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Seeking Information on Linkages Between Chronic Illness and Home Care Through an Analysis of Alberta's Home Care Data

Research Report

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Executive Summary

A research study was conducted using 2003/04, 2004/05, and 2005/06 data provided by Alberta Health and Wellness to examine linkages between chronic illness and home care. Five definitions of chronic illness were developed to test for linkages and to answer four research questions. The main findings on home care clients, home care services, the chronicity definitions, and research questions are summarized below. Additional considerations and recommendations arising from this study are listed.

Home Care Clients

Only a small proportion (<2%) of Albertans received formal home care services, with less clients served each year as compared to the late 1990s and early 2000s. Home care clients were more often elderly, female, not married, living with someone, urban, and receiving a health care insurance premium subsidy. Multiple comorbidities were common. Diagnosed ailments were extremely varied among the home care clients.

Home Care Services

Home care clients received 2 hours of home care each week on average, with large differences in care hours and service events found among clients. Home care aides provided the majority of care hours in home visits or other service events, with their services basic as compared to the skilled care provided primarily by registered nurses.

Chronicity Definition One

Half of all clients were classified by home care nurses as needing home care on a long-term (3 months or more) basis, a classification that indicates a state of chronic illness and substantial need for home care. As compared to short-term clients, long-term clients were older, more often female, and urban. Over 90% of all care hours and over 85% of all service events each year were provided to long-term clients, with individual long-term clients also receiving a much higher number of hours of home care and more service events each year on average as compared to short-term clients. This definition was helpful for identifying chronically-ill clients needing considerable home care.

Chronicity Definition Two

Half of all home care clients received home care for 90 days or more, with a longer stay indicating a state of chronic illness and substantial need for home care. As compared to short-stay clients, these clients were older, more often female, and rural. Over 95% of all care hours and all service events each year were provided to long-stay clients, with individual clients also receiving a higher number of home care hours and more service events on average as compared to short-stay clients. This definition was also helpful for identifying chronically-ill clients with considerable need for home care.

Chronicity Definition Three

Over 85% of home care clients had diagnoses that could be grouped into 4 or

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more ICD chapter headings, with this high number of ICD chapter headings or affected body systems suggesting a state of chronic illness and substantial or ongoing need for home care. As compared to clients with 0-3 ICD chapter headings, these clients were younger, more often male, and urban. Clients with 4 or more ICD chapter headings had a smaller share of total home care hours and service events each year than expected, with individual clients also receiving fewer hours of home care on average as compared to clients with 0-3 ICD chapter headings. ICD chapter headings were not found to be helpful for identifying chronically-ill clients with substantial home care support needs.

Chronicity Definition Four

Half of all home care clients had 40 or more ICD diagnostic codes or diagnoses assigned to them in hospitals or ambulatory care settings in the year that they received home care, with a high number of diagnoses suggesting a state of chronic illness and substantial need for home care. As compared to clients with 0-39 diagnoses, these clients were younger, more often male, and urban. Clients with 40 or more diagnoses had a smaller share of total home care hours and service events each year than expected, with individual clients also receiving fewer hours of home care and less service events on average as compared to clients with 0-39 diagnoses. Multiple diagnoses were not found to be helpful for identifying chronically-ill persons with substantial home care needs.

Chronicity Definition Five

Half of all home care clients were diagnosed with one or more of the four main chronic diseases - diabetes mellitus, COPD, stroke, and cancer. These clients were expected to be chronically ill and to have received more home care than other clients. The clients who had these four diagnoses were found to be younger and more often female, they also had a smaller share of total home care hours and service events each year than expected, and individual clients received less home care and had a smaller number of service events on average than the clients who had other diagnoses. This definition that focused on the four highest profile chronic diseases was the least useful for identifying chronically-ill clients who had substantial home care support needs.

Research Question One

The question “Does home care differ by chronic condition?” is difficult to answer. There is no common understanding of what a chronic condition, illness or disease is, and the information collected through the ICD diagnostic classification system and in health service databases does not usually identify persons as being chronically ill. Although it is likely that home care differs by chronic condition, medical diagnoses were not helpful for identifying the persons who needed and received considerable home care support.

Research Question Two

The question “Does home care differ if multiple chronic conditions exist?” is also difficult to answer. Many differences among clients with regard to their home care hours and number of service events were found, although clients with few diagnoses received more home care on average than clients who had many diagnoses. Home care clients typically had many comorbidities, a finding that suggests physical disability and self-care deficits are more important to assess than the number of comorbidities that a person has.

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Research Question Three

The question "Are there differences in home care on the basis of age, gender, or living arrangements?" is easily answered. Younger persons received more hours of home care on average than older persons did. Females received slightly more hours of home care on average, although females were typically much older than males. Home care clients who lived with someone else received more hours of home care on average than clients who lived alone. Home care visits or service event findings usually showed the same utilization patterns. These findings indicate that current population-based and evidence-based information on health care clients and health services utilization is extremely important for health services planning and health policy.

Research Question Four

The question "Are there differences in home care for persons living in rural areas versus urban areas?" is also easily answered. Rural residents of Alberta were less likely to become home care clients, but once admitted to their region's home care program, they received a higher number of home care visits or service events each year on average. The hours of care that they received on average each year were less, however, as compared to the care hours of urban residents. These findings show home care varies between urban and rural areas, with rural home care appearing to be more routine and less specialized. Rural home care may be more oriented to sustaining chronically-ill persons at home over the long term, while urban home care may be more oriented to other purposes, such as shortening hospital stays by permitting early discharge from hospital. Further research studies to compare rural and urban home care services are indicated, as access to home care is more limited in rural areas. These studies should aim to improve support for chronically-ill persons, with studies needing to determine if improved access to home care and a higher number of hours of home care or more frequent home care visits can sustain or improve health and prevent hospitalizations or nursing home admissions.

Other Considerations and Recommendations

Among all five definitions, the chronic illness definition that was based on the long-term and short-term classifications made by home care nurse assessors was the most successful at identifying clients who received a substantial amount of home care. As such, this definition of chronic illness was the most valid. The second definition that used actual length of stay in the home care program was also helpful for showing long-stay clients receive a very large share of total home care hours and service events, with long-stay clients also receiving a higher number of care hours and service events on average, but this was a retrospective approach as compared to the first definition's more useful prospective approach. The care classification assessments made by home care nurses were also more successful for identifying home care clients with substantial home care needs than the two multiple regression tests were at identifying the factors that could predict higher home care hours or predict a higher number of service events.

The findings of this study show home care utilization is a complex and not easily explained process, although chronicity appears to be a major factor in higher home care hours and more home care visits or service events. Although attention tends to focus only on the number of hours of home care provided to home care clients or provided overall each year, the frequency of home care visits is another important consideration. Home

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care clients may need home care services every day, or multiple times each day. Both measures have major home care resource planning and policy implications.

Some data access and data quality issues were identified as a result of regionalized health services data collection. Provincial or national criteria for health services data collection, data storage, and data sharing should be developed to ensure evidence-based health care information is available for policy and service planning.

The ICD diagnostic classification system and health care databases do not typically distinguish chronic diseases or illnesses from acute ones. To facilitate the health policy and planning that is needed to help chronically-ill persons stabilize or maintain their health and support them outside of care facilities, health care databases need to be adapted or created to collect data on chronic illness. Research is also need to develop valid and reliable indicators of chronic illness, and to study the health benefits and other outcomes of various levels or amounts and different types of home care provision.

Conclusions

This study found a large proportion of home care clients are persons who live at home with multiple health concerns. Although diabetes, stroke, COPD, and cancer are among the most recognized chronic diseases, these were not the most common health conditions among home care clients. The most common diagnoses, among the many different ones that home care clients were assigned in hospitals and ambulatory care settings, were physical activity issues and kidney failure. This study also found home care services were provided on average for only 2 hours each week, and that the number of Albertans who receive home care services has declined in recent years.

This study also found a large proportion of total home care hours and total home care visits or service events each year are used to support persons who could be described as chronically-ill with substantial home support needs. These findings suggest that home care provision, home care services planning, and home care policy should not be based on a single medical diagnosis nor even on multiple diagnoses, but instead on a comprehensive individual assessment that takes each client's current and projected health state, as well as their physical capacity and self-care abilities, and many other factors such as spousal and living arrangements into consideration.

Although additional research to substantiate the findings of this study in other provinces or territories is needed to solidify these conclusions, research efforts need to be directed at assessing the need for home care among seniors and younger disabled persons. Research is also needed to identify the number of hours of home care and the frequency of services events each week that are needed to maintain chronically-ill persons at home. Home care studies are also needed to show the outcomes of varying amounts and types of home care, and to show when home care can prevent hospitalizations and nursing home admissions. These studies will help to better understand the relationships between chronic illness and home care, and to forecast home care needs in Canada.

Disclaimer

The views expressed herein do not necessarily represent the views of Health Canada, the Government of Alberta, nor Alberta Health and Wellness.

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Seeking Information on Linkages Between Chronic Illness and Home Care

Through an Analysis of Alberta's Home Care Data

Most people who reach the age of 65 have one or more chronic illnesses (Goetghebeur et al., 2003; Ko & Coons, 2005). Chronic illnesses are not confined to old age, as younger persons also commonly report having chronic health conditions (Patten, 2005; Rapoport, Jacobs, Bell & Klarenbach, 2004). The impact of chronic conditions varies from minor to serious or life threatening, with the ones that limit a person's ability to live independently more common in old age (Wilkins & Park, 1998). Although acute episodes of ill health are usually addressed by care in hospital, the ongoing care of persons who are disabled by chronic illness is normally provided outside of hospitals. Much of this care is provided by family caregivers (Cranswick, 1998; Wilkins & Park, 1998). Formal home care services may also be provided to support chronically-ill persons at home (Forbes et al., 2003; Health Canada, 1999; Wilkins & Park, 1998; Sheps et al, 2000). With a projected increase in chronic illness and with population aging, it is important to understand the linkages between chronic illness and home care.

A research study was conducted to examine existing relationships between chronic illness and home care utilization. This study used Alberta Health and Wellness home care and other data routinely collected on home care clients in the province of Alberta. This report outlines this data, and the research methods that were used to identify and assess relationships. The research findings and some implications of these findings for health services planning and policy are also provided. This report begins with a brief literature review on home care and chronic illness.

Literature Review

To perform this study, chronically-ill home care clients needed to be differentiated from home care clients who are not chronically ill. Chronic illness definitions were therefore sought. The literature was also reviewed to understand the extent of chronic illness in Canada and to learn who suffers from chronic illness. Information on Canadian home care clients and home care services was also sought.

Chronic Illness Definitions

A search for a definition of chronic illness for this research study revealed some common understandings about chronic illness or disease, and no single or universally-used definition. The World Health Organization (2005), one of the most credible information sources, reported that chronic diseases often have their origins at younger ages, are either incurable or long term, and tend to progress or worsen over time. Cardiovascular diseases, primarily heart disease and stroke; cancer; chronic respiratory diseases; and diabetes were identified as the "main" chronic diseases.

Each disease once it has been diagnosed is assigned a specific code in the International Classification of Diseases (ICD) system to distinguish it from other diseases (World Health Organization, online). These codes do not usually specify if the disease is chronic or acute. ICD-10 is the latest version in this disease classification series, with the

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ICD-9 system still used occasionally. As there are many hundreds of diagnostic codes for the many different diseases that can be diagnosed, these codes are commonly grouped into chapters or chapter headings; such as diseases of the circulatory system, diseases of the respiratory system, etcetera. According to the World Health Organization (online):

> The ICD has become the international standard diagnostic classification for all general epidemiological and many health management purposes. These include the analysis of the general health situation of population groups and monitoring of the incidence and prevalence of diseases and other health problems in relation to other variables such as the characteristics and circumstances of the individuals affected. It is used to classify diseases and other health problems recorded on many types of health and vital records including death certificates and hospital records. In addition to enabling the storage and retrieval of diagnostic information for clinical and epidemiological purposes, these records also provide the basis for the compilation of national mortality and morbidity statistics.

Although the terms "chronic disease" and "chronic illness" are used interchangeably, a person diagnosed with a chronic disease may not be ill. Diabetes mellitus is an example of a common chronic disease that can be controlled, and have little or no impact on the person's health and ability to live independently. Diabetes can also progress to kidney failure and other secondary diseases, a time when illness and disability is often present. Chronic illness refers to the experience of ill health, a state where the person is not well and is limited in their ability to live independently (Walker, 2001).

The Extent of Chronic Illness in Canada

Rapoport, Jacobs, Bell, and Klarenbach's (2004) report on 1999 National Population Health Survey data shows 62% of Canadians aged 20-39, 56% of Canadians aged 40-59, 80% of Canadians aged 60-79, and 88% of Canadians aged 80 and older have one or more chronic illnesses. The chronic diseases that were responsible for the highest use of health care were back pain, arthritis or rheumatism, high blood pressure, and migraines for people under the age of 60; and arthritis or rheumatism and high blood pressure for people 60 years of age or older. Patten's (2005) report on National Population Health Survey data indicated instead that 4.1% of Canadians aged 12 and older had one or more chronic conditions in 1994/96, as compared to 4.1% in 1996/98 and 4.4% in 1998-2000.

A report on 2000 Canadian Community Health Survey data by Ohinmaa et al. (2006) showed 10.5% of Albertans had one or more of three major chronic diseases: heart disease, diabetes, and COPD. Gilmour and Park's (2006) study using 2003 Canadian Community Health Survey data indicated that chronic pain and disabilities are more common in old age. Instrumental activities of daily living dependency, where the person needs help with housework and shopping, was more common than for activities of daily living such as bathing and eating. Dementias and stroke were commonly associated with dependency of both kinds.

Many additional research reports are available on specific chronic diseases such as heart disease, kidney disease, dementias, mental illness, depression, lung disease, and etcetera. These reports typically say that a growing proportion of Canadians are being diagnosed with these diseases. The World Health Organization's (online) website

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similarly states that chronic diseases have become a major problem worldwide and that this problem could worsen unless individual and policy actions are taken: "Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 60% of all deaths."

Factors Associated with Chronic Illness in Canada

Although it is possible to be born with a health problem, most chronic illnesses are acquired over a lifetime of exposure to lifestyle and environmental risk factors (World Health Organization, 2005). Three other factors are commonly linked with chronic illness: (1) aging (Gilmour & Park, 2006; Rapoport, Jacobs, Bell & Klarenbach, 2004), (2) female gender (Michelson et al., 2000; Orfila et al., 2006), and (3) low income or education (Marmot, Kogevinas & Elston, 1987; Haan, Kaplan & Camacho, 1987).

