed, p. 64. The severity of illness score and number of drugs have been entered into a regression, the results of which are included in Table 28, below. Recall, from Table 13, page 63, that most of the health problems listed by this group of seniors are chronic in nature. In this case, severity of illness score and number of medications are entered into the equation as ratio data. Note that only severity of illness is significant, although number of medications is very close to significance ($p < .005$).

Table 28

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with Severity of Illness Score and Number of Medications Entered into the Equation as Independent Variables (N=2986)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Severity of Illness	.26	13.92	.000	.068

Adjusted R-Square = .07, F = 120.87, Sig of F = .000

Mental Health Scale - Page 2, LTC-1

To test the relationship between the weighted mental health scores and Care Level, a regression was run, the results of which are found below in Table 29. After resolving issues of multi-collinearity between judgement,

(using the variance inflation factor - Norusis, 1993)
 perception and cognition, only judgement, perception and
 self-direction, were found to be significant.

Table 29

Results of Multiple Regression Analysis, with Care Level as
 the Dependent Variable and with All Mental Health Items
 Entered into the Equation as Independent Variables (N=2591)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Self-Direction	.26	12.12	.000	.068
Judgement	.11	4.84	.000	.012
Perception	.08	4.18	.000	.006

Adjusted R-Square = .09, F = 60.23, Sig of F = .000

When adding the MMSE score to this same regression
 equation, the findings change somewhat, probably since only
 516 cases include data on all 10 mental health items and the
 MMSE score. The results of this analysis are found in Table
 30, below, including only variables which are significant.

Table 30

Results of Multiple Regression Analysis, with Care Level as
 the Dependent Variable and with the MMSE Score and All
 Mental Health Items Entered into the Equation as Independent
 Variables (N=516)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
MMSE Score	-.32	-6.90	.000	.102
Self-Direction	.25	5.59	.000	.063

Adjusted R-Square = .17, F = 25.97, Sig of F = .000

From Table 29, self-direction, judgement and perception are the only significant parameters of mental health, accounting for just over 15% of the variance of Care Level, whereas in Table 30, adding the MMSE score almost doubles the amount of variance of Care Level accounted for. However, in this case, only MMSE and self-direction are significant in predicting Care Level. The bivariate r value between the MMSE and Care Level is $-.47$ ($p < .0001$, $N=630$), indicating a strong relationship between the two variables.

Dental Problems - Page 3, LTC-1

To examine the possible effect of dental problems and "difficulty chewing" on Care Level, a regression has been run with the two dichotomous independent variables. Table 31, below, lists the results of the analysis. Only "ability to chew" is significant in predicting Care Level.

Table 31

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with the Two Dental Health Items Entered into the Equation as Independent Variables (N=1791)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Able to Chew?	.08	3.50	.000	.007

Adjusted R-Square = .01, F = 6.95, Sig of F = .001

Using a univariate ANOVA to compare mean Care Level, we find that those not able to chew properly have a significantly

higher Care Level than those without chewing problems. However, between those who did and those who did not acknowledge dental problems, there were minimal and non-significant differences in Care Level.

Communication and ADL Items - Page 3, LTC-1

The communication subscale is composed of four items: vision, hearing, speech and understanding. The results of this analysis are found in Table 32, below. Only speech and understanding are significant, together accounting for just 3% of the variance of Care Level.

Table 32

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with All Four Communication Items Entered into the Equation as Independent Variables (N=2654)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Speech	.15	7.87	.000	.023
Understanding	.09	4.55	.000	.008

Adjusted R-Square = .03, F = 23.66, Sig of F = .000

The ADL items include: ambulation, ability to transfer to bed, chair or toilet, bathing, dressing, grooming/hygiene, eating, and bladder and bowel control. Table 33, below, lists the results of the regression analysis, where only the significant variables included. After re-running

the regressions to determine the best fit, in light of possible multi-collinearity of the three transfer variables, keeping transfer to toilet and dropping the other two accounts for the most variance of Care Level (11%).

Table 33

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with All ADL Items Entered into the Equation as Independent Variables (N=2369)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Dressing	.18	7.10	.000	.032
Transfer to Toilet	.17	7.70	.000	.029
Ability to Ambulate	.15	7.00	.000	.023
Bathing	.14	6.43	.000	.020
Grooming	.10	4.09	.000	.010

Adjusted R-Square = .11, F = 208.88, Sig of F = .000

Housing Status and Informal Social Support - Page 4, LTC-1

To evaluate the possible impact of housing status on Care Level, two of the three variables have been recoded. For type of dwelling, subjects have been classified into those who reside in a house and those who do not. For housing companions, the variable has been coded into those who live with their spouse and those who do not. The support score has been described earlier and is added here since, to some degree, it is related to a senior's household companions. Table 34, below, lists the results for the three

housing variables and the informal support score. Of the four variables, only whether the senior rents or owns his/her dwelling is **not** related to Care Level. To further explore the impact of housing status, in separate ANOVAs (not included in a table), we find that those seniors who live in a house or with their spouse, or those who own their dwelling, have significantly higher Care Levels.

Table 34

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with Three Housing/Living Companion Items Entered into the Equation as Independent Variables (N=2445)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Spouse vs. All Others	.17	8.40	.000	.030
House vs. All Others	-.11	-4.55	.000	.012
Informal Support Score	.07	3.61	.000	.005

Adjusted R-Square = .05, F = 39.05, Sig of F = .000

Instrumental Activities of Daily Living - Page 4, LTC-1

The instrumental ADL item set is called the "self-care scale" on the LTC-1. It contains six questions concerning: food preparation, housekeeping, shopping, travelling, use of the telephone, and ability to properly self-administer medications and treatments. The results of the regression of all six items in predicting Care Level are found in Table 35, below. For this regression, there is no multi-collinearity and four of the six items are significant.

