Palliative Medicine 2005; **19:** 513–520

Utilization and costs of the introduction of system-wide palliative care in Alberta, 1993–2000

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Background: De-institutionalization of health care services provided to terminally ill cancer patients is a cost-effective strategy that underpins health care reforms in Canada. The objective of this study therefore is to evaluate the economic implications associated with Canadian innovations in the delivery of palliative care services. **Methods**: We identified 16 282 adults who died of cancer between 1993 and 2000 in two Canadian cities with newly introduced palliative care programs. Linkage of administrative databases was used to measure healthcare resource utilization. We sought to describe the utilization of palliative care services and its consequences for overall health care system costs. **Results**: Use of palliative services increased from 45 to 81% of cancer patients during the study period. Identifiable public health care services cost $28 093Cdn/patient (19 033US$, 11 508GB£, 17 778€) for terminally ill cancer patients in their last year of life. Acute care accounted for two-thirds (67%) of these costs; physician (10%), residential hospice care (8%), nursing homes (6%), home care (6%) and prescription medications (3%) comprise the remainder. Increased costs associated with the introduction of palliative care programs were offset by cost savings realized when terminally ill cancer patients spent less time in hospital. Palliative home care and residential hospice care accounted for the bulk of this substitution effect. Cost neutrality was observed from the public perspective. **Discussion**: These results demonstrate that the introduction of comprehensive and community-based palliative care services resulted in increased palliative care service delivery and cost neutrality, primarily achieved through a decreased use of acute care beds. *Palliative Medicine* 2005; **19:** 513–520

Key words: costs and cost analysis; cost neutrality; de-institutionalization; health care costs; palliative care; program evaluation

Background

A continued recognition that end-of-life care is expensive reinforces the pressure to de-institutionalize health care services provided to terminally ill cancer patients. Policy makers take for granted that this de-institutionalization is a cost-effective health reform strategy in Canada. The Royal Victoria Hospital in Montreal and St. Boniface Hospital in Winnipeg opened the world's first specialist palliative care units in 1974, thereby facilitating assimilation of palliative care into medical academics and mainstream health care. A decade later, the 1983 Canadian Medical Association Task Force on Health Care Resource Allocation,[1] determined that elderly Canadians were poorly informed of their care options and that institutional care comprised a substantial proportion of their health care utilization. Recognizing the lack of community development and the large number of institutional deaths, Canadian palliative care 'champions' introduced innovative palliative care programs in the mid-1990s.

Edmonton and Calgary were among the first programs, which consisted of comprehensive, integrated, coordinated and community-based palliative care services (which include tertiary palliative care units, specialist palliative consult teams, residential hospice care and palliative home care) that were integrated into the larger health care systems. Both systems evolved towards a community focus during the 1990s. Previous evaluations of the Edmonton program focused on hospital use and concluded that additional insight into cost was required.[2–4]

The objectives of this study are (1) to describe the development of palliative care services from 1993

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10.1191/0269216305pm1071oa

through 2000; and (2) to measure the resulting end-of-life costs associated with these services as they evolved from a disparate set of services into integrated palliative care programs.

Methods

Program description

Table 1 describes programmatic elements and summarizes the evolution of palliative care service delivery in Alberta during the study period. Although the study describes two separate programs, Table 1 demonstrates that service delivery in the two cities is quite comparable. Furthermore, separate analysis (not reported here) did not alter the conclusions.

Population

Eligibility of the study population was determined through application of the following inclusion and exclusion criteria to individuals identified in the Alberta Cancer Registry: diagnosed with cancer; died between April 1993 and March 2000; residents of the Edmonton and Calgary Regional Health Regions at time of death; 18 years of age and older at time of death; possesses a valid PHN (Personal Health Number).

Data

Individual, anonymyzed data from the provincial Cancer Registry was deterministically linked to Vital Statistics, the two palliative care program databases and administrative databases managed by the provincial Ministry of Health (Alberta Health Care Insurance Plan Registry, Acute Care, Physician Billings, Prescription Medications, Home Care, Nursing Home Care). Residential hospice care use was obtained through chart review.

Use of palliative care services

The use of palliative care services was measured by component (acute specialist consultations, community specialist consultations, residential hospice care, palliative home care, and tertiary palliative care). Specialist consultations were defined as a single visit, whereas residential hospice and tertiary palliative care services were defined by an episode of care delineated by admission and discharge dates. Palliative home care was defined by the interval between first and last home visits. Utilization of palliative care services is expressed as the percentage of people using any of these services.

