

Utilization and costs of home care for patients with colorectal cancer: a population-based study

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Abstract

Background: The utilization and costs of home care services provided for people with colorectal cancer is not well-known. We conducted an analysis to determine the utilization and costs of such services associated with each stage of colorectal cancer among patients in the province of Ontario.

Methods: We included cases of colorectal cancer diagnosed in Ontario between Jan. 1, 2005, and Dec. 31, 2009. Data were extracted from the Ontario Cancer Registry and linked to data from a home care administrative database. The types of services used were stratified by stage of disease and by phase of care (initial phase = 180 d after diagnosis, terminal phase = 180 d before death, continuing phase = interval between initial and terminal phases). Overall utilization rates and costs were determined, and regression analysis was used to examine associated factors.

Results: A total of 36 195 patients had colorectal cancer diagnosed during the study period; the median age was 71 (interquartile range 61–79) years. Home care services were provided to 24 641 patients (68.1%). The number of services per patient-year was 27.5, at a cost of \$2180 per patient-year. The number of services provided per patient-year increased with increasing disease severity at diagnosis (15.5 at stage I, 25.5 at stage II, 32.5 at stage III and 62.5 at stage IV; 22.6 for unstaged disease). The cost of services per patient-year also increased with disease severity at diagnosis (\$1170 at stage I, \$1995 at stage II, \$2727 at stage III and \$5541 at stage IV). Publicly funded home care services and associated costs decreased with increasing income group, but they increased among patients who had a history of high health resource utilization. The mean 30-day cost of home care services decreased from the initial phase of care (\$323) to the continuing phase (\$160) but increased during the terminal phase (\$616).

Interpretation: More than two-thirds of the patients with colorectal cancer in this study used home care services. Those who received home care services used about 2 services per month in a one-year period, at a cost of about \$2000 per year. This information can aid policy-makers in future decisions regarding resource allocations.

Colorectal cancer is a leading cause of morbidity and death in Canada.¹ According to 10-year prevalence data,¹ an estimated 93 489 individuals live with the disease, some of whom may require home care services at some point during the trajectory of their disease.

The Ontario Ministry of Health and Long-Term Care pays for certain home care services such as nursing care, personal support and respite care, which are organized and delivered through Community Care Access Centres.² The utilization and costs associated with home care services for patients with colorectal cancer is not well understood. Because of the recent focus on community care,³ we analyzed the utilization and associated costs of such services. We also examined the impact of disease severity at diagnosis and the phase of care on home care utilization and costs. We hypothesized that home care services would be an important part of managing colorectal cancer and that the intensity of services would increase by severity of disease.

Methods

Setting

We conducted a retrospective descriptive study using linked administrative databases in the province of Ontario, Canada. We included incident cases of colorectal cancer (International Classification of Diseases, ninth edition, codes 153.x and 154.x) diagnosed between Jan. 1, 2005, and Dec. 31, 2009. The data were extracted from the Ontario Cancer Registry, a database of all newly diagnosed cases of cancer in the province of Ontario. Cases with a valid encrypted health card number were linked to

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administrative datasets. The disease stage at diagnosis was obtained from Cancer Care Ontario. The staging algorithm with the following hierarchy was used: comprehensive > pathological > clinical staging.⁴ We obtained home care and demographic data from the Institute for Clinical Evaluative Sciences using the Ontario Home Care Administration System Database (before Apr. 1, 2005) or the Home Care Database (formerly known as the Central Home Care Client Database, from Apr. 1, 2005), and the Registered Persons Database. For each home care encounter, a record of the type and cost of service provided is entered into a provincial home care administrative database. This information is linked to diagnostic data in the Ontario Cancer Registry.

Ethics approval was obtained from the Research Ethics Board of Sunnybrook Health Sciences Centre. The relevant

datasets used in the analyses were held at the Institute for Clinical Evaluative Sciences.

Outcome measures

Home care activities were defined as visits from any member of a multidisciplinary team, including a nurse, physiotherapist, occupational therapist, respiratory therapist, nutritionist/dietitian, speech language pathologist, social worker, psychologist, case manager, homemaker or personal support worker, placement service worker or respite care worker. Each mutually exclusive home care service was defined as a visit, and each visit was considered to last 1 hour. Patients were followed from the index date of diagnosis to their death, or Mar. 31, 2010, whichever came first. Unit costs for

Table 1 (part 1 of 2): Demographic characteristics of patients with colorectal cancer, and mean home care visits and costs per patient-year