Table 35

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with All IADL Items Entered into the Equation as Independent Variables (N=2484)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Meds and Treatments	.22	11.50	.000	.048
Use of Telephone	.19	9.83	.000	.036
Travelling				
Independently	.17	8.89	.000	.032
Shopping				
Independently	.10	4.30	.000	.010

Adjusted R-Square = .13, F = 137.16, Sig of F = .000

Financial Variables - Page 5, LTC-1

Recall, from discussions in Chapter 5, that, based upon an understanding of the various old age financial assistance programs available for seniors, it seemed more appropriate to only include GIS in a regression equation with Care Level, the results of which are found in Table 36, below. The numbers of those who are receiving GIS versus those who are not is close to 50%. Also, ANOVAs of Care Level by receiving GIS reveal that those who are receiving GIS have slightly lower Care Levels than those who are not ($p < .001$).

Concurrent with the financial status, on Page 5 of the LTC-1 there are three questions about the degree of senior's independence in managing his/her own, primarily financial, affairs, who manages his/her affairs and who provides money for purchase of daily "comfort" items. Results of a

regression analysis for these three items are found below in Table 37.

Table 36

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with All Three Financial Items Entered into the Equation as Independent Variables (N=2845)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Receiving GIS	.13	7.03	.000	.017
Adjusted R-Square = .02, F = 49.48, Sig of F = .000				

Table 37

Results of Multiple Regression Analysis, with Care Level as the Dependent Variable and with All Three Items Relating to the Senior's Ability to Manage Their Affairs Entered into the Equation as Independent Variables (N=2326)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Degree of Client Independence in Managing Affairs?	.30	13.67	.000	.090
Who Manages Client Affairs?	.11	2.48	.000	.012
Who is Reponsible for Client Comforts?	.11	2.30	.000	.012
Adjusted R-Square = .11, F = 198.51, Sig of F = .000				

Possible answers for who manages a senior's affairs and who is responsible for comforts are self, a "contact" person, or "other". Degree of independence in managing

affairs could be answered as: independent, needing transport, needing advice, comprehension doubtful or having power of attorney. Because of multiple responses found in all three of these items, they have been recoded prior to running the regression. That is, using strategies described by Barer, Miller & Hollander, 1988) items with multiple responses were recoded so that the item value would normally be given the highest single value that particular response would imply. For instance with the "degree of independence" item, those where we find both responses "needs advice" - '3' and "comprehension doubtful" - '4' would be given the value of '4' for that item. However, "who manages affairs" and "[who] is responsible for comforts" were both dichotomized such that answers would be coded as either self or contact/other before running the regression analysis. The decision to dichotomize these two items is based on the very few choices of "other" in each of those two items, less than 3%.

The percent of multiple responses varies considerably among the items. For the degree of independence item it is almost 8% (N=234), for who manages client affairs it is just over 4% (N=129), but for who is responsible for comforts it is over 17% (N=514).

A Comprehensive Model

As a result of the analyses, listed in Tables 27 through 37, 25 variables are significant and meet the criteria of having a r-square change of 1%, or roundable to 1%. Those variables, listed in the same order as in Tables 27 through 37 are:

- marital status group,
- gender,
- severity of illness score,
- self-direction,
- judgement,
- perception,
- able to chew,
- comprehensibility of speech,
- understanding of speech,
- ability to independently
 - dress,
 - transfer to toilet,
 - ambulate,
 - bath,
 - groom,
- living with spouse vs. all other,
- living in house vs. all others,
- informal social support,
- ability to independently
 - self administer medications and other treatments
 - use the telephone
 - travel
 - shop
- receiving GIS
- degree of independence in managing financial affairs
- who manages client affairs
- who is responsible for client comforts.

The next logical step is to place the 25 variables listed above into one simultaneous regression model. This strategy serves to control for all possible sources of variation of those previously found to be related to Care Level and determines which variables will still predict Care Level when compared against one another. The results of the

regression, after accounting for multi-collinearity (between marital status and living companions and between the three management of affairs items), are found in Table 38, below. Because of missing data, the sample for this regression is 1342. This smaller sample size prompted a decision to accept a probability level of .01 for selecting items which are predictive of Care Level.

The standardized beta coefficients indicate that 10 variables are significant, one with a negative beta weight, although two variable do not meet the 1% r-square criteria. In decreasing order of statistical significance they are:

- ability to independently transfer to the toilet,
- severity of illness score,
- ability to independently
 - shop,
 - ambulate,
 - dress,
 - self-administer medications and treatments,
- gender,
- independence in managing (financial) affairs, and
- receiving GIS.

For all ADL/IADL items, the more dependent the senior, the higher the Care Level. For gender, men have higher Care Levels than females. Furthermore, those at higher Care Levels have significantly higher severity of illness scores. Finally, in general, those seniors who are **not** receiving GIS and/or who are more dependent on others for managing their affairs are assessed at significantly higher Care Levels.

By summing the change in r-square change for each of the ten significant variables, we arrive at a total Adjusted

R^2 which indicates that 12% of the variance of Care Level can be explained by the linear combination of the 10 independent variables.

Table 38

Results of Regression Analysis, with Care Level as the Dependent Variable and with All Significant Items Entered into the Equation, Except the MMSE Score (N=1342)

Item	Standardized Beta	T	Sig of T	Change in r-SQ
Transfer to Toilet	.20	7.45	.000	.040
Diagnosis Score	.16	8.16	.000	.026
Shopping	.11	5.32	.000	.012
Ambulation	.11	4.27	.000	.012
Dressing	.10	3.28	.000	.010
Independence in Managing Affairs?	.08	3.19	.001	.006
Independent with Meds & Treatments	.07	2.93	.005	.005
Gender	-.07	-3.15	.000	.005
Travelling	.06	2.68	.000	.004
Receiving GIS?	.05	2.68	.008	.003
Adjusted R-Square = .12, F = 65.89, Sig of F <.0001				

Despite the results found in Table 38, the fact that the variance explained by individual items in the final regression is considerably less than when they enter in blocks and the fact that some of the bivariate correlations explain an impressive amount of the variation by themselves suggests that multicollinearity is a real (and unresolved) issue beyond the diagnostics employed in this study. Caution is therefore urged when drawing conclusions about predictors of Care Level from these data.

