Health Care Use at the End of Life in Western Canada

Canadian Institute for Health Information

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ISBN 978-1-55465-074-3 (PDF)

How to cite this document:
Canadian Institute for Health Information, *Health Care Use at the End of Life in Western Canada* (Ottawa: CIHI, 2007).

Cette publication est aussi disponible en français sous le titre *Utilisation des soins de santé en fin de vie dans les provinces de l'Ouest du Canada*.
ISBN 978-1-55465-072-9 (PDF)

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About the Canadian Institute for Health Information

The **Canadian Institute for Health Information** (CIHI) collects and analyzes information on health and health care in Canada and makes it publicly available. Canada's federal, provincial and territorial governments created CIHI as a not-for-profit, independent organization dedicated to forging a common approach to Canadian health information. CIHI's goal: to provide timely, accurate and comparable information. CIHI's data and reports inform health policies, support the effective delivery of health services and raise awareness among Canadians of the factors that contribute to good health.

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Acknowledgements

The Canadian Institute for Health Information (CIHI) would like to acknowledge and thank the many individuals and organizations that have contributed to the development of this report.

In particular, CIHI would like to thank the project co-leads, whose generous contributions to the development of the study methodology, analysis plan and province-specific reports for B.C. and Manitoba are greatly appreciated:

- **Dr. Francis Lau**, Associate Professor, School of Health Information Science, University of Victoria; and

Dr. Verena Menec, Associate Professor, Department of Community Health Sciences and Director, Centre on Aging, University of Manitoba.

We would also like to thank the members of the project Advisory Committee, who provided direction and oversight to the study team:

- **Dr. Peter Kirk**, Director of Research, Vancouver Island Health Authority;
- **Ms. Wendy Hill**, Assistant Deputy Minister of Health, Government of British Columbia;
- **Ms. Annette Trimbee**, Assistant Deputy Minister of Health, Government of Alberta;
- **Mr. Roger Carriere**, Executive Director, Community Care Branch, Saskatchewan Health, Government of Saskatchewan;
- **Ms. Judy Knight**, Director, Continuing Care, Manitoba Health, Government of Manitoba;
- **Mr. Greg Webster**, Director of Research and Indicator Development, CIHI;
- **Mr. Brent Diverty**, Director of Continuing and Specialized Care Information Services, CIHI; and
- **Ms. Patricia McKendrick**, Client Affairs Manager for Alberta, CIHI.

CIHI would also like to thank the following organizations and their employees that provided support for this project, financial and otherwise:

- Government of British Columbia, Ministry of Health;
- Government of Alberta, Department of Health and Wellness;
- Government of Saskatchewan, Saskatchewan Health;
- Government of Manitoba, Department of Health;
- Capital Health;
- Chinook Health Region;
- David Thompson Regional Health Authority; and
- East Central Health Region.

Please note that the analyses and conclusions in this report do not necessarily reflect the opinions of the individuals or organizations mentioned above.

This study is based in part on de-identified data provided by the Saskatchewan Department of Health. The interpretation and conclusions contained herein do not necessarily represent those of the Government of Saskatchewan or the Saskatchewan Department of Health.

This study is based in part on data provided by Alberta Health and Wellness. The interpretation and conclusions contained herein are those of the researchers and do not necessarily represent the views of the Government of Alberta. Neither the Government of Alberta nor Alberta Health and Wellness express any opinion in relation to this study.

CIHI would also like to thank the researchers who conducted the province-specific studies for B.C., Alberta, Saskatchewan and Manitoba:

- **Ms. Robyn Kuropatwa**, Global Tiger Systems Solutions;
- **Mr. Dennis Wellbourn**, Global Tiger Systems Solutions;
- **Dr. Konrad Fassbender**, Capital Health (Edmonton);
- **Dr. Marcus Hollander**, Hollander Analytical Services Ltd.;
- **Ms. Angela Tessaro**, Hollander Analytical Services Ltd.;
- **Dr. Verena Menec**, University of Manitoba; and
- **Scott Nowicki**, University of Manitoba.

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- **Linda Choy**, Senior Analyst; and
- **Jin Huang**, Analyst.

This report could not have been completed without the generous support and assistance of many other CIHI staff members who provided expert advice on specific health services issues (in particular the National Pharmaceutical Drug Utilization Information System program staff); worked on the print and web design, translation, communications and distribution; and provided ongoing support to the core team.

Executive Summary

Canadians depend on their provincial health care systems to deliver appropriate, coordinated and compassionate care at the end of life. Each year between 60,000 and 70,000 of the estimated 9 million residents of the four western provinces die, representing approximately 30% of Canadian deaths. This report describes some aspects of care provided in the last year of life to residents who died in Canada's western provinces—British Columbia, Alberta, Saskatchewan and Manitoba—in 2003–2004.

Ideally, a report on care at the end of life would detail whether pain and suffering were minimized; spiritual and psychosocial needs were met; and health care was coordinated with home, long-term care and community-based services being delivered at the end of life. Unfortunately, the extent to which the needs of a dying person and of his or her family are met is very difficult to determine at a population level of analysis. The nature of and variation in provincial administrative health data limited the study to a descriptive design. Although the data did not provide specifics on how services were perceived by the individual, they can nevertheless be used to inform health planners and others interested in ensuring the best possible end-of-life care or some aspects of that care, including where death occurred and the extent of hospital and pharmaceutical service use.

Provincial ministries of health are interested in examining care at the end of life because it is a type of care that all residents will eventually need. As Canadians live longer lives, often with chronic illness and functional limitations, care at the end of life is complex and requires coordination of a variety of services to maintain an optimal quality of life. End-of-life care tends also to be intensive and costly, and there are questions about whether at the end of life the right kinds of care are delivered in the most appropriate settings. Developing effective models of end-of-life care is critical in light of the aging baby boom cohort that will increasingly need end-of-life care over the next decade.

For this report, the Western Office of the Canadian Institute for Health Information (CIHI) collaborated with the ministries or departments of health from B.C., Alberta, Saskatchewan and Manitoba to characterize selected aspects of health care at the end of life. Through this collaboration, analysts linked death certificate data to hospital and pharmacy administrative records for all decedents. Focusing on adult decedents (19 and older) this study examines the use of hospital and pharmacy services. The report includes analyses across the four provinces to allow comparisons of the following aspects of death:

❶ The location of death, whether in hospital or elsewhere;
❷ Hospital use within the last year of life; and
❸ Use of community-dispensed drugs and supplies, including palliative drug use.

Location of Death

Over half of western Canadians who die do so in a hospital, despite evidence indicating that in general, people prefer to die at home. According to information on death certificates, 58% of decedents in western Canada, roughly 37,000 people, died in hospital in 2003–2004. In-hospital deaths were more common in Alberta and Manitoba relative to B.C. and Saskatchewan. Studying where people die is complicated by the fact that each western province classifies location of death with different degrees of specificity on death certificates. Saskatchewan lists only two known locations, "hospital" and "non hospital," while B.C. allows for coding of nine known places of death, including "home," "residential institution" and "industrial site."

To aid in the exploration of end-of-life issues, study decedents were classified into trajectory groups to better reflect the combined effects of disease and functional status on health care utilization. These trajectory groups, which included "Terminal Illness," "Organ Failure," "Frailty" and "Sudden Death," are useful when trying to understand variations in the patterns of decline and consequent health care use at the end of life. By trajectory group, decedents in the Terminal Illness category were significantly more likely than those classified in the Frailty or Organ Failure groups to have died in hospital.

When death certificate information is supplemented with data from hospital discharge records, it is possible to approximate the proportion of decedents who received hospital care focused on palliation. This estimate ranged from 13% in receipt of hospital palliative care in Manitoba to 16% in Alberta. Among those decedents dying in hospital, those in the Terminal Illness trajectory group were much more likely to receive palliative care services. The method used to distinguish palliative from acute care at the end of life is imperfect given the nature of the information available from administrative data, so these estimates should be interpreted with caution.

Information on deaths occurring at home or at a long-term care (LTC) facility was available for B.C., Alberta and Manitoba. B.C. decedents were most likely to have died at home (17%) or in an LTC facility (27%), followed by Alberta (15% home, 16% LTC) and Manitoba (11% home, 20% LTC).

Hospital Use

Hospitalizations were common among western Canadians in the last year of life. Within 360 days of death, 62% of western Canadian decedents were hospitalized at least once. Overall, during the last year of life, decedents in the western provinces spent an average of 20.1 days in hospital. Among only those decedents hospitalized at least once, the average number of days in hospital during the last year of life was 32.1 days. Decedents in B.C. were generally less likely than those in the other western provinces to be hospitalized, and were hospitalized for fewer days in the last year of life.

Across the western provinces, decedents from smaller, rural or northern regional health authorities (RHAs) were more likely to have been hospitalized and to spend more days in hospital before death than decedents from larger, more urbanized RHAs. This finding may reflect increased availability of non–hospital based health services in larger urban centres compared to smaller communities in which these types of services would only be available at a local hospital.

Individuals dying of terminal illnesses were more likely to be hospitalized in the year preceding death than those dying of other causes. While hospital use escalated for most individuals in the last three months of life, it rose most rapidly for those in the Terminal Illness group. Decedents in the Organ Failure and Frailty groups were less likely to be hospitalized than those classified as terminally ill; however, in the year before death, they had accrued nearly the same number of hospital days as those in the Terminal Illness category.

Use of Pharmacy Products

Analysis of the use of pharmacy products by province is challenging because provincial drug benefit plans differ in their funding arrangements, formulary coverage and co-payment and deductible levels. Further complicating our analysis was missing information on community-based prescription drug use for residents of Alberta and for some residents of long-term care facilities in B.C. and Manitoba. Alberta did not provide pharmacy data for this study because at the time of the project, Alberta Health and Wellness was engaged in an effort to restructure the provincial prescription drug administrative data system and files. In B.C. and Manitoba, drugs for residents of some LTC facilities are covered by the facility budget.

Overall, community drug and supply use among seniors was lower in B.C. than in Saskatchewan and Manitoba, in terms of the per-decedent average, total number of prescriptions, different drug classes (excludes Saskatchewan) and costs to government. The most common drugs used in the last six months of life were remarkably similar in B.C. and Manitoba, indicating treatment of likely common conditions as death approached. Regionally, drug use was typically lowest in less populated northern RHAs, except in B.C., where it was lowest in the more populated urban RHAs.

Similar to overall drug use, pain medication use as measured by morphine equivalent prescriptions was lowest in B.C. relative to Saskatchewan and Manitoba. Saskatchewan had the highest morphine equivalent prescription use at all time periods during the last year of life. Because there are no population-based norms with which to compare morphine equivalents, one cannot say whether the observed levels of pain medication use are too high or too low. However, these estimates provide useful benchmarks for future tracking of pain medication use at the end of life. Examination of the most common pain medications used in the last six months revealed similar patterns in each of the three provinces, with morphine and acetaminophen with codeine the two most common drugs/chemicals used, as measured by the total number of claimants.

Overall, about one in seven decedents registered with a provincial palliative care drug benefit plan during the last two years of life. Registration with these plans was lowest in Manitoba and highest in Saskatchewan.

Terminal Illness decedents showed the highest use of prescription drugs compared to other trajectory groups, particularly within 30 days before death, indicating a stronger reliance on drugs—likely for pain management—as death approaches. Further from death, particularly between 6 and 12 months before death, Organ Failure and Frailty decedents showed higher drug use, though costs were typically highest among the Terminal Illness decedents. As expected, morphine equivalent use was highest among the Terminal Illness decedent group.

Province-Specific Findings

In addition to their contributions to the inter-provincial study, each of the participating provinces completed a "branch" study to reflect its specific interests. B.C. conducted an analysis of service utilization, using techniques to measure intensity of service use in the last two years of life. Here, health service use peaked in the last three to six months of life, the traditional period of focus for end-of-life palliative care. However, the B.C. findings illustrate that with an older population, where chronic illness and comorbid conditions are common, end-of-life care is needed well before the last three to six months.

Alberta provided a description of palliative home care programs operating in three of its RHAs and conducted a study of the efficacy of a palliative patient assessment tool. The palliative care programs reviewed relied on the model of care espoused by the Canadian Hospice Palliative Care Association and reported use of performance measures to monitor their services. The chart review generated considerable insight into the care of dying patients across multiple care settings and was viewed as being a viable means to address quality of care provided to dying patients. The palliative patient assessment tool performed well in helping to identify the optimal location of care provided to dying patients.

Saskatchewan analyzed health care costs in the two years before death and found that long-term care facility costs can be quite significant for any aggregate cost estimates of end-of-life care, particularly if costs beyond the six-month period are examined. Residents of long-term care facilities used relatively few services from other parts of the health care system.

Manitoba examined transfers among hospitals, long-term care facilities and home occurring at the end of life. Hospital use was highest among home care clients, with over 80% of these individuals being hospitalized at least once in the last six months of life, compared to about two-thirds of long-term care facility residents. Just over half of palliative patients were hospitalized during this time period. Transfers into acute care hospitals—typically from long-term care facilities—occurred relatively shortly before death: the major increase in transfers occurred within the last four weeks before death.

Summary

Although this report focuses on end-of-life care provided in the four western provinces, it is likely that findings are relevant to other parts of Canada. For example, the leading causes of death in western Canada—circulatory diseases, cancer and respiratory diseases—take the same toll nationally. The types of clinical services provided in western Canada are therefore likely to be similar to those provided elsewhere in Canada.

Significant variation across the western provinces is evident in terms of where people die and the services that are used. To some extent, this variation may indicate differences in the availability and organization of social, residential and health care services. To better understand why the location of death and use of services within a year of death vary, more comprehensive, comparable data are needed on the experience of individuals across residential and health care settings and over time. As health planners consider implementing new models of end-of-life care, investments in data standards and information systems will have to be made to improve what we know about the experience of dying in Canada.

The vital statistics and administrative data analyzed in this report are insufficient to allow any judgement of whether too much care, too little care or the wrong care was provided to the residents of western Canada in their last year of life. However, given the general population's preference to die at home with adequate supportive care services, these findings merit further investigation. Especially needed are studies of the appropriateness of in-hospital deaths, access to community-based supportive care resources and the adequacy of pain and other symptom management at the end of life.

Variation in care suggests that an integrated, systematic approach to end-of-life care does not yet exist. Such an approach is not taken for many at the end of life, simply because clinicians cannot accurately predict when death will occur. Evidence suggests that palliative care is more likely to be administered when death is somewhat more predictable, as in the case of cancer. Variation in end-of-life care will likely attenuate as prognostic instruments are improved, palliative care guidelines are promulgated and robust quality-of-care measures are identified for this important phase of care. As progress is made in these areas, there may well be a shift in location of death to residential settings and an increase in the use of palliative care services in hospitals, homes and long-term care facilities where an increasing number of seniors reside.

The data provided in this report on hospital and community drug and supply use can serve as a benchmark for future analyses. B.C. plans to monitor shifts in patterns identified in its province-specific study through ongoing analysis of its administrative data. The four-province collaboration that was integral to the development of this report has led to refinements of key methodologies and has provided a contextual basis for assessing variation in health care utilization at the end of life across the western provinces.

Introduction

“To cure sometimes,
to comfort often,
and to care always.”

Sir William Osler

Death is a universal experience. With death touching everyone and every family, logic would dictate that significant societal resources would be marshalled to ensure good care and comfort at the end of life. Instead, resources and research investments have tended to be directed to disease treatment with a focus on cures. These efforts have been largely successful, resulting in significant life expectancy gains. A baby boy born in Canada today can expect to live to age 75 and a baby girl to age 81. This represents a remarkable demographic achievement relative to forecasts from the early 1920s, when males were expected to live until age 59 and females to age 61. Death does inevitably come, however much later, and each year approximately 235,000 Canadians die.

Analyses of data relating to death can aid efforts to understand a disease's etiology, its potential prevention and treatments that are most effective in its management or cure. Available data on deaths and health care can also be studied to improve our understanding of the experience of death: for example, where death occurs and what health care services were used to provide care and comfort at the end of life. Understanding the health care experiences of individuals dying in Canada is critical because some evidence suggests that there are opportunities to improve care provided at the end of life.

Although most Canadians would prefer to die at home, the majority die in hospitals. Despite clinical advances in the ability to control pain and relieve distressing symptoms, many Canadians suffer at the end of life without having their pain and symptoms effectively managed.[1] Others are subject to extreme measures to prolong life, without sufficient attention paid to ensuring a comfortable death.[2] While over-treatment of those who are dying is worrisome, patients also fear being abandoned by their health care providers when a cure is no longer possible. Relatively few Canadians are receiving integrated, interdisciplinary palliative care aimed at alleviating physical, emotional, psychosocial and spiritual suffering at the end of life.[1, 3] With these identified concerns, renewed attention is being paid to the circumstances of death as part of efforts to ensure a "good" death and avoid a "bad" death (see box on right).

Characteristics of "Good" and "Bad" Deaths

People should be able to expect and achieve a decent or good death—one that is free from avoidable distress and suffering for patients, families and caregivers; in general accord with patients' and families' wishes; and reasonably consistent with clinical, cultural and ethical standards.

A bad death is characterized by needless suffering, disregard for patient or family wishes or values and a sense among participants or observers that norms of decency have been offended.

Source: Adapted from Institute of Medicine, *Approaching Death: Improving Care at the End of Life*, eds. M. J. Field and C. K. Cassel (Washington: National Academy Press, 1997).

In recent years, calls for enhanced and expanded services for patients at the end of life and their families have come from many fronts. The Quality End-of-Life Care Coalition of Canada, formed in 2000 to include 31 national stakeholder organizations has developed a *Framework for a National Strategy on Palliative and End-of-Life Care*.[5] This effort followed the release in 2000 of the Senate of Canada's report *Quality End-of-Life Care: The Right of Every Canadian*.[6] This Senate report was an update of a 1995 report, *Of Life and Death*,[7] and included recommendations to overcome identified shortcomings in care that had not yet been addressed. In its most recent 2005 report, *Still Not There—Quality of End-of-Life Care: A Progress Report*,[2] the Senate concluded that Canadians typically die in hospital or long-term care facilities and without the benefits of dedicated palliative care resources.

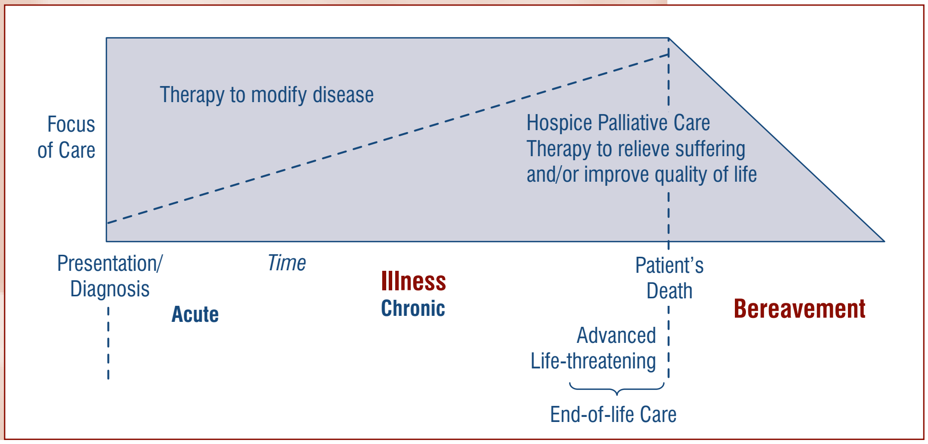
The federal government has introduced policies and programs to address the myriad of end-of-life concerns that have been identified. In 2001, Health Canada created the Secretariat on Palliative and End-of-Life Care with a mandate to help implement change in this health sector. A coordinating committee and working groups are making progress on the development and implementation of the Canadian Strategy on Palliative and End-of-Life Care.[8] The 2003 First Ministers' Accord on Health Care Renewal included end-of-life care as part of an expanded short-term, acute home care basket of services, intended to "improve the quality of life of many Canadians by allowing them to stay in their home or recover at home."[9]

At the provincial level, the British Columbia Ministry of Health in 2006 published *A Provincial Framework for End-of-Life Care* and has stipulated a decrease in the proportion of natural deaths occurring in-hospital as a performance measure in its service plan.[10] In response to a review of continuing care in Alberta, the Department of Health and Wellness recently introduced *Continuing Care Health Service Standards*, which include a focus on end-of-life and palliative care in service coordination, operational processes and quality improvement.[11]

As these examples illustrate, there is great interest in exploring new models of care to ensure the provision of compassionate, coordinated and appropriate services at the end of life. Well established are programs to provide hospice care in the home or in hospital. Hospice programs have been operating in Canada since the early 1970s to provide care for dying patients according to an established set of clinical, social and spiritual principles. Increasingly, acute care hospitals are establishing palliative care units, and long-term care facilities are developing programs in an attempt to meet the needs of their residents at the end of life. "Palliative" is a term used to denote care throughout the care trajectory that seeks to prevent, relieve, reduce or soothe the symptoms of disease or disorder without effecting a cure (see The Role of Palliative Care at the End of Life on page 4).

The Role of Palliative Care at the End of Life

The Canadian Hospice Palliative Care Association (CHPCA) uses this figure to describe the role of palliative care. In this model, “the top line represents the total ‘quantity’ of concurrent therapies. The dashed line distinguishes therapies intended to modify disease from therapies intended to relieve suffering and/or improve quality of life (labelled “hospice palliative care”). The lines are straight for simplicity. In reality, the total ‘quantity’ of therapy and the mix of concurrent therapies will fluctuate based on the patient’s and family’s issues, their goals for care and treatment priorities. At times, there may not be any therapy in use at all.”[12]

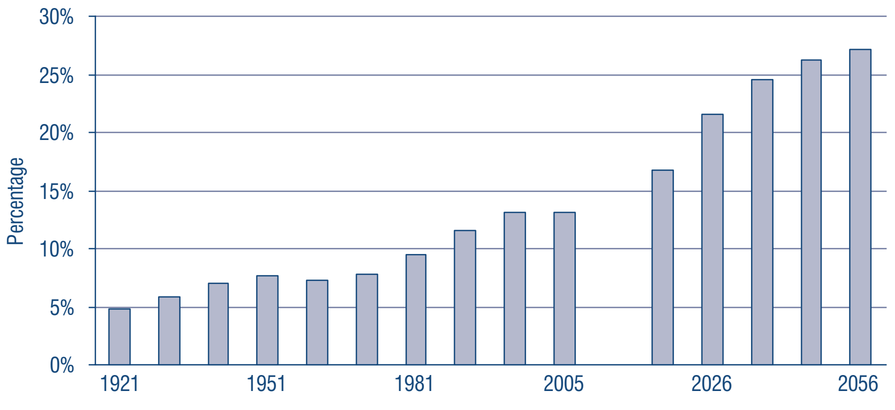


Source: Canadian Hospice Palliative Care Association, *A Model to Guide Hospice Palliative Care: Based on National Principles and Norms of Practice* (Ottawa: CHPCA, 2002).

Specific programs and services for end-of-life and palliative care arrangements vary across and within provinces. For example, palliative drug benefit programs have existed since as early as 1987 in western Canada, and, while eligibility for these benefits is essentially consistent across the west, coverage and formulary differences exist. There are also differences in palliative services, whether delivered in the home or in a hospital setting. For a summary of these services and programs applicable during 2003–2004, please refer to Appendix A.

Assessments of innovative models of end-of-life care are critically important because such services will be in great demand as the baby-boom cohort enters old age. The number of seniors 65 and older in Canada is projected to increase from 4.2 million to 9.8 million between 2005 and 2036, and seniors’ share of the population is expected to almost double, increasing from 13% to 25% (Figure 1).[12]

Figure 1: **Percentage of Canadian Population Comprised of Persons Aged 65 or Older, 1921 to 2005 and Projections to 2056**



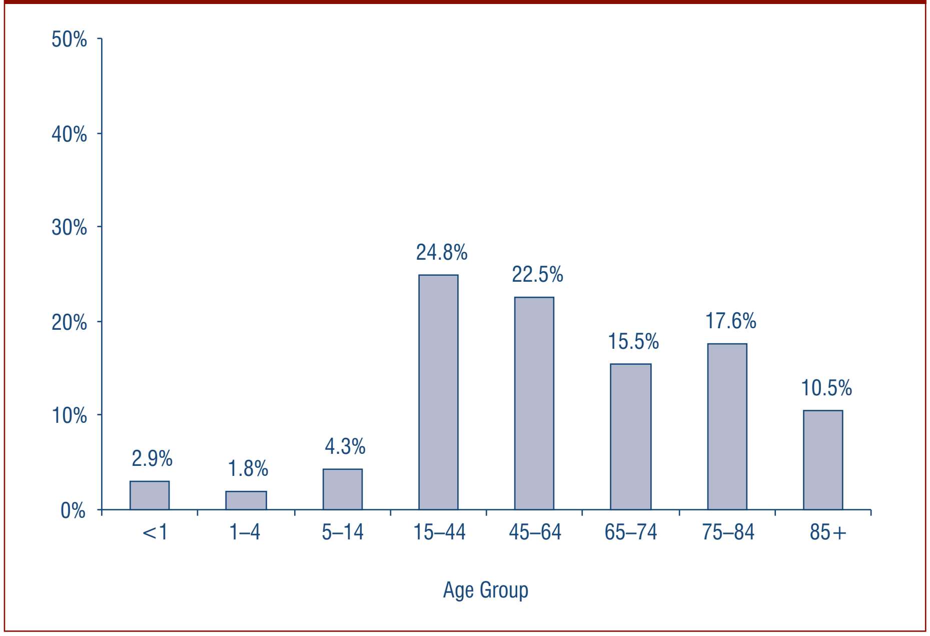
Source: Adapted from Statistics Canada, *A Portrait of Seniors in Canada, 2006* (Ottawa: Minister of Industry, 2007), catalogue number 89-519-XIE.

Because of the aging of the baby-boom cohort, the number of deaths in Canada could increase by as much as 65% by the year 2036.[12] According to the Senate of Canada's first interim report *Embracing the Challenge of Aging*, these effects will be felt more strongly in eastern Canada, where the population is older in comparison to western Canada.[15]

With extended life spans, more Canadians are dying at advanced age. More than 75% of those who die are 65 or older. The major causes of death and the typical experience of dying differ markedly from those prominent in the last century. At that time, death often came quickly following infection, untreated chronic disease or trauma. In contrast, the dying process today is often protracted, in part because medical interventions can manage pneumonia, infections and kidney failure and prolong the lives of people with heart disease, cancer and other slowly progressive conditions.

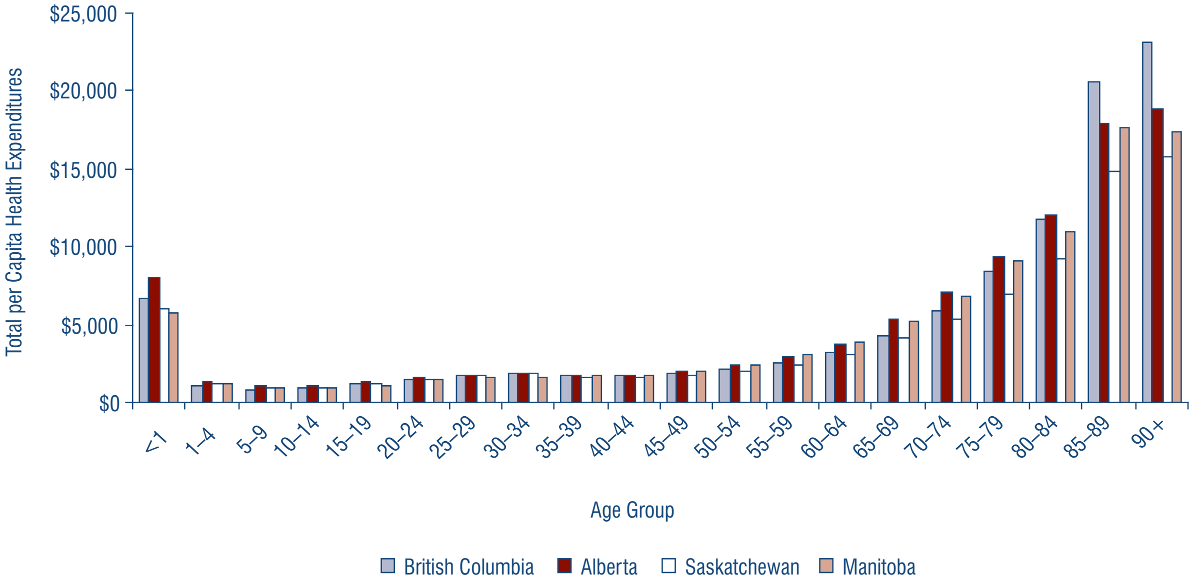
As the length of life and time spent living with chronic conditions has increased, so too have associated medical expenditures. There is a sharp increase in health spending by age, with more than 40% of total health care spending accounted for by those 65 and older (Figure 2), though they account for less than 20% of the total Canadian population. On a per capita basis, seniors account for the lion's share of provincial health care spending in western Canada (Figure 3). Although health spending increases with age, there are some persistent myths regarding health spending at the end of life, for example, that "heroic efforts" to treat the dying are driving up health care costs.[16] In reality, health care spending for individuals at the end of life has remained stable over time, and the older a person is at death, the lower his or her medical costs will be during their final year of life. This occurs because very old people tend to reside in residential care facilities and rely on services provided there.