Utilization and cost of services

Average resource utilization was measured for each of seven annual cohorts using administrative data. Acute care, long-term care, hospice care and tertiary palliative care were calculated as days. Home care and physician services were calculated as visits. Outpatient medications were calculated by the number of prescriptions. Outpatient medication data are universally available for all Albertans aged 65 and over. The administrative databases are otherwise considered complete and accurate for all other identified services.

Valuation of the consumed health resources was accomplished using established methods.[5–7] Inpatient hospital care was valued according to the relative intensity weight (RIW) for each case mix group (CMG), to which a cost per weighted case was applied. This cost was derived from financial data of 77 of the largest hospitals in Alberta. In-patient operating costs include an allocation of fixed overhead, administration, education and research dollars. All inpatient cases were grouped with a consistent 2000/2001 Canadian Institute for Health Information (CIHI) grouper.

Per diems and actual costs were used to assign costs for professional health care in residential hospices ($230/day Cdn, 156US$, 94GB£, 146€), nursing homes ($130/day Cdn, 88US$, 53GB£, 82€), or at home (actual costs).

Table 1 Development of palliative care service delivery in Alberta between 1993 and 2000

Program element*	Description
Hospital-based specialist palliative care consult service	In Edmonton, one hospital-based consult team (physician and nurse) available October 1994 with two additional teams April 1996.
Community-based specialist palliative care consult service	Community-based specialist physician and nurse consult teams introduced July 1995 (Edmonton) and October 1996 (Calgary). These teams provide services to patients without access to hospital-based palliative services in hospitals, hospices, nursing homes and private residences.
Tertiary palliative care	A 14-bed unit in Edmonton was available throughout the study period. A ten bed unit in Calgary became available in 2001, after the evaluation period.
Residential hospice	Less than ten freestanding, residential palliative beds in Calgary were available in 1993. In 2000, 99 residential palliative beds (57 in Edmonton, 42 in Calgary) existed.
Palliative home care	Palliative services provided in the home were available throughout the study period but received funding increases alongside the introduction of palliative programs.

*Discrete palliative care service and setting combinations. Does not include pain and symptom control clinics, volunteer services or community programs.

In the case of care provided in nursing homes, an average of $105Cdn (71US$, 43GB£, 66€) plus an average accommodation fee of $27/day Cdn (18US$, 11GB£, 17€) was rounded to $130Cdn (88US$, 53GB£, 82€) on the basis that many of these patients qualified for subsidization of co-payments. In the case of residential hospice care, a conservative estimate of $230Cdn (156US$, 94GB£, 146€) reflected an average reported cost during the study period. Actual costs (charge data) were available for home care and medications. We adjusted for inflation by discounting all current value costs to the midpoint in the final study year (October 1999) using the Alberta Consumer Price Index (1996 health care basket).

A cumulative yearly cost was obtained by summing all health care costs for the 365 days prior to death for each individual. Mean per-person utilization and costs were compared for each fiscal year cohort (April to March deaths) to account for the increasing terminally ill cancer population.

Administrative and ethics approvals

Data sharing agreements and administrative approvals were obtained from all relevant organizations. Ethics approval was granted by Health Research Ethics Board (Edmonton), the Conjoint Research Ethics Board (Calgary) and the Alberta Cancer Board Research Ethics Committees.

Results

Terminally ill cancer patients in Edmonton and Calgary were, on average, 68.7 years of age at time of death (and increasing) and equally distributed between genders and cities (Table 2). Half of the cancers were accounted for by the digestive and respiratory systems. Cancers of the male genital system have decreased. In addition to cancers, this population is characterized with significant health problems: 20% diagnosed with chronic obstructive pulmonary disease, 13% with moderate or severe liver

Table 2 Demographic characteristics, primary cancer diagnoses and disease burden of terminally ill cancer patients who died between April 1993 and March 2000 in Alberta