Home Care Clients and Services in Canada

Nine large-scale published research reports on home care in Canada are available for review. The early reports indicate limited access to home care. Wilkin and Park's (1998) survey report showed family caregivers were providing the majority of home care services. Home care commonly involved help with activities of daily living; such as bathing, dressing, eating, and walking. Home care recipients typically suffered from multiple chronic illnesses, with 2/3 aged 65+ and 2/3 women. Cranswick's (1998) study also found personal care was the most common assistance received at home; with it provided most often by spouses, mothers, or daughters. Chen and Wilkins' (1998) study revealed half of all Canadians who believed they needed formal home care were not receiving it. Sheps et al.'s (2000) study of British Columbia health services data for the years 1986 and 1993 found no increase in home care services had occurred despite a decline in acute care hospital beds.

Changes and differences in home care services have also been identified. Forbes et al. (2003) found formal help with housework declined across Canada between 1994 and 1999, but nursing care services in the home had remained stable. Home care services were said to have shifted to being more illness oriented and less health promotion oriented. Forbes and Jansen's (2004) next study used National Population Health Survey data found home care was more commonly provided in urban areas, as only 1.8% of rural males and 3.3% of rural females were receiving home care in 1998/99 as compared to 2.0% of urban males and 3.5% of urban females. Age was also linked to utilization, with 1.0% of rural residents under the age of 65 and 11.1% of rural residents aged 65 or older receiving home care. Similarly, 1.1% of younger urban residents and 12.0% of older urban residents were receiving home care. Persons with chronic illnesses were also identified as common home care recipients.

A study using home care and nursing home data for Alberta showed half of all nursing home residents in Alberta had received some home care in the year before they were admitted to a nursing home (Wilson & Truman, 2004). Wilson et al.'s (2005) next study found home care clients in Alberta had doubled from 1991 to 2000, although only 21% of the Albertans who died in those years had received home care in the last year of life. Short-term clients also increased considerably, with half of all home care clients still

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classified as long term. Palliative home care clients doubled in the 10 years, but were a small proportion of total clients (under 7%). Care hours for palliative clients averaged 90 hours over the last 3 months of life. Home care was mainly provided by home care aides.

Forbes, Morgan, and Jansen's (2006) report on Canadian Community Health Survey data showed Canadians who suffer from dementia need more home care than those with physical dependency. Laporte, Croxford, and Coyte's (2007) report on 1998 Ontario home care services showed age, sex, and comorbidities are the best predictors of need for home care. These predictors were also linked to the amount of home care received. Persons with lower socio-economic status and new immigrants were more likely to receive home care and to receive higher intensity home care.

Research Methodology

With no single or universal definition of chronic illness to guide this study, and with few ICD diagnostic codes indicating a state of chronic ill health, five definitions of chronic illness were developed and tested. The five sets of findings were then compared to identify and assess relationships between chronic illness and home care. These findings were also used to answer the research questions: (1) Does home care differ by chronic condition?, (2) Does it differ if multiple chronic conditions exist?, (3) Are there differences by age, gender or living arrangements?, and (4) Are there differences for persons living in rural areas versus urban areas?

Operational Definition One

The first definition was based on existing home care client classifications that differentiated some clients as long term and others as short term. In the Alberta Home Care Database, clients are classified by their anticipated need for home care as such:

Short Term - "Individuals who are expected to require home care services on a short term basis (less than 3 months) to recover from an acute illness, or an exacerbation of chronic or recurrent illness."

Long Term - "Individuals who are expected to require home care services on a continuing basis for greater than three months to gradually improve or maintain health status, functional status, level of independence, or to delay deterioration."

Palliative - "Individuals who are in the end stage of a terminal illness, and for whom treatment aimed at cure is no longer appropriate; treatment and care is aimed at maintaining and improving the client's remaining life."

Alberta Aids to Daily Living - "Helps Albertans with a long-term disability, chronic illness or terminal illness to maintain their independence at home, in lodges or group homes by providing financial assistance to buy medical equipment and supplies."

No definition for self-managed clients was available. These clients are provided with funds so they can hire their own home help.

This definition identified long-term clients as chronically ill, since they had been assessed by home care nurse assessors as needing home care on an ongoing, perhaps permanent basis. Short-term clients were not considered chronically ill, as they were not assessed as needing long-term home care. Palliative clients and other home care clients were excluded from analysis. An early data analysis showed approximately half of all

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home care clients were classified as long term and one third classified as short term.

Operational Definition Two

The second definition used actual length of stay in the home care program to identify long-stay clients (90 days or more) and differentiate them from home care clients with shorter stays (<90 days), as calculated on an annual basis. An early analysis of the data showed approximately half of all home care clients had stays of 90 days or more.

The justification for this definition is that Alberta Health and Wellness already classifies home care clients who are expected to need home care for three or more months as long term. These persons are more likely to be chronically ill, while those with shorter stays are less likely to be chronically ill. This definition was also based on the logic that some home care clients who are classified as long term can have a short stay in the home care program, while some short-term home care clients can have a long stay. Palliative clients can also have a long or short long stay. An early analysis of the data showed that 19.3% of home care clients who had been classified as long-term the first year, as well as 21.2% the second year and 21.5% the third year did not receive home care as expected for three months or more. Furthermore, 23.4% of all home care clients who were classified as short-term the first year, as well as 34.6% the second year and 36.0% the third year exceeded the expectation that they would receive home care for less than three months. Among home care clients who were classified as palliative, 50.7% the first year, 49.3% the second year, and 48.1% the third year exceeded the expectation that they would receive home care for less than three months.

Operational Definition Three

The third definition used a high number (4 or more) of ICD diagnostic chapter headings to distinguish chronically-ill home care clients from other clients. A preliminary analysis of data revealed 3.5 was the median number of ICD chapter headings, with clients who had 4 or more chapter headings assigned to them in the year that they were receiving home care accounting for 11% of all home care clients.

For this definition, all ICD-9 and ICD-10 diagnostic codes that were assigned to home care clients in physician offices or other health care settings were grouped into 19 possible chapter headings. This definition was based on the logic that when a person is diagnosed with an illness, such as diabetes mellitus, that person is assigned a diagnostic code for diabetes mellitus and one ICD chapter heading. If this disease progresses to where it and other secondary diseases are affecting multiple body organs or bodily systems, this person will have additional diagnostic codes and chapter headings assigned. The people who have multiple ICD chapter headings assigned have many body systems affected by their various illnesses; these persons are likely to be chronically ill.

Operational Definition Four

The fourth definition distinguished home care clients by the number of diagnoses assigned to them in the year that they received home care, with clients having many diagnostic codes or diagnoses (40 or more) more likely to be chronically ill as compared

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to clients with fewer diagnoses (<40). An early analysis of data showed 39 was the median or middle number of diagnoses, and that clients with 40 or more diagnoses accounted for approximately half of all home care clients.

The justification for this definition is that comorbidities or multiple chronic illnesses are common among chronically-ill persons. Persons with a high number of diagnoses, gained through one or more admissions to hospital, one or more physician office visits, and/or one or more ambulatory care visits are likely to be chronically ill.

Operational Definition Five

The fifth definition distinguished home care clients as to whether or not they had been diagnosed with one or more of four chronic diseases: Cancer, chronic obstructive lung or pulmonary disease (COPD), diabetes mellitus, and stroke or cardiovascular accident. An early data analysis showed 7-22% of home care clients were diagnosed with each disease, and half of all clients were diagnosed with one or more of them.

The justification for this definition is that these four diseases are widely understood as being chronic and common among Canadians. Other diseases were either less common or more common among the home care clients. Hypertension, for instance, was one of the most commonly diagnosed diseases with more than 50% of clients having it. Hypertension could not be used then to distinguish two groups of home care clients. Congestive heart failure was also not studied, as it was specified as a distinct disease in the ICD-9 classification system, but was not as easily identified using the ICD-10 system.

Data Acquisition

Following ethics approval from the University of Alberta and agreement from Alberta Health and Wellness, data on home care services and home care clients were provided by Alberta Health and Wellness for three fiscal years: 2003/04, 2004/05, and 2005/06. The following five databases were used to inform this research: Alberta Home Care Database, Registry Database, Physician Billing or Claims Database, DAD or Inpatient Hospital Database, and ACCS or Ambulatory Care Database (data variables are listed in the Appendix). To ensure individual anonymity, the data provided did not include any personal information on clients. In obtaining the necessary data, it became apparent that the datasets were missing data which impacted the analysis of the research questions. For example, in 2005/06, approximately one third of client data were missing as compared to the earlier 2004/05 year. In further analysis, it became apparent that the missing data were from one health region that did not submit home care data to Alberta Health and Wellness.

Preparing the Data for Analysis

Once received, data were examined and cleaned. Missing and inaccurate data were addressed on a case-by-case basis, with corrections made when possible through searching the other datasets to obtain missing or correct data. All datasets were exported to text files and then imported to Microsoft ACCESS. The most compact data type was used for each variable since datasets were large. Dataset files were flattened and tied to

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lookup tables. Dates provided in a 10 character (YYYYMMDD) format were converted to Access Date/Time variables in mm/dd/yyyy format. All datasets were reduced to only include data for persons who had received one or more home care services each fiscal year. Data was kept distinct to each fiscal year, as most health services utilization reports use this format and annualized accounts of health services utilization are common. The date range for each fiscal year was April 1 through March 31.

Diagnostic aggregation was also required, as diagnostic data were obtained from multiple sources. The datasets containing diagnostic information were queried for valid diagnostic codes, which were then added to a linear (1 diagnostic per record) table. A total of 8,438,520 diagnoses or diagnostic codes (this includes all diagnostic code fields recorded for each visit/admission) were identified as having been assigned in 361,986 health service events in hospitals or physician offices. The issue of receiving both ICD-9 and ICD-10 diagnostic data – with the diagnostic data in the Physician's Claim dataset based on the ICD-9 system – was addressed by grouping on the basis of the 3 letter code or first 3 characters of the ICD-10 diagnostic code, as ICD-9 can group on ICD-10. Following this, an iterative routine was employed to scan all of the diagnostic fields in each table for non-null data – the maximum number of diagnosis fields per record is 25 for inpatient stays, 10 for ambulatory care visits, and 3 for physician claims. Each record included the diagnostic code, the ICD '3 number' diagnostic category, and the ICD-9 or ICD-10 chapter heading. ICD-9 and ICD-10 chapter headings are similar, except that ICD-10 has one additional chapter heading; this chapter was irrelevant as it relates to injuries. Once the operational definitions were developed, the diagnostic codes were also classified as to whether they represented one or more of the four select chronic diseases.

Home care data were then aggregated to generate a summary file with a single record per home care recipient per year. Homecare events and homecare hours were totaled according to type of service for each record. The linear table of diagnostic codes was also aggregated, with diagnostic counts according to ICD chapter heading and diagnostic counts for each of the chronic illness categories added to each record of the home care summary file.

Three products were developed for data analysis. The first was three data files developed to permit ACCESS inquiries and thus the initial exploration of the data: (a) a diagnostic file containing all diagnostic data dated to each fiscal year, (b) a home care client file containing all socio-demographic data dated to each fiscal year, and (c) a home care service file containing all home care services dated to each fiscal year. Once the initial exploration of data had occurred, and the five operational definitions assessed as valid to study, a second product was developed for SPSS data analysis. This was a large or comprehensive database containing all data. The third product, a much smaller database containing data for the multiple regression tests, was then prepared.

Analysing the Data

A four-step process was used to analyse the data. First, ACCESS inquiries were used to explore the data. Next, all data variables were explored using the frequencies and summary statistics (i.e. mean or average, median, mode, standard deviation, and range) functions of the SPSS program. Similarities and differences between the three years were noted, as well as similarities and differences within each year. Data were then explored

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using statistical tests to compare mean or average scores, assess distribution probabilities, and assess for relationships between variables. The last step, multiple regression testing, was used to examine the relationship between all possible independent or predictor variables and a single dependent or criterion variable. Two such tests were used to determine predictors for home care hours and predictors for home care service events in the 2003/04 year, the only year that had complete home care utilization and client data.

Some inconsistencies among the findings were found because of missing data. Normally this was less than 1% per variable, with the exception of living arrangement (12% missing data), marital status (17.5% missing data), language spoken (20% missing data), service event data (27.5% missing in the second study year), and date of death data (100% missing in the first study year). Variables with 20% or more missing data were excluded from analysis, with some noted exceptions below. Caution in interpreting findings that involve marital status data and living arrangement data is needed.

Findings

The findings of this study are divided into two sections. The first section focuses on home care clients. The second focuses on home care services.

Home Care Clients

Table 1 shows home care clients numbered 53,922 the first year, 60,597 the second year, and 34,859 the third year. The number of clients who were classified by home care nurse assessors as needing short-term, long-term, palliative, or another type of home care is also provided, with approximately half each year classified as long-term clients. Clients increased considerably in number (9.8%) from the first to second year, with a substantial proportion of clients missing the third year. The findings that follow focus mainly on the first two years.

Table 1 also shows a relatively consistent ratio each year of roughly 60 females to 40 males. This gender pattern was also evident in the two metropolitan or urban regions of Alberta (Calgary and Capital/Edmonton), as well as the seven non-metropolitan or rural regions in both the first and second year. Approximately 3/4 of all home care clients lived in the two urban health regions.

As also shown in Table 1, the average age of home care clients was consistent from the first to second year (68.9 years). Over the first two years combined, and in each of the first two years, clients ranged in age from 0-106 years old, with a median age of 75, a mode of 83, and a standard deviation of 20, indicating considerable spread in their ages, but with this spread consistent over the two years. Approximately 2/3 clients were 65 years of age or older (69.9% and 69.4% respectively). On average, female clients were older (71.1 years each year) than male clients (65.4 and 65.5 respectively) each year, with this difference significant each year ($t=32.847$, $df=53643$, $p=.000$ and $t=34.091$, $df=60282$, $p=.000$ respectively). In the first year, urban clients were younger (on average) than rural clients (68.0 and 70.0 years of age respectively), a significant difference ($t=14.148$, $df=148568$, $p=.000$). In the second year, urban and rural clients both averaged 70.0 years of age.

Table 1 also contains “premium pay category” findings. Albertans are required to

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pay the full monthly Alberta health care insurance premium unless they are eligible for a full or partial subsidy because they are Aboriginal, a senior citizen or live with a senior citizen, a widow or widower, have a Government program paying the premium, are on social assistance, or are receiving a waiver such as for students with low incomes. In the first two years, approximately 3/4 of all home care clients did not pay the full premium. Rural home care recipients more often received the premium subsidy (80.0% and 79.0% each year) as compared to urban clients (76.9% and 76.6% each year), a significant difference each year (X2=59.764, df=1, p=.000 and X2=37.54, df=1, p=.000).