Figure 2: **Percentage Distribution of Total Health Expenditures in Canada, by Age Group, 2003**



Source: Canadian Institute for Health Information, *National Health Expenditure Trends, 1975–2006* (Ottawa: CIHI, 2006).

Figure 3: **Total per Capita Provincial Health Expenditures, by Age Group, 2003**



Source: Canadian Institute for Health Information, *National Health Expenditure Trends, 1975–2006* (Ottawa: CIHI, 2006).

With demographic trends set to stress health care systems, it is vital to have surveillance systems in place to monitor the status of care for the dying and to gauge the success of innovations in care delivery. Until such surveillance systems are available, much can be learned from available data sources.

About This Report

For this study, the Canadian Institute for Health Information (CIHI) collaborated with the ministries or departments of health from B.C., Alberta, Saskatchewan and Manitoba to examine selected aspects of health care at the end of life. Each year, between 60,000 and 70,000 people die in the western provinces, representing approximately 30% of Canadian deaths.[17] We linked death certificate data to provincial hospital discharge and community prescription drug and supply data to characterize decedents and selected health care experiences occurring within the last year of life (see below).

Summary of Study Methodology	
Population	This study included residents in the four western provinces who died between April 1, 2003, and March 31, 2004 (the most recent year for which vital statistics death data were available from all four provinces). Exclusions included non-residents, persons not eligible for provincial health coverage at the time of death and infants less than one year of age at death (due to provincial differences in documentation). The study focused on adult decedents 19 and older.
Data Sources	Provincial vital statistics (death certificates), hospital discharge data abstracts and pharmacy data (excluding Alberta).
Data Linkage	Each provincial data or research unit linked death certificate data to hospital and pharmacy databases using unique identifiers (typically personal health numbers assigned by each province).[i] Once linked, anonymized data for the two years preceding the decedent's death were extracted to create a two-year retrospective health services use record. The percentage of matched records for each province was virtually complete (at or exceeding 99%), indicating that decedents included in this study represent the vast majority of decedents in each province.
Coverage of Health Services	The focus of the study is on those health services that are comparable across the four participating provinces—hospital use and seniors' community prescription drug and supply use (these services are described further in subsequent chapters). Excluded were use of physician services, formal home care and continuing care and informal care received by family members or other means. This study also excludes services provided by Health Canada—namely hospital services for members of the military and the RCMP, as well as prescription drugs to the military, the RCMP and registered First Nations individuals.
Limitations	Due to privacy legislation and data release standards, not all data elements were available for all decedents because of the potential risk of identification of individuals given smaller cohort populations in some provinces. For example, Saskatchewan suppressed regional health authority (RHA) values for the 1-to-18 age group due to cell size concerns.

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[i] Each province used deterministic and/or probabilistic linkage methods. Deterministic linkage is more appropriate when, as in the case of this study, data sources use the same unique identifier. Probabilistic linkage, typically more complex, relies on existing subject information from various sources to create matches across sources.

The aim of the report is to assist health care planners and policy-makers as they develop approaches to meet the needs of people at the end of life. Knowing where people die and the extent to which hospital care and pharmaceuticals are used can assist in these planning efforts. Analyses of sources of variation in these statistics by province can inform health planning and focus further research efforts. This report provides some population-level data that will be of great use to planners; however, much additional research and analysis will be needed to more fully ascertain the clinical and psychosocial needs of Canadians at the end of life and how to adequately meet these needs.

The report focuses on the use of hospital and pharmacy services because comparable data were available from all four provinces for these aspects of care. The type of information collected on decedents, and how those data are categorized and recorded, varies by province. Comparisons among all four provinces have been made with common data elements. Where differences in data were evident, selected comparisons were made. Provincial-level analyses, based on data unique to each province, were performed to inform province-specific policy or research issues.

The report includes analyses across the four provinces to allow comparisons of the following aspects of death:

① The location of death, whether in hospital or elsewhere;
② Use of acute hospital services; and
③ Use of community-dispensed drugs and supplies, including provincial palliative care drug program enrolment.

These aspects of care are important determinants of health care expenditures. Hospital use in 2003 accounted for the largest proportion of total provincial health spending (Table 1). While drugs accounted for the second-largest share of provincial spending, the increase in spending on drugs has outpaced all other components of health expenditures since 1975. This study, then, compares interprovincial patterns in service use for the biggest and fastest-growing components of provincial health care spending among the adult population, of which a subcomponent—those over age 65—accounted for the largest proportion of decedents in western Canada.

Table 1: **Percentage Distribution of Total Provincial Health Expenditures, 2003**

Province	Hospitals	Other Institutions	Physicians	Other Professionals	Drugs	Capital	Public Health	Administration	Other Spending	Total
B.C.	**28.2**	12.0	15.6	12.5	**13.2**	3.7	4.6	3.9	6.3	100.0
Alta.	**31.1**	5.8	12.5	11.4	**14.3**	5.4	7.9	3.6	8.0	100.0
Sask.	**27.4**	13.2	12.3	9.4	**14.8**	2.8	8.3	4.2	7.6	100.0
Man.	**29.8**	13.2	12.2	8.8	**13.6**	4.3	6.4	3.6	8.1	100.0

Source: Canadian Institute for Health Information, National Health Expenditure Trends, 2006.

Each province examined specific issues relevant to its policy and planning requirements.

B.C.: Analyses of service utilization events in the last two years of life, grouping decedents based on complexity of care "bundles."

Alberta: Review of palliative care home programs for three RHAs and an assessment of the efficacy of a palliative patient assessment tool.

Saskatchewan: Examination of patterns in health care use and costs to government in the last two years of life.

Manitoba: Examination of patterns in transfers among home, hospital and personal care homes in the last two years of life, and assessment of palliative patient registration and identification methods and issues.

Report Structure

This report focuses on results for the western provinces and presents highlights from the individual provincial studies. Detailed, province-specific reports are available on the CIHI website at www.cihi.ca (you will find PDF versions of this and province-specific reports on the end-of-life project page by selecting "New Initiatives" under the Research & Reports heading).

Chapter 1 describes the demographic characteristics of the decedent cohort.

Chapter 2 presents findings relating to location of death, comparing results based on different methods and data sources.

Chapter 3 focuses on hospital use, illustrating variation across provinces in hospital admissions and use of hospitals in the last year of life.

Chapter 4 reports seniors' use of community prescription drugs and supplies, and palliative drug plan registrations for the total decedent cohort.

Chapter 5 provides summaries of the provincial studies, highlighting key findings from each province.

Chapter 6 summarizes the study's key findings and identifies areas for future research.

Appendix A briefly summarizes end-of-life/palliative and community-based health programs in the four western provinces.

Appendix B provides detailed results from regression analyses of location of death, hospital use and community drug use.

1

Describing Western Canada Decedents

Experiences at the end of life can vary greatly by age, sex, marital status, health status and a host of other socio-demographic factors. This chapter provides an overview of selected demographic and health characteristics for decedents in western Canada during the 2003–2004 study period.

Demographic Characteristics

The western provinces have distinct demographic profiles. Alberta, for example, has a younger population than the other western provinces (Table 2). The proportion of the total 2003 population accounted for by seniors 65 and older ranged from 10% in Alberta to 15% in Saskatchewan. Minor differences in the ratio of males to females exist across the four provinces.

Table 2: **Demographic Profile of Western Canada Population on July 1, 2003**[18]

	Western Provinces		British Columbia		Alberta		Saskatchewan		Manitoba	
	N	%	N	%	N	%	N	%	N	%
Age Group										
<19	2,444,200	25.8	989,200	23.8	856,600	27.1	280,300	28.2	318,100	27.4
19–64	5,835,100	61.6	2,604,100	62.7	1,978,700	62.6	566,600	57.0	685,700	59.0
65+	1,194,000	12.6	562,100	13.5	326,000	10.3	147,800	14.9	158,100	13.6
Sex										
Male	4,728,900	49.9	2,060,700	49.6	1,597,400	50.5	494,400	49.7	576,400	49.6
Female	4,744,300	50.1	2,094,700	50.4	1,563,900	49.5	500,300	50.3	585,500	50.4
Total Population	**9,473,300**	**100**	**4,155,400**	**100**	**3,161,300**	**100**	**994,700**	**100**	**1,161,900**	**100**

Note: Population totals have been rounded to the nearest hundred. Percentages may not add to 100 due to rounding. N = population.
Source: B.C. STATS.

These demographic differences are reflected in the demographic profile of study decedents (Table 3):

- Seniors represented the majority of decedents, ranging from a low of 75% in Alberta to a high of 83% in Saskatchewan.
- Decedents were equally likely to be men or women, though a slightly higher percentage of men died in Alberta compared to the other provinces.
- Decedents were more likely to be unmarried (or marital status unknown) at the time of death, ranging from a low of 56% in Alberta to a high of 61% in Manitoba.

Table 3: **Descriptive Profile of Adult Decedents (Age 19+) in Western Canada, 2003–2004 (Unadjusted)***

	Overall		British Columbia		Alberta		Saskatchewan		Manitoba	
	N	%	N	%	N	%	N	%	N	%
Age Group										
19–44	3,498	5.3	1,449	5.0	1,221	6.8	400	4.6	428	4.5
45–64	10,145	15.5	4,527	15.6	3,225	17.9	1,062	12.1	1,331	13.9
65–74	11,243	17.2	4,942	17.0	3,255	18.0	1,420	16.2	1,626	17.0
75–84	19,813	30.2	9,100	31.3	5,168	28.6	2,639	30.1	2,906	30.4
85+	20,804	31.8	9,092	31.2	5,190	28.7	3,255	37.1	3,267	34.2
65+	**51,860**	**79.2**	**23,134**	**79.5**	**13,613**	**75.4**	**7,314**	**83.3**	**7,799**	**81.6**
Sex										
Male	33,282	50.8	14,730	50.6	9,344	51.7	4,469	50.9	4,739	49.6
Female	32,221	49.2	14,380	49.4	8,715	48.3	4,307	49.1	4,819	50.4
Marital Status										
Unmarried/ unknown	38,146	58.2	17,062	58.6	10,160	56.3	5,122	58.4	5,802	60.7
Married	27,357	41.8	12,048	41.4	7,899	43.7	3,654	41.6	3,756	39.3
Total	**65,503**	**100**	**29,110**	**100**	**18,059**	**100**	**8,776**	**100**	**9,558**	**100**

Note: * Unless otherwise specified, the source for data presented in tables and charts is the data set created for this study, combining vital statistics and hospital and pharmacy data from each of the participating provinces.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics data from B.C., Alberta, Saskatchewan and Manitoba.

To ensure comparability across provinces, interprovincial differences in the age and sex distribution have been taken into account in the analyses. Throughout this report, unless otherwise specified, data are directly standardized to the age and sex distribution of the decedent cohort 19 and older.[i] Throughout this report, tables include the total number of decedents overall and by province. Table 4 shows the total number of decedents used in the analysis for each chapter. In chapters 2 and 3, we excluded one category of decedents to simplify comparisons. In Chapter 4, one analysis focuses on seniors only, while another includes all decedents. In Chapter 5, differences between the interprovincial numbers and the province-specific numbers exist because each province used its own method to determine the number of eligible decedents to include.

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[i] The focus of this report is on decedents 19 and older. A profile of younger decedents, aged 1 to 18, can be found in Profile of Younger Decedents on page 37.

Table 4: **Decedent Population Base Used in Different Analyses in This Report**

Decedent Population	Overall	British Columbia	Alberta	Saskatchewan	Manitoba
Chapter 1: Describing Decedents	65,503	29,110	18,059	8,776	9,558
Chapter 2: Location of Death	63,571	28,270	17,701	8,510	9,090
Chapter 3: Hospital Use	63,571	28,270	17,701	8,510	9,090
Chapter 4: Community Prescription Drug and Supply Use—Seniors Only	36,958	22,485	Not available	7,087	7,386
Chapter 4: Community Prescription Drug and Supply Use—All Decedents	45,869	28,269	Not available	8,510	9,090
Chapter 5: Province Specific Reports	Not applicable	29,456	Not available	8,703	9,471

Note: Population totals have been rounded to the nearest hundred. Percentages may not add to 100 due to rounding.

Source: B.C. STATS.

Cause of Death

The leading causes of death among adult decedents in western Canada are the same as those observed nationally.[17] Diseases of the circulatory system (35% of deaths), neoplasms (28% of deaths) and diseases of the respiratory system (10% of deaths) took the greatest toll (Table 5). The highest proportion of deaths from circulatory diseases (36%), cancer (29%) and external causes (8%) occurred in Alberta, from respiratory diseases (11%) in B.C. and from all other causes (25%) in Manitoba.

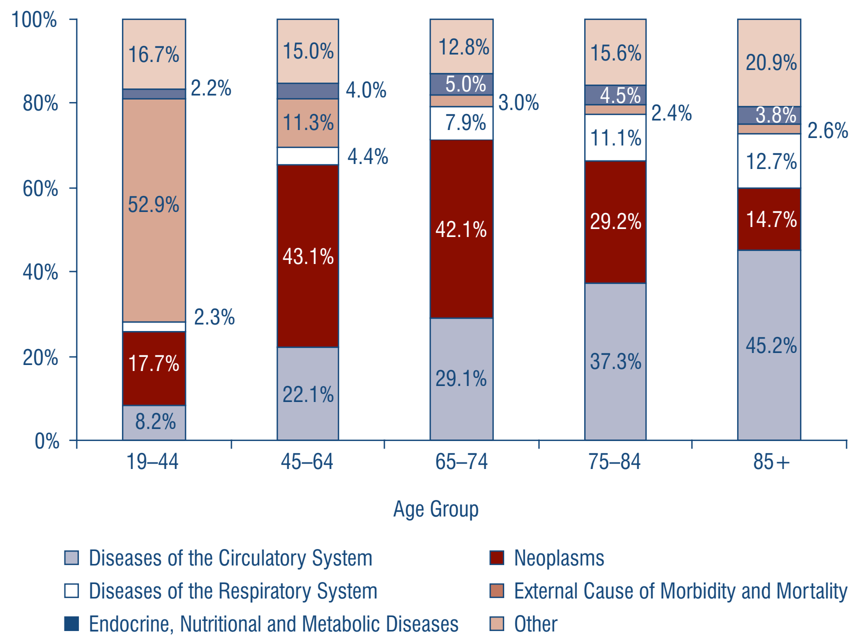
Table 5: **Cause of Death Among Adult Decedents in Western Canada, 2003–2004 (Unadjusted)**

Cause of Death	Western Provinces		British Columbia		Alberta		Saskatchewan		Manitoba	
	N	%	N	%	N	%	N	%	N	%
Circulatory Diseases	22,610	34.5	9,921	34.1	6,455	35.7	3,074	35.0	3,160	33.1
Cancer	18,567	28.3	8,332	28.6	5,317	29.4	2,321	26.4	2,597	27.2
Respiratory Diseases	6,258	9.6	3,075	10.6	1,539	8.5	800	9.1	844	8.8
External Causes	4,354	6.6	1,784	6.1	1,467	8.1	578	6.6	525	5.5
All Other Causes	13,714	20.9	5,998	20.6	3,281	18.2	2,003	22.8	2,432	25.4
Total	**65,503**	**100**	**29,110**	**100**	**18,059**	**100**	**8,776**	**100**	**9,558**	**100**

Note: N = population.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics data from B.C., Alberta, Saskatchewan and Manitoba.

Figure 4: **Percentage Distribution of Major Causes of Death in Western Canada, by Age Group, 2003–2004 (Unadjusted)**



Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics data from B.C., Alberta, Saskatchewan and Manitoba.

As shown in Figure 4, external causes of death (for example, accidents) were more common among younger decedents (19 to 44), while neoplasms predominated among middle-aged (45 to 64) and “younger” senior decedents (65 to 74). Circulatory diseases were more common among the oldest decedents.

Cause of Death Trajectory Groupings

For subsequent analyses, adult decedents were grouped into five categories based on established criteria that reflect functional status and distinct utilization patterns in a period before death (see Cause of Death Trajectory Groupings on page 18).[19–21] Decedents were assigned to one of five “trajectory” groups, based on published methods that used underlying cause of death ICD-10 codes from death certificates.[22]

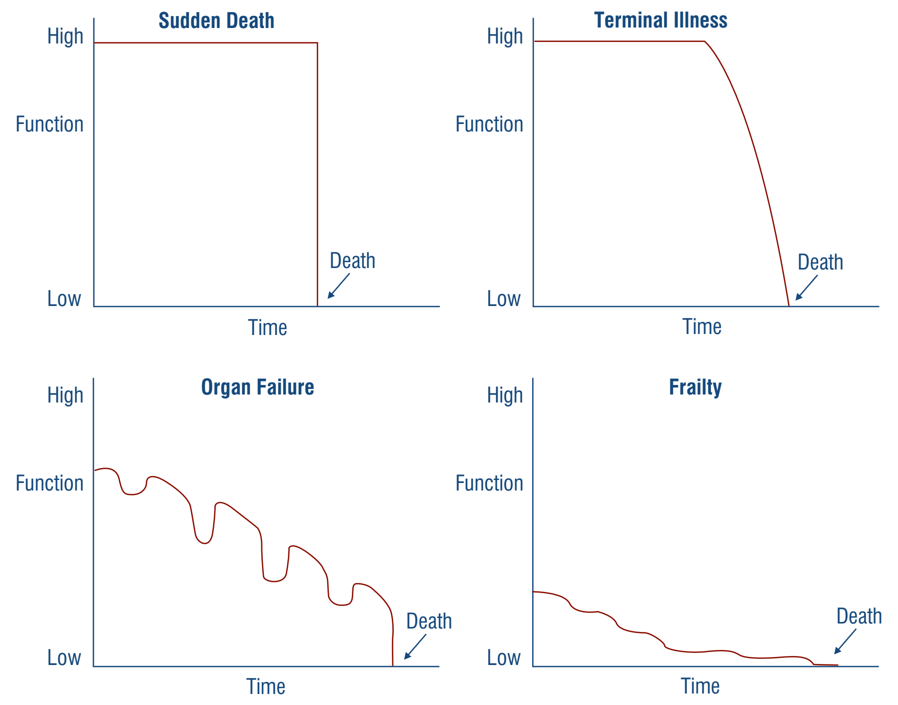
Cause of Death Trajectory Groupings

Sudden Death (e.g. accidental death, falls, trauma)	Decedents in this group are likely to be in good health or to display normal functional ability before the incident that causes death. While it is possible that a condition associated with one of the groups below is present, the underlying cause of death is one of trauma, accident or other unintended causes. Typically, these decedents display low health care costs relative to the other groups.
Terminal Illness (e.g. cancer, chronic renal failure, HIV-related diseases)	Typically, decedents in this group, diagnosed with some form of cancer, in the last year of life show substantial physician billing for cancer-related treatment. Functional status information demonstrates a terminal phase for this group. Typically, these decedents demonstrate a short period of evident decline.
Organ Failure (e.g., congestive heart failure and chronic obstructive pulmonary disease)	Organ failure decedents are typically diagnosed with either congestive heart failure or chronic obstructive pulmonary disease. Decedents in this group are likely to experience long-term limitations, exacerbated by acute episodes (with high costs or long hospitalizations) followed by recovery. Episode severity may gradually increase, while post-episode recoveries subside, eventually leading to death.
Frailty (e.g. neurological decline and other frequent causes of death among the elderly)	Typically, due to their advanced age, decedents in this category may display lower functional status relative to other decedents in the year before death. The pattern of decline over time is typically more gradual, characterized as prolonged dwindling.
Other (e.g. those not elsewhere categorized)	These are the remaining decedents whose conditions are not classified into any of the other four categories; they may not exhibit specific patterns in functional decline or service utilization.

Sources: J. Lunney, J. Lynn, D. Foley, S. Lipson and J. Guralnik, "Patterns of Functional Decline at the End of Life," *Journal of the American Medical Association* 289, 18 (May 14, 2003): pp. 2387–2392; J. Lunney, J. Lynn and C. Hogan, "Profiles of Older Medicare Decedents," *Journal of the American Geriatric Society* 50 (2002): pp. 1108–1112; and J. Lynn and D. Adamson, *Living Well at the End of Life: Adapting Health Care to Serious Chronic Illness in Old Age* (Santa Monica, California: RAND Corporation, 2003).

This trajectory group categorization is advantageous because it considers each of the underlying cause of death, functional status associated with diagnoses and distinctive patterns of health care over time (Figure 5). For example, given the pattern of decline in health status for Organ Failure decedents, it is possible to extrapolate the intensity of services required over time for patients with diseases such as congestive heart failure and chronic obstructive pulmonary disease. Differences between individual patients' decline/stabilization patterns may illustrate when more intense health care is required during the disease progression; care models could potentially be developed to allow for improved planning for services needed at the end of life.

Figure 5: **Four Main Theoretical End-of-Life Trajectories**

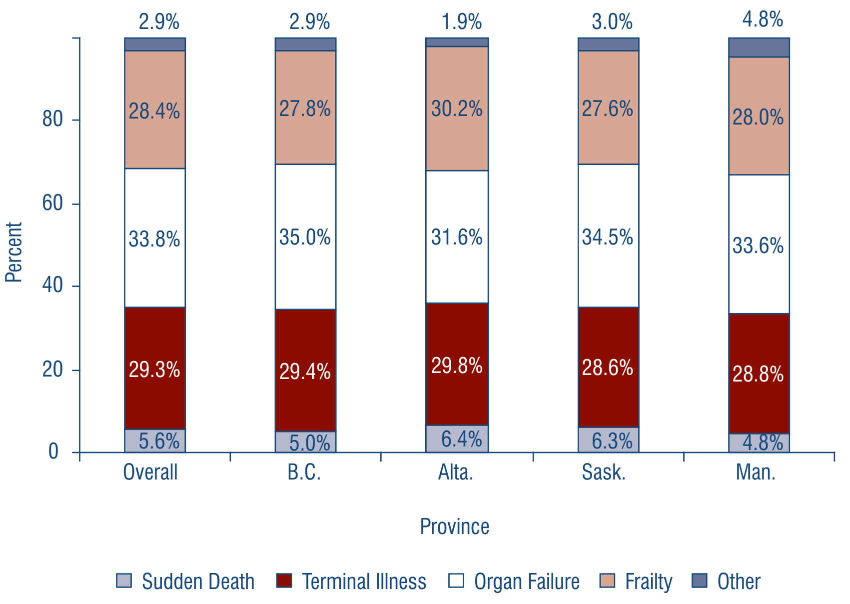


Source: J. Lunney, J. Lynn, C. Hogan, "Profiles of Older Medicare Decedents." *Journal of the American Geriatric Society*, 50 (2002), pp. 1108–1112.

The trajectory cause-of-death groupings should not be confused with a true trajectory analysis that can provide a longitudinal look at health, functional status and service use, thereby helping planners and decision-makers understand the dynamic nature of health care needs and care transitions. Due to the lack of interprovincially comparable data, we were unable to provide a true trajectory analysis.

As indicated in Figure 6, the Organ Failure trajectory group (33.8%) accounted for the largest proportion of adult decedents, followed by the Terminal Illness (29.3%) and Frailty (28.4%) trajectory groups in roughly equal proportions. The Sudden Death (5.6%) and Other (2.9%) trajectory groups accounted for much smaller proportions of decedents. The distribution of trajectory groups differed little by province.

Figure 6: **Trajectory Group Percentage Distribution, Overall and by Province, 2003–2004 (Adjusted by Age and Sex)**



Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics data from B.C., Alberta, Saskatchewan and Manitoba.

Summary

Each year between 60,000 and 70,000 of the estimated 9 million residents of the four western provinces die. These deaths represent approximately 30% of Canadian deaths. The demographic profile of the 65,503 decedents in the 2003–2004 western Canada study cohort varies somewhat by province. Decedents in Alberta, for example, were younger than those in other provinces, reflecting that province's younger age distribution.

The leading causes of death in western Canada are the same as those seen nationally. Circulatory diseases, cancer and respiratory diseases take the greatest toll. Among the study decedents, those in Alberta were more likely to have died from external causes than decedents in the other western provinces. This likely reflects Alberta's younger age distribution.

To aid in the exploration of end-of-life issues, study decedents were classified into trajectory groups to better reflect the combined effects of disease and functional status on health care utilization over time. These trajectory groups—Terminal Illness, Organ Failure, Frailty, Sudden Death and Other—are useful when trying to understand variations in health care use at the end of life. Organ Failure accounted for the largest proportion of decedents overall, followed by Terminal Illness and Frailty. Combined, these three trajectory groups accounted for 92% of all deaths in western Canada.

2

Location of Death

When asked, most people have indicated that they would prefer to die at home in the presence of loved ones.[24–26] Dying at home was the norm 100 years ago, but starting in the 1950s, death became more likely to occur in a formal health care facility—either a hospital or a long-term care facility.[25–29]

There are many explanations for this trend, including, but not limited to, the following:

- There has been a shift from seniors living with their extended family to seniors living in long-term care facilities.
- The mobility of families and the lack of extended families leave parents and grandparents out of immediate reach of family caregivers, increasing the need for institutional care at the end of life.
- A cultural shift to view dying as a medical event has occurred with expectations for life-extending and -enhancing interventions at the end of life.
- Advances in the medical management of distressing symptoms, especially pain, have also contributed to the movement of dying persons into health care facilities.

Among the factors known to influence where a person dies are cause of death, marital status, sex and the supply of long-term care beds in the community.[25, 30-31]

- As would be expected, sudden deaths (such as those from injury) are more likely to occur out of hospital, and deaths from chronic conditions (such as heart disease and organ failure) are more likely to occur in hospital.
- Married persons are more likely to die in hospital than those who are single, divorced or separated, because (a) caregivers tend to take their dying partner to the hospital with the onset of distressing symptoms and (b) older, single women account for the largest proportion of residential care facility residents and are more likely to die in these facilities than anywhere else.
- Men are somewhat less likely to die in hospital because they often have family caregivers available to provide support to them at the end of life. With greater life expectancy, women tend to outlive their husbands and often reside in long-term care facilities at the end of life.
- The availability of long-term care beds in a community allows end-of-life care to be provided to residents of these facilities and also permits health care providers to transition those close to death out of acute care hospitals and into a setting more conducive to the provision of palliative care.

Older Canadians, particularly those in fragile health, increasingly reside in long-term care facilities. These institutions have become home for an estimated 138,000 elderly Canadians, approximately 50,000 in western Canada.[32] With the number of long-term care beds exceeding the number of acute care hospital beds in Canada, there is an expectation that deaths will occur more frequently in residential care settings (see the boxes at left and below). The capacity of long-term care facilities to deliver adequate end-of-life care has been called into question following reports of long-term care facilities transferring dying residents to hospital for care.[26, 31] Compassionate, appropriate and integrated care across settings is needed to ensure quality of life up until the end of life.

One of the first questions health care planners might ask as they grapple with end-of-life reforms is, “Where are the residents in my community dying now?” This chapter, using linked death certificate and hospital data, describes the location of death for decedents in the western provinces.

Acute Hospital Capacity, Western Provinces, 2003–2004

Province	Total Beds in Acute Care Hospitals[*]	Rate per 100,000 Population[†]
B.C.[‡]	11,831	284.8
Alta.	9,683	306.5
Sask.	2,971	298.7
Man.[§]	4,297	369.9

Notes: * These data include beds in general hospitals as well as those with pediatric and other specialty.

† These data are based on population estimates on July 1, 2003, from Statistics Canada.

‡ B.C. provided a different number of acute (8,188) and long-term care beds (24,400) to CIHI for this report. However, as the sources for acute (CIHI MIS Database) and long-term care (Statistics Canada) were used for all provinces, the original source data are maintained in this report.

§ Manitoba provided a different number of acute (3,828) and long-term care beds (9,830) to CIHI for this report.

Source: Canadian Institute for Health Information, Canadian Management Information System Database, 2003–2004.