To further understand the impact of sample size, another regression was run. This time using only the 8 variables from Table 38 above which have an r-square change of at least 1%, or roundable to 1%. As a result, the number of cases increases to 2038, the same variables are all significant, the beta weights are generally increased, the Adjusted R² increases by 7.5% and the F value increases to 285.17, adding further validity to the impact of these variables on Care Level. These results are not included in a table.

One final regression has been run, this time adding the MMSE score to the group of 10 variables which are listed above. Because of missing data, the sample size drops to 419. For this model, which is not included in a table, the MMSE, transfer to toilet, the diagnosis score and the senior's independence in ambulation, dressing and managing his/her affairs are significant ($p < .01$). Moreover, the amount of variance explained increases from 12% in the model in Table 38, above, to 14%. Increasing the sample size would likely not have changed these findings. Conversations with Case Managers revealed that the MMSE was only administered to clients with obvious cognitive deficits. As a result, testing more seniors would generally have yielded scores of 28 to 30, and therefore not changed the findings of this last regression analysis.

Predicting Group Membership

The regression analyses, just described, provide some clues as to which variables are related to Care Level. Subsequently, a discriminant analysis is calculated to predict how well those variables actually predict group membership within individual Care Level designations. With this procedure, the power of a discriminant function is the amount of variance between the groups that is explained by the linear combination of one or more sets of variables (Bergob, 1992, p.53). The results of this analysis are found in Table 39, below.

Both of the two possible methods for calculating a discriminant analysis, (forcing all variables into the equation at once or a stepwise method) can be run on the data (Norusis, 1993) to provide maximum information about the relationship of the predictor variable to Care Level. The results from the "enter" (or simultaneous) method are found in Table 39, below. Although two items (independence in traveling and receiving GIS) do not meet the 1% r-square change criteria they were included in this particular analysis since they measure quite different dimensions of a senior's assessment. The other eight, except for gender and severity of illness, are ADL items.

As expected from the results of the regression analyses, all 10 variables are significant. The Eigen value implies that most of the variance (81.8%) can be explained

by a single function comprised of three items: transfer to toilet, severity of illness score, and ability to manage financial affairs, although this finding was **not** borne out in the regression analyses, described previously. More importantly, the figures at the bottom of Table 39, below indicate the accuracy of the set of 10 variables in predicting individual Care Level categories.

For Personal Care, IC-2 and Extended Care, the 10 variables correctly predict group membership in more than 50% of cases. However, IC-1 is low with 35.1% and last, IC-3 is extremely poor with 12.8%. Assuming that, with five groups the variable set should be successful in predicting IC-3 correctly, at least 20% of the time, the findings are far below a minimally expected level (Norusis, 1993; Stark, et al., 1982). These results seem to highlight IC-3 as the Care Level which is inconsistently applied and therefore provides the greatest difficulty for Case Manager to apply standardized Care Level criteria across all CCD clients.

Even doubling the IC-3 "correct rate" could have a dramatic impact on the overall rate, which is currently at 61%. While this finding must be balanced against the very small number of IC-3 seniors (N=78), the inconsistency with which this designation is apparently applied should be of concern to CCD staff and policy makers, especially when recalling that these results are very similar to previously published findings with B.C. LTC-1 data (Gutman, et al.,

1980).

Table 39

Results of Discriminant Analysis, with Care Level as the Dependent Variable and with All 10 Significant Items Entered into the Equation, Except the MMSE Score (N=2049)

Eigen value	1.13	
% of Variance Accounted for	81.80	
Canonical Correlation	.73	
Significance	.000	
	Univariate F	Sig.
Transfer to Toilet	300.88	.000
Diagnosis Score	52.42	.000
Shopping	78.98	.000
Ambulation	186.34	.000
Dressing	251.16	.000
Independence in Managing Affairs?	163.02	.000
Independent with Meds & Treatments?	74.29	.000
Gender	11.70	.000
Travelling	74.69	.000
Receiving GIS?	9.81	.000

Classification Results

	N of Cases	Percent Correctly Classified
Personal Care	1130	76.8%
IC-1	518	35.1%
IC-2	194	58.2%
IC-3	78	12.8%
Extended Care	129	58.9%
Total	2049	61%

The data in Table 39 indicate dramatic differences in sample sizes between the Care Levels. For instance, the number of personal care clients are not unusual, given that most seniors have their initial assessment at a point when they are relatively healthy and able to care for themselves (Jennings, 1993). One strategy for evaluating discrepancies in sub-group sizes is to allow SPSS/WIN (Norusis, 1993) to insert group mean values to equalize group sample size inequities. That analysis, not shown, provides results almost identical to those in Table 39, below.

Summary

Subsequent to the various regression analyses several points become clear. Gender is related to Care Level in that men have a significantly higher Care Level than an apparently similar group of women, even accounting for age. In fact, the mean age for the total group is 77.7 years, with no difference between men and women. Furthermore, marital status is not related to Care Level in the regression model, although, using a bivariate model, those who are married have a significantly higher Care Level. This finding may be explained by comments from Case Managers which indicated that many married men are not assessed until their condition becomes such that their wives (and/or children) are no longer able to adequately care for them, a phenomenon apparently common for seniors (Chappell, 1990).

While the number and seriousness of medical illnesses apparently affects Care Level, the number of medications does not, although it is close to being significant. Of the mental health items, only MMSE is related to Care Level, but not when controlling for other sources of variation.

Several items within the ADL and IADL scales predict Care Level. Within ADL, the ability to independently ambulate, dress and transfer to the toilet are related to Care Level, whereas bowel and bladder continence are not. For the IADL, the ability to independently travel, shop, administer one's medications and treatments are predictive of Care Level. Just over 37% of those who answered the question (N=2847) about GIS report receiving this government subsidy. Those who are receiving GIS have slightly lower, though statistically significant ($p < .001$), Care Levels. Last, those who can independently manage their financial affairs have significantly lower Care Levels.

The final regression, not shown in a table, implies that, for those seniors to whom the MMSE was selectively administered, their severity of illness score, the ability to independently ambulate, dress, transfer to toilet and manage their own affairs can be used to predict Care Level. However, since the MMSE is only administered to seniors for whom there is at least a suspicion of cognitive deficits or dementia, the test may not be as helpful among a group of well B.C. seniors, or those with minimal cognitive deficits.