Variable	No. (%) of patients* <i>n</i> = 36 195	Mean no. of home care services per patient-year	Mean home care costs per patient-year, † \$
Used home care services	24 641 (68.1)	27.5	2 180
Sex			
Female	16 413 (45.3)	31.0	2 275
Male	19 782 (54.7)	24.5	2 102
Age, yr			
Mean (95% CI)	69.7 (69.5–69.8)		
Median (IQR)	71 (61–79)		
Age group, yr			
≤ 45	1 239 (3.4)	21.0	2 062
45–54	3 660 (10.1)	21.5	2 047
55–64	7 425 (20.5)	22.2	2 018
65–74	10 231 (28.3)	23.7	2 041
75–84	9 924 (27.4)	33.7	2 362
≥ 85	3 716 (10.3)	51.7	2 932
Living in rural location			
No	30 477 (84.2)	27.4	2 174
Yes	5 693 (15.7)	28.1	2 214
Missing data	25 (0.1)	7.5	794
Income group			
Urban, lowest	5 694 (15.7)	31.8	2 465
Urban, second lowest	6 293 (17.4)	27.8	2 241
Urban, middle	6 050 (16.7)	28.1	2 196
Urban, second highest	6 203 (17.1)	26.2	2 075
Urban, highest	6 200 (17.1)	23.7	1 945
Rural residents	5 664 (15.6)	28.2	2 220
Missing data	91 (0.3)	13.1	1 271
Region			
A	2 053 (5.7)	33.5	2 569
B	3 078 (8.5)	31.7	2 468
C	1 893 (5.2)	27.5	2 173
D	4 551 (12.6)	28.6	2 183
E	1 416 (3.9)	24.8	2 102

Continued

home care services were provided by the Ontario Ministry of Health and Long-Term Care.⁵ Costs for all years were converted to 2009 Canadian dollars (on Nov. 22, 2012, the 2009 dollar value was US\$0.96, at an exchange rate of 0.9555, using the nominal rate⁶).

We used a phase-based approach to costing, whereby the time horizon following diagnosis was divided into 3 discrete care phases: initial, continuing and terminal.^{7,8} The initial care phase was defined as the first 6 months (180 d) following the diagnosis of colorectal cancer. The terminal care phase was defined as the 6 months before death and applied to patients who died during the study follow-up period. The continuing care phase was defined as the time between the initial and terminal phases.

A 180-day time frame was used for the initial and terminal care phases because we hypothesized that exposure to home care would occur during this time horizon. The following hierarchy of time frames was used: terminal care > initial care > continuing care, such that all phases were mutually exclusive. Terminal care was considered first, because resources in

the 180 days before death would likely be attributed to care before death.

We classified patients into health resource utilization bands using the Johns Hopkins Adjusted Clinical Groups (ACG) System (www.acg.jhsph.org). The system uses a multi-step algorithm to assign International Classification of Diseases codes to 32 Aggregated Diagnosis Groups, which are then combined with age, sex, duration and severity of disease, and number of diseases to categorize patients into 1 of 102 clinically similar disease groups called Adjusted Clinical Groups that describe patients in terms of the totality of their previous disease history. The system then groups patients into quintiles of predicted health resource utilization, which may not be clinically similar but are expected to have a similar burden on the health care system. The categories of resource utilization bands are 0 (none), 1 (healthy users), 2 (low), 3 (moderate), 4 (high) and 5 (highest).

Statistical analysis

Descriptive, bivariate, and multivariate linear regression analyses were conducted. In the regression analysis, we assessed

Table 1 (part 2 of 2): Demographic characteristics of patients with colorectal cancer, and mean home care visits and costs per patient-year

Variable	No. (%) of patients* n = 36 195	Mean no. of home care services per patient-year	Mean home care costs per patient-year, † \$
F	2 396 (6.6)	25.7	2 018
G	2 622 (7.2)	28.5	2 325
H	4 121 (11.4)	24.9	2 055
I	4 198 (11.6)	27.8	2 239
J	1 803 (5.0)	28.0	2 236
K	3 626 (10.0)	26.4	2 088
L	1 427 (3.9)	25.1	2 203
M	2 155 (6.0)	23.4	1 752
N	831 (2.3)	26.5	2 095
Missing data	25 (0.1)	7.5	794
Resource utilization band‡			
None	343 (0.9)	35.7	3 036
Healthy user	239 (0.7)	24.7	2 309
Low	1 605 (4.4)	22.1	2 059
Moderate	17 880 (49.4)	22.9	1 950
High	9 215 (25.5)	28.6	2 203
Highest	6 913 (19.1)	41.4	2 855
Cancer stage at diagnosis			
I	5 145 (14.2)	15.5	1 170
II	7 095 (19.6)	25.5	1 995
III	7 702 (21.3)	32.5	2 727
IV	5 282 (14.6)	62.5	5 541
Not staged	10 971 (30.3)	22.6	1 630

Note: CI = confidence interval, IQR = interquartile range.

*Unless stated otherwise.

†In 2009 Canadian dollars.