Long-Term Care Bed Capacity, Western Provinces, 2003–2004

Province	Total Beds in Homes for the Aged[*]	Rate per 100,000 Population	Rate per 100,000 Population Age 65+
B.C.	19,969	480.6	3552.6
Alta.	14,677	464.5	4507.7
Sask.	8,452	849.9	5722.4
Man.	9,370	806.6	5930.4

Note: * These data exclude two categories of facilities: (1) those for persons with mental disorders and (2) other residential facilities.

Source: Minister of Industry, Government of Canada, Statistics Canada, *Residential Care Facilities, 2003/2004* (Ottawa: Minister of Industry, 2006) catalogue number 82237XIE.

Measuring Location of Death

Providing comparable statistics on location of death, whether in hospital, at home or elsewhere is challenging because of differences across the western provinces in coding of location of death on death certificates (Table 6).

Table 6: **Location of Death Codes on Death Certificates, by Province**

British Columbia	Alberta	Saskatchewan	Manitoba
Hospital, school other institution	Hospital	Hospital	Hospital (including emergency department)
Residential institution*	At home	Non-hospital	Private home
Home	En route	Unknown	Nursing home/PCH
Sports and recreation centre	Auxiliary hospital		Other not specified
Street and highway	Nursing home		Other institutions
Trade and service area	Other		Other unspecified
Industrial site	Dead on arrival		
Farm	Unknown		
Other specified places	Hospice		
Unspecified place			

Note: * More than 99% of deaths coded as "hospital, school other institution" in B.C. were identified as hospital deaths using the institution numbers or death place name details in the B.C. Vital Statistics file.

Sources: Vital statistics from B.C., Alberta, Saskatchewan, Manitoba, 2003–2004.

The coding of death certificates in Saskatchewan, for example, includes only two known locations—"hospital" and "non-hospital." The other western provinces code location of death more specifically: Manitoba uses 6 location codes, Alberta uses 9 codes and B.C. uses 10 codes. Because of these differences, comparisons of location of death across the four western provinces can be made using two categories only: "in hospital" and "other locations." Moreover, death certificates do not differentiate among hospital types, so location of death data in this report represents in-hospital deaths recorded in all acute, specialty, rehabilitation and extended/chronic care facilities. Where possible, two other categories are presented, "long-term care facility" and "home."

Optimally, health planners would like to be able to identify not only the location of death, but also the type of care received at the end of life and the extent to which it was coordinated.

Increasingly, hospitals and long-term care facilities are setting aside beds for palliative end-of-life care. For example, in Winnipeg's St. Boniface Hospital, patients receive palliative care in a dedicated ward. Their care tends to differ substantially from the care provided to dying patients in other wards, because their deaths are anticipated and specialized staff is available to focus care on palliation. While this model could be considered the ideal, it is often very difficult to anticipate death, and providers may not know and be able to judge when patients should be moved from a care setting focused on cure to one focused on palliation. Many patients with uncertain prognoses will continue to die in acute care hospital settings. Death certificates do not yet make these important distinctions between palliative and acute care hospital locations of death.

Characterizing In-Hospital Deaths

The following three strategies were explored as potential methods to characterize in-hospital deaths across the four western provinces so that comparisons could be made:

- **Method 1—Use data from death certificates**: Classify location of death according to death certificate codes shown in Table 6 (with Alberta's auxiliary hospitals included in the hospital category).
- **Method 2—Use data from death certificates and hospitals**: Adjust the death certificate classification of location of death (method 1) using hospital discharge data. From the death certificate counts of in-hospital deaths, remove those decedents who received palliative services during their last hospital episode.[i] This coding scheme permits a distinction between "hospital-palliative care" and "hospital-acute care" deaths. Caution needs to be exercised when using this distinction given the limited data available for classifying hospital deaths.
- **Method 3—Use data from hospitals**: Classify location of death using only hospital discharge data. Decedents were considered in-hospital deaths if the discharge abstract indicated a discharge due to death.[ii]

These three methods result in different estimates of the proportion of in-hospital deaths in each province, as illustrated in Figure 7. Using death certificate data alone (method 1) produces the highest estimate of in-hospital deaths (58% across the four provinces). Adjusting this estimate by removing decedents who receive some in-hospital palliative care (method 2) reduces the estimate of in-hospital deaths to 43%. Lastly, using hospital discharge data alone (method 3) results in an estimate between methods 1 and 2 (47%).

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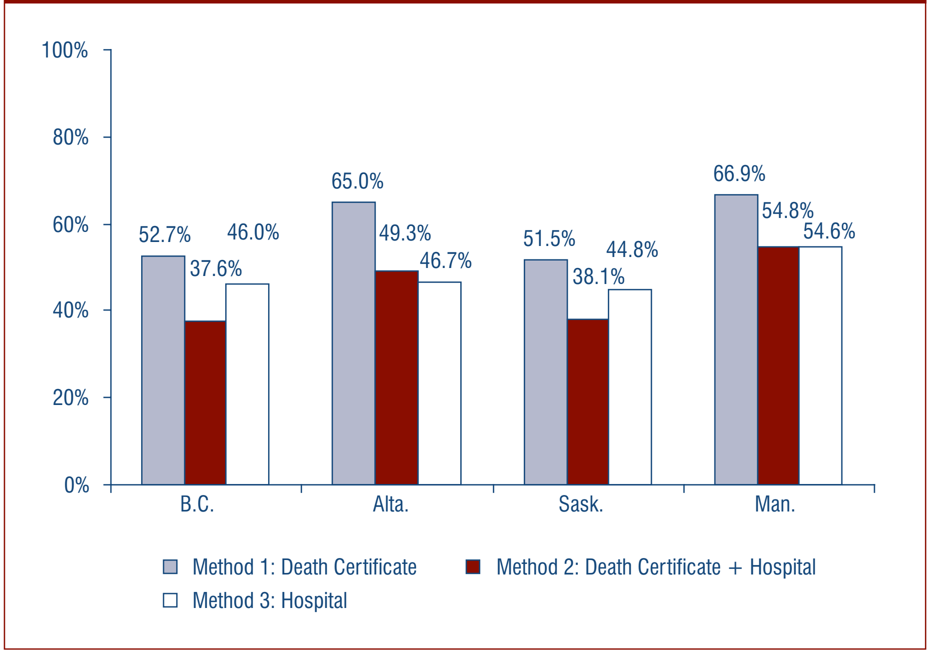
i. Palliative services included any patient service of ICD-10-CA Z51.5, ICD-9 V58.8, or ICD-9-CM V66.7; Main Patient Service = 58; or Service Transfer = 58 (in B.C., Alberta, and Saskatchewan) or 05 (in Manitoba). Provincial differences existed in coding procedures and practices during the study cohort year. For example, Manitoba coding of palliative services included only designated palliative care beds, whereas other jurisdictions included all beds.

ii. In B.C., Alberta, and Saskatchewan, this was determined using a Discharge Disposition code of 07 (deceased). In Manitoba, this was determined using a Separation code of 3 (death within 48 hours) or 4 (death after 48 hours).

Figure 7: **Proportion of In-Hospital Deaths by Province, by Data Source, 2003–2004 (Unadjusted)**



Source: Vital statistics and hospital discharge data from B.C., Alberta, Saskatchewan, Manitoba, 2003–2004.

The reduction in the estimate of in-hospital deaths that results from use of method 2 instead of method 1 is easily explained, insofar as method 2 simply removes from the estimate those decedents likely to be receiving in-hospital palliative care. The lower estimate of in-hospital deaths when relying on hospital data (method 3) relative to method 1 (death certificates) could be explained by coding of deaths occurring in emergency departments or by how "hospital" is defined. For purposes of this report, we have used methods 1 and 2 to describe location of death.

Provincial and Regional Health Authority Comparisons

More than half (58%) of decedents in western Canada, roughly 37,000 people, died in a hospital according to analyses of death certificate data (method 1) (Table 7).

Overall, in-hospital deaths were more common in Manitoba (68%) and Alberta (65%) than in B.C. (52%) and Saskatchewan (51%). For the most part, this pattern held among younger (aged 19 to 64) and older (65 and up) individuals, except that in-hospital deaths were equally likely among younger decedents in Alberta and Saskatchewan.

Table 7: Percentage Distribution of In-Hospital Deaths by Province, 2003–2004 (Unadjusted)

Province	Aged 19–64		Aged 65+		Total Aged 19+	
	Number of In-Hospital Deaths	Percentage	Number of In-Hospital Deaths	Percentage	Number of In-Hospital Deaths	Percentage
B.C.	3,089	53.3	11,681	52.0	14,770	52.2
Alta.	2,486	57.4	8,986	67.2	11,472	64.8
Sask.	823	57.8	3,542	50.0	4,365	51.3
Man.	1,228	72.1	4,943	66.9	6,171	67.9
Overall	7,626	57.6	29,152	57.9	36,778	57.9

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics and hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

These differences are generally consistent with the following findings from regression analysis by age group controlling for age, sex, marital status and trajectory group.

Aged 19 to 64

On an ascending scale, decedents in B.C. were least likely to have died in a hospital; decedents in Alberta and Saskatchewan had a higher (and similar) likelihood of dying in hospital; and decedents in Manitoba were most likely to have died in hospital.

Aged 65 and Up

Decedents in B.C. and Saskatchewan were equally likely to have died in hospital, while decedents in Alberta and Manitoba were significantly more likely to have died in hospital.

Of the almost 37,000 people who died in hospital (Table 7), roughly one-quarter (9,438) were estimated to be receiving care focused on palliation during their last hospitalization (Table 8). Among all decedents, the proportion estimated to have received hospital-based palliative care during their last hospitalization ranged from 13% in Manitoba to 16% in Alberta.[iii]

Table 8: Percentage Distribution of "Palliative" In-Hospital Deaths by Province, 2003–2004 (Unadjusted)

Province	Aged 19–64		Aged 65+		Total Aged 19+	
	Number of Palliative Hospital Deaths	Percentage	Number of Palliative Hospital Deaths	Percentage	Number of Palliative Hospital Deaths	Percentage
B.C.	1,082	18.7	3,240	14.4	4,322	15.3
Alta.	842	19.4	1,965	14.7	2,807	15.9
Sask.	299	20.9	869	12.3	1,168	13.7
Man.	311	18.3	830	11.2	1,141	12.6
Overall	2,534	19.1	6,904	13.7	9,438	14.8

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics and hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

[iii] The method used to distinguish palliative from acute care at the end of life is based on diagnosis and service codes that appear in the hospital record that may have been recorded differently in different provinces (for example, in the case of Manitoba these codes were used on palliative units only), so these estimates should be interpreted with caution.

These trends are generally consistent with the following findings, by age group, controlling for age, sex, marital status and trajectory group:

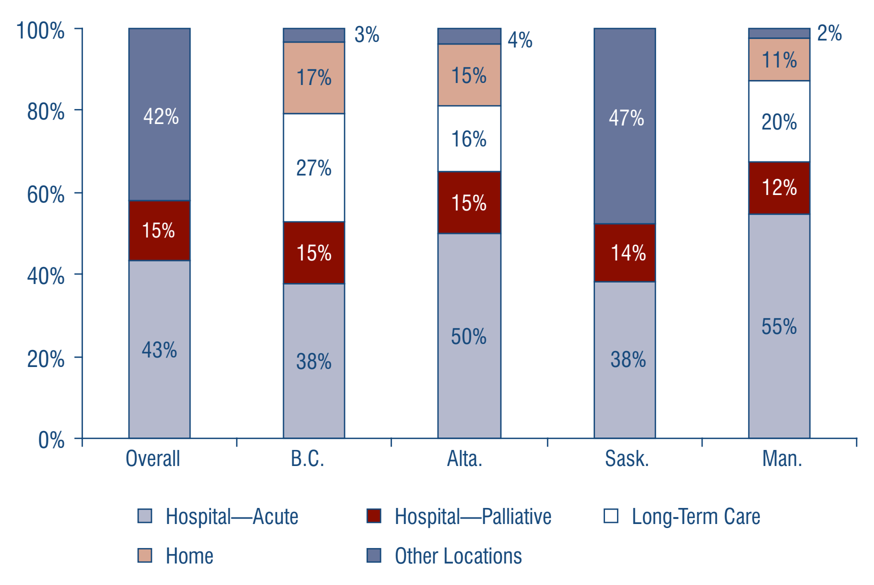
Aged 19 to 64

Decedents in Manitoba were about half as likely to have died in hospital receiving palliative care versus acute care as compared to those in Saskatchewan and Alberta, while decedents in B.C. were **most** likely to have died in hospital with palliative care.

Aged 65 and Up

Decedents in Alberta and Manitoba were **less** likely than those in Saskatchewan to have died in hospital with palliative care versus acute care, while those in B.C. were **more** likely than decedents in all other provinces to have died in hospital receiving palliative versus acute care.

Figure 8: **Location of Death, by Province, 2003–2004 (Adjusted by Age and Sex)**



Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics and hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

Among those dying in "other" locations, data from B.C., Alberta and Manitoba indicate that long-term care facilities follow hospitals as the second most common place of death.[iv] In B.C., 27% of decedents died in a long-term care facility, compared to 20% in Manitoba and 16% in Alberta (Figure 8). B.C. decedents were more likely to have died at home as 17% died in their own home, compared to 15% in Alberta and 11% in Manitoba. In Alberta, decedents were equally likely to have died in a long-term care facility, in their own home or in hospital receiving palliative care. Controlling for age, sex, marital status and province, these provincial differences in "other location" of death were confirmed in regression analyses.

With decedents in Manitoba and Alberta more likely to experience an acute hospital death in 2003–2004, it is not surprising that the regions with the highest percentage of acute hospital deaths were in these two provinces (Table 9). The northern RHAs in Alberta (the three northern-most Alberta health regions combined) reported 65% acute hospital deaths, compared to 62% in Assiniboine region in Manitoba. Vancouver Island region in B.C. had the lowest percentage (31%) of acute hospital deaths of all the western RHAs.

[iv] Long-term care facilities were defined as "residential institutions" in B.C., as "nursing homes" in Alberta and as "nursing homes/PCHs" in Manitoba. Saskatchewan did not specify long-term care facilities on its death certificates.

The highest (Brandon—28%) and lowest (northern RHAs—6%) percentages of palliative hospital deaths were reported in Manitoba. The relatively low percentage of palliative hospital deaths in the Saskatchewan northern RHAs (7%) may be due to the fact that palliative care services may be more available in Regina and Saskatoon regions; therefore, decedents in these regions may be more likely to receive in-hospital palliative care.

Interior Health in B.C. had the highest percentage of long-term care facility deaths (32%), compared to Alberta's David Thompson region with the lowest (7%). At-home deaths were most common in Vancouver Island region (20%) and least common in Brandon (6%).

Table 9: **Percentage Distribution of Locations of Death, by Regional Health Authority, 2003–2004 (Adjusted by Age and Sex)**

Province/Regional Health Authority	Percent of Acute Hospital Deaths	Percent of Palliative Hospital Deaths	Percent of Long-Term Care Facility Deaths	Percent of at Home Deaths	Percent of Other Location Deaths
British Columbia	36.9	15.2	27.2	17.6	3.1
Interior	34.3	11.3	32.3	18.6	3.6
Fraser	40.0	16.3	24.8	16.1	2.8
Vancouver Coastal	39.5	14.4	26.2	17.2	2.8
Vancouver Island	31.1	18.9	27.2	20.1	2.7
Northern	41.3	14.1	24.7	15.1	4.8
Alberta	49.6	15.5	15.8	15.3	3.9
Chinook	55.9	13.2	11.3	14.5	5.2
Palliser	51.2	16.6	13.3	14.4	4.6
Calgary	35.3	20.5	22.1	18.3	3.8
David Thompson	61.9	13.2	7.2	13.3	4.4
East Central	53.7	18.8	12.8	10.7	4.1
Capital	52.9	11.8	17.6	15.5	2.2
Aspen	56.5	18.3	8.4	11.6	5.2
Northern RHAs	65.0	9.7	6.8	10.9	7.6
Saskatchewan	37.8	14.5	Data not available	Data not available	47.7
Regina Qu'Appelle	37.8	17.7			44.6
Saskatoon	37.9	17.9			44.3
Northern RHAs	43.2	6.9			49.9
All other RHAs	37.9	11.7			50.3
Manitoba	55.4	12.7	19.2	10.5	2.2
Central	59.5	9.2	19.0	10.1	2.2
North Eastman	49.1	12.2	21.4	11.0	6.3
South Eastman	58.2	9.6	19.8	10.3	2.1
Interlake	58.2	11.0	16.4	11.5	2.9
Parkland	55.5	13.0	21.3	7.5	2.7
Brandon	42.6	27.7	22.0	6.3	1.4
Assiniboine	62.2	9.8	19.2	7.7	1.2
Winnipeg	54.6	13.6	19.1	11.3	1.5
Northern RHAs	59.9	5.5	18.3	11.5	4.8
Overall	**43.0**	**14.8**	**Not applicable**	**Not applicable**	**42.1**

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics and hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

Trajectory Group Comparisons

To assess the relationship between cause and location of death, decedents were classified into the following five trajectory groups as described in Chapter 1: Sudden Death, Terminal Illness, Organ Failure, Frailty and Other.[v] Terminal Illness decedents were most likely to have died in hospital compared to any other trajectory group (Table 10).

Table 10: **Percentage Distribution of In-Hospital Deaths by Trajectory Group, 2003–2004 (Unadjusted)**

Trajectory Group	Aged 19–64		Aged 65+		Total Aged 19+	
	Number of In-Hospital Deaths	Percentage	Number of In-Hospital Deaths	Percentage	Number of In-Hospital Deaths	Percentage
Sudden Death	677	23.5	393	51.3	1,070	29.3
Terminal Illness	3,732	71.8	9,133	65.3	12,865	67.7
Organ Failure	2,202	67.7	11,393	60.4	13,595	61.5
Frailty	1,015	53.2	8,233	49.2	9,248	49.7
Overall	7,626	57.6	29,152	57.9	36,778	57.9

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics and hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

Age 19 to 64

Decedents in the Terminal Illness category were significantly **more** likely than those classified in the Frailty or Organ Failure groups to have died in hospital, except in B.C., where Terminal Illness decedents were **less** likely than Organ Failure decedents to have died in hospital.

Age 65 and Older

Decedents in the Terminal Illness category were significantly **more** likely than those in the Frailty group to have died in hospital. Similar to their younger counterparts, older Terminal Illness decedents were more likely to have died in hospital than decedents in the Organ Failure group. In B.C., they were **less** likely to die in hospital.

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v. Trajectory group comparisons of location of death, hospital use and prescription drug/supply use exclude the Other category because the disease conditions included in this group were dissimilar enough to potentially cloud interpretation of group differences. Also, this group was small enough that excluding them from the analysis had a marginal impact on findings.

Table 11: **Percentage Distribution of Palliative In-Hospital Deaths by Trajectory Group, 2003–2004 (Unadjusted)**

Trajectory Group	Aged 19–64		Aged 65+		Total Aged 19+	
	Number of Palliative Hospital Deaths	Percentage	Number of Palliative Hospital Deaths	Percentage	Number of Palliative Hospital Deaths	Percentage
Sudden Death	26	0.9	25	3.2	51	1.4
Terminal Illness	2,211	42.5	4,929	35.2	7,140	37.2
Organ Failure	249	7.7	1,352	7.2	1,601	7.2
Frailty	48	2.5	598	3.6	646	3.5
Overall	2,534	19.1	6,904	13.7	9,438	14.8

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics and hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

Decedents in the Terminal Illness trajectory group were much **more** likely than those in other trajectory groups to have received hospital palliative services (Table 11). Even so, a minority of these decedents (37%) received care focused on palliation.

Aged 19 to 64

Terminal Illness decedents were much **more** likely to have died in hospital receiving palliative care than those with Organ Failure. This was true for all provinces except for Manitoba, where no differences were noted. Overall, no significant differences between palliative and acute hospital deaths in the Terminal Illness and Frailty groups were noted except in B.C., where Terminal Illness decedents were **less** likely to have died a palliative hospital death.

Aged 65 and Up

Decedents in the Terminal Illness group were **more** likely to have died in hospital receiving palliative care than the Organ Failure and Frailty groups. However, variation between the provinces indicated that palliative hospital deaths were higher for the Frailty group in B.C., but lower in Manitoba. No relationships were seen for Frailty compared with Terminal Illness in Alberta and Saskatchewan. Palliative hospital deaths were higher for Organ Failure in all provinces except Manitoba where no relationship was seen.

Summary

According to information on death certificates, 58% of decedents in western Canada, roughly 37,000 people, died in hospital in 2003–2004, despite evidence indicating that in general, people prefer to die at home. In-hospital deaths were more common in Alberta and Manitoba than in B.C. and Saskatchewan. By trajectory group, decedents in the Terminal Illness category were significantly more likely than those in the Frailty or Organ Failure groups to have died in hospital.

Each western province classifies location of death on death certificates with different degrees of specificity, complicating analyses of where people die. Saskatchewan lists only two known locations—hospital and non-hospital—while B.C. allows for coding of nine known places of death, including home, residential institution and industrial site.

When death certificate information is supplemented with data from hospital discharge records, it is possible to approximate the proportion of decedents who received hospital care focused on palliation. Roughly one-quarter of decedents whose death occurred in hospital received palliative care during their last hospitalization. When examining all decedents, not just those who died in hospital, proportions ranged from 13% in receipt of hospital palliative care in Manitoba to 16% in Alberta. Among decedents dying in hospital, those in the Terminal Illness trajectory group were much more likely to receive palliative care services. The method used to distinguish palliative from acute care at the end of life is imperfect, given the nature of the information available from administrative data, so these estimates should be interpreted with caution.

Information on deaths occurring at home or at a long-term care (LTC) facility was available for B.C., Alberta and Manitoba. B.C. decedents were more likely to have died at home (17%) or in an LTC facility (27%), followed by Alberta (15% home, 16% LTC) and Manitoba (11% home, 20% LTC).

3

Use of Acute Hospital Services

Hospital care is the most expensive component of the Canadian health care system, accounting for almost 30 cents of every public dollar spent in the western provinces during 2003. Hospitals are used for a variety of types of care, and, due to this complexity, research often examines whether or not a patient is hospitalized as an important indicator of acuity of care. Research also examines length of hospital stays, with longer stays typically having cost implications and implying severity of care required to treat often comorbid conditions. In this report, we focus on both issues: the proportion of decedents hospitalized and the number of days spent in hospital per decedent. Combined, these analyses provide a picture of the variation in hospital care among decedents in western Canada.

As described in Chapter 2, 58% of deaths in the western provinces occurred in hospital. Some estimates are that 10% to 12% of total health care expenditures are made within the last year of life, with the bulk of those expenditures going to hospital care.[30, 33] There is some contradictory evidence in the research about hospital use near end of life. Some research has shown that in addition to providing care in the last days of life, hospitals are often used quite intensively in the year preceding death.[30, 34-35] However, other research suggests hospital use overall is relatively low at the end of life, with higher use observed at smaller, rural hospitals. Age, gender and illness were not predictive of hospital use at the end of life.[36]

This chapter describes patterns in use of acute hospital services in the last year of life.[i] Results focus on two measures of hospital use: 1) whether or not a hospitalization occurred in the month, the six months or the year prior to death; and 2) the total number of hospital days averaged over the total decedent population and among those decedents hospitalized at least once.

Measuring Hospital Use

Hospital use was assessed for each day in the last year of life. Day 1 represents the day of death, while day 360 represents the beginning of the one-year period examined before death. To facilitate analyses, days were grouped to approximate three time periods of interest before death: one month (30 days), six months (180 days) and one year (360 days) (Table 12).[ii]

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[i] Hospital use for some western Canadian residents whose health care expenses were typically covered by Health Canada (that is, the military and the RCMP) during the study period may have been excluded.

[ii] Data extracted for this study included the last two years of life. However, this report focuses on the last year (360 days) of life because it is during this time period and in particular the last six months (180 days) and month (30 days) where differences in utilization appeared.

Table 12: **Rationale for Use of Specific Periods of Time Before Death**

Within 1 Month (≤30 Days Before Death)	Within 6 Months (≤180 Days Before Death)	Within 1 Year (≤360 Days Before Death)
Within 30 days of death, health care use typically increases substantially, particularly hospital and drug use, which tend to peak in the last week of life.	Within 180 days of death, individuals may be determined to be in need of palliative care. A six-month prognosis of death is required for registration on palliative care benefit drug plans in each of the four western provinces.	Examining hospital use within one year of death permits analysis of the period of increase in health care use and variations in patterns of care over an extended time period.

Analyses of hospitalizations and their associated length of stay are based on information available from decedents' hospital discharge abstracts. To calculate total daily hospital use, we assigned a count of one to each hospital day for each decedent and summed them over the relevant period before death.

Provincial and Regional Health Authority Comparisons

Overall, 37% of all western Canada decedents were hospitalized in the last 30 days before death. This rate of hospitalization rises to 57% in the last 180 days, and to 62% in the last 360 days before death (Table 13). Comparable emergency department data, which might have provided additional context to improve our understanding of hospital use, were not available for use in this study.

Table 13: **Number and Percentage of Decedents Hospitalized at Selected Time Periods Before Death, by Province, 2003–2004 (Adjusted by Age and Sex)**

Province	Total No. of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		No. Hospitalized	Percentage	No. Hospitalized	Percentage	No. Hospitalized	Percentage
B.C.	28,270	8,765	30.9	13,269	46.8	14,856	52.4
Alta.	17,701	7,288	41.4	11,419	64.6	12,347	69.9
Sask.	8,510	3,767	44.8	5,417	64.1	5,865	69.3
Man.	9,090	3,897	42.9	5,903	64.9	6,439	70.8
Overall	63,571	23,717	37.3	36,008	56.6	39,507	62.1

Note: According to hospital discharge data, between 45% and 55% of deaths occur in hospital (Figure 7). That only 37% of decedents were hospitalized within 30 days of death suggests that many who die in hospital have extended stays (for example, decedents hospitalized 31 or more days before death would not be counted as having a hospitalization within 30 days of death).

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

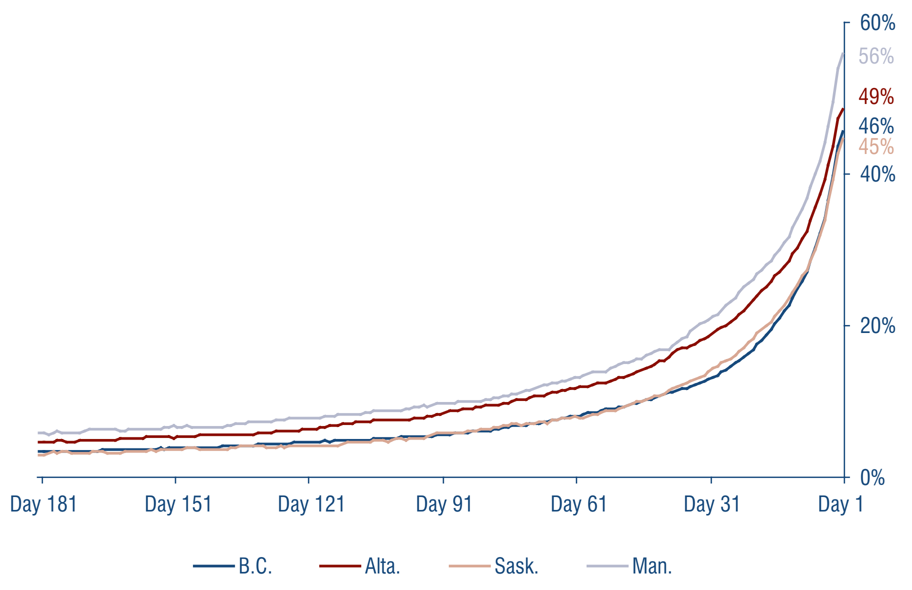
In general, B.C. decedents were less likely to be hospitalized within the last 30, 180 or 360 days of death compared to decedents from Alberta, Saskatchewan and Manitoba. When controlling for age, sex, marital status and province, these results are still borne out in regression analyses.[iii] The proportion of decedents hospitalized in B.C., in relative terms, was consistently about three-quarters of the proportion observed in the other three provinces at each time period.

[iii] See results of regression analyses in Appendix B.

These "snapshots" of hospital use provide an estimate of total hospitalizations at seminal time points at the end of life. However, creating these cumulative time periods tends to obscure the trajectory before death. An examination of daily hospital use by province (Figure 9) illustrates consistently highest daily use among Manitoba decedents (**light blue** line) during the last six months of life, followed by decedents from Alberta (**red** line), B.C. (**blue** line) and Saskatchewan (**pink** line).