As a result, the previously described 10 variables are the measures which can be applied across all possible subgroups of seniors to predict Care Level. Of all the predictors, ability to independently transfer to the toilet is consistently the strongest (highest beta weights using a simultaneous model) and the bivariate correlation between this item and Care Level yields a coefficient of .54 ($p < .001$). Likewise, the correlation of affairs management and Care Level is also significant, with a coefficient (Kendal tau b) of .40 ($p < .001$). The correlation of the diagnosis score with Care Level is not as strong as the other two ($r = .27$), although it is still statistically significant.

Based on the univariate F values from the discriminant analysis, the variables: independence in transfer to toilet, dressing, ambulation and ability to manage affairs have the most strength in predicting Care Level. However, this analysis also provides strong evidence that IC-3, as the psycho-geriatric designation, causes the most difficulty in predicting Care Level.

Chapter 7 - Discussion, Limitations, Recommendations and Summary

Discussion

In this study, an attempt has been made to discover which of more than 100 different items or pieces of information which arise from the CCD intake assessments from two recent fiscal years of data are most predictive of Care Level in a group of almost 3000 community-based seniors in B.C. Considering that approximately 14000 initial assessments are conducted in B.C. alone each year, mostly with seniors, the issue of which variables best predict Care Level takes on added meaning. This issue has relevance across Canada. For instance, in Manitoba, 5% of seniors are assessed for "community care" in any given year (Shapiro, 1995), a number which for some time has been virtually identical to that in B.C. (Hollander & Pallan, 1995).

Gender, severity of medical problems, three ADL items (independence in transferring to toilet, dressing and ambulation), two IADL items (independence in travelling and shopping), whether or not one is receiving GIS, and the ability to independently manage one's affairs are most predictive of Care Level. However, this last regression must be viewed within the context of how missing values may have affected the results. The small sub-sample, N=1298, used for the final analysis (Table 38, page 97), representing just over 43% of the original sample, raises questions about the

representativeness of this smaller sample in relation to all seniors who were assessed in B.C. during FY 91 and 92. In an attempt to verify the findings in Table 38, the analysis has been re-computed with **only** the 10 previously significant variables included. As a result the sample is much larger (N=2038) and the findings are very similar to those in Table 38, adding some confirmation for the validity of the earlier conclusions.

Assuming that these problems with missing data and therefore smaller samples do not threaten the validity of the findings, that is, that we do not commit a Type 1 error (Ostle & Malone, 1988), among cognitively intact seniors, the ability to independently transfer to the toilet, travel, shop and ambulate, along with gender, receiving GIS and the ability to independently manage one's affairs are the best predictors of Care Level. However, our results also show that among seniors with cognitive deficits, the MMSE has an important part to play, along with these other variables, in predicting Care Level.

The importance of the ADL/IADL items cannot be underestimated. The availability of an objective measure for establishing the nature of functional ADL/IADL problems is crucial (Kempen & Suurmeijer, 1990) when attempting to plan for appropriate formal services for seniors. More specifically, in their original seminal work, Katz and his colleagues (1963, p.98) found that, "with regard to a single

function, going to the toilet has been shown to be an indicator of overall performance". When examining gender and ADL competency, Frederiks, te Wierik, et al. (1991) found that problems with using the toilet was the most commonly reported ADL deficit among a group of community-based Dutch senior women, but not so among a matched group of male seniors. In our own B.C. sample, the men had only slightly poorer, though statistically significant, scores relating to independence with transfers to the toilet than the women. Hence, getting to the toilet, using it properly and problems with incontinence may all be related and may necessitate formal support and, in fact, institutionalization.

Schubin-Greenberg and Rosen (1982) studied a group of 200 Israeli seniors admitted to acute care wards after an emergency room visit and found that 37% of patients admitted to geriatrics and 6% of those admitted to a medical ward were incontinent of urine (or feces), and that even larger percentages of patients were confined to a bed or chair, and therefore not able to transfer to the toilet. Given these findings, perhaps the importance of problems with transfer to the toilet among the B.C. sample is not so difficult to understand. That is, when mobility is compromised (Rush & Ouellet, 1993) and there is therefore an inability to adequately manage toileting (Williams & Gaylord, 1990), this results in a dramatic increase in need for formal support, especially if informal support to meet this particular need

is unavailable.

One could speculate that, when Case Managers make a judgement about a senior's ability to manage his/her own affairs, this represents a subjective impression of overall cognitive function. Managing banking, a checkbook and other components of financial affairs requires many of the same skills explicitly tested via the MMSE. As such, the score generated from the management question is a proxy for that derived from the MMSE. In fact, for this sample, the bivariate correlation between the management question and MMSE was quite high and statistically significant ($r=.50$, $p < .001$). In this light and based upon the regression results, the management question is at least equally as good at predicting Care Level (as the MMSE) when controlling for all other sources of variation. In bivariate correlations between each of the two items and Care Level, the management question has only a slightly lower r value than the MMSE.

That the MMSE is strongly related to Care Level is to be expected. Recall that, B.C. Case Managers are given the option of performing the MMSE when they believe it will generate a clinically relevant piece of information. Therefore, the MMSE score for this sample of B.C. seniors is artificially low. For instance, Siu, Reuben and Hays (1990) found that the mean MMSE score among a group of ambulatory and "cognitively intact" seniors was 26.3. Our B.C. total group mean is 23.7, with slightly lower scores for the men

than women, a difference which is statistically significant. Clearly, the main value of the MMSE lies in assessing those with known, but perhaps not well understood, cognitive deficits. For instance, Farber, Schmitt and Logue (1988) found that the mean MMSE score for 105 community dwelling seniors with probable Alzheimer's dementia was 14.9 (Sd=7.1). Among our 71 B.C. seniors (see Table 13, page 63) with a recorded diagnosis of Alzheimer's, the mean score is 17.2 (Sd=6.5).