As shown in Table 1, just over half of all home care clients were not married. Among rural clients, 56.6% and 55.5% were not married in each of the first two years, as compared to 56.7% and 56.7% urban clients. Female home care clients were more often not married (65.6% and 65.3% each year respectively), while males were more often married (57.0% and 57.0% each year respectively), a significant difference each year (X2=2.255, df=1, p=.000 and X2=2.489, df=1, p=.000 respectively).

Table 1 also shows approximately 2/3 of home care clients lived with another person. This living arrangement pattern was evident for both urban and rural home care recipients, although a higher proportion of rural clients lived alone (39.2% and 37.6% respectively), as compared to urban clients (34.5% and 33.9% respectively). This rural/urban difference was statistically significant each year (X2=89.723, df=1, p=.000 and X2=62.155, df=1, p=.000). Both males and females were more likely to be living with someone than living alone, although a higher proportion of males lived with someone as compared to females. In each of the two years, 57.1% or 58.1% of females lived with someone else, while 75.3% or 76.1% of males lived with someone else, a significant gender difference each year (X2=1.607, df=1, p=.000 and X2=1.814, df=1, p=.000).

Although not shown in Table 1, 82.6% of home care clients the first year and 79.2% the second year had English listed as their primary language. No further analysis was conducted as 20% of data were missing. Furthermore, in the second study year, 7,856 (13.0%) of all clients who were receiving home care died that year. The gender of deceased clients was almost equally as likely to be male or female, with 3,986 females dying (50.7%) and 3,870 males dying (49.3%). A higher proportion of male home care clients died (8.6%) as compared to female clients (5.8%), however, a significant gender difference (X2=3.514, df=1, p=.000). Clients who died were significantly older than clients who did not die (75.0 versus 68.0 years of age, t=29.255, df=60282, p=.000). More urban clients died than rural clients (5,913 versus 1,943 persons); with this 75.3% to 24.7% ratio similar to the proportions of clients served in urban and rural health regions. A higher proportion of urban clients died, however, as compared to rural clients (7.1% versus 6.3%), a significant difference (X2=19.474, df=1, p=.000). Slightly more clients who died did not have a premium subsidy as compared to clients with a full or partial subsidy (4,146 versus 3,710 persons, a ratio of 52.8 to 47.2). However, 16.1% of unsubsidized clients died as compared to 4.2% of subsidized clients, another significant difference (X2=4.413, df=1, p=.000). Clients who died were almost equally as likely to be married or not married (3,403 versus 3,396 persons, a ratio of 50.1 to 49.9), although 8.1% of married persons died as compared to 6.2% of unmarried persons, a significant difference (X2=1.267, df=1, p=.000). Finally, the majority of home care clients who died did not live alone (4,959 or 68.5% versus 2,276 or 31.5%), with 7.4% of all clients who

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were living with someone dying and 6.4% of all clients who lived alone dying, another significant difference in expected versus actual proportions (X2=50.338, df=1, p=.000).

Table 2 provides an overview of home care client socio-demographic data divided into the four main client types. Long-term clients were more likely to be female, as compared to the three other client types. Long-term clients were older on average each year as compared to the three other client types who were similar in terms of mean or average age, median age, and age range. Just over 80% of long-term clients were seniors each year, as compared to approximately 60% for the three other client types. Long-term clients were the most likely to have their health care insurance premium subsidized, as compared to the three other client groups, although approximately half of all palliative clients did not pay the full premium. Long-term care clients were the most likely to be not married and palliative clients were the most likely to be married. Palliative clients were the most likely to be living and/or receiving care in an urban region. Long-term clients were the most likely to be living alone, although slightly more than half lived with another person. Palliative clients were the most likely to be living with someone.

Table 3 illustrates the diversity of assigned diagnostic codes, as shown for each of the four types of clients. Eleven codes were responsible for 5% or more of all of the diagnostic codes. Cancer was a common diagnosis among palliative care clients, but uncommon among other clients. Kidney failure and dialysis was relatively common among long-term clients and short-term clients. Hypertension was present across client types, as were diabetes mellitus and depression. The most common diagnostic code for all clients combined was “other physical activity.”

Home Care Services

The following findings are divided into three sections: (a) an overview, (b) the findings associated with the five definitions, and (c) the multiple regression findings.

Home Care Service Findings Overview

Table 4 shows comparisons of home care hours and home care visits or other service events on the basis of gender, age, rural or urban residence, premium subsidy status, and living arrangement for the 2003/04 year. Service events are home care visits or other episodes of care, such as those provided by telephone. Corresponding socio-demographic findings are also provided.

This table shows females had a higher number of care hours as well as a higher number of service events on average, as compared to males. Urban home care clients, who were younger and more likely to be living with someone as compared to rural clients, received more hours of care on average, although rural clients had a higher number of service visits on average. Clients with subsidized health care insurance premiums, who were older and lived alone twice as frequently as clients who were not premium subsidized, received slightly more hours of home care and slightly more service events on average as compared to clients who did not have the premium subsidy. Clients who cohabitated received more hours of home care and had more service events on average than persons who lived alone. Younger persons under the age of 65 received significantly more hours of home care on average, although older persons had more

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service events on average.

Table 4 also illustrates weak or insignificant correlations when the number of service events and the number of care hours were correlated with client age, total diagnoses per client, and total ICD chapter headings per client.

Table 4 also show descriptive findings, ones that demonstrate considerable variability in home care provision among clients. The median number of hours of home care received was 5, with a mode of 0 hours (less than one hour), and mean or average of 108.4 hours. Total service events on an individual client basis also varied considerably, with a median of 13, mode of 0.5, and mean or average of 54.3.

Table 5 shows additional care hour and service event findings. In the 2003/04 year, 5,853,603 hours of care were provided over 2,931,464 service events to 53,922 home care clients. These hours and events, if equally shared among all clients, would have resulted in an average of 108.6 hours of care and 54.4 service events. In the 2004/05 year, 111.1 hours of care were provided in 55.3 service events on average. A t-test comparing the mean or average hours of care for the first and second year was not significant ($t=1.119$, $df=113,927$, $p=.263$). A t-test to compare the mean or average number of service events for the first and second year was also not significant ($T=.397$, $df=113,927$, $p=.691$). The average number of hours of care provided per service event in both the first and second year was identical (2.0).

Table 5 also shows care provider hours, with information provided on respiratory therapists, home support aides, licensed practical nurses, nurses, occupational therapists, physiotherapists, and social workers. Self-managed care is also listed; with self-managed care workers often being home support aides, but they could be any other type of worker that is employed by these home care clients. For self-managed clients, the hours listed are what were provided over an entire month, as averaged among all such clients. In the first two years, self-managed clients received 90.5 and 72.6 hours of care on average each month respectively. Among all other care providers, social workers had the longest time per service event recorded (5.7 hours and 7.1 hours on average respectively each year), as compared to respiratory therapists (4.0 and 3.6 hours), occupational therapists (3.3 hours and 3.0 hours), home support aides (2.0 hours each year), physiotherapists (1.8 hours each year), registered nurses (1.1 hours and 1.2 hours), and licensed practical nurses (0.6 hours and 0.5 hours). Different patterns of care were evident with regard to the share of total hours of care and total service events each year. Home support aides supplied 62.9% and 63.9% of all care hours in the two years respectively, as well as 63.2% and 64.5% of all service events in the two years respectively. Registered nurses were the next most common service provider in terms of share of total care hours and total service events; with all other providers having a smaller share of total care hours and total service events.

Operational Definition One Findings

As shown in Table 6, considerable differences were found when long-term and short-term clients were compared. In each of the two years, long-term clients were significantly older, with a difference of 12.3 years in average ages for the first year and 11.4 years for the second year. More long-term clients each year were female, a relatively small difference (as more than 55% of the clients in both groups were female) but one that was statistically significant. A higher proportion of long-term clients were from the

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two urban regions as compared to the seven rural regions, another small but still significant difference. Considerable differences existed with regard to average care hours and average service visits, with long-term clients receiving 15 times more care hours on average and 9 times more service events on average than short-term clients. Long-term clients were also responsible for 96.3% of all care hours provided in the 2003/04 year and 93.5% of all service events that year. Although not shown, utilization differences among long-term clients were found; for instance, 80% of long-term clients had 66 service events or less each year, while 5% had 280 service events or more each year.

Operational Definition Two Findings

As shown in Table 7, considerable differences existed between the home care clients who received home care services for 90 or more days each year as compared to those who received home care for less than 90 days. The average ages differed by 8.1 and 8.7 years in each of the two study years, with long-stay clients significantly older. A greater proportion of long-stay clients each year were female, a small but still significant difference as more than 55% were female in both groups. A higher proportion of long-stay clients were from the seven rural regions, another relatively small but significant difference. As compared to short-stay clients, long-stay clients received 15 or 22 times more care hours on average and 14 or 17 times more service events on average each year respectively. Long-stay clients were responsible for 95.5% of all care hours provided in the 2003/04 year and 94.4% of total service events that year. Considerable differences in utilization across long-stay clients were also found. Although not shown, approximately 80% of long-stay clients had 62 service events or less in each of the two years, while 5% had either 482+ or 488+ more home care visits in each of the two years respectively.

Operational Definition Three Findings

Table 8a shows that diagnostic codes most often were in the ICD chapter heading "factors influencing health status and contact with health services" (18.6%), followed by the chapter headings "diseases of the circulatory system" (13.8%) and "symptoms, signs, and ill-defined conditions (10.4%). Six other chapter headings had more than 5% of all diagnostic codes grouped into them: Mental disorders (7.2%), diseases of the genitourinary system (7.0%), diseases of the musculoskeletal system and connective tissue (5.7%), diseases of the nervous system and sense organs (5.6%), diseases of the respiratory system (5.5%), and endocrine, nutritional and metabolic diseases, and immunity disorders (5.1%).

As shown in Table 8b, 8c, and 8d, home care clients usually had more than one ICD chapter heading assigned to them, with Table 8c showing that only 3,740 (2.5%) home care clients had 1 or no ICD chapter heading assigned to them. Table 8e shows that clients with 4 or more chapter headings were younger, more often male, and more often urban. Clients with 4 or more ICD chapter headings had significantly fewer hours of care, but a higher number of service events. Table 8e also shows that clients with 4 or more ICD chapter headings were responsible for more than 80% of the total care hours and total service visits in both the 2003/04 and 2004/05 years.

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Operational Definition Four Findings

Table 9a shows the origin of the diagnostic codes assigned to home care clients, with most diagnoses assigned during community physician visits. Tables 9b and 9c show home care clients with 0-39 diagnoses received a significantly higher number of care hours and service events on average than clients who had 40+ diagnoses. Clients with 40+ diagnoses were older, more often female, and more often urban. Furthermore, the clients with 40+ diagnoses, who were 47.5% and 48.1% of all home care clients in the 2003/04 and 2004/05 years respectively, were responsible for less than half of all home care hours and all service events. In the 2003/04 year, only 38.5% of all home care hours and 45.3% of all service visits were accumulated by clients who had 40+ diagnoses.

Although not shown in any tables, home care clients had between 0 and 1,770 diagnoses assigned to them. Most (99.0% to 99.1%) home care clients visited a physician one or more times each year, most (87.6%) home care clients had one or more ambulatory care visits each year, and just over half (55.1% to 56.4%) were admitted to hospital one or more times each year.

Operational Definition Five Findings

Table 10a shows nearly half of all clients were diagnosed with one or more of the four selected chronic diseases, with cancer and COPD the more common among the four. Table 10b shows some diversity exists between clients who were diagnosed with each of the four chronic diseases. Home care clients who had one or more of these four diagnoses are typically elderly, although clients who had had a stroke were the oldest on average. While home care clients who were diagnosed with cancer or diabetes were almost equally as likely to be male or female, clients diagnosed with COPD or stroke were more commonly female. Table 10b also shows clients who had had a stroke had the highest number of service events and number of home care hours on average.

Table 10c contains the findings when clients diagnosed with one or more of the four chronic diseases were compared with clients who were not diagnosed with these four diseases. Clients who had one or more of the four diseases were significantly older (by 4.1 or 4.2 years each year respectively). Most clients in both groups were female, and the group with the four specific chronic diseases had a higher proportion of males. Most clients in both groups were urban. Considerable differences existed with regard to average care hours, with the clients diagnosed with the four diseases receiving considerably less hours of home care each year on average. In the first year, the clients who had the four diseases also had fewer services events on average. That year, the share of total care hours for home care clients with the four diagnoses was also less than the share of total home care hours for the other clients (43.0% versus 57.0%). The share of total service events for home care clients with the four diagnoses was also less than the other group's share of service events (48.2% versus 51.8%).

Operational Definition Comparisons

Table 11 contains comparative findings for the five definitions. As shown, there are differences in the number of clients potentially identified as chronically-ill with each

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definition. Definition three, which focused on chapter headings, had the highest number of clients identified as chronic, with definition four having the fewest clients identified. These two definitions are the most similar, since both are based on client diagnoses. As indicated by the service events/day findings and the hours/service event findings in Table 11, the clients with the highest number of diagnoses and the highest number of chapter headings did not receive as much home care as the clients with fewer diagnoses and fewer chapter headings. The clients who were diagnosed with one or more of the four chronic diseases similarly did not receive as much home care as did the other clients.

Multiple Regression Findings

Table 12 contains the output from the multiple regression analysis that was performed to examine the relationship between all independent variables and the dependent variable, in this case, the hours of home care that were provided to individual home care clients in the 2003/04 year. As shown in the model summary, no independent variables were predictors of home care hours, nor were these variables collectively predictive of home care hours.

Table 13 contains the output from the multiple regression analysis that was performed to examine the relationship between all possible independent variables and the dependent variable, in this case, the number of home care visits or service events for individual home care clients in the 2003/04 fiscal year. As shown in the model summary, no independent variables were predictors of service events, nor were these variables collectively predictive of home care service events.