In separate analyses by age, the oldest group of seniors (those aged 85 and older) were **more** likely to have been hospitalized than younger seniors. An increased tendency for older persons to continue living longer in the community might explain this.[37] An increased likelihood of hospitalization would result from the occurrence of a health crisis, which would tend to be more likely in old age.

Figure 9: **Percentage of Decedents in Hospital Within the Last Six Months of Life, by Day and Province, 2003–2004 (Adjusted by Age and Sex)**



Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

Variations by RHA, as illustrated in Table 14, suggest that decedents from larger, more densely populated urban RHAs (**ight blue shading**) were less likely to have been hospitalized in the last year of life, particularly in the last 30 days, relative to decedents from smaller, less densely populated and northern RHAs (**pink shading**). The most striking example of this regional difference was in B.C., where 22% of decedents from the Fraser Health Authority were hospitalized in the last 30 days before death, compared to 43% in B.C.'s Northern Health Authority. In Saskatchewan, 54% of the decedents from the northern health regions (combined) were hospitalized in the 30 days before death, compared to 44% in the other less populated RHAs. In Alberta and Manitoba, these regional differences were less pronounced.

Table 14: **Total and Percentage of Decedents Hospitalized Before Death, by Province and RHA, 2003–2004 (Adjusted by Age and Sex)**

Province/Regional Health Authority	Total No. of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		No. Hospitalized	%	No. Hospitalized	%	No. Hospitalized	%
British Columbia	28,270	8,765	30.9	13,269	46.8	14,856	52.4
Interior	5,950	2,285	37.7	3,367	55.7	3,720	61.7
Fraser	8,665	1,899	21.8	3,007	34.5	3,465	39.8
Vancouver Coastal	6,207	1,563	25.7	2,495	40.9	2,823	46.2
Vancouver Island	6,017	2,409	40.2	3,546	59.0	3,925	65.3
Northern	1,430	609	42.8	854	60.0	923	65.0
Alberta	17,701	7,288	41.4	11,419	64.6	12,347	69.9
Chinook	1,187	503	42.5	768	64.7	846	71.3
Palliser	734	352	48.3	535	73.5	557	76.4
Calgary	5,281	2,024	38.2	3,281	62.0	3,577	67.6
David Thompson	2,017	831	41.5	1,316	65.7	1,408	70.2
East Central	986	433	44.4	636	64.7	698	70.9
Capital	5,549	2,276	40.7	3,588	64.4	3,875	69.7
Aspen	1,120	505	44.8	741	65.6	794	70.6
Northern RHAs	823	362	46.2	551	70.2	589	75.6
Saskatchewan	8,510	3,767	44.8	5,417	64.1	5,865	69.3
Regina Qu'Appelle	1,972	896	45.9	1,250	63.9	1,354	69.1
Saskatoon	2,065	944	46.5	1,330	65.4	1,420	69.6
Northern RHAs	113	55	53.9	75	76.0	81	81.3
All other RHAs	4,360	1,872	43.4	2,762	63.6	3,010	69.2
Manitoba	9,090	3,897	42.9	5,903	64.9	6,439	70.8
Central	731	349	48.2	505	69.5	551	75.5
North Eastman	277	132	47.1	181	65.5	196	70.7
South Eastman	312	137	43.4	209	66.4	224	71.7
Interlake	575	295	50.5	432	73.8	454	78.0
Parkland	454	206	46.1	293	64.0	324	71.1
Brandon	348	150	42.7	239	68.0	260	74.0
Assiniboine	754	337	46.0	498	67.7	546	73.9
Winnipeg	5,329	2,153	40.4	3,347	62.8	3,668	68.8
Northern RHAs	310	138	46.2	199	64.7	216	71.4
Overall	63,571	23,717	37.3	36,008	56.6	39,507	62.1

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

Overall, western Canada decedents spent 416,386 total days in hospital in the 30 days before death, for an average of 6.5 days per decedent (Table 15). During the 180 and 360 days before death, decedents averaged 15.5 and 20.1 hospital days, respectively.

Table 15: **Total Hospital Days and Average Days per Decedent, by Province, 2003–2004 (Adjusted by Age and Sex)**

Province	Total Number of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		Total Number of Hospital days	Average per Decedent	Total Number of Hospital days	Average per Decedent	Total Number of Hospital days	Average per Decedent
B.C.	28,270	127,589	4.5	287,942	10.2	372,658	13.1
Alta.	17,701	148,352	8.4	364,506	20.6	475,052	26.9
Sask.	8,510	61,110	7.3	134,653	16.1	171,164	20.4
Man.	9,090	79,335	8.7	195,663	21.5	260,642	28.6
Overall	**63,571**	**416,386**	**6.5**	**982,764**	**15.5**	**1,279,516**	**20.1**

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

The age- and sex-adjusted number of hospital days per decedent in B.C. was substantially lower than in the other western provinces, at all time periods before death.[iv] Controlling for age, sex, marital status and province, this finding was confirmed in regression analyses. The differences are sizable. For example, in the last 30 days before death, decedents in B.C. spent an average of 4.5 days in hospital, compared to 8.7 days in Manitoba, 8.4 days in Alberta and 7.3 days in Saskatchewan (Table 15).

B.C.'s significantly lower average number of hospital days per decedent can be partially explained by its relatively low rate of hospitalization (Table 13) and fewer hospital days used per decedent hospitalized (Table 16). For example, among individuals with at least one hospitalization, B.C. decedents spent an average of 21.4 days in hospital within 180 days of death (Table 16). In contrast, decedents in Manitoba with at least one hospitalization spent an average of 32.2 days in hospital.

Table 16: **Average Hospital Days per Decedent Hospitalized, by Province, 2003–2004 (Adjusted by Age and Sex)**

Province	Total Number of Decedents	≤30 Days Before Death	≤180 Days Before Death	≤360 Days Before Death
		Per Decedent Hospitalized at Least Once	Per Decedent Hospitalized at Least Once	Per Decedent Hospitalized at Least Once
B.C.	28,270	12.2	21.4	25.0
Alta.	17,701	15.2	31.3	38.1
Sask.	8,510	13.4	24.6	29.1
Man.	9,090	15.1	32.2	39.5
Overall	**63,571**	**13.8**	**26.8**	**32.1**

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

One significant interprovincial difference was evident when regression analyses were limited to decedents 65 and older at death (see Appendix B). Older decedents in Alberta and Manitoba were as likely to be hospitalized at least once as those in Saskatchewan, but they had fewer hospitalizations. Even so, Manitoba

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[iv] This is true when average number of days is restricted to those decedents with at least one hospitalization.

decedents spent more days in hospital than did those in Saskatchewan. Provincial differences in transfer patterns could account for differences in number of hospitalizations. However, this is impossible to determine without comparable residential care data to link with hospital data.

The regional pattern of more hospitalizations in less populated regions and fewer hospitalizations in more populated regions was somewhat consistent when comparing hospital days across western Canada. In B.C. and Saskatchewan, for example, the average number of hospital days per decedent was highest at all time periods in the sparsely populated northern RHAs, while in Alberta and Manitoba the average in less-populated northern RHAs was not too dissimilar to the overall provincial average (Table 17).

Table 17: **Total Hospital Days and Average Days per Decedent, by RHA, 2003–2004 (Adjusted by Age and Sex)**

Province/ Regional Health Authority	Total Number of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		Total Number of Hospital days	Average per Decedent	Total Number of Hospital days	Average per Decedent	Total Number of Hospital days	Average per Decedent
British Columbia	28,270	127,589	4.5	287,942	10.2	372,658	13.1
Interior	5,950	29,925	4.9	65,863	10.9	84,472	14.0
Fraser	8,665	28,140	3.2	65,412	7.5	84,916	9.7
Vancouver Coastal	6,207	25,146	4.1	56,762	9.3	70,835	11.7
Vancouver Island	6,017	35,267	5.8	79,862	13.2	106,064	17.5
Northern	1,430	9,111	6.5	20,043	14.6	26,371	19.4
Alberta	17,701	148,352	8.4	364,506	20.6	475,052	26.9
Chinook	1,187	8,444	7.1	19,105	16.2	26,432	22.4
Palliser	734	6,920	9.5	17,074	23.7	21,899	30.2
Calgary	5,281	39,242	7.5	96,927	18.4	126,564	24.0
David Thompson	2,017	18,981	9.5	48,580	24.2	64,562	32.4
East Central	986	8,127	8.4	19,774	20.2	26,499	26.9
Capital	5,549	49,371	8.9	120,775	21.7	153,988	27.8
Aspen	1,120	10,501	9.1	25,885	22.6	33,440	29.4
Northern RHAs	823	6,724	8.6	16,217	20.6	21,448	27.3
Saskatchewan	8,510	61,110	7.3	134,653	16.1	171,164	20.4
Regina Qu'Appelle	1,972	13,677	7.0	30,409	15.6	38,783	19.8
Saskatoon	2,065	15,243	7.6	32,303	16.1	40,511	20.2
Northern RHAs	113	916	9.6	1,871	19.4	2,279	23.9
All other RHAs	4,360	31,274	7.3	70,070	16.4	89,591	20.9
Manitoba	9,090	79,335	8.7	195,663	21.5	260,642	28.6
Central	731	6,755	9.4	16,800	23.0	23,472	32.0
North Eastman	277	2,223	8.1	5,220	19.0	6,914	25.3
South Eastman	312	2,880	9.3	7,504	24.1	9,454	30.5
Interlake	575	5,701	9.7	12,920	22.0	16,344	28.1
Parkland	454	4,059	8.8	10,132	21.6	14,028	30.0
Brandon	348	3,782	10.7	8,695	24.6	11,868	33.4
Assiniboine	754	6,959	9.6	16,488	22.6	22,126	30.0
Winnipeg	5,329	44,549	8.3	112,062	21.0	149,015	27.8
Northern RHAs	310	2,427	8.0	5,842	19.5	7,421	24.3
Overall	63,571	416,386	6.5	982,764	15.5	1,279,516	20.1

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

Trajectory Group Comparisons

Decedents in the Terminal Illness trajectory group (for example, those with cancer) were most likely to be hospitalized within all periods before death. For example, within 180 days of death, 75% of Terminal Illness decedents were hospitalized as compared to 57% of those in the Organ Failure trajectory group and 43% of those in the Frailty group (Table 18).

Table 18: **Number and Percentage of Decedents Hospitalized at Selected Time Periods Before Death, by Trajectory Group, 2003–2004 (Unadjusted)**

		≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
Trajectory Group	Total Number of Decedents	Number Hospitalized	Percentage	Number Hospitalized	Percentage	Number Hospitalized	Percentage
Sudden Death	3,653	621	17.0	997	27.3	1,207	33.0
Terminal Illness	19,183	8,838	46.1	14,295	74.5	15,345	80.0
Organ Failure	22,108	8,877	40.2	12,667	57.3	13,857	62.7
Frailty	18,627	5,381	28.9	8,049	43.2	9,098	48.8
Overall	63,571	23,717	37.3	36,008	56.6	39,507	62.2

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

On average, decedents in the Terminal Illness category, relative to the other trajectory groups, also used more hospital days within all periods during the last year of life (Table 19). However, when comparing among decedents hospitalized at least once within each time period, differences in average number of days between Terminal Illness decedents and others were smaller. This suggests that decedents in the Organ Failure and Frailty groups who were hospitalized in the last year of life likely had more hospitalizations further from death compared to Terminal Illness decedents.

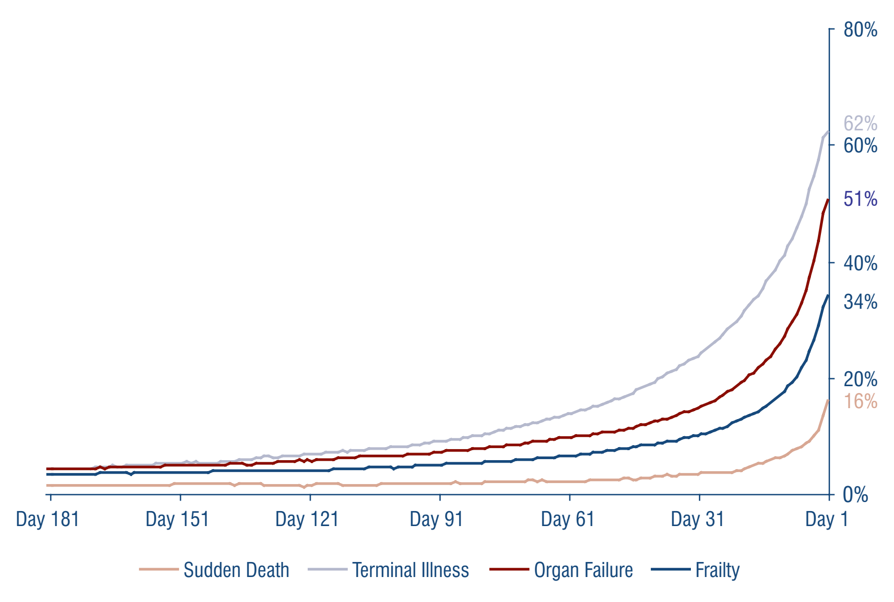
Table 19: **Average Hospital Days per Decedent and by Decedents Hospitalized, by Trajectory Group, 2003–2004 (Unadjusted)**

		≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
Trajectory Group	Total Number of Decedents	Per Decedent	Per Decedent Hospitalized at Least Once	Per Decedent	Per Decedent Hospitalized at Least Once	Per Decedent	Per Decedent Hospitalized at Least Once
Sudden Death	3,653	1.8	9.2	4.6	16.5	6.4	19.2
Terminal Illness	19,183	9.6	15.7	22.0	29.2	27.0	33.7
Organ Failure	22,108	6.5	13.2	15.7	26.8	21.1	33.3
Frailty	18,627	4.3	12.2	10.6	23.9	14.6	29.5
Overall	63,571	6.5	13.8	15.5	26.8	20.1	32.1

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

The intensity of hospital use varied markedly by trajectory group, as illustrated in Figure 10, which shows the proportion of decedents who were in hospital each day within six months of death, by trajectory group.

Figure 10: **Percentage of Decedents in Hospital During the Last Six Months of Life, by Day and Trajectory Group, Western Canada, 2003–2004**



Source: CIHI 2007, study data set based on pooled 2003–2004 provincial hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

At the beginning of the last six months of life (day 180), the proportion of decedents in hospital each day was similar among the Organ Failure (**red** line), Terminal Illness (**light blue** line), and Frailty (**blue** line) groups. However, the lines diverged, revealing distinct patterns. The percentage of Terminal Illness decedents in hospital each day increased at a faster rate than the other trajectory groups, as indicated by the spread in the three lines representing each of the Terminal Illness, Organ Failure and Frailty groups. On the day of death, 6 in 10 Terminal Illness decedents were in hospital, compared to about half of Organ Failure decedents and about one-third of Frailty decedents.

Regression analyses confirmed that decedents in the Terminal Illness group were significantly more likely than decedents in other trajectory groups to have used hospital care more intensively—that is, to have been hospitalized more and used more hospital days. These distinct patterns can be helpful in anticipating the need for end-of-life care services by disease group. Not surprisingly, total daily hospital use for the Sudden Death group (**pink** line) was lowest overall and showed a marked increase only in the last week of life, the time period when treatment was likely received for the accident or trauma that caused death.

Summary

As might be expected, hospitalizations were common in the last year of life. Within 360 days of death, the percentage of western Canadian decedents hospitalized at least once averaged 62%. Overall, during the last year of life, decedents in the western provinces spent an average of 20.1 days in hospital. Among only those decedents hospitalized at least once, the average number of days in hospital during the last year of life was 32.1 days.

Decedents in B.C. were less likely than those in the other western provinces to be hospitalized, and to be hospitalized for fewer days in the last year of life. This finding is consistent with published inpatient hospitalization rates indicating a generally lower tendency toward hospitalizations in B.C. compared to the other western provinces (Table 20).

Table 20: **Inpatient Hospitalization Rates, by Province, 2003–2004**[38]

Province	Inpatient Hospitalization Rate (per 100,000 Population)
B.C.	7,870
Alta.	9,592
Sask.	11,828
Man	9,664

Source: Canadian Institute for Health Information, *Analysis in Brief: Inpatient Hospitalizations and Average Length of Stay Trends in Canada*, 2003–2004 and 2004–2005 (Ottawa: CIHI, 2005).

Across the western provinces, decedents from smaller, rural RHAs were more likely to have been hospitalized and to spend more days in hospital before death relative to decedents from larger, more urbanized RHAs. This finding may reflect increased availability of non–hospital based health services in larger urban centres compared to smaller communities in which these types of services would only be available at a local hospital.

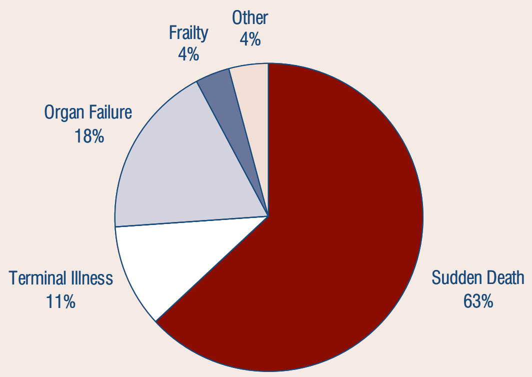
Individuals dying of terminal illnesses were more likely to be hospitalized in the year preceding death than those dying of other causes. While hospital use escalated for most individuals in the last six months of life, it rose most rapidly for those in the Terminal Illness group. Decedents in the Organ Failure and Frailty groups were less likely to be hospitalized than those classified as terminally ill; however, within a year of death, they had accrued nearly the same average number of hospital days as those in the Terminal Illness category, likely indicating more hospital stays further out from dpeath among Organ Failure and Frailty decedents.

Profile of Younger Decedents

As demonstrated in Chapter 1, individuals aged 65 and up account for a large proportion of all people who die. Accordingly, most death-related health care services are planned for older people. There are instances, however, when a person dies at a young age. Here we provide a profile of younger decedents—those aged 1 to 18—to illustrate how they differed from older decedents.[v]

- In 2003, people under age 19 accounted for just about one-quarter (24% in B.C. for example) of the total population. Yet, decedents under the age of 19 comprised less than 2% of the total decedent population in western Canada.[15]
- Younger decedents were more likely to be male (64%) than female (36%), with Saskatchewan, Alberta and Manitoba showing higher proportions of younger male decedents, as might be expected given the distribution of causes of death.
- Most notably, external causes were the most common cause of death, accounting for almost two-thirds (64%) of deaths among those aged 1 to 18. Cancer was the second most common cause of death among younger people, accounting for approximately 1 in 10 (11%) deaths overall.
- The Sudden Death trajectory group (63%) was most common among younger decedents, followed by Organ Failure (18%) and Terminal Illness (11%). Combined, these trajectory groups accounted for the vast majority of deaths among younger decedents.

Trajectory Group Distribution Among Decedents Aged 1 to 18 Years



- Just over half (51%) of all younger decedents were hospitalized at some point during the last two years of life.
- Among those hospitalized, the median number of hospital episodes was two, and the median length of stay was 6.5 days.
- Hospital episodes and median length of stay were highest among younger decedents in the Terminal Illness trajectory group and lowest for those in the Sudden Death trajectory group.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial vital statistics and hospital discharge data from B.C., Alberta, Saskatchewan and Manitoba.

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v. Study results exclude neonatal deaths (under age 1) because documentation of newborn deaths varies across provinces, making interprovincial comparisons difficult.

4

Use of Community Dispensed Drugs and Supplies

Many medications and medical supplies (for example, oxygen) are used to manage the symptoms that frequently occur at the end of life, such as pain, anxiety, depression and respiratory symptoms.[39-40]

Measuring Drug and Supply Use

This chapter describes the use of drugs and supplies dispensed through community pharmacies for decedents who were 65 or older or who were of any age, but were enrolled in the provincial palliative drug program at the time of death. Because of the great interest in ensuring adequate palliative care at the end of life, information is provided on registration for provincial palliative care drug benefit plans/programs (herein referred to as palliative care programs). In addition, detailed analyses are provided on symptom management using a technique to monitor the use of prescribed pain medication.

Seniors' prescription drug data were not available from Alberta for this study.[i] These analyses also exclude information on drug use among those residents whose health care expenses are typically covered by Health Canada (that is, First Nations, the military and the RCMP). Finally, because each province has a unique approach to supporting the use of drugs and supplies through structured benefit programs, comparisons in this area are sometimes difficult. A description of the provincial programs and program arrangements in place in 2003–2004 provides context for later comparisons.

Prescription drugs are the second most expensive component of the Canadian health care system, following expenditures on hospitals. Between 1997 and 2003, total drug expenditures in Canada increased by an average annual growth rate of 10% (unadjusted for inflation) to reach $20.1 billion.[41] The federal, provincial and territorial governments have structured distinct drug benefit programs to meet the needs of their residents (or, in the case of the federal government, veterans, the RCMP, First Nations and Inuit and other groups under federal jurisdiction) in purchasing prescription drugs and supplies. In the west, seniors (those 65 years of age or older) typically account for a disproportionately large percentage of all drug program beneficiaries. For example, in B.C. in 2003, 77.4% of those 65 or older were beneficiaries of the provincial drug program as compared to 21.7% of the total population.[42]

In addition to the prescription drug programs, the four western provinces have established palliative care drug programs in recognition of the importance of prescription drugs for pain control and relief of other symptoms. These programs, created in part due to agreements negotiated between the provinces, the territories and the federal government, have provided enhanced financial support for both palliative drugs and, in some cases, non-drug benefits such as oxygen and ostomy and diabetic supplies.

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i. Data were unavailable because at the time of the project, Alberta Health and Wellness was engaged in an effort to restructure the provincial prescription drug administrative data system and files.

While the palliative care programs for the four western provinces have similar enrollment requirements (that is, a physician's notification that a patient has a life expectancy of six months or less), the structure of the plans varies by province (see Table 21). For example, in Manitoba and B.C., palliative care drugs for residents of some long-term care facilities are included in the facility's drug budget. While these differences do not affect patients' access to prescription drugs or supplies, they may affect the comparability of the data. This chapter will focus on the following analyses, illustrating provincial and RHA differences where appropriate for three western provinces (B.C., Saskatchewan and Manitoba).

❶ Senior Decedents:

- The total, average number of prescriptions per decedent;[ii]
- The total average number of different drug classes per decedent;
- The total cost per decedent paid through provincial prescription drug plans; and
- The top 10 drugs or supplies (by claimants) in the six months and two years before death.

❷ Seniors' Morphine Equivalent Use:

- The use of pain medication in the six months before death focusing on the use of morphine equivalent drugs; and
- The top 10 (by claimants) pain medications in the six months before death.

❸ Palliative Drug Plan Beneficiaries (All Ages):

- Enrollment with the provincial palliative care drug benefit programs (all decedents and those dying of cancer).

Finally, each prescription drug program exists within a larger system of established arrangements. For example, in all three provinces, cancer patients would have their cancer drugs (including those used in the community) paid for by the provincial cancer agency, and some or all drugs to manage pain and other symptoms paid for by the provincial drug plan. Interprovincial differences also exist with respect to payment for drugs for renal patients, payments for supplies and payments for over-the-counter medications. Table 21 provides an overview of these various arrangements.

Consistent with most drug utilization studies, this report describes community drugs dispensed. Obviously, the amount consumed by a patient may be less than the dispensed amount.

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ii. The number of prescriptions is an imperfect indicator of drug utilization because prescriptions can vary in duration from as short as three days for some specific acute diseases to as long as three months for drugs used to treat some chronic diseases. This measure was used, in part, to provide continuity with the MCHP 2004 report (V. Menec, et al., *Patterns of Health Care Use and Costs at the End of Life* [Winnipeg: Manitoba Centre for Health Policy, 2004]).

Table 21: **Overview of Provincial Prescription Drug Benefit Plans Used in This Study, 2003–2004**

Prescription Drug Information	British Columbia	Saskatchewan	Manitoba
Prescription Drug Program	• Universal with sub-plans for select populations	• Universal with sub-plans for select populations	• Universal with sub-plans for select populations
Community	B.C. Fair PharmaCare • Income tested • Deductibles with co-payments • Family maximum level contribution	Saskatchewan Drug Benefit Program • Income tested • Deductibles with co-payments for those qualifying for special support	Pharmacare—all provincial residents who are eligible for benefits under *The Prescription Drug Cost Assistance Act* • Income-based deductible • Deductibles with no co-payments • Covers some oral cancer agents
Long-Term Care	Plan B—permanent residents of licensed long-term care facilities* • Eligible drugs provided free of charge, subject to pricing rules • Patient-level data captured in PharmaCare Plan B	• Patient-level data captured in Saskatchewan Prescription Drug Plan†	Residents of personal care homes • Drugs provided free of charge‡
Palliative Drug Program	B.C. Palliative Care Benefits Program—for B.C. residents who wish to receive palliative care at home • Referral by physician required for registration • Does not apply to those living in a “home” environment identified under Plan B	• Referral by physician required for registration	Palliative Care Drug Access Program for Manitoba residents who are terminally ill and wish to remain at home • Referral by physician required for registration • Deductible free coverage
Drugs	• All drugs, whether specifically for palliative needs or other issues, are provided free of charge, subject to pricing rules	• Formulary drugs • Exception Status Drugs (EDS) where individual approval has been granted • Most laxatives	• All drugs, whether specifically for palliative needs or other issues, are provided free of charge
Non-Drugs	Includes: • Ostomy supplies • Intravenous therapy supplies • Wound care supplies • Other supplies	Includes: • Other supplies	Includes: • Ostomy supplies • Diabetic supplies • Other supplies
Supplies and Assistive Devices	Includes: • Diabetic supplies • Ostomy supplies • Designated permanent prosthetic appliances • Children’s orthotic devices	Includes: • Diabetic supplies • Saskatchewan Aids to Independent Living (SAIL) covers services and supplies for those living with long-term disabilities	Not applicable
Cancer Agency	• The B.C. Cancer agency covers all cancer drugs and related supplies for registered cancer patients	• The Saskatchewan Cancer Agency covers all cancer drugs and related supplies for registered cancer patients when requested by a clinic oncologist or a physician working in association with the Agency	• CancerCare Manitoba covers the costs of all intravenous chemotherapy drugs for registered cancer patients
Renal Agency	• The B.C. Renal Program covers all renal formulary drugs to all registered patients	• Renal drugs are covered through the regular Saskatchewan Prescription Drug Plan and SAIL	• Renal drugs are covered under a separate program

Notes: * Patient-level data are not available for approximately one-third of residents in B.C. long-term care facilities, specifically those in extended care hospitals or in LTC residential beds in acute care hospitals.

† Patient-level data are not available for one rehabilitation facility in Saskatchewan.

‡ Patient-level data are not available for some personal care home facilities that are juxtaposed with acute care facilities, and for which drugs are provided as part of the acute care programs and services.

Provincial and Regional Health Authority Comparisons

Seniors' Drug and Supply Use and Cost

To provide an overview of prescription drug use, data were obtained from provincial drug plan benefit databases that include information on all drugs and supplies listed in the provincial formularies, which were dispensed by a community pharmacy and paid for, in whole or in part, by the provincial government. Across Canada, each province devises a formulary that includes both drugs and supplies. Drugs and supplies listed in the formulary are benefits of the provincial program, although there may be qualifications with respect to whether the product is available as a first-line benefit with no criteria other than a prescription associated with coverage or a second-line benefit where special criteria must be met before the product will be covered. These data have not been adjusted to reflect differences in provincial formularies.

Table 22 presents the average, per decedent, number of prescriptions and the number of different classes of drugs dispensed within 30, 180 and 360 days of death, by province. The Anatomical Therapeutic Chemical (ATC)[42] classification of drugs system was used to distinguish the number of different drug classes.[iii] The average total prescription costs per decedent shown in Table 23 include only the costs (both drug and dispensing fees) incurred by the provincial governments—not the total cost of the drugs and supplies, as some of the total cost may have been paid out of pocket by the patient or through private insurance coverage.

Table 22: **Average, per Decedent, Number of Prescriptions and Different Drug Classes,* by Province, 2003–2004 (Adjusted by Age and Sex)**

Trajectory Group	Total Number of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		No. of Prescriptions	No. of Different Drug Classes	No. of Prescriptions	No. of Different Drug Classes	No. of Prescriptions	No. of Different Drug Classes
B.C.	22,485	4.3	2.9	21.5	6.4	39.3	8.0
Sask.	7,087	4.7	Data not available	25.7	Data not available	48.2	Data not available
Man.	7,386	5.1	4.0	29.7	8.7	56.0	10.8
Overall	36,958	4.6	3.2	24.0	7.0	44.4	8.7

Notes: Excludes First Nations persons.
* Data were not available because Saskatchewan did not provide sufficient information to distinguish individual drug products.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

[iii] The ATC classification system, developed by the World Health Organization, divides drugs into groups according to the organ or system on which they act and their chemical, pharmacological and therapeutic properties. Drugs are classified into five different levels. For this study, we used the number of occurrences of unique drug classes based on ATC level 4 chemical/therapeutic/pharmacological subgroups, to count the number of different prescription drug classes used.