Based upon similar comments from Case Managers, facility staff and CCD managers, it is no surprise that IC-3 has such a poor prediction rate, despite the fact that the 10 predictor variables being so strongly related to Care Level. The current financial pressures not to institutionalize, home care requirements versus institutional bed availability, and care givers who may no longer be able to cope, along with other forces, may hamper Case Managers' decisions to assign IC-3 within strict, standard policy-driven parameters. Those seniors assessed at an IC-3 level will need heavier care if left in the community and are therefore more likely to require institutional placement. As such, it may be more appropriate for Case Managers to assess IC-3 seniors instead at the Extended Care level, which might serve the client better, but skews predicted group membership results.

Further, recall that, using data from clients at the inception of the B.C. LTC care program, Stark and her colleagues (1982) found that the greatest amount of disagreement between CCD assessors and a similar group of nurse assessors was at the IC-3 level. Moreover, in an earlier study, Gutman, et al., (1980) also found, via discriminant analysis, that a group of variables (almost identical to those which proved predictive of Care Level in the present study) had an overall success rate of 78.4%, somewhat higher than in this study. Last, with that discriminant analysis (Gutman, et al., 1980), IC-3 had the poorest success rate of 20% and 14.3% for an urban and rural group of clients. Therefore, the results just cited are only slightly better than those reported here in Table 39. From the inception of the LTC system, the IC-3 designation has created difficulty for Case Managers and this situation has apparently not been adequately addressed and, therefore, not improved in the last 12 years.

Limitations

The generalizability of the findings of this study are limited by a number of factors, some of which have been previously mentioned. One issue is the validity of self-report data. That is, virtually all information recorded on the LTC-1 is received directly from the client or a family member. As a result, the client may claim independence with,

for instance, shopping. However, there may be no way to verify the accuracy of such an assertion. Kuriansky, Gurland, et al. (1976) point out that subjective and objective information about, for instance, ADL competencies are not necessarily interchangeable. They propose a patient self-care performance scale which they believe has concurrent validity, is easy to administer, and allows for visual verification of a senior's ADL skills.

Another limitation of this study is the cross-sectional nature of the data collection and the fact that longitudinal outcomes and service utilization information have not been analyzed for this group of seniors. While having such data would dramatically increase the complexity of the overall study, it might also provide more helpful conclusions about the outcome of the intake and assessment processes.

Last, representativeness of the sample should be addressed at least in terms of the number of CCD clients who died shortly after their initial assessment by a Case Manager. For the present sample, as of 28 February 1995, just over 28% of the clients had died in an average of almost 13 months after their initial CCD assessment. Recall that we were more likely to gather data for deceased clients since their charts were always located in a separate area or box and were therefore quite accessible. Since our overall goal was to capture as many charts as possible, deceased clients charts provided a way to facilitate increasing the

size of the data base, especially in the C.R.D.

Despite gathering as many charts as possible for seniors who had died, comparative data between our overall sample and key demographic variables indicated a high degree of consistency between all seniors in B.C. and our sample (see also the discussion in Chapter 5). Specific information about those in our sample who have died has yet to be analyzed in order to explore this issue further.

Last, although social support has been repeatedly shown to be important to the health of seniors (Chappell, 1992; and Chappell & Prince, 1994), it was not significant within the final regression model in the present study. It is likely that this particular finding was the result of how the variable was operationalized from inadequate data on the LTC-1. It is possible that if the LTC-1 Form was changed to request more specific social support data, along with indicators of competency or extent of that support (Alberta Health, 1989; and Chappell, 1991), then a support variable might prove more robust in predicting Care Level.

Recommendations

While the extreme complexity of the LTC system and the current wave of changes for the overall health care system in B.C. is recognized, based on the findings of this research the following is recommended:

One, the psycho-geriatric designation should be

examined in depth by those who have a clear understanding of the history of its evolution, as well as the power to mandate changes in how Care Levels are determined and services are provided. Along with the literature cited and the data from this study, anecdotal evidence, in the form of many discussions with CCD staff in the five health units, make it very clear that the current Care Level system needs revision. Some informants suggested doing away with the Care Level designations entirely and using a client specific service authorization as the main outcome of the assessment process. However, this strategy would be difficult to implement for those clients who are admitted to long term care facilities, since currently that care is funded, in part, based on client Care Levels.

Two, there could be a number of different strategies for examining problems Case Managers have with assigning Care Levels. For instance, a simple methodology could be to select a representative (rural vs. urban) group of Case Managers throughout the province, and prospectively ask them to indicate the five to ten key reasons why they assign a particular Care Level to their client as a result of initial assessment. Sampling an adequate number of clients/charts could provide valuable information about which items are most helpful in facilitating the professional judgement of and assigning of Care Levels by Case Managers. A number of methodological issues would need to be resolved, such as a

possible "Hawthorne affect" (Skodol Wilson, 1989). That is, the Case Managers might be biased, since they would know that they are part of a study. Nonetheless, Case Managers could be the very best source of information for evaluating and possibly changing the structure of Care Levels.

Three, the tedious nature of collecting the LTC-1 data could be relieved by an automated/hand-held device, carried and used in the home by CCD staff. This suggestion was spontaneously given to me by Case Managers at all five health units we visited. Automated storage and display of data could also relieve service providers of the difficulty of reading written comments by Case Managers on paper forms (Meller, 1994). Technology currently exists which would allow for easy collection, secure storage and simplified transmission of LTC-1 data to all who need it, via inexpensive automated devices (Seaton, 1994). The B.C. Ambulance Service has been using such a device for some time. While this particular issue is outside the realm of this study, it is clearly one which should be considered by CCD policy makers.

Four, in light of considerable anecdotal information from Case Managers regarding the tedious nature of the LTC-1 data recording process, further study is necessary to understand why so many items are left blank, especially among the financial and social support questions. It would be relatively simple to select the five to ten most commonly

unanswered items and query a representative sample of Case Managers about possible reasons for this phenomenon. The results of such a follow-up study could be valuable in efforts to revision, and perhaps, reduce the size of the LTC-1.