Discussion

Home Care Clients

Many findings from this study are of interest. One of the first with regard to home care clients is that the number of persons receiving home care in Alberta each year, with 53,922 clients in 2003/04 and 60,597 clients in 2004/05, is less than expected. A past analysis of Alberta home care data found a steady increase in clients each year from the 1991/92 year to 64,887 clients in the 2000/01 year (Wilson et al., 2005). As such, the considerable momentum in home care program growth that occurred as a result of 1993-95 hospital downsizing and other health system changes has apparently dissipated. Other jurisdictions are increasing home care provision instead. A Nova Scotia (1997) home care report highlighted considerable growth in home care clients. A Scottish Government (2006) report also told of a substantial increase in home care clients; with the hours of home care provided per client also increasing 3 percent each year.

This reduction in Alberta's home care clients is a major concern, as potential clients could be receiving supportive care in hospitals or nursing homes instead. Unmet needs for home care could also exist, with chronically-ill persons who need assistance in the home to maintain their health and stay out of hospital not receiving this help. This concern is not new. Chen and Wilkins' (1998) study found only half of all Canadians surveyed who believed they needed formal home care were receiving some. Wilkin and Park's (1998) study of unmet home care needs among community-dwelling Canadians

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also revealed the importance of family caregivers, as these persons provided most care services, a finding that raises concern for persons who do not have families or family members who are available and capable of providing assistance to them.

Client numbers, when compared to Alberta population estimates of 3,172,100 in 2003, 3,201,895 in 2004, 3,236,906 in 2005, and 3,306,400 in 2006, show less than 2% of Albertans each year were home care clients. This low proportion suggests that the already considerable but sill continuing shift from inpatient-based care to ambulatory or outpatient-based care is not being supported by formal home care. The concept of "home alone" is of concern, as home care clients are often elderly, female, and not married. This concern is not isolated to Alberta, a survey in 2000/01 revealed only 1.3% to 2.9% of people living in each province or territory was receiving home care (Canadian Home Care Association, 2003). A recent report by the Nunavut Department of Health & Social Services (2003/04) showed 2.3% of people living in Nunavut were receiving home care.

Another remarkable finding is that 31.3% to 35.2% of Alberta's home care clients each year were classified as short term and another 10.5% to 14.5% each year were classified as palliative with palliative care also expected to be provided for less than three months, which shows home care in Alberta is now almost equally as likely to be for short-term purposes as long-term provision. An earlier baseline report on home care in Canada by Health Canada (1999) found two thirds of all home care clients across Canada had "long-term" home care services. Hollander (2003/2004) and others have raised concern over a shift in home care provision from the ongoing supportive care of seniors, disabled persons, and chronically-ill persons to more acute illness-oriented care purposes (Canadian Institute for Health Information, 2007; Duncan & Reutter, 2006).

Another change is that home care is also being used more often for palliative and end-of-life care purposes. A previous home care study revealed only 7% of home care clients in Alberta were classified as palliative (Wilson et al., 2005). Nearly twice as many Albertans are receiving palliative care in the home now. Although home-based palliative and end-of-life care may not prevent hospital deaths, it is likely to shorten terminal hospital stays if not avoid them altogether. Home-based end-of-life care is also what terminally-ill persons often desire, with this change a positive finding overall.

The finding that around 3/4 of all home care clients lived in the two urban regions (Edmonton/Capital and Calgary) despite one third of Albertans living in the seven rural regions demonstrates that rural home care provision is less than expected. This same issue was identified in the previous Alberta home care study (Wilson et al., 2005). Unmet home care needs may be greater in rural areas, but it is also possible that there is a higher rate of hospitalization and nursing home admission in rural areas, as well as longer rural hospital stays and rural nursing home stays (Wilson & Truman, 2001). The health care funding cutbacks that occurred in Alberta in the mid-1990s were primarily directed at the two urban regions, where more hospitals and hospital beds were closed than in rural areas (Wilson & Truman, 2001). The availability of hospital beds is already considered a major factor in their use (Wilson & Truman, 2001). Although rural persons are often considered vulnerable by having reduced access to health care, the finding that rural residents received nearly three times the number of home visits or other service events each year indicates considerable ongoing support for rural citizens once they have been admitted to their region's home care program. However, rural residents received less than half the hours of home care on average as compared to urban residents (53.6 versus 129.2 hours

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in 2003/04). Additional comparisons of rural and urban home care programs are needed to explore and determine the outcomes of these differences, and rectify them if needed.

The premium subsidy findings show over three quarters of all home care clients each year did not pay the full health care insurance premium. As such, a substantial proportion of home care recipients could be described as low income. The remaining one-quarter, all of whom would be below the age of 65, could be in the same financial state, as home care clients are unlikely to be working when receiving home care. A study of the implications of the low financial state of home care recipients is important for policy and other purposes, as home care supplies and medications are often paid for privately or out-of-pocket in home-based care situations.

Another remarkable finding is the prevalence of cohabitation among home care clients, with two thirds of home care clients living with another person. Other studies have shown that most home care clients live alone (Scottish Commission for the Regulation of Care, 2007). This current finding suggests the cohabitants of home care recipients are elderly and have limited health and well-being, as home care is typically only provided when the family cannot provide the required care.

A related finding is that nearly twice as many female home care recipients were living alone as compared to male home care recipients (42.9% and 24.8% respectively in 2003/04), a situation that likely reflects the fact that women typically live longer than men. Furthermore, female home care recipients were much older than male home care recipients on average (71.1 versus 65.4 years of age respectively in the 2003/04 year). These age and gender differences could explain why females received more hours of home care on average than males (112.6 versus 101.7 hours respectively in 2003/04), and in more service events on average as compared to males (57.85 versus 48.4 respectively in 2003/04). These findings need to be balanced, however, against the finding that younger home care clients received significantly more hours of home care on average than home care clients who were aged 65 or older (140.5 hours compared with 94.5 hours in 2003/04), although elderly home care clients received significantly more home care service events on average than younger home care clients (58.3 and 44.5 events respectively). As such, it is not correct to think that elderly persons are the main or predominant users of home care.

A number of findings highlight the state of health among home care clients, although it can be assumed that with limited home care resources, only those persons who clearly need assistance in the home will receive home care. The wide range of diagnoses and ICD chapter headings identified among these home care recipients shows considerable variability in health concerns. Half suffered from the four main chronic diseases (diabetes, stroke, cancer, and/or COPD), with many other ailments more prevalent among these home care clients. Kidney failure and physical activity limitations were the most common diagnoses. Clearly, there is no typical home care client in terms of ailments. The exception is palliative clients, where cancer was a common diagnosis.

The ICD diagnostic code findings also show home care recipients typically have many health concerns, with the majority having multiple comorbidities. The findings associated with ICD diagnostic chapter headings also show home care recipients typically have many body systems affected by their ailments. Clearly, a large proportion of home care recipients have one or more chronic diseases, and a substantial proportion could be considered chronically-ill. Nearly 90 percent of home care clients also had one or more

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ambulatory care visits and over half were admitted to hospital one or more times in the year that they received home care. This health services utilization suggests home care recipients have unstable health and possibly unmet health care needs. Wilkin and Park's (1998) previous survey revealed home care recipients commonly suffer from multiple chronic illnesses that limit their ability to perform basic activities of daily living (such as bathing and dressing) and also instrumental activities of daily living (such as driving and housekeeping). Another previous study found elderly home care recipients were higher users of hospitals and ambulatory care services than nursing home residents, which suggested that home care recipients were ill and not receiving the health care they needed to stabilize or maintain their health (Wilson & Truman, 2005).

Home Care Services

The information that premium-subsidized home care clients received more hours on average of home care than unsubsidized home care clients (110.5 versus 101.0 hours in 2003/04) is one of many findings that shows home care is not only considerably rationed for persons who have a premium subsidy, but even more rationed for persons who do not have a premium subsidy. This level of service is the equivalent of 2 hours of home care each week. Inpatient hospital care normally involves 3-4 hours of direct care per day and nursing home care normally involves 2-4 hours of direct care per day. Other jurisdictions provide a higher level of home care, such as in Wales and Scotland where 8.5 and 9 hours a week respectively are provided (O'Brien, 2007). Home care recipients in England received 10.1 hours of care on average each week in 2005, an increase over the 7.5 hours provided in 2001 (Health and Social Care Information Centre, 2006).

Home care clients in 2003/04, the best data year, were found to have received their home care in 53.1 service events on average. Although differences among home care clients in the number of their service events were identified, this finding raises concern about whether the ongoing daily needs of chronically-ill persons are being met. If home care is limited to one visit each week, then the care needs of chronically-ill persons who are living at home are not being met by formal home care services. Chronically-ill persons are likely to need care once a day or multiple times each day.

Home care was provided primarily by home support aides. This finding, that the least educated and lowest paid health care worker was the predominant care provider, is consistent with the findings of a previous Alberta home care study (Wilson et al., 2005). This finding shows that a considerable proportion of home care hours are for basic personal or supportive care, such as bathing and dressing, care that can be provided by either family members or health care aides. One third of all hours of home care were provided by health care professionals, with registered nurses first and then licensed practical nurses the most common professional home care providers. The care provided by these and other professionals is skilled, and not likely to be replaceable by family members. Skilled care may be essential for detecting and preventing health problems leading to hospitalization or nursing home admission. Both types of care are essential for chronically-ill persons living at home, with concerns then over whether the home care currently provided to chronically-ill persons is the right quantity and the right type to sustain their health and wellbeing outside of care facilities.

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Chronic Illness Definitions

The findings associated with the five chronic illness definitions outline a number of linkages between chronic illness and home care. Definition one, which focused on the home care clients who were classified as long-term or short-term, shows long-term clients use a disproportionately large share of home care hours and service events, with long-term clients responsible for over 90% of total care hours and over 90% of total service events. Substantial differences in the need for home care between long-term and short-term clients are suggested by these findings, particularly as long-term home care clients are older and more often female. Long-term home care clients could be considered chronically-ill and with substantial as well as ongoing home care needs.

The second definition that used the actual length of stay in the home care program to classify home care recipients as long-stay (90 or more days) or short-stay (<90 days) similarly revealed that long-stay clients use a disproportionately large share of care hours and large share of service events (90%). Chronic illness among long-stay clients is also suggested by their greater age, female gender, and higher number of diagnoses and ICD chapter headings.

Definition three, which distinguished home care clients by the number of ICD diagnostic chapter headings, was less helpful for identifying linkages between chronicity and home care. While it would be reasonable to think that individual clients with many ICD chapter headings would receive more hours of home care and have more service events, the opposite was found. The clients who had few (0-3) ICD chapter headings accounted for nearly double their expected share of total care hours. These clients were also older and more often female than the clients who had many ICD chapter headings. As such, the clients who were found to be more intensive users of home care differed considerably from the clients who were identified through definitions one and two.

Similarly, definition four which distinguished home care clients by the number of ICD diagnostic codes or diagnoses assigned to them in the year that they received home care was less helpful for identifying linkages between chronicity and home care. Although it is possible that a greater number of diagnoses is indicative of chronic illness, if not multiple chronic illnesses, home care clients with fewer diagnoses received a higher number of care hours and service events each year on average as compared to clients with more diagnoses, as well as a larger share of total home care hours and service events. These higher-intensity clients were also younger and more often male. Factors other than diagnoses appear to be more important to consider when determining home care needs.

Definition five which distinguished home care clients by the four chronic diseases (cancer, chronic obstructive lung or pulmonary disease (COPD), diabetes mellitus, and stroke or cardiovascular accident) produced similar controversial findings. Although just over half of all clients were diagnosed with one or more of these four diseases, they accounted for less than half of the total service events and care hours provided each year. Although these clients were older than the clients who were not diagnosed with these diseases, they also received fewer hours of home care and service events on average. As such, the clients who were diagnosed with the four main chronic diagnoses were less resource intense as compared to the other home care clients. This definition, like the previous two definitions, was based on medical diagnoses. All three definitions were seen as an ineffective way of identifying persons who could be chronically ill and needing

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ongoing or substantial home care. This is not the first time that medical diagnoses have been said to be less important for indicating home care need. A US study that focused on chronically-ill seniors showed socio-demographic variables and the ability to function independently were more important for indicating home care need that illnesses or health conditions such as heart disease (Alkema, Reyes & Wilber, 2006).

The first two definitions were the best at identifying clients who were more intensively served as individuals and who were also collectively responsible for a large share of home care resources. The first definition was based on the nursing intake assessment that classifies clients as long-term or short-term. The second definition was based on the actual length of stay in the program, with three months used to separate long-stay clients from short-stay clients. The second definition is not as useful as the first, as clients who remain in the program longer than three months will use more home care resources and are more likely to be chronically ill. It is also not practical to wait until a period of three months has passed to anticipate if a home care client will be resource intense or not. In short, the first definition that forecasts some clients as being long term is the most useful for identifying chronically-ill persons who need substantial home care services. This definition of chronic illness was based on a nursing assessment of the client that takes a wide range of health information, socio-demographic data, and other information into consideration. This nursing assessment was more successful than the two multiple regression tests which did not reveal any specific predictors or collective predictors for higher home care hours or more service events.

Answering the Four Research Questions

The question "does home care differ by chronic condition?" is difficult to answer. Not only is there no common understanding of what a chronic illness is, but the data collected to date on home care clients and services does not normally identify persons with chronic conditions. The four widely recognized chronic diseases (cancer, COPD, stroke, and diabetes) were not the most common diagnoses among home care recipients. Furthermore, these four diseases, although half of all home care clients were diagnosed with one or more of them, were not associated with higher home care hours nor more service events. Although it is likely that home care differs by chronic condition, medical diagnoses were not helpful for identifying persons needing home care, and not helpful for measuring or quantifying their need for home care.

The question "does home care differ if multiple chronic conditions exist?" similarly is difficult to answer. Considerable differences in home care provision were found, some of which appear to be associated with multiple chronic conditions. Home care clients typically had many different ailments, as indicated by the high number of diagnoses and chapter headings assigned to each in the year that they receive home care. In addition, around half of all home care clients were hospitalized in the year that they received home care, and nearly all received care in ambulatory care settings as well as physician offices. All of this indicates that home care clients are not well and that their health is not stable, a health state that could be expected when there are multiple chronic conditions present. Among the three definitions that relied on medical diagnoses, diagnostic chapter headings were somewhat more useful for identifying persons who were more likely to be chronically ill and needing substantial home care. Regardless, the

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definition that was best able to identify clients who were more resource intense in hours of care and service events was the one which relied on the home care nursing intake assessment. This nursing assessment would involve a consideration of the collective effect of all health conditions, chronic and acute, as well as many other factors on their anticipated need for home care.