Characteristic	Fiscal year							Group summary
	93/94	94/95	95/96	96/97	97/98	98/99	99/00	
Total cohort (No.)	2075	2008	2335	2425	2370	2520	2549	16 282
Age (years)	67.5	67.8	69.0	68.8	69.5	68.7	69.1	68.7
Female (%)	46.8	48.5	47.2	49.6	49.6	47.9	48.9	48.4
Edmonton (%)	51.7	51.1	51.2	49.7	50.3	51.9	50.3	50.8
Primary cancer diagnosis (%)[a]								
Buccal cavity and pharynx	2.5	2.5	2.1	1.5	2.0	2.3	2.2	2.1
Digestive system	25.6	24.8	25.4	25.8	25.5	27.1	25.9	25.8
Respiratory system	25.7	25.3	26.9	25.9	24.5	24.5	28.1	25.9
Skin	1.2	1.2	1.3	1.4	1.1	1.4	1.2	1.3
Breast	9.8	11.3	8.7	10.4	9.0	9.6	7.9	9.5
Female genital system	4.7	4.1	5.4	4.7	4.6	4.5	4.8	4.7
Male genital system	6.6	7.5	6.9	5.8	6.7	6.0	5.0	6.3
Urinary system	4.9	3.2	4.4	4.5	4.9	5.0	4.3	4.5
Brain and other nervous system	3.1	3.5	2.6	2.6	3.8	2.9	2.7	3.0
Endocrine system	0.5	0.4	0.2	0.5	0.2	0.4	0.4	0.4
Lymphomas	3.2	4.3	3.6	4.4	4.7	3.9	4.6	4.1
Multiple myeloma	2.4	1.7	1.5	1.8	1.8	1.3	1.7	1.8
Leukemias	3.2	3.3	3.4	3.5	3.4	3.7	3.7	3.5
Ill-defined and unknown	6.7	6.9	7.5	7.3	7.8	7.5	7.4	7.3
Disease burden (%)[b]								
Acute myocardial infarction	7.3	7.1	8.1	7.7	7.2	8.0	7.7	7.6
Congestive heart failure	10.5	10.4	10.1	10.4	10.5	10.5	10.4	10.4
Cerebrovascular disease	6.2	6.1	5.5	6.5	6.5	6.0	6.4	6.2
Dementia	1.9	3.0	2.7	2.7	2.9	1.9	2.1	2.4
Chronic obstructive pulmonary disease	22.4	20.5	21.0	18.4	18.2	16.3	20.2	19.5
Peptic ulcer disease	4.8	4.2	3.9	4.3	3.3	3.7	3.1	3.9
Mild liver disease	1.3	1.4	1.3	1.6	0.9	1.6	1.2	1.3
Mild to moderate diabetes	8.8	8.5	9.3	8.6	9.6	10.8	9.4	9.3
Diabetes with chronic complications	0.6	0.9	0.9	1.2	0.6	1.5	0.7	0.9
Hemiplegia or paraplegia	5.1	4.7	4.6	3.7	3.7	3.0	2.6	3.8
Renal disease	6.3	4.7	4.5	4.7	4.1	4.4	4.1	4.7
Moderate or sever liver disease	17.1	16.8	15.0	14.1	13.6	12.9	12.9	14.5

[a] Underlying cause of death was used to assign primary cancer diagnosis.
[b] Occurrence in any diagnostic field recorded in hospital records during last year of life.

disease and 10% with congestive heart failure in their last year of life.

Utilization of palliative care services in the two health regions is illustrated in Figure 1 as a function of time. Referrals to any palliative service increased from 45 to 81% over the seven study years. Use of palliative home care was 44% in 1993 and increased to 57% in 2000. Use of tertiary care unit remained essentially constant at just under 5% over the seven years. Moreover, expansion of services occurred at different points in time. Home care expanded during the first study year. The introduction of consults and residential hospice beds in Edmonton explains increases in years two and three. Increases in residential hospice beds explain increased use in year four. Increases in acute consults explain expansion in the last three study years.

In Table 3, we describe the utilization of palliative care and associated health care expenditures at end-of-life. We note that changes in resource utilization and patterns of practice vary by type of service. In acute care, for example, we note that the proportion of individuals admitted to a hospital declined steadily from 95 to 83%. During the same time period, hospital length of stay decreased until 1996/1997 and increased thereafter. Almost everyone sees a physician and the number of visits increased steadily throughout. The proportion receiving home care had not changed much but the hours per year varied considerably. Finally, both the proportion of individuals receiving prescriptions and the number of prescription medications per individual increased each year.