Five, a number of possible changes to the LTC-1 Form have been suggested (Beebe, 1993), based upon the same data which was analyzed for this study. In particular, while the Mental Health Scale was revised just three years ago, it has still been shown to lack reliability (Beebe, 1993) and should be examined and reworded. However, more important than the Mental Health items is the need for better questions relating to availability and competence of informal social support from family and/or friends. The current LTC-1 has one question on page one which asks whether or not the client lives with the care giver. Additionally, question A-3 on page four is a free-text box which asks about "supportive relationships". In fact, the "lives with care giver" question was only added to the LTC-1 in 1992. We found that question A-3 on page four was left blank more than 16% of the time, and the format of the responses on this item were very inconsistent. The LTC-1 should include items which ask about the exact nature, relationship and **competency** of social support, similar to what is done in Alberta (Alberta Health, 1989). Furthermore, along with these questions there should be a specific

request for any indications of abuse by care givers.

Six, more thorough information should be gathered regarding history and risk of falls. A substantial body of literature exists which provides a basis for predicting both person-oriented and environmental factors which might predispose a senior to fall. Recording such information could facilitate efforts to decrease the risk of falls, thereby having a positive impact both on the quality of life for the senior as well as a health care system which must care for those who have fallen.

Last, while the focus of this study has been seniors who were assessed at home, data for FY 92 and 93 exists in the database for an additional 764 people who are less than 65 years age and for 761 seniors who were assessed in hospital, a facility or "other". Because, the data from the LTC-1 is used as an admission data collection document for anyone 19 years of age and older requiring services from the CCD and is used by 40 different agencies throughout the province (Jennings, 1995), data for these groups should be analyzed as a component of any efforts to change the form. Furthermore, it has already been mentioned that similar LTC-1 data was collected for FY 80 and 87 which, except for the Mental Health items, could also be compared with the FY 92 and 93 data. Such analysis could be enlightening during any process to revise the LTC-1.

Summary

In this thesis, predictors of Care Level have been examined among a sample of B.C. seniors. We found that gender, medical diagnoses, receiving the GIS, ability to manage one's affairs, and six items from ADL and IADL scales are predictive of Care Level. However, these items are not consistent in predicting (Care Level) group membership. The most problematic level is IC-3 or the psycho-geriatric classification. As noted above, the results from this study should prompt CCD staff to re-examine the Care Level system, especially as it relates to the psycho-geriatric designation. A number of other suggestions have been made as to possible revisions of the form. Overall, these ideas relate to improving the depth and hopefully the quality of information recorded on the LTC-1.

The LTC-1 has been in use since 1978, although it has undergone some revisions since that time and studies of early data from LTC-1 have virtually identical results as the present study. The LTC-1 is a lengthy document and is used to determine eligibility and Care Level, and assist with care planning, but questions exist about the reliability and validity of the individual scales within the instrument (Beebe, 1993), especially the mental health scale. CCD assessments are carried out by Case Managers, most of whom are nurses. These individuals then determine Care Level and plan for the clients' care, regardless of

where that care is to be delivered. While this thesis does not make the case for eliminating the LTC-1, it reinforces concerns which have been known almost since the form was first instituted in 1978. Our results are consistent with a large body of gerontology literature, and this study presents information about assessment items which predict Care Level for a representative group of seniors in British Columbia.

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Province of British Columbia Ministry of Health and Ministry Responsible for Seniors CONTINUING CARE PROGRAM

APPLICATION AND ASSESSMENT FORM

- 1 NEW ASSESSMENT
- 2 REVIEW
- 3 REASSESSMENT
- 4 APPEAL
- 5 CORRECTION

RESPONSIBLE ASSESSOR	1
HEALTH DIST.	CLIENT NUMBER

SECTION 1 - ADMINISTRATIVE AND SUMMARY

A CLIENT'S PERSONAL DATA

1 CLIENT'S FAMILY NAME FIRST NAME INIT'S PHONE (CURRENT)

2 CURRENT ADDRESS FROM (DATE) 3. MARITAL STATUS VETERAN SERVICE CATEGORY

CITY POSTAL CODE 1 SINGLE 2 MARRIED 3 WIDOWED 4 DIVORCED 5 SEPARATED 6 OTHER

CURRENT LOCATION OF CLIENT AS ABOVE OTHER

SEX BIRTHDATE PERSONAL HEALTH NUMBER SPOUSE'S CLIENT NUMBER SPOUSE'S PERSONAL HEALTH NUMBER

B CONTACT PERSON'S FAMILY NAME INIT'S RELATIONSHIP

STREET ADDRESS

CITY POSTAL CODE HOME PHONE BUSINESS PHONE

LOCATION OF ASSESSMENT ACTION REQUIRED

1 HOME 1 TEAM REVIEW

2 FACILITY 2 FOLLOW-UP

3 HOSPITAL 3 NA

4 OTHER

C NAME NEXT OF KIN RELATIONSHIP RESEARCH CODES

ADDRESS POSTAL CODE

D PHYSICIAN'S NAME OFFICE PHONE

OFFICE ADDRESS POSTAL CODE

APPROVED SERVICES

1 NOT ELIGIBLE

2 CARE DECLINED BY CLIENT

3 CARE AT HOME

4 CARE AT HOME WITH MENTAL HEALTH SUPPORT

5 FACILITY CARE

6 DAY CARE

E APPLICATION

I hereby apply for benefits for which I / Client may be eligible under the Continuing Care program and certify that the information I have provided is correct to the best of my knowledge and may be released to the Continuing Care provider.