Table 23: **Average, per Decedent, Total Prescription Costs to Government, by Province, 2003–2004 (Adjusted by Age and Sex)**

Province	Total Number of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		Per Decedent	Per Decedent With at Least 1 Prescription	Per Decedent	Per Deceden With at Least 1 Prescription	Per Decedent	Per Deceden With at Least 1 Prescription
B.C.	22,485	$111	$162	$591	$668	$1,107	$1,181
Sask.	7,087	$132	$171	$666	$733	$1,172	$1,275
Man.	7,386	$178	$246	$1,077	$1,148	$2,022	$2,022
Overall	36,958	$128	$181	$702	$780	$1,303	$1,385

Note: Excludes First Nations persons.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

According to the two measures for which data were available across the three provinces—number of prescriptions and total cost of prescriptions filled—B.C. decedents had the lowest and Manitoba the highest drug use and costs at all time periods before death.

The relative differences in drug use and costs are more pronounced at times further from death. For example, the average of 4.3 prescriptions per decedent within 30 days of death in B.C. is about 10% less than the average in Saskatchewan and about 20% less than the average in Manitoba (Table 22). Within 360 days, the average of 39.3 prescriptions per decedent in B.C. was considerably less than the averages for Saskatchewan and Manitoba. Differences in the average number of prescriptions may be due to differences in maximum prescription duration across the provinces. For example, in Saskatchewan, some medications used for chronic diseases are prescribed with a 100-day supply, rather than the typical 34-day maximum supply. These trends were confirmed with multivariate analyses, which controlled for interprovincial population differences in age, sex and marital status (see Appendix B).

Since these analyses were limited to prescriptions filled in the community, we questioned whether the results might be skewed by variation in rates of hospital use across the provinces. That is, when an individual is in hospital, his or her drugs are paid for from the hospital's global budget and his or her use of drugs during the hospital stay will not be reflected in community drug data. In such cases, a lower rate of community drug use may simply reflect the fact that the patient was using drugs dispensed during a hospital stay. In order to test this, we conducted a sensitivity analysis, comparing utilization among only those patients who were not hospitalized during the last 30, 180 and 360 days of life. We found the same pattern of utilization in the non-hospitalized group as we found in the entire cohort and have concluded that the variation in drug use by province cannot be explained by variation in rates of hospital use.

Table 24: **Average, per Decedent, Number of Prescriptions and Total Prescription Costs to Government, by Province and RHA, 2003–2004 (Adjusted by Age and Sex)**

		≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
Province/Regional Health Authority	Total Number of Decedents	Number of Prescriptions	Total Costs	Number of Prescriptions	Total Costs	Number of Prescriptions	Total Costs
British Columbia	22,485	4.3	$111	21.5	$591	39.3	$1,107
Interior	4,757	5.7	$137	27.1	$675	48.8	$1,236
Fraser	6,817	3.7	$97	19.6	$561	36.2	$1,073
Vancouver Coastal	4,969	3.9	$105	19.6	$563	36.3	$1,064
Vancouver Island	4,961	4.4	$111	21.3	$590	38.4	$1,094
Northern	981	4.2	$105	20.3	$545	36.4	$1,005
Saskatchewan	7,087	4.7	$132	25.7	$666	48.2	$1,172
Regina Qu'Appelle	1,673	4.8	$137	25.0	$648	46.4	$1,117
Saskatoon	1,595	4.8	$144	25.9	$736	49.0	$1,305
Northern RHAs	68	2.0	$45	13.0	$285	24.4	$546
All other RHAs	3,751	4.6	$125	26.1	$650	49.1	$1,150
Manitoba	7,386	5.1	$178	29.7	$1,077	56.0	$2,022
Central	623	3.7	$129	23.8	$850	47.1	$1,661
North Eastman	209	6.3	$227	32.6	$1,174	60.1	$2,158
South Eastman	245	6.0	$205	33.0	$1,216	61.7	$2,300
Interlake	454	5.7	$185	34.3	$1,152	65.8	$2,205
Parkland	390	5.4	$239	31.1	$1,111	59.8	$2,018
Brandon	293	5.8	$199	35.9	$1,275	67.6	$2,339
Assiniboine	644	4.9	$170	31.1	$1,111	59.1	$2,090
Winnipeg	4,343	5.1	$177	28.9	$1,076	54.3	$2,020
Northern RHAs	185	3.9	$108	26.9	$809	49.6	$1,460
Overall	36,958	4.6	$128	24.0	$702	44.4	$1,303

Note: Excludes First Nations persons.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

RHA differences in the per-decedent average number of prescriptions and total prescription costs are presented in Table 24. Regional differences highlighted in Chapter 3—higher levels of hospital use in smaller, less populated northern regions and lower levels in more densely populated regions—were less evident in community drug use. In B.C., the number of prescriptions and total prescription costs were highest in the Interior Health Authority—a large geographic region with one larger urban community—and very similar in the other four RHAs. In Saskatchewan, the number of prescriptions and total prescription costs tended to be lowest in the northern RHAs and highest in the Saskatoon RHA, at all time periods before death. In Manitoba, patterns were less evident, though the number of prescriptions and total prescription costs were typically lowest in the northern RHAs.

Top 10 Drugs Overall

Prescription drug plans frequently provide descriptive statistics of the "top 10" drugs/chemicals used by plan beneficiaries either by number of claims, number of claimants or cost to the drug program. In this analysis, we used the top 10 by number of claimants, as this provides a better indication of the types (rather than the financial impact which "by cost" provides or intensity of use which "by number of claims" provides) of drugs used.

Table 25: **Top 10 Prescribed Drugs Within 180 and 720 Days of Death, by Number of Claimants, by Province, 2003–2004 (Unadjusted)**

Top Ten Drugs by Claimants ≤180 Days and ≤720 Days Before Death					
British Columbia			**Manitoba**		
	Number of Claimants			**Number of Claimants**	
	≤180 Days	**≤720 Days**		**≤180 Days**	**≤720 Days**
Furosemide	6,681	8,533	Furosemide	3,048	3,690
Morphine	4,665	5,356	Acetylsalicylic acid	1,760	2,524
Lorazepam	4,332	6,274	Lorazepam	1,561	2,297
Codeine combinations	3,940	7,654	Codeine combinations	1,372	2,544
Ramipril	3,598	5,234	Omeprazole	1,363	1,887
Glyceryl trinitrate	3,342	5,164	Glyceryl trinitrate	1,282	1,865
Ciprofloxacin	3,239	7,199	Acetaminophen (paracetamol)	1,186	1,728
Digoxin	3,008	3,994	Digoxin	1,172	-
Levothyroxine sodium	2,998	-	Levothyroxine sodium	1,070	-
Warfarin	2,402	-	Potassium chloride	1,059	-
Cephalexin	-	3,932	Ciprofloxacin	-	2,233
Clarithromycin	-	3,924	Levofloxacin	-	1,757
			Sulfamethoxazole and trimethoprim	-	1,742

Notes: Excludes First Nations persons.
Pink shading indicates common ranked drugs at six months. Light blue shading indicates common ranked drugs at 24 months.
Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

In B.C. and Manitoba, the most widely used drug in the last six months and the last two years of life was furosemide, sometimes used to relieve pulmonary congestion in patients with end-stage chronic obstructive pulmonary disease or congestive heart failure, or nebulized to treat dyspnea in cancer patients[iv] (Table 25). Lorazepam, a sedative used to treat anxiety and agitation conditions, and codeine combinations (Tylenol 3) showed similarly high patterns of use in both provinces within six months of death, though less so at two years. The high use of codeine combinations at the end of life was consistent with this drug being the most widely used drug according to the B.C. and Manitoba drug plans overall (tables 26a and 26b) during 2003.

Among the differences in top 10 drugs noted within the last six months of life, B.C.'s top 10 included morphine (pain medication), ramipril (used to treat high blood pressure), ciprofloxacin (an antibiotic) and warfarin (a blood-thinning agent), while Manitoba's top 10 did not. On the other hand, Manitoba's top 10

[iv] The primary function of furosemide is as a diuretic used in the treatment of congestive heart failure.

Table 26a: Top 10 Drugs by Number of Distinct Beneficiaries, British Columbia, 2003[42]

Generic Name	Therapeutic Category	Commonly Used to Treat	Distinct Beneficiaries
Codeine/acetaminophen	Analgesics and antipyretics	Pain and fever	129,052
Amoxicillin	Antibiotics	Bacterial infection	112,800
Ramipril	Hypotensive agents	High blood pressure	104,039
Atorvastatin	Antilipemic agents	High cholesterol	93,821
Hydrochlorothiazide	Diuretics	Congestive heart failure/hypertension	86,180
Levothyroxine	Thyroid agents	Hypothyroidism	82,579
Salbutamol	Adrenergic agents	Asthma and lung diseases	73,039
Lorazepam	Anxiolytics, sedatives, hypnotics	Anxiety	69,401
Ciprofloxacin	Quinolones	Bacterial infection	68,624
Metformin	Antidiabetic agents	Diabetes	60,878

Source: Government of British Columbia, Ministry of Health, *PharmaCare trends 2003* (Victoria: Government of B.C., 2004).

Table 26b: Top 10 Drugs by Number of Distinct Beneficiaries, Manitoba, 2003–2004

Generic Name	Therapeutic Category	Commonly Used to Treat	Distinct Beneficiaries
Tylenol 3	Analgesics and antipyretics	Pain and fever	18,543
Atorvastatin	Antilipemic agents	High cholesterol	18,199
Hydrochlorothiazide	Diuretics	Congestive heart failure/hypertension	16,413
Glucose test strip	Diagnostic agents	Diabetes	15,921
Omeprazole	Gastrointestinal agents	Stomach ailments, ulcers, etc.	15,260
Furosemide	Diuretics	Congestive heart failure/hypertension	15,102
Metoprolol tartrate	Cardiovascular agents	Hypertension	14,356
Levothyroxine sodium	Thyroid agents	Hypothyroidism	13,987
Metformin Hcl	Antidiabetic agents	Diabetes	12,477
Rofecoxib	Central nervous system agents	Arthritic pain	12,234

Source: Manitoba Health (email correspondence based on request submitted April 20, 2007).

included more pain drugs such as acetylsalicylic acid and acetaminophen in the last six months of life, as well as omeprazole (a proton pump inhibitor used to treat stomach problems) and potassium (used in conjunction with diuretics). B.C.'s 24-month top 10 drugs included cephalexin and clarithromycin (antibiotics), while Manitoba's included ciprofloxacin, levofloxacin (an antibiotic) and sulfamethoxazole and trimethoprim (an antibacterial agent).

Despite the fact that 48% of British Columbia PharmaCare beneficiaries are seniors whose drug use was reflected in the top 10 drugs as described above,[42] the top 10 drugs used by seniors in the end-of-life cohort did not include certain drugs for highly prevalent conditions (for example, elevated cholesterol), which one might expect to see reflected in drug use two years prior to death.

Morphine Equivalent Use

Management of pain and discomfort is an important feature of care at end of life. Much has been written on the issue of under-treatment of pain at end of life, and many families and patients fear such under-treatment when considering care options at end of life.

Because pain medications belong to different categories of drugs, it is difficult to capture and compare medication with different strengths, different mechanisms of action and different forms of dosage. However, using calculations that convert different pain medications to a common denominator—a morphine equivalent—can help provide a uniform picture of the use of pain medication.[44,45,46] For this study, we converted pain medication to morphine equivalents (MEq) using the calculation described below.

There are no published population-based estimates of MEq among individuals during their last months or years of life, so the provincial data presented here cannot be compared to normative values. Provincial variations in MEq may reflect differences in prescribing practices, clinical practices, roles of cancer agencies or drug formularies. While these data provide useful benchmarks for the provinces, one cannot say whether any of the estimates are too high or too low or reflective of the quality of palliative care.

Calculation of Morphine Equivalents

Morphine equivalents (MEq) per prescription were calculated using the following formula:

MEq per prescription = MEq value × (unit dose × (dispensed quantity))

MEq value: derived from 1 dose of morphine taken intramuscularly as the reference measure.

Unit dose: the dosage prescribed, per injection, for example.

Dispensed quantity: the total amount of pain medication dispensed (for example, total days supply)

Source: Adapted from Institute of Medicine, *Approaching Death: Improving Care at the End of Life*, eds. M. J. Field and C. K. Cassel (Washington: National Academy Press, 1997). For details, see www.palliative.org/PC/ClinicalInfo/AssessmentTools.pdf.

Marked differences exist in MEq use among the three provinces by the entire decedent population compared to individuals who died from cancer (Table 27). Overall, MEq drug use was highest in Saskatchewan and lowest in B.C. and Manitoba across all time periods. As might be expected, overall MEq use was two to three times higher when analyses were restricted to cancer decedents. Among cancer decedents, however, MEq use was highest in B.C. within 30 days of death, and in Manitoba within 180 and 360 days of death, though relative differences were much smaller.

Table 27: **Average, per Decedent and per Cancer Decedent, Total Morphine Equivalents Dispensed, by Province, 2003–2004 (Adjusted by Age and Sex)***

Province	Total Number of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		Per Decedent	Per Cancer Decedent	Per Decedent	Per Cancer Decedent	Per Decedent	Per Cancer Decedent
B.C.	22,485	419	1,288	1,289	3,772	1,655	4,499
Sask.	7,087	464	1,208	1,553	3,604	2,173	4,520
Man.	7,386	418	1,105	1,524	3,785	2,156	4,975
Overall	36,958	429	1,241	1,392	3,752	1,862	4,604

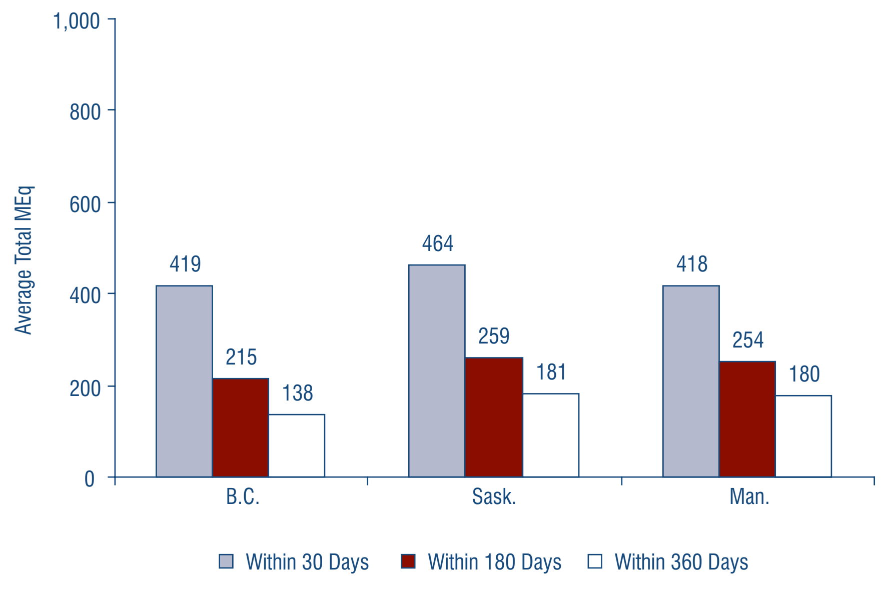
Notes: Excludes First Nations persons.

* Cancer decedents were those with underlying cause of death codes (ICD-10 C00.0 through D48.9.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

To illustrate the effects of time until death, Figure 11 presents monthly, per decedent average total MEq use. It was not possible to use the same approach as outlined in Chapter 2 to create daily drug use. By dividing the total MEq for each time period by the number of months in the time period, we were able to create a monthly trajectory analysis. This analysis offers a crude estimate of increased use as one nears death. As the figure shows, monthly use was highest within 30 days of death and was substantially higher than the monthly MEq use within 180 days of death.

Figure 11: **Average, per Decedent Monthly Total Morphine Equivalents Dispensed, by Province, 2003–2004 (Standardized by Age and Sex)***



Notes: Excludes First Nations persons.

* This analysis assumes consistent drug use during each month of the time period. As drug use typically increased closer to death, these smoothed monthly rates likely overestimated drug use further from death. Information on daily drug use was widely variable and not sufficiently accurate to permit a robust daily use analysis; therefore, this chart provides a representative time series of drug use in the months preceding death.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

B.C., Saskatchewan and Manitoba showed a remarkably similar pattern in the types of pain drugs used at end of life, although there was some variation in the number of claimants for the various types of drugs (Table 28). Morphine and codeine combinations were the two most commonly used MEq drugs during the last 180 days of life. Morphine was used by over 35% of decedents in B.C., 28% in Saskatchewan and 19% in Manitoba. Codeine combinations were used by about 33% of Manitoba decedents, compared to 30% in B.C. and 20% in Saskatchewan.

Table 28: **Top 10 Morphine Equivalent ATC-5 Classes Dispensed in the Six Months Before Death, by Number of Claimants, 2003–2004 (Adjusted by Age and Sex)***

	Rank			Number and Percent of MEq Claimants						
	B.C.	Sask.	Man.	B.C.	%	Sask.	%	Man.	%	Total
Morphine	1	1	2	4,665	35.1	1,085	28.1	804	19.1	6,554
Codeine combinations	2	2	1	3,940	29.7	777	20.1	1,372	32.7	6,089
Hydromorphone	3	4	5	1,427	10.7	567	14.7	451	10.7	2,445
Fentanyl	4	3	3	1,112	8.4	580	15.0	674	16.1	2,366
Acetaminophen and combinations excluding psycholeptics	5	7	4	989	7.4	123	3.2	515	12.3	1,627
Scopolamine	6	5	6	511	3.8	331	8.6	202	4.8	1,044
Oxycodone	7	6	7	238	1.8	232	6.0	86	2.0	556
Codeine	8	8	8	223	1.7	80	2.1	48	1.1	351
Pethidine	9	9	9	156	1.2	67	1.7	37	0.9	260
Acetylsalicylic acid and combinations with psycholeptics	10	12	10	21	0.2	--	--	--	--	30

Note: Excludes First Nations persons.

* Provincial formulary differences: (1) opium and belladonna 65 mg, 15 mg suppositories covered only in B.C.; (2) oxycodone coverage varies by strength and forms in each of the three provinces; (3) meperidine (Demerol) covered in Manitoba, not covered in B.C. and strengths and forms vary in Saskatchewan; (4) fentanyl patches (duragesic) coverage is restricted in Saskatchewan only; (5) over-the-counter analgesics covered in B.C. when prescribed; some are benefit drugs for a subset of beneficiaries; not eligible in Manitoba or Saskatchewan.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

Looking within provinces, more densely populated regions in B.C. showed somewhat lower MEq use compared to less densely populated regions, particularly Interior Health, which had one of the highest levels across the western RHAs (Table 29). In Saskatchewan, MEq use was lowest by a substantial margin in the northern RHAs, and highest in the Regina Qu'Appelle RHA. In Manitoba, MEq use was generally lowest among decedents from the RHAs in the northern and central areas of the province and highest in the southern, more highly populated regions.

Focusing across all decedents in all regions, MEq use was highest in the North Eastman RHA within 30 (MEq = 583) and 360 days (MEq = 3,587) of death, and in the Brandon RHA within 180 days (MEq = 2,399). The combined northern RHAs in Saskatchewan had the lowest MEq use within all time periods. Among cancer decedents, typically the same regions showed the highest use. However, higher use in smaller regions, the northern Saskatchewan RHAs for example, may be an artifact of greater variability due to fewer decedents or a greater proportion of individuals whose data are not included in this analysis (for example, First Nations persons).

Table 29: **Average, per Decedent Total Morphine Equivalents Dispensed, by Province and RHA, 2003–2004 (Adjusted by Age and Sex)**

Province/Regional Health Authority	Total No. of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		Per Decedent	Per Cancer Decedent	Per Decedent	Per Cancer Decedent	Per Decedent	Per Cancer Decedent
British Columbia	22,485	419	1,288	1,289	3,772	1,655	4,499
Interior	4,757	563	1,739	1,680	4,827	2,134	5,665
Fraser	6,817	325	1,014	1,044	3,198	1,362	3,917
Vancouver Coastal	4,969	347	1,147	1,088	3,503	1,355	4,130
Vancouver Island	4,961	484	1,334	1,478	3,794	1,937	4,530
Northern	981	397	1,244	1,218	3,681	1,600	4,428
Saskatchewan	7,087	464	1,208	1,553	3,604	2,173	4,520
Regina Qu'Appelle	1,673	574	1,531	1,809	4,691	2,305	5,585
Saskatoon	1,595	438	1,108	1,616	3,353	2,410	4,234
Northern RHAs	68	62	189	328	942	391	1,004
All other RHAs	3,751	443	1,143	1,460	3,282	2,074	4,221
Manitoba	7,386	418	1,105	1,524	3,785	2,156	4,975
Central	623	227	664	1,055	2,780	1,724	4,028
North Eastman	209	583	1,236	2,281	4,845	3,587	7,150
South Eastman	245	372	988	1,646	4,471	2,390	6,237
Interlake	454	384	976	1,513	4,032	1,913	5,079
Parkland	390	455	1,105	1,481	4,020	2,053	5,358
Brandon	293	541	1,207	2,399	5,709	3,144	6,563
Assiniboine	644	316	572	1,224	2,876	1,823	4,280
Winnipeg	4,343	446	1,237	1,543	3,767	2,174	4,911
Northern RHAs	185	321	1,226	1,080	3,834	1,262	4,437
Overall	36,958	429	1,241	1,392	3,752	1,862	4,604

Note: Excludes First Nations persons.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

Palliative Drug Plan Registration

Overall, about one in seven decedents were registered to receive benefits through a provincial palliative care drug benefit plan. Enrolment rates ranged from 8% in Manitoba to 18% in Saskatchewan (Table 30). As would be expected, enrolment levels were higher among individuals who had died of cancer. Among these decedents, enrolment ranged from a low of 28% in Manitoba to a high of 53% in Saskatchewan.[v]

Table 30: **Percentage of Decedents Registered on Provincial Palliative Drug Plans, by Province, 2003–2004 (Adjusted by Age and Sex)**

Province	Total Number of Decedents	Percentage of Decedents Registered on Palliative Drug Plan	
		All Decedents	Cancer Decedents*
B.C.	28,269	16.1	47.6
Sask.	8,510	17.7	53.2
Man.	9,090	8.4	27.6
Overall	45,869	14.9	44.7

Notes: Excludes First Nations persons.

* Cancer decedents were those with underlying cause of death codes (ICD-10 C00.0 through D48.9).

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

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v. Regression analyses confirmed the finding among individuals dying of cancer of significantly greater palliative drug plan enrolment in Saskatchewan relative to that seen in B.C. and Manitoba.

We examined whether the lower enrolment in Manitoba was a function of the start-up dates of the provincial palliative care drug benefit plans. Palliative care drug benefit plans have existed in Saskatchewan since 1987 and in B.C. since 2000. Manitoba's plan was implemented in December 2002. The study cohort included individuals who may have died within four months of the Manitoba palliative care drug plan implementation date: lower registration in Manitoba may be attributed to lower awareness of the plan. To investigate this potential start-up bias, we conducted a sensitivity analysis, comparing the proportion of decedents registered on the plan that died between January 1 and March 31, 2004, to the proportion that died during the entire cohort year. Negligible differences existed between these time periods, indicating there was likely no bias in registrations during the decedent cohort year. However, given the short comparative time frame, additional registration data may indicate otherwise (a potential topic for future research).

Other possible explanatory factors that bear further investigation include the complexity of six-month death prognoses, reluctance to accept a death prognosis and variations in individuals' ability to pay for prescription drugs. First, palliative care drug plan registration requires a six-month death prognosis from a physician. The accuracy of such a diagnosis can vary substantially, depending on a host of issues. Second, individuals and/or family members may be reluctant to accept a death prognosis, so may choose not to register for palliative care drug benefits. Third, individuals may choose not to register because they may receive more comprehensive coverage through a different provincial benefit plan. For example, residents of some long-term residential care facilities in B.C. and Manitoba receive drug benefit coverage through the facility budget and do not have any out-of-pocket drug expenses at all.

Trajectory Group Comparisons

An individual's prescription drug and supply use depends on whether or not effective interventions are available to treat or manage his or her particular condition. It is therefore instructive to examine patterns of prescription drug and supply use by disease category. Variations in use may also reflect differences in the access to drugs and devices (for example, secondary to provincial formularies), variation in physician's prescribing patterns and differences in patients' filling of prescriptions, perhaps related to variations in health beliefs or ability to pay.

When total prescription drug and supply costs and number of different prescriptions filled are examined by trajectory group,[vi] the estimates were highest among Terminal Illness decedents and lowest among Sudden Death decedents at all time periods (tables 31 and 32). In terms of the number of prescriptions filled, the number is greatest for the Terminal Illness group within 30 days of death, but beyond this 30-day threshold, the number of prescriptions filled was highest among the Organ Failure group, followed by those in the Frailty group (Table 31).[vii]

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vi. Results in this section exclude the Other trajectory group to simplify comparisons.

vii. Prescription drug and supply use within 30 days of death is expected to be depressed because more than a third of decedents are hospitalized during this period and receive drugs and supplies from the hospital.

Table 31: **Average, per Decedent Number of Prescriptions and Different Drug Classes, by Trajectory Group, 2003–2004 (Unadjusted)**

Trajectory Group	Total Number of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		No. of Prescriptions	No. of Different Drug Classes	No. of Prescriptions	No. of Different Drug Classes	No. of Prescriptions	No. of Different Drug Classes
Sudden Death	512	3.1	2.2	17.5	5.2	33.0	6.7
Terminal Illness	10,131	5.2	3.4	23.4	7.8	39.4	9.6
Organ Failure	14,197	4.5	3.1	25.3	6.8	48.4	8.5
Frailty	12,118	4.2	3.1	23.2	6.4	44.4	8.0
Overall	36,958	4.6	3.2	24.0	7.0	44.4	8.7

Note: Excludes First Nations persons.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

Prescription cost differences were much larger within 30 days of death, as costs more than doubled for the Terminal Illness group relative to the Sudden Death decedents. Relative cost differences were much smaller in the 360-day period, indicating that Terminal Illness decedents used more drugs and supplies and/or more expensive pharmacy products (for example, higher pain medication dosages) closer to death (Table 32).

Table 32: **Average, per Decedent Community Drug and Supply Total Costs to Government, by Trajectory Group, 2003–2004 (Unadjusted)**

Trajectory Group	Total Number of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		Per Decedent	Per Decedent With at Least 1 Prescription	Per Decedent	Per Decedent With at Least 1 Prescription	Per Decedent	Per Decedent With at Least 1 Prescription
Sudden Death	512	$77	$122	$455	$521	$880	$951
Terminal Illness	10,131	$189	$266	$863	$924	$1,450	$1,506
Organ Failure	14,197	$112	$160	$684	$768	$1,329	$1,419
Frailty	12,118	$99	$137	$600	$677	$1,166	$1,259
Overall	36,958	$128	$181	$702	$780	$1,303	$1,385

Note: Excludes First Nations persons.

Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

MEq use was much higher among Terminal Illness decedents than all other trajectory group decedents at all time periods (Table 33). This higher level of MEq use among Terminal Illness decedents was expected given the preponderance of individuals dying of cancer in this group. Cancer is the condition most often associated with palliative care, of which pain management is a major component.

Table 33: **Average, per Decedent Total Morphine Equivalents Dispensed, by Trajectory Group, 2003-2004 (Unadjusted)**

Trajectory Group	Total Number of Decedents	≤30 Days Before Death		≤180 Days Before Death		≤360 Days Before Death	
		Per Decedent	Per Decedent With at Least 1 Prescription	Per Decedent	Per Decedent With at Least 1 Prescription	Per Decedent	Per Decedent With at Least 1 Prescription
Sudden Death	512	98	310	359	1,135	599	1,892
Terminal Illness	10,131	1,216	1,856	3,682	5,621	4,530	6,916
Organ Failure	14,197	141	400	583	1,658	942	2,677
Frailty	12,118	123	388	468	1,477	763	2,408
Overall	36,958	429	1,241	1,392	3,752	1,862	4,604

Note: Excludes First Nations persons.
Source: CIHI 2007, study data set based on pooled 2003–2004 provincial pharmacy data from B.C., Saskatchewan and Manitoba.