In Figure 2, identifiable health care costs were compared across the seven study years. During the period, acute care declined from 83 to 68% of total costs. Most importantly, we see that the total cost in 1999/2000 was slightly lower than that for 1993/1994, prior to the introduction of palliative care. Despite a substantial decline, acute care still accounted for most of the cost at end-of-life in 1999/2000. Two-thirds of $28 093 (19 033US$, 11 508GB£, 17 778€) services we identified were provided by hospitals. Physician (10%), residential hospice care (8%), nursing homes (6%), home care (6%) and prescription medications comprised the remainder.

Figure 2 also illustrates an absolute reduction in acute care that appears to perfectly offset an increase in hospice and palliative home care costs. During the study time period, fewer cancer patients were hospitalized (from 94.7 to 82.7%) with only a slight increase in the complexity as indicated by dollars per day (from $791Cdn (536US$, 324GB£, 501€) to $846Cdn (573US$, 347GB£, 535€)). The total number of days that patients remained in hospital during the last year dropped dramatically from 39.1 to 27.3 days and increased again to 32.3 days. The overall decrease in hospital costs perfectly offset the 32% of patients seen in hospice for an average of 28.6 days at the end of the study period (1999/2000).

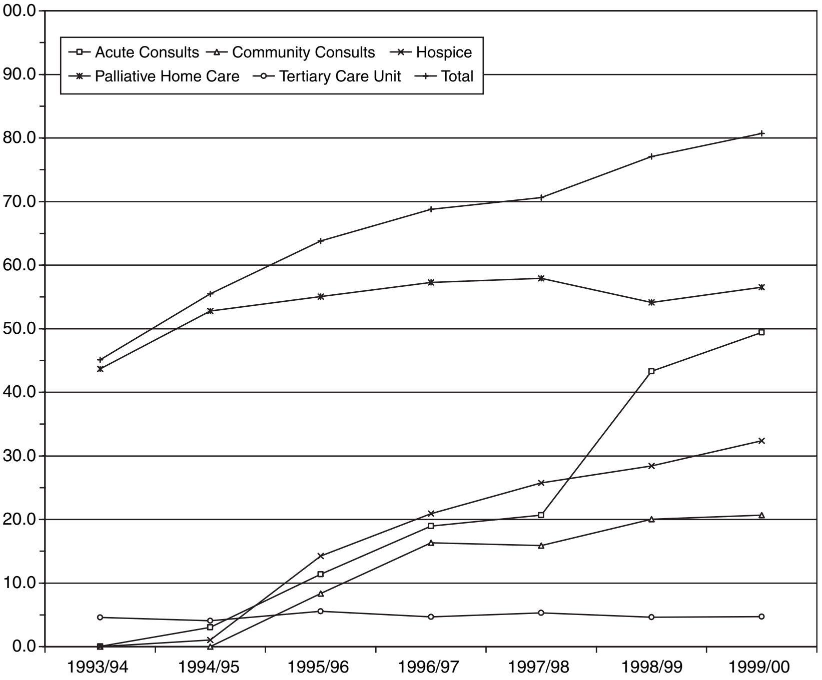

Figure 1 Percentage utilization of palliative care during the last year of life, 1993/1994 to 1999/2000, $n = 16282$*. *Percent of terminally ill cancer patients that use designated service within the last year of life.

Table 3 Utilization of palliative care services and other end-of-life health care system resources

	Fiscal year							Group summary
	93/94	94/95	95/96	96/97	97/98	98/99	99/00	
Hospice (days)	–	11.2	35.2	36.2	34.3	29.9	28.6	33.0
Acute care (%)	94.7	89.2	86.8	84.2	82.9	83.5	82.7	86.0
Acute care cost per day $Cdn	791	842	871	887	875	879	846	856
(US$, GB£, €)	(536, 324, 501)	(570, 345, 533)	(590, 357, 551)	(601, 363, 561)	(593, 358, 554)	(596, 360, 556)	(573, 347, 535)	(580, 351, 542)
Acute care (days)	39.1	33.6	28.9	27.3	29.9	30.9	32.3	31.6
Physician services (%)	100	100	100	100	98	97	97	99
Physician cost per service[a] $Cdn	36	37	39	42	42	42	40	40
(US$, GB£, €)	(24, 15, 23)	(25, 15, 23)	(26, 16, 25)	(28, 17, 27)	(28, 17, 27)	(28, 17, 27)	(27, 16, 25)	(27, 16, 25)
Physician cost per visit[a] $Cdn	95	92	87	84	85	86	83	87
(US$, GB£, €)	(64, 39, 60)	(62, 38, 58)	(59, 36, 55)	(57, 34, 53)	(58, 35, 54)	(58, 35, 54)	(56, 34, 53)	(59, 36, 55)
Physician services (services per year)	84	70	65	57	62	64	72	67
Physician services (visits per year)	29	28	29	29	30	31	35	31
Home care (%)	69	73.8	74.4	75.9	77.8	74.8	76.5	74.7
Home care hours (mean yearly)	35.2	71.9	85.4	82.8	91.0	87.9	75.6	76.6
Long-term care (%)	4.2	4.7	5.1	3.7	5.2	4.4	4.4	4.5
Long-term care (days)	12.7	14.4	15.9	11.6	16.2	13.6	13.5	14.0
Outpatient medications[b] (%)	–	56.9	67.8	66	67.4	64.8	70.9	65.9
Outpatient medications[b] (No. per year)	–	10.84	19.99	19.7	20.5	19.95	23.25	19.3