The question "are there differences in home care on the basis of age, gender, or living arrangements?" can be readily answered. Differences in home care hours and service events were linked with age, gender, and living arrangements. These differences are particularly revealing about the state of health of home care recipients, and also about some myths or misconceptions around home care. The findings of this study clearly showed younger persons were provided more hours of home care than older persons, that males and female received nearly the same number of hours of care each year on average. Females were provided a few more hours of home care on average although females were typically much older. Furthermore, home care clients who lived with someone else received more hours of home care than home care clients who lived alone. Service event findings often revealed the same utilization patterns.

The question "are there differences in home care for persons living in rural areas versus urban areas?" can also be readily answered. Rural residents of Alberta were less likely to become home care clients, but once admitted to a home care program, they received a higher number of service events each year on average. However, their average hours of care were considerable less than the care hours for urban residents. These findings suggest home care varies considerable between urban and rural areas. Home care in rural areas appears to be more routine and less specialized, as indicated by the greater number of services but lower care hours. Rural home care may be more oriented to sustaining chronically-ill persons at home over the long term, while urban home care may be more oriented to other purposes, such as for shortening hospital stays by permitting early discharge from hospital.

Conclusion

Chronic illnesses are common among Canadians of all ages. Chronic illnesses can necessitate supportive care, with this care provided entirely outside of hospital or after release from hospital (Goetghebeur et al. 2003; Ko & Coons 2005). Few large-scale research studies have been done on formal home care clients and services in Canada. This study, a secondary analysis of data routinely collected on home care clients and home care services in Alberta, was designed to understand linkages between home care and chronic illness.

One of the most remarkable findings is that half of all home care clients were persons who could be categorized as chronically-ill, with these persons receiving a very large share of total home care hours and home care visits or service events provided each year. Less than 2% of Albertans received home care services each year, and home care was provided on average for only 2 hours each week. The relative scarcity of home care services is also illustrated by a decline in recent years in the number of Albertans who were receiving home care. Clearly, substantial investments in home care are needed to better support chronically-ill persons at home (Commission on the Future of Health Care in Canada, 2002). This support is essential for reducing the hospital, ambulatory or

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outpatient clinic, and emergency department visits that currently supplement home care services. In closing, it is evident that much more attention to chronic illness is needed for effective health services planning and policy development. This attention is critical, as chronic illnesses are expected to increase in Canada with population aging building upon the many foundational factors for developing one or more chronic illnesses, such as lifelong obesity and long-term physical inactivity.

Disclaimer

The views expressed herein do not necessarily represent the views of Health Canada, the Government of Alberta, nor Alberta Health and Wellness.

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Table 1. Home Care Client Socio-Demographic Findings

		2003/04*	2004/05*	2005/06*	All Years
Home Care Clients		53,922	60,597	34,859	149,378
- Short-term classification		16,887	21,340	11,744	49,971
- Long-term classification		28,370	27,766	17,564	73,700
- Palliative classification		3,026	2,681	1,430	7,137
- All other (Self-managed or AADL Clients)		5,639	8,810	4,121	18,570
Gender	Female	32,838	36,658	21,088	90,584
	Male	21,084	23,939	13,771	58,794
	% Female	60.9%	60.5%	60.5%	60.6%
	% Male	39.1%	39.5%	39.5%	39.4%
Average Age		68.9 years	68.9 years	70.6 years	69.3 years
Health Region	Chinook	121	160	116	397
	Palliser	2,677	3,186	2,862	8,725
	Calgary	17,153	22,912	19,857	59,922
	David Thompson	4,456	4,899	2,762	12,117
	East Central	1,146	195	3,824	5,165
	Capital	21,890	21,839	382	44,111
	Aspen	3,425	4,201	3,609	11,235
	Peace Country	2,176	2,268	711	5,155
	Northern Lights	875	930	732	2,537
	Unknown	3	7	4	14
Residence **	Urban	39,043	44,751	20,239	104,033
	Rural	14,879	15,846	14,620	45,345
	% Urban Region	72.4%	73.9%	58.1%	69.6%
	% Rural Region	27.6%	26.1	41.9	30.4
Health Care Insurance Premium Pay Category	Aboriginal Waiver	551	579	242	1,372
	Government Waiver	1,389	1,623	822	3,834
	Senior Exemption	36,069	40,310	24,001	100,380
	Welfare Exemption	3,731	4,142	1,988	9,861
	Widow Waiver	96	63	34	193
	Premium Waiver	79	78	34	191
	Not Subsidized	12,007	13,802	7,738	33,547
	% Premium Subsidized	77.7%	77.2%	77.8%	77.5%
	% Not Subsidized	22.3%	22.8%	22.2%	22.5%
Marital Status***	Not Married	25,940	29,199	14,571	69,710
	Married	19,734	22,416	11,337	53,487
	% Married	43.2%	43.4%	43.7%	43.3%
	% Not Married	56.8%	56.6%	56.3%	56.6%
Living Arrangement	Lives alone	16,957	18,630	11,518	47,105
	Lives with spouse only	15,012	17,042	9,874	41,928
	With spouse & others	3,818	4,338	2,656	10,812
	Lives with others only	11,556	13,412	7,799	32,767
	Missing data	6,579	7,175	3,012	16,766
	% Cohabitates	68.6%	69.3%	67.0%	68.5%
	% Lives by self	31.4%	30.7%	33.0%	31.5%

* Chinook Region submitted fewer than expected records in all 3 fiscal years, as did East Central Region in 2004/05 and Capital Health Region in 2005/06.

** Residence: metropolitan = Calgary and Capital/Edmonton, non-metropolitan/rural = all other regions

*** Not married includes single, divorced, widowed and common-law, values missing in 26,181 cases

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Table 2. Overview of Home Care Clients As Classified By Home Care Assessors

	2003/04		2004/05		2005/06		All	
	#	%	#	%	#	%	#	%
Short-term	16,887	31.3%	21,340	35.2%	11,744	33.7%	49,971	33.5%
Long-term	28,370	52.6%	27,766	45.8%	17,564	50.4%	73,700	49.3%
Palliative	3,026	5.6%	2,681	4.4%	1,430	4.1%	7,137	4.8%
All Others*	5,639	10.5%	8,810	14.5%	4,121	11.8%	18,570	12.4%
All Clients	53,922	100%	60,597	100%	34,859	100%	149,378	100%

2003/04 Fiscal Year					
	Short-term	**Long-term**	**Palliative**	**Other**	**Significance Test**
Clients # (%)	16,887 (31.3)	28,370 (52.6)	3,026 (5.6)	5,639 (10.5)	-
Gender F (%)	9,503 (56.3)	18,519 (65.3)	1505 (49.7)	3,311 (58.7)	X2=5.497, df=3, p=.000
Gender M (%)	7,384 (43.7)	9,851 (34.7)	1521 (50.3)	2,328 (41.3)	
Mean age	62.2 years	74.5 years	66.3 years	62.0 years	F=1801.17, df=3, p=.000
Median age	68 years	80 years	68 years	68 years	-
Age range	0-100 years	0-106 years	0-101 years	0-104 years	-
Senior (%)	9,374 (55.5)	23,216 (81.8)	1,817 (60)	3,262 (57.8)	X2=4.108, df=3, p=.000
Younger (%)	7,513 (44.5)	5,154 (18.2)	1,209 (40)	2,377 (42.2)	
Urban (%)	11,850 (70.2)	20,630 (72.7)	2561 (84.6	4,002 (71.0)	X2=275.712, df=3, p=.000
Rural (%)	5,036 (29.8)	7,738 (27.3)	465 (15.4)	1,637 (29.0)	
Subsidized (%)	11,697 (69.3)	24,490 (86.3)	1,577 (52.1	4,151 (73.6)	X2=3.112, df=3, p=.000
No Subsidy (%)	5,190 (30.7)	3,880 (13.7)	1449 (47.9)	1,488 (26.4)	
Married (%)	7,030 (49.8)	8,744 (36.0)	1674 (62.8)	2,286 (49.8)	X2=1.268, df=3, p=.000
Not Married(%)	7,077 (50.2)	15,564 (64)	993 (37.2)	2,306 (50.2)	
Lives Alone (%)	4,449 (30.0)	11,178 (41.7)	560 (20)	770 (26.8)	X2=1.028, df=3, p=.000
Cohabitates (%)	10,398 (70.0)	15,643 (58.3)	2,240 (80)	2,105 (73.2)	

2004/05 Fiscal Year					
	Short-term	**Long-term**	**Palliative**	**Other**	**Significance Test**
Clients # (%)	21,340 (35.2)	27,766 (45.8)	2,681 (4.4)	8,810 (14.5)	-
Gender F (%)	12,078 (56.6	18,187 (65.5)	1308 (48.8)	5085 (57.7)	X2=6.089, df=3, p=.000
Gender M (%)	9,262 (43.4)	9,579 (34.5)	1308 (48.8)	3,725 (42.3)	
Mean age	63.5 years	74.9 years	65.6 years	64.2 years	F=1681.27, df=3, p=.000
Median age	69 years	80 years	67 years	70 years	-
Age range	0-106 years	0-107 years	0-100 years	0-105 years	-
Senior (%)	12,335 (57.8)	22,755 (82)	1535 (57.3)	5,412 (61.4)	X2=3.860, df=3, p=.000
Younger (%)	9,005 (42.2)	5,011 (18)	1146 (42.7)	3,398 (38.6)	
Urban (%)	16,057 (75.3)	21,885 (78.8)	2324 (86.7	4,485 (50.9)	X2=3.007, df=3, p=.000
Rural (%)	5,281 (22.7)	5,877 (21.2)	357 (13.3)	4,324 (49.1)	
Subsidized (%)	15,060 (70.6)	23,739 (85.5)	1,350 (50.4)	6,646 (75.4)	X2=2.734 df=3, p=.000
No Subsidy (%)	6,280 (29.4)	4,027 (14.5)	1331 (49.6)	2,164 (24.6)	
Married (%)	9,411 (49.7)	8,770 (35.3)	1520 (63.0)	2,715 (50.0)	X2=1.448, df=3, p=.000
Not Married(%)	7,077 (50.2)	15,564 (64)	993 (37.2)	2,306 (50.2)	
Lives Alone (%)	5,956 (31.0)	10,506 (40.2)	513 (20.6)	1,655 (29.7)	X2=746.38, df=3, p=.000
Cohabitates (%)	13,276 (69.0)	15,617(59.8)	1,973 (79.4)	3,926 (70.3)	

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Table 3. Thirteen Most Common Diagnostic Codes by Classified Client Type *

	Short-term		Long-term		Palliative		All Other Types	
	#	%	#	%	#	%	#	%
1	Other physical activity, n=121,493	11.4	Extracorporeal dialysis n= 108,547	7.3	Malignant neoplasm of trachea, lung, or bronchus, n=19,842	11.2	Other physical activity, n=35,326	12.6
2	Extracorporeal dialysis, n=46,156	4.3	Chronic renal failure, unspecified n=98,249	6.6	Radiology examination, not specified elsewhere, n=11,411	6.4	Essential hypertension, n=14,572	5.2
3	Chronic renal failure, unspecified n=45,603	4.3	Other physical activity, n=81,490	5.5	Malignant neoplasm of female breast, n=9,332	5.2	Depressive disorder, not otherwise specified, n=11,995	4.3
4	Essential hypertension, n=40,343	3.8	Chronic renal failure, n=79,715	5.4	Malignant neoplasm of prostate, n=9,041	5.1	Diabetes mellitus, n=11,860	4.2
5	Other chemotherapy, n=37,417	3.8	Senile and pre-senile organic psychosis, n=57,815	3.9	Bronchus and lung, unspecified, n=8,790	4.9	Radiology examination, not otherwise classified, n=11,788	4.2
6	Radiology examination, not specified elsewhere, n=35,486	3.3	Depressive disorder, not otherwise specified, n=56,882	3.8	Malignant neoplasm of colon, n=6,874	3.9	Extracorporeal dialysis, n=9,826	3.5
7	Chronic renal failure, n=34,906	3.3	General symptoms, n=54,520	3.7	Malignant neoplasm, no site specified n=9,332	3.2	Chronic renal failure, unspecified, n=9,470	3.4
8	Diabetes mellitus, n=34,030	3.2	Diabetes mellitus, n=52,692	3.6	General symptoms, n=5,284	3.0	General symptoms, n=8,859	3.2
9	Other specified counseling, n=33,801	3.2	Essential hypertension, n=51,771	3.5	Malignant neoplasm pancreas, n=5,250	3.0	Osteoarthritis and allied disorders, n=8,500	3.0
10	Other specified orthopedic follow-up, n=31,683	3.0	Heart failure, unspecified, n=44,049	3.0	Breast, unspecified, n=4,858	2.7	Occupational therapy and vocational rehabilitation, n=7,416	2.6
11	Depressive disorder, not otherwise specified, n=31,238	2.9	Other specified counseling, n=43,736	2.9	Palliative care, n=4,634	2.6	Other chemotherapy, n=6,904	2.5
12	Osteoarthritis and allied disorders, n=31,044	2.9	Heart failure, n=43,517	2.9	Chronic renal failure, unspecified n=3,749	2.1	Chronic renal failure, n=6,672	2.4
13	General symptoms, n=29,223	2.7	Radiology examination, not specified elsewhere, n=34,528	2.3	Extracorporeal dialysis, n=3,518	2.0	Other specified counseling, n=6,604	2.4

* three years of diagnostic data from all sources combined

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Table 4. Home Care Client and Service Comparisons, for the 2003/04 Fiscal Year