Terminal Illness decedents filled more prescriptions and used more different drug classes within 30 days of death than decedents in the other trajectory groups according to results from the regression analyses. These differences generally held across the western provinces (see Appendix B).

Summary

Analyses of the use of pharmacy products by province is challenging because provincial drug plans differ in their funding arrangements, formulary coverage and co-payment and deductible levels. Further complicating our analysis was missing information on community-based prescription drug use for residents of Alberta and for some residents of long-term care facilities in B.C. and Manitoba. Alberta did not provide pharmacy data for this study because at the time of the project Alberta Health and Wellness was engaged in an effort to restructure the provincial prescription drug administrative data system and files. In B.C. and Manitoba, drugs for residents of some LTC facilities are covered by the facility budget.

Community drug use among seniors was lower in B.C. than in Saskatchewan and Manitoba, in terms of the average per decedent total number of prescriptions, the number of different drug classes (excluding Saskatchewan) and costs to government. The most common drugs used in the last six months of life were remarkably similar in B.C. and Manitoba, likely indicating treatment of common symptoms and conditions as death approaches. Regionally, drug and supply use was typically lowest in less populated northern RHAs, except in B.C. where it was lowest in the urban RHAs.

As was the case for overall drug use, MEq prescriptions signalling the provision of palliative care were lower in B.C. than in Manitoba and Saskatchewan. Decedents in Saskatchewan had the highest MEq prescription use at all time periods during the last year of life. The lack of normative data on MEq limits the ability to judge whether reported levels of use are appropriate in the context of end-of-life care. The values presented provide benchmarks with which to track future MEq use. Examination of the most common pain medications used in the last six months of life revealed similar patterns in each of the three provinces, with morphine the most commonly prescribed pain medication, as measured by total number of claimants.

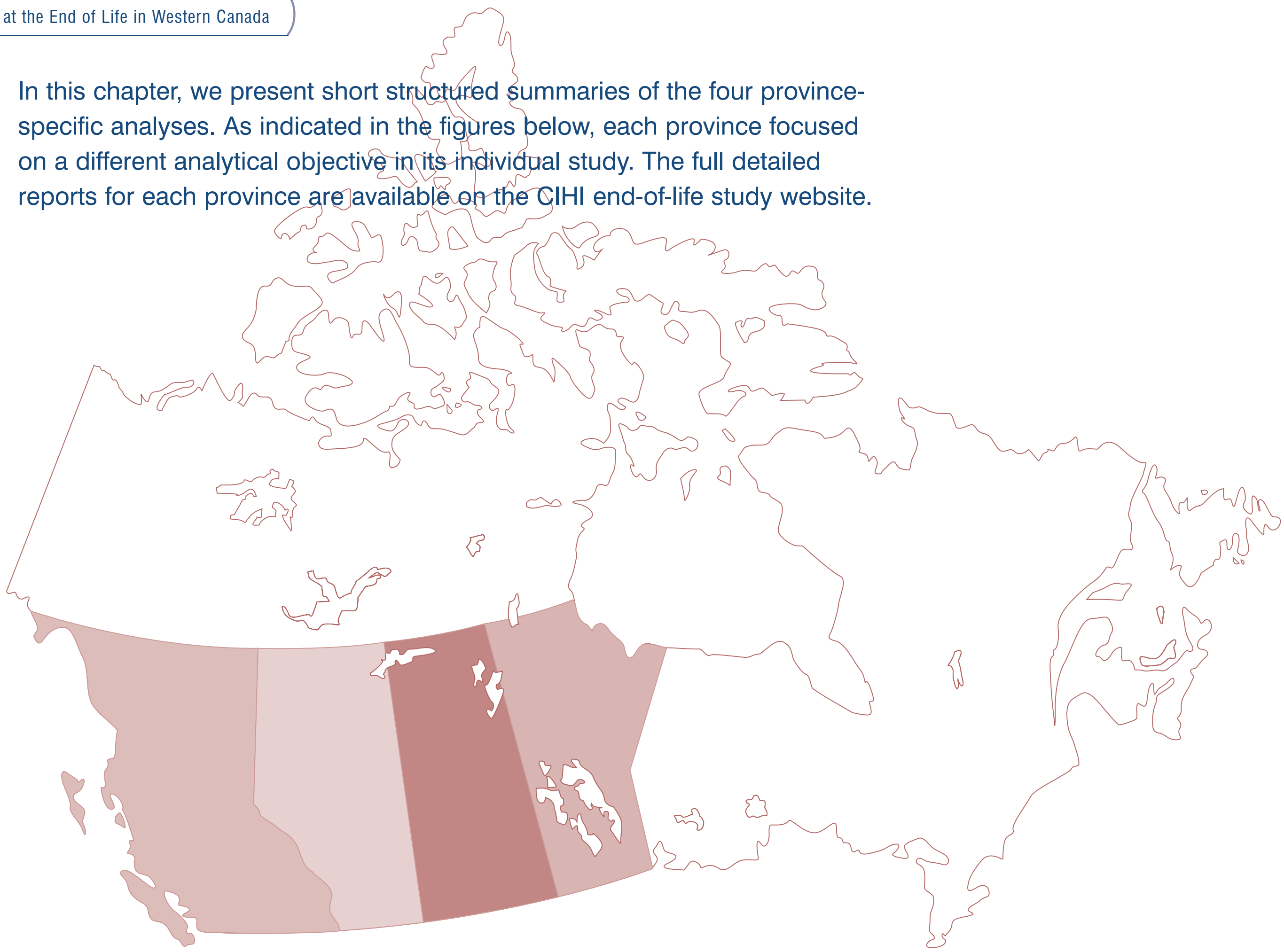
Overall, about one in seven decedents registered with a provincial palliative care drug benefit plan during the last two years of life. Registration with these plans was lower in Manitoba and higher in Saskatchewan.

Terminal Illness decedents showed the highest use of prescription drugs compared to other trajectory groups, particularly within 30 days before death, indicating a stronger reliance on drugs—likely for pain management—as death approaches. Further from death, particularly between 6 and 12 months before death, Organ Failure and Frailty decedents showed higher drug use, though costs were typically highest among the Terminal Illness decedents. As expected, morphine equivalent prescriptions were highest among the Terminal Illness decedent group.

5

Spotlight on Western Provinces

In this chapter, we present short structured summaries of the four province-specific analyses. As indicated in the figures below, each province focused on a different analytical objective in its individual study. The full detailed reports for each province are available on the CIHI end-of-life study website.



British Columbia conducted an analysis of service utilization, using methods to measure intensity of service use in the last two years of life.

Alberta provided descriptions of palliative home care programs operating in three of its RHAs, and conducted a study to determine the efficacy of a palliative patient assessment tool in another RHA.

Saskatchewan analyzed health care costs in the two years before death.

Manitoba examined transfers among hospitals, long-term care facilities and home occurring at the end of life, as well as issues related to palliative patient registration methods.

British Columbia: Service Utilization at the End-of-Life

Introduction

The British Columbia Ministry of Health conducted an analysis of service needs and use at the end of life in an effort to support decision-making for clinical managers, health authorities and provincial governments.

The objectives of the B.C. study were:

- To describe the people who died during 2003–2004 in B.C.;
- To determine where these people died (geographic area, service location, institution type and home);
- To examine the patterns of health care use (for example, hospitalizations, physician utilization, home care, prescription drugs and residential facilities) by these decedents during their last two years of life; and
- To describe the use of the palliative drug plan.

Data and Methods

The data holdings used in this analysis included the following: Vital Statistics (deaths); Medical Services Plan (physician claims); Discharge Abstract Database (hospital separations); Continuing Care Information Management System (continuing care, home support, home care and adult day care); PharmaCare and palliative drug program database; and the ambulance database.

For each B.C. resident who died in 2003–2004, the use of the following services during each month in the last two years of life was analyzed: physician services, pharmaceutical prescriptions, acute care, residential services, direct care, home support and adult day care.

Three basic assumptions guided the analyses:

- The months in which the person had no service events reflect periods of complete self-care.
- The higher the number of service events a person had over the two years, the higher the service need. For example, a person who had 50 service events over two years had less of a need for services than a person who had 400 service events.
- The higher number of types of services used concurrently reflects increased complexity in service need.

The two primary analyses completed involved:

- Creating Service Event Groups—13 unique groups of people were identified based on the total number of services used over the last two years of life. The service event groups range from those people who used only 0 to 49 services in total over the last two years of life (Group 1) to those people who used 2,900 or more services in total (Group 13).
- Classifying Months by Service Type—for each decedent, each of the 24 months in the last two years of life was classified based on the type of service used. The three broad categories included: 1) self-care, where no publicly funded health service was used; 2) simple single service, where only one service type was used; and 3) complex services, where bundles of services were used concurrently. There were 23 possible service classification categories.

Key Findings

The 29,456 people who died in B.C. in 2003–2004 used 2.2 million physician visits, 1.99 million prescriptions, 0.76 million acute care days, 3.97 million residential care days, 0.33 million direct care visits, 2.0 million home support hours and 0.045 million adult day care visits in the last two years of life. The estimated total cost of these services was $1.32 billion and from a capital capacity perspective delivery of these resources required 2,455 acute care beds (at 85% occupancy) and 11,455 residential care beds (at 95% occupancy).

When examined by service event groups, 3,778 people (13%) were primarily self care, 15,876 people (53%) were self care with simple single service use, 2,752 (10%) of people had increased dependence on publicly funded health services and used services frequently in complex bundles and the remaining 7,040 people (24%) were primarily dependent on the publicly funded health service system.

General practice physicians provided the majority of physician services used by decedents in all service event groups, followed by diagnostic services, medicine specialists, anesthesiologists, ophthalmologists, psychiatrists, general surgeons, podiatrists, urologists and orthopedic surgeons and then all other specialists.

The average, per-decedent cost of services over the last two years of life varied by the volume and complexity of services used. For those people who were primarily self-care in the last 24 months of life, the cost was $2,159 per person. On the other end of the spectrum, for those people dependent on the publicly funded health service system using complex bundles and high volumes of services in the last two years of life, the average cost per person was $106,000 to $210,000. Many people were found to be accessing services at end of life, but it is unclear from these analyses if the services delivered were appropriate and timely.

Cancer cases were distributed across the service event groups, but had higher use of palliative services. This finding is consistent with origins of palliative care, which historically have focused on cancer.

For many decedents, health service use peaked in the last three to six months of life, the traditional period of focus for end-of-life palliative care. However, findings illustrate that with an older population among whom chronic illness and comorbid conditions are common, end-of-life care is needed well before the last three or six months.

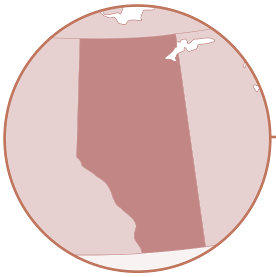
The many different patterns of service use at the end of life identified in these analyses raise many interesting health service research questions. The sources of the variation in service use could not be fully assessed with available data and need to be further investigated.

Discussion and Conclusions

Analysts in B.C. have depicted health service utilization from a different vantage point by categorizing, for each decedent, the number and type of services used during the last two years of life.

Distinct service groups of decedents could be characterized to provide valuable insight into resource use and expenditures. A gauge of service intensity based on counts of service use has been developed; however, it is recognized that further refinement of this method will strengthen the development of this initial baseline.

Future work should address questions raised by this analysis: for example, What are the characteristics and specific service use patterns of identified groups and Can service use be predicted with available data?



Alberta: Select RHA Palliative Home Care and Patient Assessment

At the onset of the CIHI end-of-life study, Alberta Health and Wellness (AHW) was conducting its own end-of-life study and opted not to produce a province-wide branch study for the CIHI report.[23] To complete the Alberta-specific study, CIHI approached the Alberta RHAs with a request to participate either by providing descriptive information about their palliative care programs or conducting an end-of-life related research project. Four RHAs elected to participate. The Chinook (CHR), David Thompson (DTHR) and East Central (ECH) health regions provided CIHI with descriptions of their end-of-life or palliative care programs. Capital Health (CH) participated by reporting results of a study of a palliative assessment tool designed to define the regional palliative care population. First we describe the end-of-life/palliative home care programs from the three RHAs that provided information. Second, we present findings from the study of a palliative care assessment tool.

Regional End-of-Life and Palliative Programs

The following summary of palliative care documentation submitted by CHR, DTHR and ECH illustrates some of the diversity of services available across Alberta's health regions.

Program and Service Summary

All three regions collaborated with the Alberta Cancer Board Hospice Palliative Care Network (AHPCN) to establish innovative projects to further enhance their services through partnering and collaborative strategies. Each of these rural regions also participated in a number of the 72 sub-projects funded through the Pallium Project, a national initiative to support development of hospice palliative care programs across Canada. Considering that CHR, ECH and DTHR have similar geographic challenges and population characteristics, it is not surprising that they have adopted similar models. It is also important to note that all three programs are situated in rural locations in Alberta. DTHR and ECH mission statements address care that:

- Is comprehensive and coordinated;
- Is interdisciplinary and patient focused;
- Is evidence based;
- Includes ongoing education to patients, families and caregivers;
- Is delivered to individuals and their families in their setting of choice and regardless of age or diagnosis; and
- Addresses the diverse physical, emotional, social and spiritual needs that accompany the dying process.

Each of these regions follows the Canadian Hospice Palliative Care Association model and norms presented in the introduction of this report. Typically, each RHA provides palliative services in many sites across the region, including acute care settings, continuing care facilities and individuals' homes. In DTHR, this involves 55 separate sites and in ECH 84 sites including two community cancer centres. Each of these three rural programs focuses on an interdisciplinary, collaborative approach that is client/patient focused, evidence based and with accountability to RHA senior management and AHW. Business plans, action plans and health plans support the organization and delivery of these services across each region and provide the basis of regular performance reporting. CHR and ECH health regions provided examples of performance reports, which address the following business goals:

- To sustain and improve the delivery of accessible, effective quality health service to residents;
- To improve the health and well-being of residents through strategies for protection, promotion and prevention;
- To support and promote a system for health;
- To optimize the effectiveness of the health authority; and
- To achieve an optimal workforce and maintain a healthy satisfied workforce.

Examples of performance measures that are monitored include, but are not limited to, the following:

- The number of individuals designated as palliative by region and site;
- The number of home deaths;
- Type and outcome of consults;
- Patient and family satisfaction;
- Physician satisfaction with consultant services;
- The number of palliative referrals; and
- The number of staff attending palliative educational sessions and number of educational sessions.

Palliative Assessment Tool Evaluation

Introduction

The Alternate Level of Palliative and End-of-Life Care Audit Instrument (ALPACA) was developed to assess the appropriateness of resource use and the effectiveness of organizational structures. In an effort to define the palliative and end-of-life care in Capital Health and to better understand ALPACA's value in this area, Capital Health conducted a study with the following objectives:

① To evaluate chart review as a method to describe the health care needs and resource use by palliative and end-of-life patients in the Capital Health Region;

② To refine and validate ALPACA as an audit tool for the evaluation of appropriate resource utilization by palliative and end-of-life patients; and

③ To describe the potential population for palliative care services.

Data and Methods

A total of 175 medical charts of individuals who had died between January 1 and December 31, 2005, were chosen from sites selected randomly from the patient population across six sites in Capital Health.[i] Inclusion criteria consisted of lengths of stay/care exceeding three days (or visits) and episode of care coded as medical (surgery, obstetrics and psychiatry were excluded). ALPACA guided the abstraction of 254 observations (variables) from the medical chart for each patient and three consecutive days (visits) of care (including visits in community settings). This three-day sampling frame improved the likelihood of capturing comprehensive information related to patient acuity, procedures and the full assessment and clinical plan. The items abstracted using the ALPACA tool included age, gender, culture/ethnicity, language, education, income, diagnosis, advance directives, interdisciplinary care, morphine equivalent daily dose (MEDD), physician order changes, symptoms assessment, social work/psychological assessment, interdisciplinary progress notes, pressure ulcer risk assessment and nursing care.

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i. As the cohort selection dates for this study differ from those for the larger four-province study, no direct comparisons can be made between the two studies.

Data reduction (aggregation and averaging) was applied to convert this data set to approximately 100 variables. A two-step cluster analysis was then used to assign patients to groups with similar profiles of resource utilization and need. A scoring algorithm then provided insight into the optimal number of clusters, cluster frequencies and descriptive statistics.

Key Findings

Audit Summary

The 175 abstracted patient charts represented six care settings (tertiary palliative care, acute care, continuing care, hospice, palliative home care and Capital Health Regional Palliative Care Program) located within seven institutions or programs yielding a total of 501 days of observation. About half (53%) of patients admitted to a facility were directly admitted from the home while one-third were admitted from hospital. Median length of stay varied from 15.5 days for patients in acute settings to 430 days for patients in long-term care (LTC) facilities. Acute care patients spent a significant time in emergency, averaging 26 hours with a maximum of 104 hours. Average documentation rates for 25 core variables varied from 67% in palliative care settings to 43% in non-palliative care settings. Approximately two-thirds of patient charts contained a do-not-resuscitate (DNR) order, varying from 48% in LTC settings to 96% in tertiary care and hospices.

Physician order changes varied from 0.5 per visit in palliative home care to 10.0 per day in acute settings. Physicians saw patients about once every two days or, visits across all settings (0.4 per day in palliative home care to 2.1 times per day in acute care). Respiratory, physical and occupational therapists saw patients on average every 10 days. Nursing care interventions (defined by a list of 13 procedures requiring intensive nursing resources) varied from 0.2 procedures during a palliative consult, to 0.9 procedures in LTC facilities to 3.8 in acute care. Opioid pain medications were most prevalent in tertiary care and lowest for patients in LTC facilities.

Population Description

The LTC facility population was typically an older female population, while a younger population with an average age of 65 years characterized the tertiary care unit. The average age of acute care patients was 78, which was lower than the 84 years of long-term care, but much higher than tertiary care.

Care Variations

Personal directives were present in 8% of palliative consultation records and 68% of LTC facility records. A total of 65 patients were being cared for on account of cancer. Palliative home care patients were characterized with higher functional status, while patients in acute and hospice settings averaged lower scores. On average, patients in tertiary palliative care units were more symptomatic, while patients in LTC facilities were less symptomatic.

Patient Groupings

Two-step cluster analysis was conducted to characterize the similarity of individuals dying in acute care settings, LTC facilities and palliative care and hospice programs. Three cohorts were identified:

- Group 1, or the "acute EOL" group, was homogenous and comprised solely of acute care patients.
- Group 2, or the "chronic palliative care" group, was comprised of all LTC patients, most hospice patients, plus some acute and tertiary care patients.
- Group 3, or the "acute palliative care" group, was comprised mainly of the tertiary unit and a handful of hospice patients.

The fact that some patients seen in hospices resemble those of tertiary care, and the fact that patients dying in LTC facilities resemble those in hospice suggest that additional resources may be warranted in these settings.

Limitation: Chart review was limited primarily by the reliance on documentation. Documentation rates may be understated in that some institutions and units included the use of temporary means of recording information, and therefore the information was not available to the abstractor at the time of review.

Discussion and Conclusions

Implications for Decision-Making

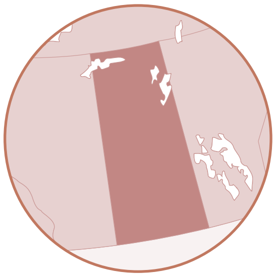
Is chart review a viable means to address quality of care provided to dying patients? The answer is yes, as the audit generated considerable insight into the care of dying patients across multiple care settings. Chart review resulted in considerably more information than was available in electronically available data sets and is less costly than surveillance using prospective observational tools. However, these findings are conditioned on the level of documentation. It is therefore recommended that efforts to improve assessment, documentation and data capture be encouraged.

Did ALPACA identify the optimal location of care provided to dying patients? This tool performed very well, with relatively few variables requiring additional research and revision. The two-stage clustering procedure was fairly robust, and underlying statistical assumptions were considered in detail. Findings confirmed that the location of care provided to patients in Capital Health was appropriate, for the most part.

Is the palliative care program sufficiently resourced to address all end-of-life care needs in the region? In other words, does ALPACA allow us to identify (1) diagnoses that are more likely to benefit from palliative consultation; (2) cancer patients more likely to benefit from earlier referral; and (3) patients who would benefit from more intense palliative services at their current location as opposed to transferring to another location? This is an important question to answer. On the one hand, there is some solace in the fact that the majority of patients dying in acute care were different from those seen in the palliative program. They received high levels of care, suggesting that transfer to alternative settings may not be appropriate or economical.

These findings are primarily limited to the physical care of the patient, as charts inadequately describe the psychosocial needs and care plans. It is well known that patients and their families experience anxiety during care and bereavement across all care settings. Providing adequate support to address anxiety and other psychosocial symptoms at end of life is clinically important and should be documented. Through the accreditation process, the palliative care program should set a standard for appropriate documentation for psychosocial support in end of life care.

Saskatchewan: Health Care Utilization and Costs at the End of Life



Introduction

The Saskatchewan portion of the End-of-Life Care Study focused on service utilization and costs to government for a range of health services, for people who died in 2003–2004. The main focus of the study was on the costs of hospital services, physician services, drugs, long-term residential care and home care for the two years before death. It is believed that the Saskatchewan portion of the study is one of the first comprehensive longer-term analyses of health care costs for people at the end of life conducted in Canada.

Data and Methods

Detailed utilization data were obtained, on an anonymized basis, for the two-year period prior to death for Saskatchewan residents who died in Saskatchewan during 2003–2004. An extensive set of edit and logic checks was used to clean the data. Given the inter-relationships of the data elements used in the analysis, and the relatively few people with missing information or other factors requiring an adjustment, it was decided to exclude such persons from the analysis. In this way, all analyses would be conducted based on individuals with complete and appropriate data. Individuals were excluded from the analysis for several reasons, including the following: missing location of death (14 cases); entry dates within 30 days of death (6 cases); under 19 years of age (88 cases); and unknown marital status (6 cases). After the above exclusions, clients with no recorded services (62 cases) were also excluded from the analysis. This resulted in the exclusion of some 176 individuals from an initial cohort of 8,879 individuals, or less than 2% of the initial cohort, and did not result in any material difference in the overall findings. Thus, the final cohort for analysis comprised 8,703 individuals.

In regard to hospital costs, the Resource Intensity Weight (RIW) cost factor for 2003–2004 for Saskatchewan was used. Hospital data contain the number of RIWs used for a hospital stay. This number was multiplied by a Saskatchewan-derived funding-per-weighted-case to obtain the estimated funded cost of the hospital stay. Costs for prescription drugs and physician services are reported directly on the Saskatchewan Health database, along with utilization data, and these costs were included in the analysis.

For long-term care (LTC) facilities, the average regional cost of an LTC facility bed was used for each health region. These costs differed across regions. For home and community care, Saskatchewan uses a series of weights for different services to estimate costs. The base unit for these costing ratios is the average provincial cost of providing one meal, which is deemed to be one unit of service. A nursing unit, for example, is defined as one hour of service and has been set at 9.7 times the cost of providing one meal, while homemaking and home maintenance visits are 4.4 times the cost of providing a meal.

It should be noted that all costs have been standardized to 2003–2004 dollars. That is, the 2003–2004 unit costs are applied to the utilization rates, irrespective of the year in which services were utilized. Finally, it should also be noted that the administrative data did allow for a fairly complete accounting of total costs, including both the costs to government and the user fees paid by clients for such services. Income-tested user fees were charged for long-term care facilities, home care services and drugs. User fees are actuals, or estimates, based on data provided by Saskatchewan Health.

Key Findings

A major, and significant, finding of this study was that LTC facility costs can have a profound impact on the average costs of care. For example, LTC residents (at the start of the six-month period prior to death) averaged $28,125 in total costs compared to $16,068 among individuals living independently in the community. Thus, the influence of LTC facility costs can be quite significant on any aggregate cost estimates, particularly if examining costs over a six-month to one-year period. In order to reflect the impact of residential LTC, a number of the data tables in this report show the impact on costs of differential amounts of time spent in LTC facilities.

The context of care has a great deal to do with the costs incurred at the end of life. For each of the time periods in our analysis, that is, the 30, 90, 180 and 365 days prior to death, the highest cost was for decedents who started the time period in the hospital. For the 30- and 90-day periods, the next-highest cost group was individuals living in the community with home care. The majority of the costs for this group were related to hospital care. For the 180- and 365-day groups, the second-highest cost was for LTC residents. What is also interesting, and quite significant, is that the LTC group had consistently lower costs for other parts of the health care system. Thus, there was an interesting and noticeable difference in the distribution of costs across the health care system for LTC versus community residents. The majority of costs for community-living individuals was for hospital care. The major cost for people in facilities was the cost of facility care. The costs of acute care for these people were relatively modest. Thus, it appears that LTC facilities are able to provide most of the services used by clients, within the facility, while clients living at home make extensive use of acute care hospitals.

It is interesting to note that for the period 30 days prior to death, the highest cost factor for all groupings was hospital care, the next-highest was residential LTC and the third-highest was physician services. This pattern changed over time. For the period 365 days prior to death for Frailty, Organ Failure and Other, the highest cost factor was residential LTC. The clear exception to this pattern was Terminal Illness for which hospital care was, by far, the most significant cost factor across all time periods.

A wide range of causes of death were analyzed for this project. The five most common causes of death were analyzed in this report. For the 30 days prior to death, with one exception, the primary cost factor was hospital care. The exception was death due to diseases of the nervous system and sense organs, for which the highest cost was residential LTC. This could be related to LTC residents suffering from dementia. For the period 365 days prior to death, the major cost factor for neoplasms was hospital care. For deaths due to diseases of the circulatory system, the respiratory system and the nervous system and sense organs, the major cost factor was residential LTC.

It is interesting to note that the average total cost per client was less for decedents identified as receiving palliative care than for people who did not receive palliative care, except in the 365 days prior to death. The difference between the two groups appears to diminish in proportion to the length of the period prior to death. This is understandable, as most palliative care programs are designed for people near the end of life.

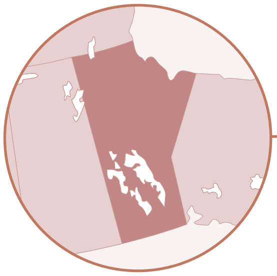
The data in Saskatchewan allowed for comparisons related only to the location of death between people who died in hospital and people who died in other settings. Costs were significantly higher for people who died in the hospital. This difference decreased over time, primarily in relation to the relative rise of costs related to residential LTC facilities, with non-hospital deaths accounting for higher costs than hospital deaths for the period 365 days prior to death.

The average total cost per person who died in Saskatchewan in 2003–2004 was fairly similar across regions. The only exception was the cluster of the three relatively sparsely populated regions in the northern part of Saskatchewan. Except for the period 30 days prior to death, the average total costs tended to be lower in the north. For the 30 days prior to death, the average total cost for people in the three northern health authorities was $7,267, compared to the overall average of $7,411 and the average of the health authorities (excluding Regina and Saskatoon) of $7,290. In contrast, for the period 365 days prior to death, the average total cost for the northern health authorities was $21,364, compared to the provincial average of $31,942 and $33,524 for the health authorities (excluding Regina and Saskatoon). These differences could be due to the sparse population and/or the significant First Nations population living in northern Saskatchewan, as persons living on reserve come under the responsibility of Health Canada in regard to the delivery of health services and thus would have relatively lower provincial health care costs.

Discussion and Conclusions

It is believed that this study represents one of a relatively few major studies conducted in Canada on the costs of end-of-life care. It would certainly be of interest to compare the Saskatchewan experience to that of other parts of Canada. Future research in other jurisdictions could begin to paint a more complete picture of the costs of end-of-life care in Canada. This information would be useful for future planning and cost projections.

Finally, this study has pointed out a major new finding related to the relative influence of care in LTC facilities on the average costs of end-of-life care. As can be seen from this report, the influence on costs of persons receiving long-term residential care is significant, and increases over time. Thus, the relative proportion of individuals in facilities can impact end-of-life costing for a given geographic entity such as a regional health authority. For example, if all other conditions are identical across two regional health authorities, and the proportion of people who are in LTC facilities prior to death differs, the overall costs would also tend to differ. Thus, when making cost comparisons, it is necessary to control for the impact of facility care across geographic entities such as health authorities, provinces or countries. It is recommended that, in future, researchers should clearly show costs separately for individuals living at home and in LTC facilities as part of their analyses.



Manitoba: Transfers and Palliative Patient Identification

Introduction

The objectives of the Manitoba-specific study were:

1. To examine transfers to hospital at the end of life among personal care home (PCH) residents;
2. To examine transfers to hospital at the end of life among home care clients; and
3. To examine data capabilities for identifying and describing palliative care patients across the province.