[a] Physician services include palliative and non-palliative services. In Alberta, physicians receive payment for services provided directly to the patient (face-to-face). University departments submit claims to the government for services provided by academically appointed physicians and in turn pay the physicians' salaries.

[b] Outpatient prescription medication data not available for the first year.

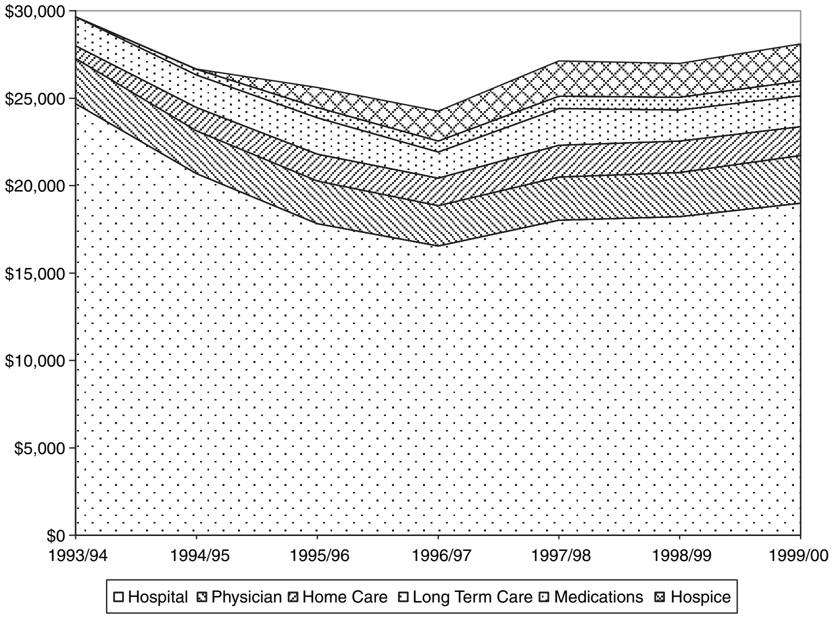

Figure 2 Identifiable public costs of terminally ill cancer patients in their last 365 days of life, 1993/1994 to 1999/2000, Canadian 1999/2000 dollars*. *$1Cdn = 0.67751US$ = 0.40964GB£ = 0.63282€.

Discussion

In this study we describe the substantially increased use of palliative care services. In turn, we know that improved symptom control is correlated with utilization of palliative services in institutional settings,[8–17] through consultation with specialist teams,[18,19] and in community settings.[20,21] Furthermore, improved satisfaction with care has been expressed in terms of patients' and families' preference for non-institutional care.[22] Our finding therefore promises a substantial reduction in symptom burden and commensurate quality of life during the final months of cancer patients' lives.

In this study, we also developed an analysis of the total cost – community, inpatient, physician and drugs – of end-of life-care, over a seven-year time span in Edmonton and Calgary. Our results show that during this period, total costs declined slightly, largely a result of system-wide health budget cutbacks. These cutbacks were transitory, and their effect on the acute care system until 1996/1997 have been documented elsewhere.[23] In that study however, the authors did not examine non-acute sectors of the health care system. In our study the results clearly demonstrate a displacement of community for acute costs and continued suppression of hospital utilization through 1999/2000 despite a substantial reinvestment in health care by the government. Although an increase in hospice beds and palliative home care resulted directly from the introduction of palliative programs, causation cannot be concluded from correlation of the timing of this displacement with the introduction of the regional palliative care programs. Causation however may be considered somewhat irrelevant in that decision-makers and funders supported the introduction and expansion of community services during a time of severe, system-wide cutbacks to the health budget.