X CANADIAN CITIZEN B.C. RESIDENT

YES NO YY MM DD

LIVES WITH CARE GIVER? YES NO

F ASSESSMENT SUMMARY

Y Y M M D D

CASE MANAGER'S SIGNATURE: X

G SERVICE AUTHORIZATION

PROVIDER ID	ASSESSOR	SA - ID	AUTHORIZATION DATE	ORG.	SERVICE	TYPE
	1 PAID 2 UNPAID		Y Y M M D D			
	CARE LEVEL CLIENT CONTRIBUTION APPROVED HRS, DAYS					
	1 BEGIN PAID A VACATION B ILLNESS 2 RETURN ABSENCE					
	2 DEATH 5 UNPAID TEMP ABSENCE					
	CORRECT DELETE SA - ID					

AUTHORIZING SIGNATURE: DATE:

H CLIENT'S PREFERENCE (see reverse)

1 AT HOME

2 FACILITY

21 STANDARD

22 SEMI-PRIVATE

23 PRIVATE

PREFERRED FACILITY

FACILITY CODE DATE ON LIST

ALTERNATE FACILITY

FACILITY CODE DATE ON LIST

BF CODE BF DATE

LONG TERM CARE ASSESSMENT	SECTION II	HEALTH PROFILE	DATE YY MM DD	CLIENT FAMILY NAME	CLIENT NUMBER	2
A. MEDICAL BACKGROUND 1			MAJOR MEDICAL PROBLEMS INCL. PSYCHIATRIC DIAGNOSIS		INFO PROVIDED OR VERIFIED BY PHYSICIAN <input type="checkbox"/> YES <input type="checkbox"/> NO	
2. MEDICATIONS	DOSAGE	FREQUENCY	ROUTE	PRESCRIBED BY		
3. TREATMENTS/SPECIAL PROCEDURES						
4. CLIENT SMOKES <input type="checkbox"/> YES <input type="checkbox"/> NO DEGREE OF PROBLEM <input type="checkbox"/> NONE <input type="checkbox"/> MODERATE <input type="checkbox"/> MAJOR		5. CLIENT DRINKS <input type="checkbox"/> YES <input type="checkbox"/> NO DEGREE OF PROBLEM <input type="checkbox"/> NONE <input type="checkbox"/> MODERATE <input type="checkbox"/> MAJOR		6. ALLERGIES _____		
7. CURRENT DIET						
EATING HABITS				HEIGHT: _____ WEIGHT: _____		
B. MENTAL HEALTH			INDICATE WHICH OF THE FOLLOWING STATES ARE APPLICABLE FROM YOUR INTERVIEW TODAY:		BASE ASSESSMENT ON WHAT YOU HAVE SEEN TODAY AND USE COLLABORATIVE INFORMATION AS REQUIRED	
1. ATTITUDE <input type="checkbox"/> COOPERATIVE <input type="checkbox"/> INDIFFERENT <input type="checkbox"/> RESISTIVE <input type="checkbox"/> DEMANDING <input type="checkbox"/> SUSPICIOUS <input type="checkbox"/> HOSTILE						
2. APPEARANCE <input type="checkbox"/> WELL GROOMED <input type="checkbox"/> ADEQUATE <input type="checkbox"/> DISHEVELLED <input type="checkbox"/> INAPPROPRIATELY DRESSED <input type="checkbox"/> ILL - NOT DRESSED						
3. SELF DIRECTION <input type="checkbox"/> INDEPENDENT <input type="checkbox"/> NEEDS MOTIVATION <input type="checkbox"/> NEEDS DIRECTION <input type="checkbox"/> DEPENDENT						
4. BEHAVIORS <input type="checkbox"/> NORMAL <input type="checkbox"/> WANDERING <input type="checkbox"/> SUNDOWNING <input type="checkbox"/> WITHDRAWN <input type="checkbox"/> SEXUALLY INAPPROPRIATE <input type="checkbox"/> AGGRESSIVE <input type="checkbox"/> VERBAL <input type="checkbox"/> RESTLESS <input type="checkbox"/> ELOPING <input type="checkbox"/> SELF DESTRUCTIVE <input type="checkbox"/> FIRE HAZARD <input type="checkbox"/> OTHER (SPECIFY BELOW)						
5. AFFECT <input type="checkbox"/> APPROPRIATE <input type="checkbox"/> ANXIOUS <input type="checkbox"/> EUPHORIC <input type="checkbox"/> LABILE <input type="checkbox"/> HISTORY OF MOOD SWINGS <input type="checkbox"/> INAPPROPRIATE <input type="checkbox"/> BLUNTED <input type="checkbox"/> DEPRESSED <input type="checkbox"/> ANGRY						
6. THOUGHT CONTENT <input type="checkbox"/> NORMAL <input type="checkbox"/> DELUSIONS: <input type="checkbox"/> PERSECUTORY <input type="checkbox"/> GUILT <input type="checkbox"/> OTHER <input type="checkbox"/> OBSESSIONS <input type="checkbox"/> PHOBIAS <input type="checkbox"/> PREOCCUPATION <input type="checkbox"/> NOT ABLE TO ASSESS						
7. PERCEPTIONS <input type="checkbox"/> NORMAL <input type="checkbox"/> HALLUCINATIONS: <input type="checkbox"/> AUDITORY <input type="checkbox"/> VISUAL <input type="checkbox"/> OTHER _____						
8. COGNITION <input type="checkbox"/> NORMAL <input type="checkbox"/> IMPAIRMENT: <input type="checkbox"/> MILD <input type="checkbox"/> MODERATE <input type="checkbox"/> SEVERE <input type="checkbox"/> MINI MENTAL STATUS SCORE <input type="text"/> EXPLAIN REASON FOR NOT COMPLETING						
9. INSIGHT <input type="checkbox"/> GOOD <input type="checkbox"/> PARTIAL <input type="checkbox"/> NONE						
10. JUDGEMENT <input type="checkbox"/> GOOD <input type="checkbox"/> ADEQUATE <input type="checkbox"/> POOR						
C. ADDITIONAL COMMENTS						