Data and Methods

This report was based on anonymized (no names, no addresses) Manitoba Health administrative data contained in the Population Health Research Data Repository housed at the Manitoba Centre for Health Policy (MCHP). Databases used included vital statistics data, hospital file, personal care home database, home care data, pharmaceutical (DPIN) files (including Palliative Care Drug Access Program data) and the population registry.

Data to examine data capabilities for identifying and describing palliative care patients across the province were obtained by Manitoba Health by contacting each of the RHAs to determine the availability of data on palliative care patients in the region. Participating RHAs sent data files to Manitoba Health, which anonymized the data and attached a scrambled PHIN (personal health information number) to allow data linkage with other health care use files (vital statistics data, hospital file and prescription drug file).

The study cohort includes all Manitoba residents who died during 2003–2004; a total of 9,741 individuals. From this, we identified PCH residents (individuals who spent at least one day in a PCH or chronic care hospital in the last 360 days before death), home care clients (individuals who incurred at least one day on home care in the last year of life, excluding PCH residents) and palliative patients. Palliative patients were identified using one of the four following sources:

- Palliative registries provided by the RHAs;
- Hospital separations file;
- Palliative Care Drug Access Program file; and
- Home care file.

It is important to recognize data limitations here, in that the “flags” that identify palliative patients in the hospital and home care files may not capture all palliative patients. This means that some individuals identified here as being in an acute care hospital may have received palliative care, although not in a specifically designated palliative care unit or bed. Similarly, individuals that we identified as receiving “regular” home care and included in our home care group may in fact have received palliative home care, but were not identified as such in the home care file.

Key Findings

PCH Residents

About a third of all the decedents in 2003–2004 were PCH residents (N = 3,056). Not surprisingly, PCH residents tended to be older; about two-thirds were 85 years old or older. About 40% were classified as being in the frailty trajectory group, and about 40% in the Organ Failure group. The remainder was divided approximately evenly into the Terminal Illness and Sudden Death/Other groups.

Although most PCH residents died in a PCH, many were hospitalized at least once in the last 180 days before death. Overall in Manitoba, 18% of PCH residents died in an acute care hospital. However, about 40% were hospitalized at least once in the last 180 days before death, with 10% hospitalized two or more times. PCH residents incurred close to 17,000 hospital days in the last 180 days before death, over one-third (36%) of which were in the last month before death. Thus, hospital use increased markedly shortly before death, although most individuals did in fact die in a PCH.

There was substantial variability in hospital use across different trajectory groups. Individuals in the Organ Failure group were most likely to die in hospital (22%), whereas those in the Terminal Illness group were least likely to die there (13%). Similarly, PCH residents in the Organ Failure group incurred the most hospital days in the last 180 days before death (648 days per 100 decedents in that group versus, for example, 416 days per 100 decedents in the Frailty group).

Hospital use varied markedly across RHAs. While, overall, 18% of PCH residents died in a hospital, the range was from 9% (North Eastman) to 29% (Interlake). Whether individuals were hospitalized in the last 180 days before death, and hospital days, also varied substantially across RHAs.

Hospital use also varied substantially across PCHs. The percentage of residents who died in hospital ranged from a low of 0% to 41%—clearly reflecting a great deal of variation around the provincial average of 18%.

Home Care Clients

Our home care analysis included 2,655 individuals (about a quarter of the entire number of decedents 2003–2004). Age-wise, they were split approximately evenly into three age groups—less than 74 years of age, between 75 and 84 years and 85 years or older. Organ failure was the largest trajectory group (37%), followed by Terminal Illness (34%), Frailty (24%) and Sudden Death/Other (5%).

Almost two-thirds (64%) of home care clients died in an acute care hospital. An additional 16% died in a palliative care unit/bed in hospital and 17% died at home, while receiving home care. The remainder died in other locations. The majority of individuals who died in hospital in palliative care units/beds were in the Terminal Illness group (81%), whereas a large proportion of individuals who died in acute care hospitals died of Organ Failure (44%).

Hospital use was substantial in the last 180 days before death. The 2,655 home care clients had 3,458 hospitalizations in the last 180 days before death, accounting for 68,189 hospital days. Eighty percent of home care clients were hospitalized at least once in the last 180 days before death, with almost a third (32%) hospitalized two or more times.

Even when controlling for other factors, home care clients in the Organ Failure group were more likely to be hospitalized in the last 180 days before death than the other trajectory groups. Only 13% of individuals with organ failure were never hospitalized in the last 180 days before death, whereas 50% were hospitalized once, 21% were hospitalized twice and 16% were hospitalized three or more times.

As among PCH residents, the percentage of deaths in acute care hospitals as well as hospital use in the last 180 days before death among home care clients varied markedly across RHAs.

Palliative Care Patients

There was varied consistency in the kind of information recorded in the palliative care registries across RHAs. While some RHAs collected minimal information, others collected a wide range of information.

The number of individuals identified as palliative across the four data files (palliative care registry, hospital file, home care file and palliative drug file) varied substantially—from, 7% of decedents when using the home care file to 18% when using the palliative registries; 22% were identified as palliative in any one of the four data files.

The vast majority of palliative patients died of terminal illness. In the palliative care registries, 81% of palliative patients were in the Terminal Illness group, compared to only 12% in the Organ Failure, 5% in the Frailty and 2% in the Sudden Death/ Other groups. However, this varied substantially across RHAs.

About two-thirds of palliative patients died in a palliative care setting. Focusing on the 2,042 individuals identified as palliative from any one of the four data files, 54% died in hospital in a palliative care unit/bed and 8% died while receiving palliative home care. About a third of palliative patients died in an acute care hospital or PCH.

About two-thirds of palliative patients were hospitalized at least once in the last 180 days before death. The Organ Failure group, although relatively small number-wise, was most likely to be hospitalized—70% were hospitalized at least once, compared to 61% of individuals in the Frailty and 64% in the Terminal Illness groups.

Discussion and Conclusions

One of the most striking findings for PCH residents was the large variation in hospital use at the end of life. This variation suggests the need to examine more specifically systemic factors (for example, staff mix and care philosophy) that may make transfers to hospital more likely for certain PCHs. The substantial transfer into hospitals of both PCH residents and home care clients at the end of life may be related to patients’ wishes as indicated on their health care directive, a need to address an acute health episode not related to their primary diagnosis or family ability to provide required care for clients in the home setting. While some hospitalizations may be avoidable or unwanted, in some cases, hospitalization may be a choice made by a patient or family member. The appropriateness of these hospitalizations should be examined.

Many decedents do not qualify for the palliative drug access program, which is designed for individuals who have been given a six-month life expectancy prognosis by their physician and who have decided to move to comfort-oriented, rather than curative-oriented care. Such a six-month prognosis is most appropriate for cancer patients, which means therefore, not surprisingly, that the vast majority of individuals in the palliative care program are cancer patients.

Study findings suggest that the end-of-life care options provided to individuals, particularly those with organ failure, need to be examined more closely. Of all the trajectory groups, these individuals were most likely to be hospitalized and to die in an acute care hospital. The Organ Failure group also showed a noticeable increase in the rate of hospitalization as long as four months before death. Exploring the possibility of targeting such high-risk individuals through increased home care supports or other programs (for example, outpatient services) would be useful.

Striking was the large variation across RHAs throughout this report. This variation was apparent for PCH residents and home care clients, as well as palliative patients. Some of this variation can be explained in terms of hospital bed supply and availability of designated palliative beds (for example, some RHAs may not have any designated palliative beds, whereas others may). Routine reporting of end-of-life indicators, such as the ones used in the present report (hospital deaths, hospitalizations, enrolment in palliative drug plan, etc.) could effectively be used to monitor a jurisdiction's progress in end-of-life care. This might, for example, help prioritize targets for improvements to palliative care services.

One of the objectives of the present report was to determine data capabilities in the area of palliative patients. The findings indicate that there is inconsistency in the information collected by RHAs in their palliative patient registries. Moreover, there is substantial inconsistency across the various administrative data files as to who is identified as palliative. In order to allow examination of palliative care issues, this therefore suggests the need to standardize data-collection methods. This applies to palliative care registries, home care files—where the palliative flag is currently not consistently used across RHAs—and hospital discharge abstracts.

6

Summary

Key Messages

When using population-level data to analyze and describe end-of-life care in western Canada, a picture of fairly intensive health care use in the last year of life emerges. Western Canadians spend a significant portion of their last year of life in hospital, with the majority of decedents dying there. Among those hospitalized in the last year of life, relatively few—roughly one-quarter of decedents—received inpatient care designated as palliative. Community-based palliative services were difficult to assess due to lack of comparable data; however, fewer than one in five decedents from the study cohort were registered with provincial palliative care drug benefit plans.

The vital statistics and administrative data analyzed in this report are insufficient to allow any judgement of whether too much care, too little care or the wrong care was provided to the residents of western Canada in their last year of life. However, given the general population's preference to die at home with adequate supportive care services, these findings merit further investigation. Especially needed are studies of the appropriateness of dying in hospital, access to community-based supportive care resources and the adequacy of symptom management at the end of life.

Wide variation in care suggests that a systematic approach to end-of-life care does not yet exist. Such an approach is not taken for many at the end of life simply because clinicians cannot accurately predict when death will occur. Evidence suggests that palliative care is more likely to be administered when death is somewhat more predictable, as in the case of cancer. Variation in end-of-life care will likely attenuate as prognostic instruments are improved, palliative care guidelines are promulgated and robust quality-of-care measures are identified for this important phase of care. As progress is made in these areas, there will likely be a shift in location of death to residential settings and an increase in the use of palliative care services in hospitals, homes and long-term care facilities where an increasing number of seniors reside.

Information Gaps

While the information on end-of-life care provided in this report represents an important first step, much remains to be known. Needed are qualitative and quantitative studies pertaining to health care preferences, quality of care and innovative models for delivering cost-effective end-of-life care. Longitudinal studies are necessary to evaluate the dynamic nature of the dying process and the relative appropriateness of levels of care along the care trajectory.

Barriers to population-based assessments of end-of-life care include a lack of standardized key data elements on death certificates, hospital discharge abstracts and provincial drug benefit plans. Analyses of location of death in this report were limited by provincial differences in the specificity of coding of location of death on death certificates. Analyses of hospital care were limited by provincial differences in documentation of the provision of care focused on palliation on hospital discharge abstracts. Analyses of seniors' drug and supply use were limited by provincial differences in drug formularies and prescription data, including but not limited to dosage, days supply and payment information.

To better understand end-of-life care, the full range of sites of care needs to be assessed. One key advantage of a trajectory analysis, as was partially done in this study, is that it allows researchers to observe health services utilization by similar categories of patients over time. Trajectory analyses are more informative, however, if all services used by patients can be captured so that the full picture of care can be observed and characterized. Despite the fact that these data describe hospital use only, the pattern of use over time is informative. In this study, B.C. decedents, in comparison to those from other western provinces, were found to be less reliant on acute, inpatient hospital care in the last year of life, particularly in the last month. However, without information on community-based care—physician visits, home care and residential care—it is difficult to determine whether differences in access to non–hospital based care explain this difference.

Information related to the health care sector is critical to understanding the care of the chronically ill at the end of life, which some have described as "supply-sensitive care."[43] There are few evidence-based clinical practice guidelines concerning when to hospitalize a seriously ill patient, and in the absence of such guidelines, other factors influence decisions. Clinicians tend to use the resources at hand to manage patients with chronic, complex conditions which results in utilization being driven by the available supply of resources.[43] It may be the case, for example, that the relatively high rate of hospitalization in the last year of life observed in Manitoba is, in part, related to its relatively high ratio of acute beds per population.

Closing the information gaps related to end-of-life care is critical to efforts to improve the quality of Canadian health care. Research in this area is challenging because end-of-life care is medically complex, involves multiple providers practising at different sites and bridges medical and social service care sectors. It will become imperative to better understand end-of-life care as the Canadian population ages and health care costs continue to escalate. Gaining better insights into how to optimally deliver care at the end of life has relevance to all Canadians who will inevitably desire compassionate, comprehensive and coordinated care for themselves and their loved ones as they approach death.

The patchwork of different home care programs in western Canada and across the country, each with their own unique definitions, standards and levels of care, prevents cross-jurisdictional comparisons, thereby making national surveillance impossible. Calls for a national home care program have come from many organizations and individuals.[48, 49] Implementing a national program would require consensus on many levels—which is difficult, if not impossible, given the different political, labour and health care environments that exist in each province.

However, development of national data standards and a national database for home care utilization is possible. In fact, it is a reality. CIHI has created the Home Care Reporting System (HCRS), based in part on the interRAI Minimum Data Set.[50] This database allows participating jurisdictions to submit to CIHI client-centred diagnostic and utilization data that can be used to compare across provinces. Similarly, provinces can submit data to the Continuing Care Reporting System (CCRS), thereby providing nationally comparable data on residential facility clients. To date, only the province of B.C. and the Yukon Territory currently submit to HCRS, and some western RHAs also submit. Only Ontario submits to CCRS. Several provinces are preparing to submit data to these two databases. Adoption of these databases nationally would go a long way to improving the pan-Canadian comparability of health services utilization information at the end of life. Consistency across provinces in terms of how palliative patients are identified in the hospital discharge abstract presents another opportunity for developing national data standards to improve interprovincial comparisons.

The data provided in this report on hospital and palliative drug use can serve as a benchmark for future analyses. B.C. plans to monitor shifts in patterns identified in its province-specific study through ongoing analysis of its administrative data. The four-province collaboration that was integral to the development of this report has led to refinements of key methodologies and has provided a contextual basis for assessing variation in health care use at the end of life across the western provinces.

Want to Know More?

Please see the following websites for more information:

Canadian Hospice Palliative Care Association: www.chpca.net/home.htm

Quality End-of-Life Care Coalition of Canada, 2005, *Framework for a National Strategy on Palliative and End-of-Life Care*: www.caot.ca/pdfs/National Strategy Final Draft.pdf

Senate of Canada, 2005, *Still Not There—Quality of End-of-Life Care: A Progress Report*: www.chpca.net/public_policy_advocacy/QELC_still-not-there-report.htm

2003 First Ministers' Accord on Health Care Renewal: www.hc-sc.gc.ca/hcs-sss/delivery-prestation/fptcollab/2003accord/notes

British Columbia, 2006, *A Provincial Framework for End-of-Life Care*: www.healthservices.gov.bc.ca/hcc/endoflife.html

Appendix A: Summary of Provincial End-of-Life and Palliative Programs and Services, 2003–2004

Palliative/Hospice Care

World Health Organization: Definition of Palliative Care

"Palliative care is an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual. Palliative care:

- Provides relief from pain and other distressing symptoms;
- Affirms life and regards dying as a normal process;
- Intends neither to hasten or postpone death;
- Integrates the psychological and spiritual aspects of patient care;
- Offers a support system to help patients live as actively as possible until death;
- Offers a support system to help the family cope during the patients illness and in their own bereavement;
- Uses a team approach to address the needs of patients and their families, including bereavement counselling, if indicated;
- Will enhance quality of life, and may also positively influence the course of illness; [and]
- Is applicable early in the course of illness, in conjunction with other therapies that are intended to prolong life, such as chemotherapy or radiation therapy, and includes those investigations needed to better understand and manage distressing clinical complications."

Source: World Health Organization, *WHO Definition of Palliative Care*, [online], cited July 25, 2007, from <http://www.who.int/cancer/palliative/definition/en/>.

British Columbia

"What is Hospice Palliative Care?

As it is currently defined, the term hospice palliative care refers to the physical, emotional, social and spiritual care aimed at providing comfort and improving 'quality of life for those persons who are living with or dying from advanced illness.' Hospice palliative care is based on a commitment to the whole person.

In British Columbia, hospice palliative care is defined as the combination of active and compassionate therapies intended to comfort and support individuals and families who are living with a life-threatening illness. During periods of illness and bereavement, hospice palliative care may be combined with therapies aimed at reducing or curing illness, or it may be the total focus of care.

Hospice palliative care strives to meet, through patient-directed supportive interventions, the physical, social and spiritual needs of patients and families, with sensitivity to their personal, cultural and religious beliefs."

Source: British Columbia Hospice Palliative Care Association, "What Is Palliative Care?" *Frequently Asked Questions*, [online], cited July 25, 2007, from <http://www.hospicebc.org/faqs.php>.

Alberta

Palliative Care

Palliative care aims to relieve symptoms and improve the quality of living and dying for a person and/or family living with a life threatening illness. Palliative care strives to help individuals and their families:

- Address physical, psychological, social, spiritual and practical issues and associated expectations, needs, hopes and fears;
- Prepare for, and manage, life closure and the dying process; and
- Cope with loss and grief during the illness and bereavement.

Palliative care may:

- Complement and enhance treatment of the disease at any time during the disease trajectory, or
- Become the total focus of care.

Palliative care may be provided to individuals:

- With any diagnosis;
- Regardless of age; and
- When they have unmet needs and are prepared to accept care.

Services in palliative care are arranged in a coordinated network, delivered by an interdisciplinary team and provided in an atmosphere of respect for human dignity.

Source: Adapted from Canadian Hospice Palliative Care Association, [online], cited July 25, 2007, from <http://www.chpca.net/menu_items/faqs.htm#faq_whatis>.

Saskatchewan

Palliative Care

Palliative care refers to interdisciplinary services that provide active, compassionate care to the terminally ill at home in hospital or at other care facility. It is a service made available to terminally ill persons and their supporters who have determined that treatment for cure or prolongation of life is no longer the primary goal.

Paramount is the care of physical, psychosocial and spiritual needs, including bereavement as experienced by the terminally ill person and their family.

Individuals who have been designated as “end stage” palliative, or assessed as requiring acute care management of palliative symptoms, through the Regional Health Authority’s assessment and case management process, are exempt from:

a) Home care fees for home care services;

b) Resident charges when in the hospital;

c) Resident charges when admitted specifically for “end stage” palliative purposes in special-care (nursing) homes and health centres; and

d) Resident charges when admitted specifically for acute care management of palliative symptoms in hospital, in special-care (nursing) homes and health centres (that is, they are exempted from charges regardless of the care setting).

Dietary Supplement and Basic Supplies

Individuals (who may be receiving care in their own homes, in hospitals in special-care homes or in health centres) who have been designated as palliative (regardless of stage) by the RHA’s assessment and case-management process are provided with dietary supplements and basic supplies without charge.

Drug Coverage

Physicians have the authority to designate individuals as palliative and therefore eligible for drug plan coverage for regular formulary and exception drug status drugs.

Source: Adapted from Saskatchewan Health, *Saskatchewan Health Homecare Policy Manual 2006*, [online], cited July 25, 2007, from <http://www.health.gov.sk.ca/adx/aspx/adxGetMedia.aspx?DocID=509,94,88,Documents&MediaID=1028&Filename=home-care-manual-2006.pdf>.

Manitoba

Palliative Care

In Manitoba, the definition of palliative care is viewed as a broad term that encompasses caring for people with a life-threatening illness and improving the quality of their lives from the time of a diagnosis through treatment, at the end of life, and into the bereavement period. Palliative care is a philosophy of care that is delivered in a broad range of settings, including acute care, chronic care, personal care homes, hospice, outpatient clinics and in the home.

Hospice palliative care provides comfort for individuals and their families living with a terminal illness or coping with grief. Hospice palliative care is a team approach to quality end-of-life care, which includes the person, the family, health care providers and trained volunteers. Care may take place at home, in hospital, in a personal care home or at a special hospice facility. Being sensitive to personal beliefs and values, it offers:

- Relief of physical pain and other symptoms;
- Practical help;
- Emotional and spiritual support; and
- Bereavement support after the death of a loved one.

Most of all, hospice palliative care is about living fully to the very end of life with dignity and comfort.

Source: Adapted from the Hospice & Palliative Care Manitoba website, [online], cited July 25, 2007, from <http://www.manitobahospice.ca/pdf/HPCM_BROCHURE.pdf>.

Palliative Care Drug Benefit Program

British Columbia

The B.C. Palliative Care Benefits Program was developed to support individuals of any age who have reached the terminal stage of their disease or illness and are facing the last months, weeks or days of their lives. The terminal stage of a life-threatening disease or illness is a medical decision and is determined by the individual's physician.

Persons eligible for this program are B.C. residents who:

- Are enrolled in MSP (Medical Service Plan);
- Are living at home;
- Have been diagnosed as being in the terminal stage of their life-threatening disease or illness;
- Have a life expectancy of up to six months; and
- Consent to the focus of care as palliative and not treatment aimed at cure.

The following categories of B.C. residents are not enrolled in MSP and thus are not eligible for this program:

- Active members of the Royal Canadian Mounted Police and Canadian Armed Forces; and
- Persons serving a term of imprisonment in a federal penitentiary.

Source: Adapted from the website of the B.C. Ministry of Health, [online], cited July 25, 2007, from <http://www.health.gov.bc.ca/pharme/outgoing/palliative_patientinfo.pdf>.

Alberta

Alberta Health and Wellness sponsors Palliative Care Drug Coverage, which is offered through Alberta Blue Cross to any Albertan who has been diagnosed by a physician as being palliative—who is in the end stage of a terminal illness or disease, is aware of the diagnosis and has made a voluntary informed decision related to resuscitation, and for whom the focus of care is palliation and not treatment aimed at a cure—and whose physician has applied on his or her behalf.

The Palliative Care Drug Coverage program provides premium-free Alberta Blue Cross coverage with no waiting period. The program subsidizes the cost for eligible prescription medications, specific laxatives and solutions for hydration therapy.

Source: Adapted from Alberta Government, *Palliative Care Drug Coverage*, [online], cited July 25, 2007, from <http://www.health.gov.ab.ca/ahcip/ahcip_palliative.html>.

Saskatchewan

"The Palliative Care Drug Program provides drug plan benefits for patients who are in the late stages of a terminal illness:

- Where life expectancy is measured in months; and
- For whom treatment aimed at cure or prolonging of life is no longer deemed appropriate; but
- For whom care is aimed at improving or maintaining the quality of remaining life (e.g., management of symptoms such as pain, nausea and stress).

The patient's physician must submit a completed Drug Plan Request for Palliative Care Drug Coverage form to the Drug Plan in order to register a patient for this program."

Source: Government of Saskatchewan, *Palliative Care Drug Plan*, [online], cited July 25, 2007, from <http://www.health.gov.sk.ca/palliative-care-program>.

Manitoba

Manitoba Health's Palliative Care Drug Access Program respects the dignity of people in the final stages of life by supporting their decision to choose where they would prefer to spend their final days. Individuals who choose a hospital or personal care home for the final days of their life have their drug costs covered by the health care system. Manitoba Health has set up a program that provides deductible-free coverage, so that the same drug coverage will now apply to patients who choose to die at home or in another residence. The program is open to Manitoba residents with a current Manitoba Health registration number. This program is designed for people at the end stages of their illness, when the focus of care is on comfort. By covering the cost of these eligible drugs for use in the home, a major financial burden is removed for the patient and their family.

Source: Adapted from Manitoba Health, *Palliative Care Drug Access Program*, [online], cited July 25, 2007, from <http://www.gov.mb.ca/health/pcdap/>.

Long-Term Care

British Columbia

“Residential care facilities provide 24-hour professional nursing care and supervision in a protective, supportive environment for people who have complex care needs and can no longer be cared for in their own homes.

Residential care services include:

- An assisted meal service;
- Medication supervision;
- Personal assistance with daily activities such as bathing, dressing or grooming; and
- A planned program of social and recreational activities.”

Source: Government of B.C., Ministry of Health, *Community Care Services*, [online], cited July 25, 2007, from <http://www.health.gov.bc.ca/hcc/residential.html>.

Alberta

A February 1998 survey showed that 12,844 individuals lived in long-term care centres in Alberta. While this figure included some young people, about 94% were residents 65 years of age or older.

Continuing care services are provided in three streams:

1. Home care services enable relatively healthy individuals to remain living in their homes, rather than making a potentially premature move to a care facility.
2. Supportive living arrangements provide a secure environment and various levels of assistance with everyday chores for frail and older seniors who do not need the services of a continuing care facility.
3. Continuing care facilities are the new generation of nursing homes and long-term care centres. They provide services ranging from nursing and personal care to accommodation and meals.

Long-term care residents require more care and increased monitoring.

- People living in long-term care facilities tend to be more seriously ill than in the past. This is due to a number of factors, including longer life spans and more people with lower care needs receiving care in their homes and communities.
- A growing percentage of long-term care residents have some form of dementia (such as Alzheimer’s) that requires a greater level of watchful care.

Source: Adapted from Alberta Government, *Continuing Care in Alberta*, [online], cited July 25, 2007, from <http://www.continuingcare.gov.ab.ca/>.

Saskatchewan

A special-care home is a facility that provides institutional long-term care services to meet the needs of individuals usually having heavy care needs that cannot appropriately be met in the community through home/community-based services. Special-care homes may be referred to as nursing homes.

Special-care homes may also provide support to family care providers through respite care and adult day programs. Special care homes are licensed under *The Housing and Special-care Homes Act*. Regional health authorities may operate a special-care home directly through an affiliation or contract.

Individuals are admitted to special-care homes on the basis of assessed need. The assessment and prioritizing of individuals for placement in special-care homes is the responsibility of the regional health authorities. Individuals who wish to request an assessment should contact their local regional health authority.

Government funds special care homes through regional health authorities. Residents pay an income-tested charge. The income-tested resident charge is based on annual income plus earned interest from bank accounts and investments. Personal assets (land, houses, bank accounts, etc.) are not taken into account in determining the resident charge.

A home must be licensed as a personal care home if it provides accommodation, meals and assistance or supervision with activities of daily living to an adult aged 18 and older who is not a relative. Facilities licensed under other forms of legislation do not have to be licensed under *The Personal Care Homes Act*.

Personal care homes may care for one resident or for many residents. The personal care home licensee sets this fee and the resident pays the full cost of his or her own care. People do not have to demonstrate need to be admitted to a personal care home, but rather are admitted because they choose that service option.

Sources: Adapted from Government of Saskatchewan, *Special Care Homes (Nursing Homes)*, [online], cited July 25, 2007, from <http://www.health.gov.sk.ca/special-care-homes> and Government of Saskatchewan, *Personal Care Homes*, [online], cited July 25, 2007, from <http://www.health.gov.sk.ca/personal-care-homes>.

Manitoba

"Personal care services assist Manitobans who can no longer remain safely at home because of a disability or their health care needs. Personal care services are offered throughout Manitoba, and include:

- Meals (including meals for special diets);
- Assistance with daily living activities like bathing, getting dressed and using the bathroom;
- Necessary nursing care;
- Routine medical and surgical supplies;

- Prescription drugs eligible under Manitoba's Personal Care Home Program;
- Physiotherapy and occupational therapy, if the facility is approved to provide these services; and
- Routine laundry and linen services.

The cost of these services is shared by the provincial government (Manitoba Health) and the client who needs the services. Manitoba Health pays the majority of the cost through the regional health authorities. The personal care service client pays the other portion of the cost. This cost is a daily charge based on income."

Source: Manitoba Health, *Personal Care Services*, [online], cited July 25, 2007, from <http://www.gov.mb.ca/health/personalcareservices/index.html>.

Home Care/Home Support

British Columbia

"Home and community care services provide a range of health care and support services for eligible residents who have acute, chronic, palliative or rehabilitative health care needs. These services are designed to complement and supplement, but not replace, the efforts of individuals to care for themselves with the assistance of family, friends and community.

In-home services, for eligible clients, include home care nursing, rehabilitation, home support and palliative care. Community-based services include adult day programs, meal programs, as well as assisted-living, residential care services and hospice care. Case management services are provided in both the home and community.

Home and community care services:

- Support clients to remain independent and in their own homes for as long as possible;
- Provide services at home to clients who would otherwise require admission to hospital or would stay longer in hospital;
- Provide assisted living and residential care services to clients who can no longer be supported in their homes; and
- Provide services that support people who are nearing the end of their life, and their families, at home or in a hospice."

Source: Government of B.C., Ministry of Health, *Home and Community Care*, [online], cited July 25, 2007, from <http://www.health.gov.bc.ca/hcc/index.html>.

Alberta

In Alberta, home care is one of the community-based programs provided through regional health authorities (RHA). Alberta's home care program provides a number of client services: assessment and case management, treatment services, support services, palliative care, respite care services and day support programs. In addition, it provides linkages and integration of a number of community services for clients and acts as a single point of access for the home and community care system, which includes both home and facility-based care.

Source: Adapted from Alberta Government, *Health and Wellness, Community Based Services*, [online], cited July 25, 2007, from <http://www.health.gov.ab.ca/regions/ahcip_community.html>.