	Comparisons	Findings	Statistical Tests
Males	Average age	65.4 years	T=33.009, df=53920, p=.000
Females	Average age	71.1 years	
Urban	Average age	68.5 years	T=8.028, df=53917, p=.000
Rural	Average age	70.0 years	
Subsidized	Average age	73.8 years	T=120.021, df=53920, p=.000
Unsubsidized	Average age	51.9 years	
Lives Alone	Average age	76.8 years	T=61.818, df=47341, p=.000
Cohabitates	Average age	65.6 years	
Males	Lives alone	24.8%	X2=1.604, df=1, p=.000
Females	Lives alone	42.9%	
Urban	Lives alone	34.6%	X2=87.757, df=1, p=.000
Rural	Lives alone	39.2%	
Subsidized	Lives alone	38.9%	X2=7.207, df=1, p=.000
Unsubsidized	Lives alone	24.5%	
Age 65+	Lives alone	42.6%	X2=2.365, df=1, p=.000
Younger	Lives alone	18.9%	
Males	Mean care hours	101.7 annually	T=3.533, df=53920, p=.000
Females	Mean care hours	112.6 annually	
Males	Mean service events	48.4 annually	T=2.836, df=52920, p=.005
Females	Mean service events	57.85 annually	
Urban	Mean care hours	129.2 annually	T=22.509, df=53917, p=.000
Rural	Mean care hours	53.6 annually	
Urban	Mean service events	37.2 annually	T=16.859, df=53917, p=.000
Rural	Mean service events	98.6 annually	
Premium Subsidized	Mean care hours	110.5 annually	T=2.543, df=53920, p=.010 *
Unsubsidized	Mean care hours	101.0 annually	
Premium Subsidized	Mean service events	56.3 annually	T=2.543, df=53920, p=.010 *
Unsubsidized	Mean service events	46.6 annually	
Lives Alone	Mean care hours	107.8 annually	T=4.982, df=47341, p=.000
Cohabitates	Mean care hours	125.4 annually	
Lives Alone	Mean service events	66.6 annually	T=3.976, df=47341, p=.000
Cohabitates	Mean service events	52.05 annually	
Age 65+	Mean care hours	94.5 annually	T=13.957, df=53920, p=.000
Younger	Mean care hours	140.4 annually	
Age 65+	Mean service events	58.3 annually	T=3.892, df=53920, p=.000
Younger	Mean service events	44.5 annually	
Correlation	Service events (#)	Client Age	R= .009, p=.038
	Care hours (#)	Client Age	R= -.04, p=.000
Correlation	Service events (#)	Diagnoses (#)	R= -.005, p=.270*
	Care hours (#)	Diagnoses (#)	R= -.022, p=.000
Correlation	Service events (#)	Chapter Headings (#)	R= .036, p=.000
	Care hours (#)	Chapter Headings (#)	R= -.008, p=.371*
Descriptive	Service events/client	Mean = 54.2	Median = 13, mode = 0.5
Descriptive	Care hours/client	Mean = 108.4	Median = 5, mode = 0
Descriptive	Diagnoses/client	Mean = 55.5	Median = 37, mode = 18
Descriptive	Chapter heading/client	Mean = 9.1	Median = 9, mode = 9

* non-significant test (no difference between the two groups)

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Table 5. Home Care Providers, With Care Hours and Service Events by Provider

		2003/04*	2004/05*	2005/06*	All
All Providers**	Clients (#)	53,922	60,597	34,859	149,378
	Service events (#)	2,931,464	3,348,573	1,653,132	7,933,169
	Care hours (#)	5,853,603	6,734,894	3,866,737	16,455,234
	Average hours/event	2.0	2.0	2.3	2.1
Respiratory Therapist	Clients (#)	2,305	2,778	844	5,927
	Clients (%)	4.3%	4.6%	2.4%	4.0%
	Service events (#)	3,375	4,129	2,990	10,494
	% of total events	0.12%	0.12%	0.18%	0.13%
	Total hours	13,367	14,919	4,688	32,973
	% total hours	0.23%	0.22%	0.12%	0.20%
	Average hours/event	4.0 hours	3.6 hours	1.6 hours	3.1 hours
Self-managed Care	Clients (#)	876	897	546	2,319
	Clients (%)	1.6%	1.5%	1.6%	1.6%
	Service events (#)	12861	17844	7293	37998
	% of total events	0.4%	0.5%	0.4%	0.5%
	Total hours	1,164,347	12,94,708	758,695	3,217,749
	% total hours	19.9%	19.2%	19.6%	19.6%
	Average hours/event	90.5 hours	72.6 hours	104.0 hours	84.7 hours
Home Support Aide	Clients (#)	22,087	23,680	13,606	59,373
	Clients (%)	40.9%	39.0%	39.0%	39.7%
	Service events (#)	1,853,424	2,160,438	854,219	4,868,081
	% of total events	63.2%	64.5%	51.7%	61.4%
	Total hours	3,683,468	4,305,827	2,496,072	10,485,367
	% total hours	62.9%	63.9%	64.6%	63.7%
	Average hours/event	2.0 hours	2.0 hours	2.9 hours	2.2 hours
Licensed Practical Nurse	Clients (#)	8,489	10,953	10,845	30,287
	Clients (%)	15.7%	18.0%	31.1%	20.2%
	Service events (#)	343,300	372,473	88,384	804,157
	% of total events	11.7%	11.1%	5.3%	10.1%
	Total hours	189,239	196,951	114,956	501,146
	% total hours	3.2%	2.9%	3.0%	3.0%
	Average hours/event	0.6 hours	0.5 hours	1.3 hours	0.6 hours
Registered Nurse	Clients (#)	47,754	54,140	31,610	133,504
	Clients (%)	88.4%	89.2%	90.6%	89.2%
	Service events (#)	503,191	506,539	418,629	1,428,359
	% of total events	17.2%	15.1%	25.3%	18.0%
	Total hours	561,051	629,828	335,125	1,526,004
	% total hours	9.6%	9.4%	8.7%	9.3%
	Average hours/event	1.1 hours	1.2 hours	0.8 hours	1.1 hours
Occupational Therapist	Clients (#)	15,840	17,872	7,130	40,842
	Clients (%)	29.3%	29.4%	20.4%	27.3%
	Service events (#)	25,739	32,919	32,150	90,808
	% of total events	0.9%	1.0%	1.9%	1.1%
	Total hours	84,353	97,526	37,317	219,196
	% total hours	1.4%	1.4%	1.0%	1.3%
	Average hours/event	3.3 hours	3.0 hours	1.2 hours	2.4 hours
Physiotherapist	Clients (#)	8,887	10,733	6,179	25,799
	Clients (%)	16.5%	17.7%	17.7%	17.2%
	Service events (#)	24,274	26,309	26,898	77,481
	% of total events	0.8%	0.8%	1.6%	1.0%

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		2003/04*	2004/05*	2005/06*	All
	Total hours	42,691	47,099	27,699	117,490
	% total hours	0.7%	0.7%	0.7%	0.7%
	Average hours/event	1.8 hours	1.8 hours	1.0 hours	1.5 hours
Social Worker	Clients (#)	5,699	5,837	1,891	13,427
	Clients (%)	10.6%	9.6%	5.4%	3.8%
	Service events (#)	5,976	5,151	9,645	20,772
	% of total events	0.2%	0.2%	0.6%	0.3%
	Total hours	34,275	36,553	9,559	80,388
	% total hours	0.6%	0.5%	0.2%	0.5%
	Average hours/event	5.7 hours	7.1 hours	1.0 hours	3.9 hours

* Chinook submitted fewer than expected records in all 3 fiscal years, as well as East Central Region in 2004/05 and Capital Health Region in 2005/06.

** All providers includes respiratory therapist, clerical worker, self-managed care, home support aide, licensed practical nurse, meals, nurse, occupational therapist, physiotherapist, supervisor, other health care professional, volunteer, social worker, materials and supplies.

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Table 6. Definition One Findings - Long-term Versus Short-term Classified Clients

Table 6a. Overview of Home Care Clients by Care Classification Type

Classified Client Type	2003/04		2004/05		2005/06		All Years	
	#	%	#	%	#	%	#	%
Short-term	16,887	31.3%	21,340	35.2%	11,744	33.7%	49,971	33.5%
Long-term	28,370	52.6%	27,766	45.8%	17,564	50.4%	73,700	49.3%
Palliative	3,026	5.6%	2,681	4.4%	1,430	4.1%	7,137	4.8%
All Others	5,639	10.5%	8,810	14.5%	4,121	11.8%	18,570	12.4%
All Clients	53,922	100%	60,597	100%	34,859	100%	149,378	100%

Table 6b. Comparing Short-term and Long-term Classified Home Care Clients *

2003/04		Short-term	Long-term	Significance Test
Clients # (%)		16,887 (37.3)	28,370 (62.7)	45,257 (100)
Gender	F (%)	9,503 (56.3)	18,519 (65.3)	
	M (%)	7,384 (43.7)	9,851 (34.7)	X2=3.639, df=1, p=.000
Average age		62.2 years	74.5 years	T=67.071, df=45255, p=.000
Urban Region (%)		11,850 (70.2)	20,630 (72.7)	
Rural Region (%)		5,036 (29.8)	7,738 (27.3)	X2=33.876, df=1, p=.000
Diagnoses count -average/person		60.2	54.0	T=-8.723, df=45255, p=.000
Chapter headings- average/person		9.2	9.5	T=5.136, df=9921, p=.000
Care hours - average/person		12.2	187.4	T=49.072, df=45255, p=.000
Share of care hours/client group		3.7%	96.3%	-
Service events - average/person		10.8	92.5	T=20.626, df=45255, p=.000
Share of events/client group		6.5%	93.5%	-

2004/05		Short-term	Long-term	Significance Test
Clients # (%)		21,340 (43.5)	27,766 (56.5)	49,106 (100)
Gender	F (%)	12,078 (56.6)	18,187 (65.5)	
	M (%)	9,262 (43.4)	9,579 (34.5)	X2=4.045, df=1, p=.000
Average age		63.5 years	74.9 years	T=65.968, df=49104, p=.000
Urban Region (%)		16,057 (75.2)	21,885 (78.8)	
Rural Region (%)		5,281 (24.7)	5,877 (21.3)	X2=88.056, df=1, p=.000
Diagnoses count -average/person		60.9	52.6	T=-13.512, df=49104, p=.000
Chapter headings- average/person		9.31	9.40	T=1.647, df=11156, p=.000
Care Hours - average/person		25.4	210.7	T=65.968, df=49104, p=.000
Share of care hours/client group		8.5%	91.5%	-
Service events - average/person		19.5	97.6	T=65.968, df=49104, p=.000
Share of events/client group		13.3%	86.7%	-

* Includes clients classified as long-term or short-term, does not include palliative or other clients.

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Table 7. Definition Two Findings - Long-stay (90+ Days) Versus Short-Stay (0-89 Days) Clients

Table 7a. Home Care Clients by Length of Stay in Home Care Program

	2003/04		2004/05		2005/06		All Years	
Clients	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
Short-stay	24,969	46.3%	27,987	46.2%	15,451	44.3%	68,407	45.8%
Long-stay	28,953	53.7%	32,610	53.8%	19,408	55.7%	80,971	54.2%
All clients	53,922	100%	60,597	100%	34,859	100%	149,378	100%

Table 7b. Home Care Clients Compared by Length of Stay in Home Care Program

2003/04		**Short-stay**	**Long-stay**	**Significance Test**
Clients # (%)		24,969 (46.3)	28,953 (53.7)	53,922 (100)
Gender	F (%)	14,074 (56.4)	18,764 (64.8)	
	M (%)	10,895 (43.6)	10,189 (35.2)	X2=4.013,, df=1, p=.000
Average age		64.5 years	72.6 years	T=-48.411, df=53920, p=.000
Urban region (%)		18,230 (73.0)	20,813 (71.9)	
Rural region (%)		6738 (27.0)	8,138 (28.1)	X2=8.463, df=1, p=.004
Diagnoses count -average/person		52.6	58.1	T=8.956, df=53920, p=.000
Chapter headings- average/person		8.7	9.5	T=15.089, df=13912, p=.000
Care hours - average/person		10.6	192.6	T=62.245, df=53920, p=.000
Share of care hours/client group		4.5%	95.5%	-
Service events - average/person		6.6	95.2	T=27.284, df=53290, p=.000
Share of events/client group		5.6%	94.4%	-

2004/05		**Short-stay**	**Long-stay**	**Significance Test**
Clients (%)		27,987 (46.2)	32,610 (53.8)	60,598 (100)
Gender	F (%)	15,629 (55.8)	21,029 (64.5)	
	M (%)	12,358 (44.2)	11,581 (35.5)	X2=4.707, df=1, p=.000
Average age		64.2 years	72.9 years	T=-54.579, df=60595, p=.000
Urban region (%)		21,123 (75.5)	23,628 (72.5)	
Rural region (%)		6862 (24.5)	8977 (27.5)	X2=70.775, df=1, p=.000
Diagnoses count -average/person		51.9	57.6	T=10.544, df=60595, p=.000
Chapter headings- average/person		8.72	9.41	T=14.653, df=15513, p=.000
Care hours - average/person		9.0	198.5	T=-66.087, df=60595, p=.000
Share of care hours/client group		3.8%	96.2%	-
Service events - average/person		5.6	97.6	T=-24.43, df=60595, df=.000
Share of events/client group		4.7%	95.3%	-

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Table 8. Definition Three Findings – 4+ ICD Diagnostic Chapter Headings Versus 0-3 ICD Diagnostic Chapter Headings

There are nineteen ICD diagnostic chapter headings in total:

(A) Infectious and parasitic diseases,
(C) Neoplasms,
(D) Diseases of the blood and blood-forming organs,
(E) Endocrine, nutritional and metabolic diseases, and immunity disorders,
(F) Mental disorders,
(G) Diseases of the nervous system and sense organs,
(I) Diseases of the circulatory system,
(J) Diseases of the respiratory system,
(K) Diseases of the digestive system,
(L) Diseases of the skin and subcutaneous tissue,
(M) Diseases of the musculoskeletal system and connective tissue,
(N) Diseases of the genitourinary system,
(O) Complications of pregnancy, childbirth, and the puerperium,
(P) Certain conditions originating in the perinatal period,
(Q) Congenital anomalies,
(R) Symptoms, signs, and ill-defined conditions,
(S) Injury and poisoning,
(X) External causes of morbidity, and
(Z) Factors influencing health status and contact with health services.