We argue that the displacement and reduction in acute care beds represents a real economic saving to the health care system due to the fact that the two palliative care programs operate in an environment characterized by chronic hospital bed shortages.[24] In the short-term, beds fill quickly and variable costs savings are not realizable and health benefits accruing to these new patients are not taken into account. However, a reduced demand for beds in the long-term describes real economic gains. These results demonstrate that these gains could be used to fund the introduction of palliative services to an important population.

An arbitrary time horizon of one year preceding death was chosen for the analysis. This time period encompasses a well documented decline in functional status for cancer patients.[25] We therefore believe that this time period is long enough to capture virtually all costs related to end-of-life care, and therefore those that are relevant to the program.

Another major strength of this study was the ability to track health system costs across a multitude of settings. By linking provincial and community data together, we were able to develop a comprehensive picture of end-of-life care during a period when a community palliative care program was developing. This information is crucial to decision makers in allocating scarce resources.

Study limitations

The study design and analytical strategies have been devised to limit the role of bias in estimating the impact of palliative care on hospital and physician expenditures. We could not control for a system-wide group as data for an alternative, comparable group of persons who were receiving end-of-life care was not available. As a result, history bias during the study period is of greatest concern. Unit costs, quantities and quality of palliative care, non-palliative practice patterns, and funding levels have changed. In particular, overall funding for the Alberta health care system has been initially curtailed and restored during this time period.

Reliable costing data for ambulatory care and diagnostic tests were not available and therefore excluded from this study. However, physician billings associated with ambulatory services and interpretation of tests are included in the physician expenditures.

Conclusion

These results demonstrate that the introduction of comprehensive, integrated, co-ordinated and community-based palliative care programs allows patients to spend more time in community settings and is a cost-neutral strategy that may be applicable to other settings. In other words, it is possible to introduce an integrated and comprehensive palliative program at no additional cost to the health care system. These results further demonstrate that introduction of a palliative program can substantially decrease use of acute care beds. Despite the technological improvements in palliative home and residential hospice care, the hospital, however, remains a major contributor to health care costs for terminally ill cancer patients.

Moving care into communities is often perceived to create burden, particularly for patients and their families. The bulk of the substitutive effect means that patients spent more time in hospice, which does not necessarily represent a burden. The authors plan to include personal costs and adopt a societal perspective in future studies to address this issue.

This project has underscored the need for additional research. To begin with, the results rely heavily on crude estimates of acute care, nursing home and hospice costs. Application of activity-based costing, microcosting and workload measurement would serve to validate the findings and identify further efficiencies. Finally, the development and application of preference-based measures of quality of life are necessary to quantify the benefits and compare efficiencies gained in palliative care to other domains of health care.

Acknowledgements

This study was conducted under the auspices of the Alberta Cancer Board Palliative Care Research Initiative. Funding was provided by grants from the Canadian Health Services Research Foundation (RC1-603-9) and the Alberta Heritage Foundation for Medical Research. No conflict of interest was identified. Antonio Vigano is credited with project management while Catherine Neumann provided valuable research assistance. We thank several organizations and individuals who provided data and expertise: Alberta Cancer Board: Juanita Hatcher, Douglas Dover and Maxine Raphael; Alberta Health and Wellness: Linda Holmstrom; Capital Health Authority: Hue Quan, Chris Houston and Janet Johnson; Calgary Regional Health Authority: Laura Kowalsky and Ed Enns; Salvation Army: Major Margaret Foley and Lynn Whitten; Calgary Hospice Foundation: Lou Winthers. The investigators thank CHSRF and their anonymous referees for their thoughtful review and editing of our initial report. We are indebted to Vickie Baracos for her constructive criticism and boundless encouragement. We also thank Eduardo Bruera and two anonymous reviewers for reviewing earlier versions of this manuscript. All authors participated in the study design and execution of the study. The opinions expressed in this paper are those of the authors and do not necessarily reflect the official views of the Alberta Cancer Board, the Capital Health Authority, the Calgary Regional Health Authority or Alberta Health and Wellness.