Saskatchewan

"Saskatchewan's home care program helps people remain at home for as long as possible. It also prevents unnecessary hospital admissions and facilitates earlier discharge.

Regional Health Authorities provide home care services in the province. Services are provided on the basis of assessed need and are intended to help people who need acute, palliative and supportive care to remain independent at home.

Home care services include case management and assessment, nursing, therapies (in some areas), personal care, home management, meals, respite, minor home maintenance and volunteer services such as visiting, security calls and transportation. Home care fees are established based on income."

Source: Government of Saskatchewan, *Home Care*, [online], cited July 25, 2007, from <http://www.health.gov.sk.ca/home-care>.

Manitoba

"The Manitoba Home Care Program, established in its present form in September 1974, is the oldest comprehensive, province-wide, universal home care program in Canada. Home Care is provided to Manitobans of all ages based on assessed need and taking into account other resources available to the individual including families, community resources and other programs.

In 2002–2003 the average number of clients receiving coordinated Home Care services each month was 21,115 and an estimated 35,000 Manitobans in total received Home Care services in the year.

The Regional Health Authorities employ approximately 5,500 individuals on a casual basis to deliver approximately 6,900,000 units of direct service per year.

Manitoba Health is responsible for:

- Strategic planning for priority populations;
- Home care policy development and interpretation;

- Monitoring and analysis of Program activity and its impact on the target population and the health care delivery system;
- Development and monitoring of standards and provincial outcomes;
- Research on, and development of, program benchmarks and best practices;
- Management information system standards and development in conjunction with the Regional Health Authorities; and
- Liaison with other components of the health system in Manitoba and Canada.

The RHAs have operational responsibilities for Home Care including planning, delivery and ongoing maintenance of the services."

Source: Manitoba Health, *Manitoba Home Care Program*, [online], cited July 25, 2007, from <http://www.gov.mb.ca/health/homecare/>.

Appendix B: Regression Tables

Regression Output Tables Legend

Location of Death Regression Analyses

Odds ratios >1 indicate an increased likelihood of dying in hospital.

Odds ratios <1 indicate a decreased likelihood of dying in hospital.

Bolded odds ratios indicate statistically significantly differences from 1 at alpha = 0.01.

Hospital Use Regression Analyses

Odds ratios >1 indicate an increased likelihood of being hospitalized within 180 days of death.

Odds ratios <1 indicate a decreased likelihood of dying in hospital.

Bolded odds ratios indicate statistically significantly differences from 1 at alpha = 0.01.

Relative rates >1 indicate an increased relative number of hospitalizations or hospital days.

Relative rates <1 indicate a decreased relative number of hospitalizations or hospital days.

Bolded relative rates indicate statistically significantly differences from 1 at alpha = 0.01.

Prescription Drug and Supply Use Regression Analyses

Relative rates >1 indicate an increased relative number of prescriptions or different drug classes.

Relative rates <1 indicate a decreased likelihood relative number of prescriptions or different drug classes.

Bolded relative rates indicate statistically significantly differences from 1 at alpha = 0.01.

Beta estimates >0 indicate increased total prescription costs to government (log transformed) within 30 days of death.

Beta estimates <0 indicate decreased total prescription costs to government (log transformed) within 30 days of death.

Bolded beta estimates indicate statistically significant effects at alpha = 0.01.

Odds ratios >1 indicate an increased likelihood of enrolment with a provincial palliative drug benefit plan.

Odds ratios <1 indicate a decreased likelihood of enrolment with a provincial palliative drug benefit plan.

Bolded odds ratios indicate statistically significantly differences from 1 at alpha = 0.01.

For all tables, a **hyphen (-)** indicates the analysis focused on relationships between the covariates and cost within each province, so no interprovincial comparisons were made.

Location of Death

Multivariate regression analyses were conducted to examine the relationship between trajectory group and location of death, adjusting for age group, sex, marital status and province of residence. Decedents who were classified in the "other" trajectory group were excluded from the regression analyses. Analyses were run separately to examine younger decedents (those under 65) and older decedents (those 65 and up). The models were run overall and for each individual province.

Two locations of death outcomes were modeled: hospital versus other and hospital-acute care versus hospital-palliative care and other. A logistic regression was used for the first outcome and a multinomial regression was used for the second.

Appendix Table 1: **Logistic Regression Results for Hospital Versus Other Location of Death (Odds Ratio) Among Decedents Aged 19 to 64**

Predictor	Comparison	Overall	B.C.	Alta.	Sask.	Man.
Age Group	19–44 vs. 45–64	1.09	1.13	0.96	1.19	1.37
Sex	Male vs. female	**0.81**	0.88	**0.66**	1.06	**0.76**
Marital Status	Married vs. unmarried/unknown	**1.26**	**1.27**	1.14	1.14	**1.88**
Trajectory	Frailty vs. Terminal Illness	**0.46**	**0.59**	**0.38**	**0.31**	**0.37**
	Organ Failure vs.Terminal Illness	**0.87**	1.08	0.86	**0.62**	**0.44**
	Sudden Death vs.Terminal Illness	**0.13**	**0.17**	**0.10**	**0.10**	**0.08**
Province	Alberta vs. Saskatchewan	1.04	-	-	-	-
	B.C. vs. Saskatchewan	**0.77**	-	-	-	-
	Manitoba vs. Saskatchewan	**1.87**	-	-	-	-

Appendix Table 2: **Logistic Regression Results for Hospital Versus Other Location of Death (Odds Ratio) Among Decedents Aged 65 and Up**

Predictor	Comparison	Overall	B.C.	Alta.	Sask.	Man.
Age Group	65–74 vs. 85+	**1.61**	**1.72**	1.10	**2.23**	**1.91**
	75–84 vs. 85+	**1.54**	**1.55**	**1.24**	**1.90**	**1.81**
Sex	Male vs. female	**1.18**	**1.22**	1.11	1.11	**1.25**
Marital Status	Married vs. unmarried/unknown	**1.45**	**1.39**	**1.34**	**1.60**	**1.79**
Trajectory	Frailty vs. Terminal Illness	**0.60**	**0.78**	**0.49**	**0.53**	**0.39**
	Organ Failure vs. Terminal Illness	0.97	**1.17**	**0.95**	**0.78**	**0.62**
	Sudden Death vs. Terminal Illness	**0.56**	**0.67**	**0.43**	**0.50**	0.61
Province	Alberta vs. Saskatchewan	**2.06**	-	-	-	-
	B.C. vs. Saskatchewan	1.05	-	-	-	-
	Manitoba vs. Saskatchewan	**2.08**	-	-	-	-

Appendix Table 3A: **Logistic Regression Results for Acute Hospital Care, Palliative Hospital Care and Other Location of Death (Odds Ratio) Among Decedents Aged 19 to 64**

		Hospital (Palliative Care) Versus Hospital (Acute Care)				
Predictor	**Comparison**	**Overall**	**B.C.**	**Alta.**	**Sask.**	**Man.**
Age Group	19–44 vs. 45–64	0.82	**0.69**	0.86	0.73	1.42
Sex	Male vs. female	0.97	1.01	0.95	1.06	0.80
Marital Status	Married vs. unmarried/unknown	0.94	0.89	1.04	1.45	**0.65**
Trajectory	Frailty vs. Terminal Illness	**0.03**	**0.03**	**0.04**	**0.03**	**0.03**
	Organ Failure vs. Terminal Illness	**0.09**	**0.09**	**0.11**	**0.06**	**0.04**
	Sudden Death vs. Terminal Illness	**0.03**	**0.03**	**0.05**	**0.01**	**0.01**
Province	Alberta vs. Saskatchewan	0.83	-	-	-	-
	B.C. vs. Saskatchewan	0.82	-	-	-	-
	Manitoba vs. Saskatchewan	**0.54**	-	-	-	-

Appendix Table 3B: **Logistic Regression Results for Acute Hospital Care, Palliative Hospital Care and Other Location of Death (Odds Ratio) Among Decedents Aged 19 to 64**

		Other Location of Death Versus Hospital (Acute Care)				
Predictor	**Comparison**	**Overall**	**B.C.**	**Alta.**	**Sask.**	**Man.**
Age Group	19–44 vs. 45–64	0.88	0.81	1.01	0.80	0.76
Sex	Male vs. female	**1.22**	1.14	**1.49**	0.96	1.28
Marital Status	Married vs. unmarried/unknown	**0.78**	**0.76**	0.88	0.96	**0.50**
Trajectory	Frailty vs. Terminal Illness	0.92	**0.67**	1.17	1.14	1.39
	Organ Failure vs. Terminal Illness	**0.52**	**0.40**	**0.57**	**0.61**	1.16
	Sudden Death vs. Terminal Illness	**3.40**	**2.45**	**4.43**	**3.48**	**6.11**
Province	Alberta vs. Saskatchewan	0.91	-	-	-	-
	B.C. vs. Saskatchewan	**1.22**	-	-	-	-
	Manitoba vs. Saskatchewan	**0.46**	-	-	-	-

Appendix Table 4: **Logistic Regression Results for Acute Hospital Care, Palliative Hospital Care and Other Location of Death (Odds Ratio) Among Decedents Aged 65 and Up**

		Hospital (Palliative Care) Versus Hospital (Acute Care)				
Predictor	**Comparison**	**Overall**	**B.C.**	**Alta.**	**Sask.**	**Man.**
Age Group	65–74 vs. 85+	**1.29**	1.07	**1.57**	1.26	**1.50**
	75–84 vs. 85+	**1.16**	1.06	**1.34**	1.24	1.13
Sex	Male vs. female	**0.83**	**0.85**	0.90	**0.67**	**0.74**
Marital Status	Married vs. unmarried/unknown	1.07	1.04	1.07	1.06	1.23
Trajectory	Frailty vs. Terminal Illness	**0.07**	**0.07**	**0.07**	**0.05**	**0.03**
	Organ Failure vs. Terminal Illness	**0.12**	**0.12**	**0.13**	**0.09**	**0.08**
	Sudden Death vs. Terminal Illness	**0.06**	**0.02**	**0.09**	**0.05**	**0.11**
Province	Alberta vs. Saskatchewan	**0.81**	-	-	-	-
	B.C. vs. Saskatchewan	**1.16**	-	-	-	-
	Manitoba vs. Saskatchewan	**0.57**	-	-	-	-

Appendix Table 5A: **Logistic Regression Results for Acute Hospital, Palliative Hospital, Long-Term Care, Home and Other Location of Death (Odds Ratio) Among Decedents Aged 65 and Up**

		Hospital (Palliative Care) Versus Hospital (Acute Care)			
Predictor	**Comparison**	**Overall**	**B.C.**	**Alta.**	**Man.**
Age Group	65–74 vs. 85+	**1.32**	1.10	**1.59**	**1.59**
	75–84 vs. 85+	**1.16**	1.07	**1.35**	1.17
Sex	Male vs. female	**0.87**	**0.87**	0.91	**0.76**
Marital Status	Married vs. unmarried/unknown	1.08	1.05	1.07	1.24
Trajectory	Frailty vs. Terminal Illness	**0.07**	**0.07**	**0.07**	**0.04**
	Organ Failure vs. Terminal Illness	**0.12**	**0.12**	**0.13**	**0.08**
	Sudden Death vs. Terminal Illness	**0.06**	**0.02**	**0.09**	**0.11**
Province	Alberta vs. Manitoba	**1.43**	-	-	-
	B.C. vs. Manitoba	**2.04**	-	-	-

Appendix Table 5B: **Logistic Regression Results for Acute Hospital, Palliative Hospital, Long-Term Care, Home and Other Location of Death (Odds Ratio) Among Decedents Aged 65 and Up**

		Home Versus Hospital (Acute Care)			
Predictor	**Comparison**	**Overall**	**B.C.**	**Alta.**	**Man.**
Age Group	65–74 vs. 85+	**2.08**	**1.63**	**2.94**	**2.39**
	75–84 vs. 85+	**1.38**	**1.25**	**1.69**	**1.41**
Sex	Male vs. female	1.08	1.07	1.09	1.14
Marital Status	Married vs. unmarried/unknown	**0.84**	0.90	**0.81**	**0.70**
Trajectory	Frailty vs. Terminal Illness	**0.65**	**0.40**	1.05	1.00
	Organ Failure vs. Terminal Illness	**0.37**	**0.32**	**0.35**	**0.55**
	Sudden Death vs. Terminal Illness	0.96	**0.65**	1.31	1.60
Province	Alberta vs. Manitoba	**1.60**	-	-	-
	B.C. vs. Manitoba	**2.84**	-	-	-

Appendix Table 5C: **Logistic Regression Results for Acute Hospital Care, Palliative Hospital Care, Long-Term Care, Home and Other Location of Death (Odds Ratio) Among Decedents Aged 65 and Up**

		Long-Term Care Facility Versus Hospital (Acute Care)			
Predictor	**Comparison**	**Overall**	**B.C.**	**Alta.**	**Man.**
Age Group	65–74 vs. 85+	**0.31**	**0.30**	**0.37**	**0.22**
	75–84 vs. 85+	**0.53**	**0.52**	**0.60**	**0.44**
Sex	Male vs. female	**0.68**	**0.67**	**0.75**	**0.66**
Marital Status	Married vs. unmarried/unknown	**0.64**	**0.65**	**1.15**	**0.51**
Trajectory	Frailty vs. Terminal Illness	0.93	**0.65**	0.83	**2.02**
	Organ Failure vs. Terminal Illness	**0.63**	**0.44**	**0.83**	**1.40**
	Sudden Death vs. Terminal Illness	**0.21**	**0.09**	**0.45**	**0.38**
Province	Alberta vs. Manitoba	**0.83**	-	-	-
	B.C. vs. Manitoba	**2.08**	-	-	-

Appendix Table 5D: Logistic Regression Results for Acute Hospital Care, Palliative Hospital Care, Long-Term Care, Home and Other Location of Death (Odds Ratio) Among Decedents Aged 65 and Up

		Other Location of Death Versus Hospital (Acute Care)			
Predictor	Comparison	Overall	B.C.	Alta.	Man.
Age Group	65–74 vs. 85+	**2.98**	**3.79**	**2.61**	**2.33**
	75–84 vs. 85+	**1.53**	**1.88**	**1.45**	1.05
Sex	Male vs. female	**1.30**	1.39	1.25	1.18
Marital Status	Married vs. unmarried/unknown	**0.74**	0.74	0.71	0.89
Trajectory	Frailty vs. Terminal Illness	1.31	0.98	**1.78**	1.04
	Organ Failure vs. Terminal Illness	**0.70**	0.69	0.68	0.69
	Sudden Death vs. Terminal Illness	**13.10**	**16.34**	**12.76**	**4.62**
Province	Alberta vs. Manitoba	**2.09**	-	-	-
	B.C. vs. Manitoba	**2.06**	-	-	-

Appendix Table 6: Logistic Regression Results for Hospital Versus Other Location of Death (Odds Ratio) Among Decedents Aged 19 and Up

Predictor	Comparison	Hospital
Age Group	19–44 vs. 65+	**1.24**
Sex	Male vs. female	**1.12**
Marital Status	Married vs. unmarried/unknown	**1.53**
Trajectory	Frailty vs. Terminal Illness	**0.54**
	Organ Failure vs. Terminal Illness	**0.90**
	Sudden Death vs. Terminal Illness	**0.19**
Province	Alberta vs. Saskatchewan	**1.81**
	B.C. vs. Saskatchewan	1.01
	Manitoba vs. Saskatchewan	**2.06**

Appendix Table 7: Logistic Regression Results for Acute Hospital Care, Palliative Hospital Care and Other Location of Death (Odds Ratio) Among Decedents Aged 19 and Up

Predictor	Comparison	Hospital (Palliative)	Other Locations
Age Group	19–44 vs. 65+	**1.18**	**0.85**
Sex	Male vs. female	**0.85**	**0.86**
Marital Status	Married vs. unmarried/unknown	1.04	**0.66**
Trajectory	Frailty vs. Terminal Illness	**0.06**	**0.89**
	Organ Failure vs. Terminal Illness	**0.11**	**0.56**
	Sudden Death vs. Terminal Illness	**0.04**	**2.46**
Province	Alberta vs. Saskatchewan	**0.82**	**0.53**
	B.C. vs. Saskatchewan	1.08	1.01
	Manitoba vs. Saskatchewan	**0.57**	**0.44**

Hospital Use

Logistic and multinomial regression models were performed for the categorical outcome for hospitalization within the three time periods. Poisson regression models were fit for discrete count outcomes, including hospital days, and number of hospitalizations. Where a Poisson model was overdispersed, a negative binomial regression was conducted instead. In addition to adjusting for demographic variables, we also tested for and found significant interactions between province and the other variables. Thus, models were run overall and stratified by province.

Multivariate regression analyses were conducted to examine the relationship between trajectory group and hospital use in the last 180 days of life, adjusting for age group, sex, marital status and province of residence. Analyses were run separately to examine younger decedents (those under 65) and seniors (those 65 and up).

Appendix Table 8: **Logistic Regression Results for Decedents Hospitalized Within 180 Days of Death Versus Not (Odds Ratio) Among Decedents Aged 19 to 64**

Predictor	Comparison	Overall	B.C.	Alta.	Sask.	Man.
Age Group	19–44 vs. 45–64	1.00	1.12	0.86	1.02	0.99
Sex	Male vs. female	**0.72**	**0.80**	**0.65**	**0.71**	**0.55**
Marital Status	Married vs. unmarried/unknown	1.10	1.00	1.19	1.30	1.19
Trajectory	Frailty vs. Terminal Illness	**0.16**	**0.26**	**0.09**	**0.06**	**0.17**
	Organ Failure vs.Terminal Illness	**0.44**	**0.58**	**0.32**	**0.18**	**0.39**
	Sudden Death vs.Terminal Illness	**0.08**	**0.13**	**0.05**	**0.03**	**0.05**
Province	Alberta vs. Saskatchewan	0.98	-	-	-	-
	B.C. vs. Saskatchewan	**0.50**	-	-	-	-
	Manitoba vs. Saskatchewan	1.00	-	-	-	-

Appendix Table 9: **Logistic Regression Results for Decedents Hospitalized Within 180 Days of Death Versus Not (Odds Ratio) Among Decedents Aged 65 and Up**

Predictor	Comparison	Overall	B.C.	Alta.	Sask.	Man.
Age Group	65–74 vs. 85+	**1.61**	**1.80**	**1.31**	**1.78**	**1.49**
	75–84 vs. 85+	**1.55**	**1.58**	**1.48**	**1.62**	**1.56**
Sex	Male vs. female	**1.19**	**1.24**	**1.12**	**1.17**	1.14
Marital Status	Married vs. unmarried/unknown	**1.32**	**1.18**	**1.41**	**1.47**	**1.58**
Trajectory	Frailty vs. Terminal Illness	**0.32**	**0.43**	**0.23**	**0.18**	**0.30**
	Organ Failure vs. Terminal Illness	**0.55**	**0.66**	**0.46**	**0.34**	**0.50**
	Sudden Death vs. Terminal Illness	**0.32**	**0.32**	**0.25**	**0.24**	**0.41**
Province	Alberta vs. Saskatchewan	1.06	-	-	-	-
	B.C. vs. Saskatchewan	**0.43**	-	-	-	-
	Manitoba vs. Saskatchewan	1.04	-	-	-	-

Appendix Table 10: **Logistic Regression Results for Relative Number of Hospitalizations, Among Those Hospitalized, Within 180 Days of Death (Relative Rates) Among Decedents Aged 19 to 64**

Predictor	Comparison	Overall	B.C.	Alta.	Sask.	Man.
Age Group	19–44 vs. 45–64	**1.08**	1.06	1.09	1.09	1.08
Sex	Male vs. female	1.01	1.06	0.96	1.08	0.92
Marital Status	Married vs. unmarried/unknown	1.02	1.02	1.02	1.03	0.99
Trajectory	Frailty vs. Terminal Illness	**0.79**	**0.77**	**0.83**	**0.74**	**0.78**
	Organ Failure vs.Terminal Illness	**0.87**	**0.89**	**0.87**	**0.81**	**0.88**
	Sudden Death vs.Terminal Illness	**0.64**	**0.66**	**0.67**	**0.51**	**0.65**
Province	Alberta vs. Saskatchewan	0.95	-	-	-	-
	B.C. vs. Saskatchewan	0.98	-	-	-	-
	Manitoba vs. Saskatchewan	0.96	-	-	-	-

Appendix Table 11: **Logistic Regression Results for Relative Number of Hospitalizations, Among Those Hospitalized, Within 180 Days of Death (Relative Rates) Among Decedents Aged 65 and Up**

Predictor	Comparison	Overall	B.C.	Alta.	Sask.	Man.
Age Group	65–74 vs. 85+	**1.14**	**1.17**	**1.09**	**1.14**	**1.18**
	75–84 vs. 85+	**1.08**	**1.09**	**1.06**	**1.07**	**1.09**
Sex	Male vs. female	**1.03**	1.04	1.04	1.01	1.04
Marital Status	Married vs. unmarried/unknown	**1.03**	1.04	1.01	**1.07**	1.00
Trajectory	Frailty vs. Terminal Illness	**0.88**	**0.86**	**0.92**	**0.82**	**0.91**
	Organ Failure vs. Terminal Illness	**0.91**	**0.88**	**0.94**	**0.89**	0.94
	Sudden Death vs. Terminal Illness	**0.80**	**0.79**	0.87	**0.72**	**0.76**
Province	Alberta vs. Saskatchewan	**0.93**	-	-	-	-
	B.C. vs. Saskatchewan	**0.94**	-	-	-	-
	Manitoba vs. Saskatchewan	**0.92**	-	-	-	-

Appendix Table 12: **Logistic Regression Results for Relative Number of Hospital Days Within 180 Days of Death (Relative Rates) Among Decedents Aged 19 to 64**

Predictor	Comparison	Overall	B.C.	Alta.	Sask.	Man.
Age Group	19–44 vs. 45–64	0.92	0.94	0.90	0.97	0.88
Sex	Male vs. female	**0.83**	**0.85**	**0.84**	0.85	**0.78**
Marital Status	Married vs. unmarried/unknown	0.92	0.90	0.92	1.09	0.87
Trajectory	Frailty vs. Terminal Illness	**0.35**	**0.35**	**0.35**	**0.26**	**0.38**
	Organ Failure vs.Terminal Illness	**0.72**	**0.77**	**0.73**	**0.53**	**0.71**
	Sudden Death vs.Terminal Illness	**0.14**	**0.16**	**0.13**	**0.09**	**0.14**
Province	Alberta vs. Saskatchewan	**1.26**	-	-	-	-
	B.C. vs. Saskatchewan	**0.71**	-	-	-	-
	Manitoba vs. Saskatchewan	**1.24**	-	-	-	-

Appendix Table 13: **Logistic Regression Results for Relative Number of Hospital Days Within 180 Days of Death (Relative Rates) Among Decedents Aged 65 and Up**

Predictor	Comparison	Overall	B.C.	Alta.	Sask.	Man.
Age Group	65–74 vs. 85+	**1.29**	**1.44**	1.09	**1.48**	1.11
	75–84 vs. 85+	**1.31**	**1.33**	**1.26**	**1.42**	**1.27**
Sex	Male vs. female	**1.07**	**1.09**	1.06	1.08	1.01
Marital Status	Married vs. unmarried/unknown	**1.09**	1.07	1.07	1.11	**1.14**
Trajectory	Frailty vs. Terminal Illness	**0.55**	**0.64**	**0.51**	**0.43**	**0.51**
	Organ Failure vs. Terminal Illness	**0.78**	**0.86**	**0.77**	**0.64**	**0.75**
	Sudden Death vs. Terminal Illness	**0.49**	**0.38**	**0.46**	**0.55**	**0.55**
Province	Alberta vs. Saskatchewan	**1.36**	-	-	-	-
	B.C. vs. Saskatchewan	**0.65**	-	-	-	-
	Manitoba vs. Saskatchewan	**1.42**	-	-	-	-

Prescription Drug Use

Regression analyses were used to determine the effect of disease groupings on different outcomes, adjusting for age, sex, marital status, province, and location of death. Poisson regression models were fit for discrete count outcomes, such as number of prescriptions filled and distinct drug classes. Where a Poisson model was overdispersed, a negative binomial regression was conducted instead. The one continuous outcome variable, community prescription drug costs, was highly skewed and did not fit a linear regression model well. Instead, we analyzed a log-transformation of the cost.

Appendix Table 14: **Logistic Regression Results for Relative Number of ATC Level 4 Prescriptions Within 30 Days of Death (Relative Rates) Among Decedents Aged 65 and Up**

Predictor	Comparison	Overall	B.C.	Sask.	Man.
Age Group	65–74 vs. 85+	**1.23**	**1.24**	**1.11**	**1.29**
	75–84 vs. 85+	**1.09**	**1.12**	1.00	1.09
Sex	Male vs. female	**0.82**	**0.80**	**0.83**	**0.90**
Marital Status	Married vs. unmarried/unknown	0.96	**0.92**	1.03	1.02
Trajectory	Frailty vs. Terminal Illness	**0.82**	**0.73**	**0.86**	1.07
	Organ Failure vs. Terminal Illness	**0.89**	**0.81**	0.92	**1.16**
	Sudden Death vs. Terminal Illness	**0.60**	**0.48**	**0.74**	0.77
Location of Death	Hospital vs. other	**0.60**	**0.61**	**0.64**	**0.55**
Province	B.C. vs. Saskatchewan	**0.91**	-	-	-
	Manitoba vs. Saskatchewan	**1.16**	-	-	-

Appendix Table 15: **Logistic Regression Results for Relative Number of Different ATC Level 4 Prescriptions Within 30 Days of Death (Relative Rates) Among Decedents Aged 65 and Up**

Predictor	Comparison	Overall	B.C.	Man.
Age Group	65–74 vs. 85+	**1.18**	**1.17**	**1.18**
	75–84 vs. 85+	**1.07**	**1.07**	1.05
Sex	Male vs. female	**0.84**	**0.82**	**0.90**
Marital Status	Married vs. unmarried/unknown	0.97	**0.94**	1.05
Trajectory	Frailty vs. Terminal Illness	**0.87**	**0.80**	**1.12**
	Organ Failure vs. Terminal Illness	**0.92**	**0.85**	**1.18**
	Sudden Death vs. Terminal Illness	**0.58**	**0.48**	0.86
Location of Death	Hospital vs. other	**0.61**	**0.63**	**0.58**
Province	B.C. vs. Manitoba	**0.68**	-	-

Appendix Table 16: **Differences in Log (Cost of Prescriptions Within 30 Days of Death +1) (Beta Estimates) Among Decedents Aged 65 and Up**

Predictor	Comparison	Overall	B.C.	Sask.	Man.
Age Group	65–74 vs. 85+	**0.40**	**0.47**	0.18	**0.39**
	75–84 vs. 85+	**0.11**	**0.15**	-0.08	**0.19**
Sex	Male vs. female	**-0.38**	**-0.37**	**-0.56**	**-0.22**
Marital Status	Married vs. unmarried/unknown	0.02	-0.09	0.02	**0.39**
Trajectory	Frailty vs. Terminal Illness	**-0.63**	**-0.83**	**-0.59**	-0.12
	Organ Failure vs. Terminal Illness	**-0.51**	**-0.72**	**-0.44**	-0.02
	Sudden Death vs. Terminal Illness	**-1.33**	**-1.65**	**-1.18**	**-0.73**
Location of Death	Hospital vs. other	**-0.91**	**-0.74**	**-0.97**	**-1.41**
Province	B.C. vs. Saskatchewan	**-0.29**	-	-	-
	Manitoba vs. Saskatchewan	**0.64**	-	-	-

Appendix Table 17: **Enrollment in Palliative Drug Program Among Cancer Patients (Odds Ratio)**

Predictor	Comparison	Overall	B.C.	Sask.	Man.
Age Group	19–44 vs. 85+	**3.70**	**4.53**	**2.39**	**2.85**
	45–64 vs. 85+	**4.19**	**4.68**	**3.42**	**3.47**
	65–74 vs. 85+	**3.39**	**3.59**	**2.74**	**3.47**
	75–84 vs. 85+	**2.07**	**2.14**	**1.78**	**2.19**
Sex	Male vs. female	**0.81**	**0.88**	**0.73**	**0.69**
Marital Status	Married vs. unmarried/unknown	**1.42**	**1.40**	**1.36**	**1.51**
Location of Death	Hospital vs. other	**0.29**	**0.25**	**0.42**	**0.38**
Province	B.C. vs. Saskatchewan	**0.70**	-	-	-
	Manitoba vs. Saskatchewan	**0.37**	-	-	-

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