Table 8a. Chapter Headings by Frequency of Diagnoses *

Chapter Heading	2003/04		2004/05		2005/06		All Years	
	#	%	#	%	#	%	#	%
A	33,421	1.1%	39,128	1.2%	25,182	1.3%	97,731	1.2%
C	151,261	5.1%	170,896	5.1%	102,962	5.2%	425,119	5.1%
D	39,319	1.3%	45,658	1.4%	27,519	1.4%	112,496	1.4%
E	156,293	5.2%	168,842	5.1%	96,882	4.9%	422,017	5.1%
F	208,779	7.0%	245,691	7.4%	140,834	7.1%	595,304	7.2%
G	158,546	5.3%	181,815	5.5%	121,159	6.1%	461,520	5.6%
I	402,892	13.5%	455,982	13.7%	285,898	14.5%	1,144,772	13.8%
J	166,207	5.6%	181,891	5.5%	112,197	5.7%	460,295	5.5%
K	110,029	3.7%	118,559	3.6%	75,020	3.8%	303,608	3.7%
L	87,450	2.9%	102,829	3.1%	60,716	3.1%	250,995	3.0%
M	176,505	5.9%	194,204	5.8%	104,161	5.3%	474,870	5.7%
N	230,699	7.7%	227,249	6.8%	121,084	6.1%	579,032	7.0%
O	5,237	0.2%	7,195	0.2%	3,661	0.2%	16,093	0.2%
P	3,469	0.1%	3,919	0.1%	-	-	7,388	0.1%
Q	9,680	0.3%	10,360	0.3%	-	-	20,040	0.2%
R	298,395	10.0%	333,181	10.0%	227,207	11.5%	858,783	10.4%
S	148,872	5.0%	161,484	4.8%	95,647	4.9%	406,003	4.9%
X	45,933	1.5%	45,967	1.4%	24,078	1.2%	115,978	1.4%
Z	561,663	18.8%	635,683	19.1%	346,109	17.6%	1,543,455	18.6%
All	2,994,650	100%	3,330,533	100%	1,970,316	100%	8,295,499*	100%

*1.7% missing data

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Table 8b. ICD Chapter Headings per Client (All Years Combined) *

Chapter Heading	Clients Who Did Not Have a Diagnosis in Each Chapter Heading		Clients With One or More Diagnoses in Each Chapter Heading	
	#	%	#	%
A	113,916	76.3	35,462	23.7%
C	110,988	74.3	38,390	25.7%
D	117,618	78.7	31,760	21.3%
E	79,903	53.5	69,475	46.5%
F	83,456	55.9	65,922	44.1%
G	68,470	45.8	80,908	54.2%
I	68,470	45.8	80,908	54.2%
J	78,882	52.8	70,496	47.2%
K	92,826	62.1	56,552	37.9%
L	99,229	66.4	50,149	33.6%
M	69,650	46.6	79,728	53.4%
N	90,324	60.5	59,054	39.5%
O	146,892	98.3	2,486	1.7%
P	148,249	99.2	1,129	0.8%
Q	145,713	97.5	3,665	2.5%
R	30,052	20.1	119,326	79.9%
S	82,148	55.0	67,230	45.0%
X	98,421	65.9	50,957	34.1%
Z	19,824	13.3	129,554	86.7%

* Percentages in each column add up to more than 100%.

Table 8c. Total Number of ICD Chapter Headings per Client, With Service Averages

Chapter Headings In Total	Clients N	Clients (%)	Average Service Events #	Average Service Hours #
0	1,039	0.7	58.5	213.1
1	2,701	1.8	67.4	218.2
2	5,042	3.4	60.1	192.0
3	8,301	5.6	62.0	151.0
4	11,827	7.9	52.9	137.2
5	15,112	10.1	52.6	119.1
6	17,625	11.8	49.3	104.9
7	18,504	12.4	45.3	95.6
8	17,746	11.9	46.0	88.6
9	15,981	4.0	53.7	91.7
10	13,005	8.7	46.3	91.8
11	9,896	6.6	61.6	90.6
12	6,673	4.5	63.1	97.9
13	3,798	2.5	63.2	98.0
14	1,643	1.1	91.4	93.3
15	434	0.3	50.1	117.5
16	45	0.03	24.6	57.8
17	6	0.004	14.7	103.5
18	0	0	0	0
19	0	0	0	0
	149,378	100 %	-	-

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Table 8d. Clients With 4+ ICD Chapter Headings Versus 0-3 ICD Chapter Headings

Clients	2003/04		2004/05		2005/06		All Years	
	#	%	#	%	#	%	#	%
0-3 headings	6,169	11.4%	6,852	11.3%	4,062	11.7%	17,083	11.4%
4-19 headings	47,753	88.6%	53,745	88.7%	30,797	88.3%	132,295	88.6%
All clients	53,922	100%	60,597	100%	34,859	100%	149,378	100%

Table 8e. Comparisons of Clients with 4+ Versus 0-3 ICD Chapter Headings

2003/04		0-3 Headings	4+ Headings	Significance Test
Clients # (%)		6,169 (11.4)	47,753 (88.6)	53,922 (100)
Average age		69.2 years	68.8 years	T=3.385, df=13912, p=.000
Gender	F (%)	3,886(63.0)	28,952(60.6)	X2=.029, df=1, p=.865
	M (%)	2,283(37.0)	18,801(39.4)	
Urban (%)		4,234(68.6)	34,809(72.9)	X2=4.979, df=1, p=.000
Rural (%)		1935 (31.4)	12944 (26.1)	
Diagnosis count –average/person		13.5	69.1	T=15.356, df=13962, p=.000
Chapter headings-average/person		2.4	9.3	T=47.961, df=13962, p=.000
Care hours – average/person		134.8	73.9	T=1.382, df=13912, p=.000
Share of care hours (%)		19.3	80.7	-
Service events-average/person		27.2	38.5	T=4.898, df=13912, p=.000
Share of service events (%)		13.0	87.0	-

2004/05		0-3 Headings	4+ Headings	Significance Test
Clients # (%)		6,852 (11.3)	53,745 (88.7)	60,597 (100)
Average age		69.7 years	70.0 years	T=.385, df=13912, df=.700 *
Gender	F (%)	4,360(63.6)	32,298(60.6)	X2=2.986, df=, p=.04
	M (%)	2,492(36.4)	21,447(39.4)	
Urban (%)		4,865 (71.0)	39,886(74.2)	X2=4.979, df=1, p=.026
Rural (%)		1,987 (20.0)	13,859 (25.8)	
Diagnosis count –average/person		13.5	69.1	T=15.356, df=13912, df=.000
Chapter headings-average/person		2.4	9.3	T=47.98, df=13912, p=.000
Care hours – average/person		134.9	73.9	T=4.898, df=13912, p=.000
Share of care hours (%)		18.2	81.8	-
Service events-average/person		27.2	38.5	T=1.382, df=13912, p=.167 *
Share of service events (%)		13.9	86.1	-

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Table 9. Definition Four Findings – 40+ Diagnoses Versus 0-39 Diagnoses

Table 9a. Origin of Diagnoses

			2003/04	2004/05	2005/06	All Years
Community Physician	Service Events/Visits		53,442	60,039	34,497	147,978
	Assigned Diagnoses	#	1,544,584	1,804,927	1,143,456	4,492,967
		%	50.7%	53.2%	57.1%	53.2%
Ambulatory Care	Service Events/Visits		47,236	53,029	30,551	130,816
	Assigned Diagnoses	#	1,117,065	1,184,331	642,979	2,944,375
		%	36.7%	34.9%	32.1%	34.9%
Inpatient Hospital Care	Service Events/Admissions		30,425	33,542	19,225	83,192
	Assigned Diagnoses	#	383,890	401,131	216,157	1,001,178
		%	12.6%	11.8%	10.8%	11.9%
Total Diagnoses						8,438,520
Total Service Events						361,986

Table 9b. Overview of Clients with 40+ Diagnoses or 0-39 Diagnoses

	2003/04		2004/05		2005/06		All Years	
	#	%	#	%	#	%	#	%
0-39 diagnoses	28,560	53.0%	31,766	52.4%	18,052	51.8%	78,378	52.5%
40+ diagnoses	25,362	47.0%	28,831	47.6%	16,807	48.2%	71,000	47.5%
All clients	**53,922**	**100%**	**60,597**	**100%**	**34,859**	**100%**	**149,378**	**100%**

Table 9c. Comparison of Clients With 40+ and 0-39 Diagnoses

2003/04		0-39 Diagnoses	40+ Diagnoses	Significance Test
Clients # (%)		28,283 (52.5)	25,362 (47.5)	53,922 (100)
Average age		70.5 years	67.1 years	T=19.900, df=53920, p=.000
Gender	F (%)	18,343 (64.2)	14,646 (57.1)	X2=2.926, df=1, p=.000
	M (%)	10,217 (35.8)	10,993 (42.9)	
Urban (%)		19,988 (70.7)	19,055 (74.3)	X2=89.521, df=1, p=.000
Rural (%)		8293 (29.3)	6585 (25.7)	
Diagnosis count – average/person		19.4	95.4	T=19.900, df=53920, p=.000
Chapter headings-average/person		6.9	10.5	T=47.962, df=13912, p=.000
Care hours – average/person		126.2	88.7	T=12.447, df=53920, df=.000
Share of care hours (%)		61.6	38.4	-
Service events-average/person		56.1	52.0	T=1.230, df=53920, p=.219*
Share of service events (%)		54.7	45.3	-

2004/05		0-39 Diagnoses	40+ Diagnoses	Significance Test
Clients		31,443 (51.9)	28,831 (48.1)	60,597 (100)
Average age		69.95 years	67.8 years	T=13.594, df=60595, p=.000
Gender	F (%)	20,039 (63.7)	16,619 (57.0)	X2=2.864, df=1, p=.000
	M (%)	11,404 (36.3)	12,535 (43.0)	
Urban (%)		22,719 (72.3)	22,032 (75.6)	X2=86.352, df=1, p=.000
Rural (%)		8,721 (27.7)	7,118 (24.4)	
Diagnosis count – average/person		19.5	93.2	T=13.594, df=60595, p=.000
Chapter headings-average/person		6.8	10.4	T=89.626, df=155131, p=.000
Care hours – average/person		126.0	94.8	T=10.538, df=60595, p=.000
Share of care hours (%)		59.3	40.7	-
Service events-average/person		55.6	54.5	T=.286, df=60595, p=.775
Share of service events (%)		52.9	47.1	-

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Table 10. Definition Five Findings – Four Select Diseases Versus All Others

Table 10a. Overview of Four Select Chronic Diseases

	2003/04		2004/05		2005/06		All Years	
	#	%	#	%	#	%	#	%
Cancer	11,515	21.3	12,878	21.3	7,378	21.2	31,771	21.3
COPD	11,819	21.9	12,914	213	7,370	21.1	32,103	21.5
Diabetes	10,511	19.5	11,584	19.1	6,797	19.5	28,892	19.3
Stroke	4,100	7.6	4,714	7.8	2,798	8.0	11,612	7.8
All of above*	27,293	50.6	30,342	50.1	17,606	50.5	75,241	50.4
None of above	26,699	49.4	30,255	49.9	17,253	49.5	74,137	49.6

* Some home care clients were diagnosed with more than one chronic disease

Table 10b. Comparing Clients with Four Chronic Diseases to Each Other

2003/04		Cancer	COPD	Diabetes	Stroke
Clients		11,515	11,819	10,511	4,100
Average age		70.1	68.9	71.7	75.3
Gender	F (%)	6031 (52.4)	6926 (58.6)	5634 (53.6)	2340 (57.1)
	M (%)	5484 (47.6)	4893 (41.4)	4877 (46.4)	1760 (42.9)
Urban (%)		8750 (76.0)	4893 (67.7)	7346 (69.9)	2944 (71.6)
Rural (%)		2765 (24.0)	6928 (32.3)	3165 (21.4)	1156 (28.2)
Diagnosis count -average/person		68.1	55.9	93.4	78.4
Chapter headings-average/person		9.1	9.1	10.7	10.6
Care hours - average/person		72.2	107.8	94.9	126.4
Service events - average/person		37.1	54.1	57.5	60.5

2004/05		Cancer	COPD	Diabetes	Stroke
Clients		12,878	12,914	11,584	4,714
Average age		70.4	70.0	71.7	75.4
Gender	F (%)	6623 (51.4)	7916 (61.3)	6209 (53.6)	2666 (56.6)
	M (%)	6255 (48.4)	4998 (38.7)	5375 (46.4)	2046 (43.4)
Urban (%)		9917 (77.0)	9479 (73.4)	8347 (72.1)	3518 (74.6)
Rural (%)		2961 (23.0)	3435 (26.6)	3235 (27.9)	1196 (25.4)
Diagnosis count -average/person		66.3	55.3	90.6	78.9
Chapter headings-average/person		9.05	9.07	10.7	10.6
Care hours - average/person		74.8	221.0	95.9	121.3
Service events - average/person		35.8	53.4	56.4	63.0

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Table 10c. Comparison of Home Care Clients With Four Diseases Versus All Others

2003/04		**Four Chronic Diseases Combined**	**All Other Diseases**	**Significance Test**
Clients # (%)		27,293 (51.0)	26,264 (49.0)	53,557 (100)
Average age		70.9 years	66.8 years	T=-23.828, df=53555, p=.000
Gender	F (%)	15,337 (56.2)	17,287 (65.8)	X2=5.209, df=1, p=.000
	M (%)	11,956 (43.8)	8,977 (34.2)	
Urban (%)		19,769 (72.4)	19,027 (72.5)	X2=.003, df=1, p=.957 *
Rural (%)		7,524 (27.6)	7,234 (27.5)	
Diagnosis count - average/person		72.9	83.0	T=57.977, df=53555, p=.000
Chapter headings - average/person		9.2	8.3	T=11.186, df=13912, p=.000
Care hours - average/person		90.9	125.4	T=11.442, df=53555, p=.000
Share of care hours (%)		43.0	67.0	-
Service events - average/person		51.1	57.1	T=1.832, df=53555, p=.067*
Share of service events (%)		48.2	51.8	-

2004/05		**Four Chronic Diseases Combined**	**All Other Diseases**	**Significance Test**
Clients # (%)		30,342 (50.4)	29,849 (49.6)	60,191 (100)
Average age		70.95 years	66.8 years	T=-25.753, df=60189, p=.000
Gender	F (%)	16,886 (55.7)	19,523 (65.4)	X2=5.209, df=1, p=.000
	M (%)	13,456 (44.3)	10,326 (34.6)	
Urban (%)		22,508 (74.2)	21,945 (73.5)	X2=5.209, df=1, p=.000
Rural (%)		7,832 (25.8)	7,899 (26.5)	
Diagnosis count - average/person		72.2	38.2	T=65.918, df=60189, p=.000
Chapter headings - average/person		9.15	8.3	T=11.003, df=15513, p=.000
Care hours - average/person		93.8	127.0	T=11.259, df=60189, p=.000
Share of care hours (%)		42.9	57.1	-
Service events - average/person		56.0	54.2	T=-.476, df=60189, p=.634 *
Share of service events (%)		51.2	48.8	-

* non-significant test (no difference between the two groups of clients)

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Table 11. Comparing Service Events and Care Hours by the Five Definitions

Table 11a. Number of Clients Over all Three Years – Compared by Definition

	1	2	3	4	5
1 Long-term Classified Clients	73,700	58,572	35,946	32,007	63,099
2 Long-stay Clients (90+ days)	58,572	80,971	41,441	38,327	70,667
3 Four or More ICD Chapters	63,099	70,667	75,241	70,382	132,295
4 Forty or More Diagnoses	32,007	38,327	48,171	71,000	70,382
5 Four Specific Chronic Illnesses	63,099	70,667	72,832	70,382	132,295