LONG TERM CARE SECTION III SOCIAL PROFILE DATE CLIENT FAMILY NAME CLIENT NUMBER **4**

A HOUSING AND SOCIAL CONTEXT

<p>1 HOUSING</p> <p style="text-align: center;">APPROPRIATENESS</p> <p>MODE</p> <p>1 <input type="checkbox"/> HOUSE 2 <input type="checkbox"/> APARTMENT 3 <input type="checkbox"/> ROOM 4 <input type="checkbox"/> FACILITY 5 <input type="checkbox"/> OTHER</p> <p>1 <input type="checkbox"/> RENTAL 2 <input type="checkbox"/> SELF-OWNED 1 <input type="checkbox"/> CURRENT 2 <input type="checkbox"/> PROPOSED</p>	<p>2 HOUSEHOLD COMPOSITION</p> <p style="text-align: center;">DESCRIBE RELATIONSHIPS</p> <p>COMPANIONS</p> <p>1 <input type="checkbox"/> LIVES ALONE 2 <input type="checkbox"/> SPOUSE 3 <input type="checkbox"/> OTHER ADULT MALE(S) 4 <input type="checkbox"/> OTHER ADULT FEMALE(S) 5 <input type="checkbox"/> CHILDREN GIVE AGES</p> <p>PRINCIPAL HELPER: _____</p>
<p>3 SUPPORTIVE RELATIONSHIPS (SEE GUIDE ON REVERSE OF THIS PAGE)</p> <p>_____</p>	
<p>4 RELEVANT CULTURAL AND RELIGIOUS FACTORS</p> <p>_____</p>	

B SELF CARE INDICATE CLIENT'S CAPABILITY ON MOST DAYS

<p>1 FOOD PREPARATION</p> <p>1 <input type="checkbox"/> INDEPENDENT</p>	<p>2 <input type="checkbox"/> ADEQUATE IF INGREDIENTS SUPPLIED</p>	<p>3 <input type="checkbox"/> CAN MAKE OR BUY MEALS BUT DIET INADEQUATE</p>	<p>4 <input type="checkbox"/> PHYSICALLY OR MENTALLY UNABLE</p>	<p>5 <input type="checkbox"/> NO OPPORTUNITY OR DOES NOT PARTICIPATE BY CHOICE</p>
<p>2 HOUSEKEEPING</p> <p>1 <input type="checkbox"/> INDEPENDENT WITH HELP FOR HEAVY TASKS</p>	<p>2 <input type="checkbox"/> CAN PERFORM ONLY LIGHT TASKS ADEQUATELY</p>	<p>3 <input type="checkbox"/> PERFORMS LIGHT TASKS BUT NOT ADEQUATELY</p>	<p>4 <input type="checkbox"/> NEEDS REGULAR HELP AND SUPERVISION</p>	<p>5 <input type="checkbox"/> NO OPPORTUNITY OR DOES NOT PARTICIPATE BY CHOICE</p>
<p>3 SHOPPING</p> <p>1 <input type="checkbox"/> INDEPENDENT</p>	<p>2 <input type="checkbox"/> INDEPENDENT ONLY FOR SMALL ITEMS</p>	<p>3 <input type="checkbox"/> MUST BE ACCOMPANIED</p>	<p>4 <input type="checkbox"/> PHYSICALLY OR MENTALLY UNABLE</p>	<p>5 <input type="checkbox"/> NO OPPORTUNITY OR DOES NOT PARTICIPATE BY CHOICE</p>
<p>4 TRAVELLING</p> <p>1 <input type="checkbox"/> INDEPENDENT</p>	<p>2 <input type="checkbox"/> NO PUBLIC TRANSPORT USES PRIVATE VEHICLE OR TAXI</p>	<p>3 <input type="checkbox"/> CAN TRAVEL ONLY IF ACCOMPANIED</p>	<p>4 <input type="checkbox"/> PHYSICALLY OR MENTALLY UNABLE</p>	<p>5 <input type="checkbox"/> REQUIRES AMBULANCE FACILITIES</p>
<p>5 TELEPHONE</p> <p>1 <input type="checkbox"/> INDEPENDENT</p>	<p>2 <input type="checkbox"/> DIALS WELL KNOWN NUMBERS</p>	<p>3 <input type="checkbox"/> ANSWERS TELEPHONE ONLY</p>	<p>4 <input type="checkbox"/> PHYSICALLY OR MENTALLY UNABLE</p>	<p>5 <input type="checkbox"/> NO OPPORTUNITY OR DOES NOT USE PHONE</p>
<p>6 MEDICATIONS AND TREATMENTS COMPLETELY RESPONSIBLE FOR SELF</p> <p>1 <input type="checkbox"/> COMPLETELY RESPONSIBLE FOR SELF</p>	<p>2 <input type="checkbox"/> REQUIRES REMINDER OR ASSISTANCE</p>	<p>3 <input type="checkbox"/> RESPONSIBLE IF MEDICATIONS PREPARED IN ADVANCE</p>	<p>4 <input type="checkbox"/> PHYSICALLY OR MENTALLY UNABLE</p>	<p>5 <input type="checkbox"/> RESISTS</p>
<p>7 COMMENTS ON SELF CARE</p> <p>_____</p>				

C SERVICE INVENTORY SEE GUIDE ON INSTRUCTION PAGE

CODE	HEALTH SERVICES	Y/N	CODE	HOME SUPPORT SERVICES	N/Y	CODE	COMMUNITY SERVICES	N/Y
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		

VITA

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Educational Institutions Attended:

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University of California at Los Angeles	1976 to 1979
Boston University	1973 to 1974
Missouri University	1971 to 1972
Kansas City General Hospital	1967 to 1968

Degrees Awarded

B.S.N.	Missouri University	1972
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D.N.S.	Indiana University	1982

Honors and Awards

1990, 92 & 93 U.S. Army Commendation Medal

1984 & 89 Listed in "Who's Who in American Nursing"

Publications

Williams, D., Beebe, M.E. & Levine, B.L. (1994), The roles of key players throughout the acquisition and implementation process for a clinical information system, Journal of Clinical Engineering, 19(4), 274-283.

Beebe, M.E. (1994), Implementation of staff scheduling software for long term care, in Nursing Informatics: An International Overview for Nursing in a Technological Era, Grobe, S.J. & Pluyter-Wenting, E.S.P. (Eds.), Amsterdam: Elsevier, 96-100.

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McAfoes, J., Beebe, M.E., et al. (1990) Therapeutic Communication, Interactive Laser Disk, FITNE, Athens, OH.

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Title of Thesis:

Predictors of Care Level Among British Columbia Seniors

Author



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May 24, 1995