References

1 Watson J. *Health, a need for redirection, a task force on the allocation of health care resources*. Ottawa: Canadian Medical Association, 1983.
2 Fainsinger RL, Bruera E, Macmillan K. Innovative palliative care in Edmonton. *Can Fam Physician* 1997; **43**: 983–92.
3 Bruera E, Neumann CM, Gagnon B, Brenneis C, Kneisler P, Selmser P, Hanson J. Edmonton Palliative Care Program: impact on patterns of terminal cancer care. *Can Med Assoc J* 1999; **161**: 290–93.
4 Bruera E, Neumann CM, Gagnon B, Brenneis C, Quan H, Hanson J. The impact of a regional palliative care program on the cost of palliative care delivery. *J Palliat Med* 2000; **3**: 181–86.
5 Baladi F. *A guidance document for the costing process.* Ottawa: Canadian Coordinating Office for Health Technology Assessment, 1996.
6 Canadian Coordinating Office for Health Technology Assessment. *Guidelines for economic evaluation of pharmaceuticals: Canada,* second edition. Ottawa: Canadian Coordinating Office for Health Technology Assessment, 1997.

7 Institute of Health Economics. *A national list of provincial costs for health care: Canada, 1997/8.* Ottawa: Coordinating Office for Health Technology Assessment, 2000.

8 Bosanquet N, Salisbury C. *Providing a palliative care service: toward an evidence base.* London: Oxford University Press, 1999.

9 Greer DS, Mor V. An overview of National Hospice Study findings. *J Chronic Dis* 1986; **39**: 5–7.

10 Hearn J, Higginson IJ. Do specialist palliative care teams improve outcomes for cancer patients: a systematic literature review. *Palliat Med* 1998; **12**: 317–32.

11 Higginson IJ, Wade AM, McCarthy M. Effectiveness of two palliative support teams. *J Public Health Med* 1999; **14**: 50–56.

12 Hockley J. Role of the hospital support team. *Br J Hosp Med* 1992; **48**: 250–53.

13 Jack B, Hillier V, Williams A, Oldham J. Hospital based palliative care teams improve the symptoms of cancer patients. *Palliat Med* 2003; **17**: 498–502.

14 Morris JN, Mor V, Goldberg RJ, Sherwood S, Greer DS, Hiris J. The effect of treatment setting and patient characteristics on pain in terminal cancer patients: a report from the National Hospice Study. *J Chronic Dis* 1986; **39**: 27–35.

15 Parkes CM. Home or hospital? Terminal care as seen by surviving spouses. *J R Coll Gen Pract* 1978; **28**: 19–30.

16 Parkes CM. Terminal care: evaluation of in-patient service at St Christopher's Hospice. Part I. Views of surviving spouse on effects of the service on the patient. *Postgrad Med J* 1979; **55**: 517–22.

17 Seale C. A comparison of hospice and conventional care. *Soc Sci Med* 1991; **32**: 147–52.

18 Ellershaw JE, Peat SJ, Boys LC. Assessing the effectiveness of a hospital palliative care team. *Palliat Med* 1995; **9**: 145–52.

19 McQuillan R, Finlay I. Facilitating the care of terminally ill children. *J Pain Symptom Manage* 1996; **12**: 320–24.

20 Ventafridda V, De Conno F, Vigano A, Ripamonti C, Gallucci M, Gamba A. Comparison of home and hospital care of advanced cancer patients. *Tumori* 1989; **75**: 619–25.

21 Wallston KA, Burger C, Smith RA, Baugher RJ. Comparing the quality of death for hospice and non-hospice cancer patients. *Med Care* 1988; **26**: 177–82.

22 Townsend J, Frank AO, Fermont D, Dyer S, Karran O, Walgrove A, Piper M. Terminal cancer care and patients' preference for place of death: a prospective study. *Br Med J* 1990; **301**: 415–17.

23 Saunders LD, Bay KS, Alibhai AA. Regionalization and hospital utilization: Alberta 1991/2–1996/7. *Health Manage Forum* 1999; **12**: 38–43.

24 Alberta Health and Wellness. *Alberta's health system: some performance indicators.* Edmonton: Alberta Health and Wellness, 2002.

25 Teno JM, Weitzen S, Fennell ML, Mor V. Dying trajectory in the last year of life: does cancer trajectory fit other diseases? *J Palliat Med* 2001; **4**: 457–64.