Table 11b. Comparisons by Operational Definition and Fiscal Year

2003/04		Clients #	Total Service Events	Total Service Hours	Service events/ day*	Hours/ service event	% of service events	% of service hours
1	Short-term	16,887	181,858	205,227	0.18	1.1 hours	6.2%	3.7%
	Long-term	28,370	2,625,371	5,317,154	0.41	2.0 hours	89.9%	96.3%
2	Short-stay	24,969	164,010	265,660	0.26	1.6 hours	5.6%	4.5%
	Long-stay	28,953	2,755,856	5,577,325	0.38	2.0 hours	94.4%	95.5%
3	0- 3 ICD chapters.	6,169	379,079	1,125,202	0.35	3.0 hours	13.0%	19.3%
	4-19 ICD chapters	47,753	2,540,787	4,717,783	0.37	1.9 hours	87.0%	80.7%
4	0-39 diagnoses	28,560	1,597,885	3,596,719	0.36	2.3 hours	54.7%	61.6%
	40+ diagnoses	25,362	1,321,981	2,246,266	0.38	1.7 hours	45.3%	38.4%
5	Has Cancer	11,515	426,615	831,127	0.30	1.9 hours	14.7%	14.4%
	Has COPD	11,819	705,823	1,088,550	0.39	1.5 hrs	24.4%	18.8%
	Has Diabetes	10,511	603,964	997,233	0.38	1.7 hours	20.9%	17.3%
	Has Stroke	4,100	248,028	518,046	0.38	2.1 hours	8.6%	9.0%
	All of the above	27,293	1,395,559	2,481,334	0.36	1.8 hours	48.2%	43.0%
	None of the above	26,629	1,524,307	3,361,651	0.39	2.2 hours	51.8%	57.0%

* Total number of service events / Total of all days between all first and last service dates that fiscal year

2004/05		Clients #	Total Service Events	Total Service Hours	Service events /day*	Hours /service event	% all service events	% all service hours
1	Short-term	21,340	415,267	541,471	0.22	1.3 hours	12.4%	8.5%
	Long-term	27,766	2,708,710	5,850,814	0.42	2.2 hours	81.2%	91.5%
2	Short Stay	27,987	155,889	252,652	0.22	1.6 hours	4.7%	3.8%
	Long Stay	32,610	3,181,723	6,473,996	0.38	2.0 hours	95.3%	96.2%
3	0-3 ICD chapters	6,852	462,846	1,222,382	0.38	2.6 hours	13.9%	18.2%
	4-19 ICD chapters	53,745	2,874,766	5,504,267	0.36	1.9 hours	86.1%	81.8%
4	0-39 diagnoses	31,766	1,765,582	3,989,878	0.35	2.3 hours	52.9%	59.3%
	40+ diagnoses	28,831	1,572,030	2,736,771	0.38	1.7 hours	47.1%	40.7%
5	Cancer	12,878	461,450	963,470	0.30	1.9 hours	13.9%	14.5%
	COPD	12,914	879,560	1,278,291	0.39	1.5 hrs	26.5%	19.3%
	Diabetes	11,584	653,240	1,111,284	0.38	1.7 hours	19.7%	16.7%
	Stroke	4,714	296,995	571,948	0.38	2.1 hours	9.0%	8.6%
	All of the above	30,342	1,698,765	2,845,028	0.36	1.8 hours	51.2%	42.9%
	None of the above	30,255	1,638,847	3,881,620	0.39	2.2 hours	48.8%	57.1%

* Total number of service events / Total of all days between all first and last service dates that fiscal year.

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Table 12. Multiple Linear Regression Test for Predictors of Home Care Hours

Variables Entered/Removed(a)

Model	Variables Entered	Variables Removed	Method
1	Op_2	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
2	AGE	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
3	OP1	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
4	metro_rural	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
5	OP4	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
6	OP5	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
7	Living	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
8	Marry	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
9	OP_3	.	Forward (Criterion: Probability-of-F-to-enter <= .050)

a Dependent Variable: Total_SVC_HRS

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.247(a)	.061	.061	394.63555
2	.272(b)	.074	.074	391.93453
3	.305(c)	.093	.093	387.88564
4	.314(d)	.098	.098	386.68927
5	.321(e)	.103	.103	385.66534
6	.325(f)	.106	.105	385.16492
7	.326(g)	.106	.106	384.98983
8	.329(h)	.108	.108	384.64118
9	.329(i)	.108	.108	384.55217

a Predictors: (Constant), Op_2
b Predictors: (Constant), Op_2, AGE
c Predictors: (Constant), Op_2, AGE, OP1
d Predictors: (Constant), Op_2, AGE, OP1, metro_rural
e Predictors: (Constant), Op_2, AGE, OP1, metro_rural, OP4
f Predictors: (Constant), Op_2, AGE, OP1, metro_rural, OP4, OP5
g Predictors: (Constant), Op_2, AGE, OP1, metro_rural, OP4, OP5, living
h Predictors: (Constant), Op_2, AGE, OP1, metro_rural, OP4, OP5, living, marry
i Predictors: (Constant), Op_2, AGE, OP1, metro_rural, OP4, OP5, living, marry, OP_3

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	11.100	3.374		3.290	.001
	Op_2	206.664	4.297	.247	48.094	.000
2	(Constant)	163.543	7.632		21.430	.000

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Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta	B	Std. Error
	Op_2	225.384	4.350	.269	51.813	.000
	AGE	-2.347	.106	-.115	-22.232	.000
3	(Constant)	310.581	9.268		33.512	.000
	Op_2	147.859	5.153	.177	28.694	.000
	AGE	-3.016	.107	-.148	-28.102	.000
	OP1	-146.855	5.364	-.173	-27.376	.000
4	(Constant)	243.915	10.266		23.761	.000
	Op_2	150.748	5.141	.180	29.325	.000
	AGE	-2.951	.107	-.145	-27.565	.000
	OP1	-142.295	5.357	-.168	-26.565	.000
	Metro_rural	74.663	5.011	.075	14.900	.000
5	(Constant)	272.097	10.440		26.063	.000
	Op_2	152.968	5.130	.183	29.821	.000
	AGE	-3.038	.107	-.149	-28.402	.000
	OP1	-135.866	5.363	-.160	-25.336	.000
	Metro_rural	76.917	5.000	.077	15.383	.000
	OP4	-56.876	4.119	-.070	-13.807	.000
6	(Constant)	321.533	11.610		27.695	.000
	Op_2	152.265	5.123	.182	29.719	.000
	AGE	-2.986	.107	-.147	-27.911	.000
	OP1	-132.145	5.369	-.156	-24.611	.000
	Metro_rural	77.752	4.994	.078	15.568	.000
	OP4	-44.217	4.317	-.054	-10.243	.000
	OP5	-67.952	7.019	-.051	-9.681	.000
7	(Constant)	294.806	12.491		23.602	.000
	Op_2	153.404	5.125	.183	29.933	.000
	AGE	-2.827	.110	-.139	-25.621	.000
	OP1	-132.433	5.367	-.156	-24.674	.000
	Metro_rural	76.948	4.994	.077	15.408	.000
	OP4	-45.107	4.318	-.055	-10.447	.000
	OP5	-68.012	7.016	-.051	-9.694	.000
	Living	25.523	4.413	.030	5.783	.000
8	(Constant)	280.963	12.596		22.306	.000
	Op_2	152.006	5.123	.182	29.670	.000
	AGE	-2.624	.113	-.129	-23.204	.000
	OP1	-128.134	5.389	-.151	-23.779	.000
	Metro_rural	75.647	4.992	.076	15.153	.000
	OP4	-43.583	4.318	-.053	-10.094	.000
	OP5	-66.066	7.014	-.050	-9.420	.000
	Living	47.320	5.165	.056	9.162	.000
	Marry	-39.910	4.925	-.048	-8.104	.000
9	(Constant)	279.265	12.599		22.165	.000
	Op_2	151.621	5.123	.181	29.597	.000
	AGE	-2.566	.114	-.126	-22.522	.000
	OP1	-128.746	5.389	-.152	-23.889	.000
	Metro_rural	75.156	4.992	.076	15.054	.000

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Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta	B	Std. Error
	OP4	-38.331	4.496	-.047	-8.526	.000
	OP5	-60.805	7.124	-.046	-8.535	.000
	Living	47.566	5.164	.056	9.211	.000
	Marry	-39.296	4.926	-.047	-7.978	.000
	OP_3	-18.527	4.428	-.023	-4.184	.000

a Dependent Variable: Total_SVC_HRS

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Table 13. Multiple Linear Regression for Predictors of Home Care Service Events

Variables Entered/Removed(a)

Model	Variables Entered	Variables Removed	Method
1	Op_2	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
2	Metro_rural	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
3	OP1	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
4	AGE	.	Forward (Criterion: Probability-of-F-to-enter <= .050)
5	Marry	.	Forward (Criterion: Probability-of-F-to-enter <= .050)

a Dependent Variable: Total_SVC_EVT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.093(a)	.009	.009	421.863
2	.113(b)	.013	.013	420.990
3	.120(c)	.014	.014	420.659
4	.127(d)	.016	.016	420.279
5	.128(e)	.016	.016	420.253

a Predictors: (Constant), Op_2
b Predictors: (Constant), Op_2, metro_rural
c Predictors: (Constant), Op_2, metro_rural, OP1
d Predictors: (Constant), Op_2, metro_rural, OP1, AGE
e Predictors: (Constant), Op_2, metro_rural, OP1, AGE, marry

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	5.868	3.606		1.627	.104
	Op_2	81.290	4.594	.093	17.696	.000
2	(Constant)	58.612	5.624		10.422	.000
	Op_2	80.552	4.584	.092	17.571	.000
	metro_rural	-66.448	5.444	-.064	-12.205	.000
3	(Constant)	90.487	7.025		12.880	.000
	Op_2	56.336	5.590	.065	10.079	.000
	metro_rural	-68.476	5.447	-.066	-12.572	.000
	OP1	-42.881	5.672	-.049	-7.560	.000
4	(Constant)	160.691	11.157		14.402	.000
	Op_2	57.734	5.587	.066	10.333	.000
	metro_rural	-70.255	5.446	-.068	-12.900	.000
	OP1	-53.682	5.822	-.061	-9.221	.000
	AGE	-.942	.116	-.045	-8.095	.000
5	(Constant)	163.817	11.238		14.577	.000
	Op_2	57.126	5.593	.066	10.214	.000

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Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
	metro_rural	-70.384	5.446	-.068	-12.924	.000
	OP1	-52.364	5.849	-.059	-8.952	.000
	AGE	-.924	.117	-.044	-7.927	.000
	Marry	-10.617	4.581	-.012	-2.318	.020

a Dependent Variable: Total_SVC_EVT

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Appendix

Home Care Study Elements Requested in Alberta Health and Wellness Databases

*Inclusion and Exclusion Criteria

All Albertans who appear in the home care database for the years 2004/05, and 2005/06 (with 2003/04 added when 2005/06 data were incomplete). Include only Albertans who have been admitted to the provincial home care program (exclude non-admissions, AADL only, provisional admissions and supplementary services only using the Home Care Status variable), exclude all non-Alberta residents (use the Province variable <>AB).

Unique Recipient Information

- Anonymous personal health insurance number
- Birth Date (ddmmyyyy)
- Sex
- Current home care status (admitted, discharged)
- Date of Admission to the program (ddmmyyyy)
- Reason for admission
- Referred from location type (private dwelling, senior citizens self-contained housing, lodge, long term care facility, psychiatric hospital, other residential facility, acute geriatric assessment unit, acute care hospital, other, not applicable, deceased)
- Date of discharge from the program (ddmmyyyy)
- Referred to location type (private dwelling, senior citizens self-contained housing, lodge, long term care facility, psychiatric hospital, other residential facility, acute geriatric assessment unit, acute care hospital, other, not applicable, deceased)
- Reason for discharge (deceased, moved, admitted to a facility, under 65, support service only, requires service not provided, refused services, can manage care, no longer requires service, insufficient home care resources, other)
- Self managed Care Client (yes, no)
- Date of becoming a self-managed care client (ddmmyyyy)
- Residence type (private dwelling, seniors housing, lodge, other residential facility, other) (track change)
- RHA of residence (1 to 9)
- Postal Code of Residence (xxxxxx)
- Client Type (short-term, long-term, palliative, unclassified)(track change)

note: if more than one AAPI has been completed, include the completion data and the AAPI classification scores for each AAPI

- AAPI Completion Date (ddmmyyyy)
- AAPI Client Classification Scores
- Home Care Functional Need Score (all thirteen indicator scores)
- Home Care Informal Support Score (all thirteen indicator scores)
- Combined Home Care Classification Score (0 to 9)
- Estimated RSC Score (A to G)

Service Provision Information

Aggregate file of total service hours provided by recipient, by provider type,

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by service category on a monthly basis

- Month (mmyyyyy)
- Client anonymous personal health insurance number
- RHA of Service provider
- Provider office number
- Service provider type (nurse, occupational therapist, physiotherapist, home support aide, licensed practical nurse, social worker, respiratory therapist, self-managed care, all other)
- Service Category (general assessment, case co-ordination, direct health services, personal care, home support, general indirect services and other)

Link with additional elements (from AB Health and Wellness Databases listed below) *
* all individual anonymous data, using Alberta Ministry of Health and Wellness assigned scrambled individual identifier (SII) for each individual, with same identifier regardless of database.

Inpatient Abstracts Database

(A) Service Recipient

- SII
- gender/sex
- age/date of birth (BY/BM)
- location of residence (postal code)
- RHA of residence

(C) Service Event

- diagnosis X 16

(D) Provider specialty

- doctor service - M or P

Physician Billing/Claims Database

(A) Service Recipient

- SII
- gender/sex
- age/date of birth (BY/BM)
- location of residence (postal code)

(B) Service Event

- diagnosis

(D) Provider specialty

- physician specialty (aggregated)
- general surgeon
- general practitioner
- other combined surgical specialist
- internal medicine
- remaining/other physicians combined

ACCS Database

(A) Service Recipient

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- SII
- gender/sex
- age/date of birth (BY/BM)
- location of residence (postal code)
- RHA of residence

(C) Service Event
- diagnosis X 16

(D) Provider specialty
- doctor service - M or P

<u>AHCIP Registry</u>
- SII
- SES proxy/premium subsidy level (full, partial, none)

- Marital status (divorced, married, single, widowed, separated, common law)
- Living arrangement (lives alone, with spouse only, with spouse and others, with others)

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