‡Resource utilization bands categorize patients according to their morbidity and corresponding expected use of health care resources; the bands range from 0 (none) to 5 (highest expected health care costs). See Methods for details.

factors associated with the 30-day cost (dependent variable), by phase of care, among patients with colorectal cancer who had used home care services. All analyses were performed using SAS 9.2 (SAS Institute).

Results

A total of 36 195 patients had colorectal cancer diagnosed during the study period; the median age was 71 (interquartile range 61–79) years. There were slightly more men than women in the cohort. Most (84.2%) of the patients resided in an urban setting. The distribution of patients was similar across the income groups. Most of the patients were classified in the mid- to high-range health resource utilization band. Of the cases for which there was staging information, most were diagnosed at stage II and III (40.9%). Overall, 68.1% of the patients used at least 1 home care service after diagnosis. The number of home care services per patient-year was 27.5. The overall cost for home care visits was \$2180 per patient-year. The number and cost of home care services increased by severity of disease at diagnosis. Patients with stage IV colorectal cancer received the highest mean number of visits (62.5), at an overall annual cost of \$5541 (Table 1).

Sixty percent of home care visits were for nursing services, followed by homemaking and personal support (35.0%). Nursing visits generally increased by disease stage, whereas visits for homemaking and personal support generally decreased by stage (Table 2).

Table 3 shows results by disease stage and phase of care. In each phase, the number of home care services and costs per 30 days generally increased as the severity of colorectal cancer at diagnosis increased. The number of visits and costs were substantially higher in the terminal care phase than in the earlier care phases.

Table 4 shows the factors associated with 30-day costs by phase of care among patients who used home care services. In the initial care phase, the factors that contributed to significantly higher use of home care services and 30-day costs were

male sex, age 75 years or higher, any urban income group, active resource utilization band and disease stage II or higher. In the continuing care phase, these factors were male sex, age 65 or higher, urban income groups of low to middle, low to high resource utilization bands, and disease stage II and higher. In the terminal care phase, the factors were male sex, moderate to high resource utilization bands and disease stage IV.

Interpretation

This evaluation is representative of the entire colorectal cancer population in Ontario during the years analyzed and presents net costs by stage of disease at diagnosis. We found that 68% of patients with colorectal cancer received at least 1 home care service. The 30-day costs for home care services during the terminal phase of care were substantially higher than the costs during the initial and continuing phases of care. The difference was due to a higher number of home care services per 30 days during the 6 months before death. The higher cost in the terminal phase most likely represents additional home nursing care for the palliative management of symptoms and adverse effects of treatment for metastatic disease or end-of-life care. Costs were also high in both the initial and continuing care phases, which could represent additional nursing care for postsurgical management or the management of adverse effects related to postoperative or palliative chemotherapy or end-of-life care. Different service intensities by time have been reported in other cohorts.^{8,9}

The 30-day costs for home care services increased as the severity of colorectal cancer at diagnosis increased, which suggested that more home care services were required for patients who presented with more advanced disease. We found that patients with higher incomes used fewer publicly or government-funded home care services. This association may have been due to access to privately funded home care services or informal care; however, this hypothesis cannot be proven using administrative databases. Stage of disease was the only variable that was consistently associated with higher

Table 2: Types and number of home care visits by stage of disease at diagnosis

Type of service	Stage of disease; no. (%) of home care visits					
	All stages	Stage I	Stage II	Stage III	Stage IV	Not staged
Total no. of visits	2 009 832 (100.0)	151 715 (100.0)	365 783 (100.0)	493 303 (100.0)	365 556 (100.0)	633 475 (100.0)
Visiting nursing*	1 206 498 (60.0)	80 197 (52.9)	214 305 (58.6)	337 363 (68.4)	262 272 (71.7)	312 361 (49.3)
Shift nursing*	9 558 (0.5)	926 (0.6)	1 096 (0.3)	1 464 (0.3)	2 383 (0.7)	3 689 (0.6)
Homemaking/ personal support	702 694 (35.0)	63 226 (41.7)	133 306 (36.4)	134 926 (27.4)	84 048 (23.0)	287 188 (45.3)
Service by allied health professional†	48 335 (2.4)	3 909 (2.6)	8 851 (2.4)	9 727 (2.0)	8 799 (2.4)	17 049 (2.8)
Case management	21 358 (1.1)	2 144 (1.4)	4 218 (1.2)	5 760 (1.2)	3 912 (1.1)	5 324 (0.8)
Respite	9 136 (0.5)	529 (0.3)	2 039 (0.6)	1 234 (0.3)	1 462 (0.4)	3 872 (0.6)
Additional services‡	12 253 (0.6)	784 (0.5)	1 968 (0.5)	2 829 (0.6)	2 680 (0.7)	3 992 (0.6)

*Visiting nursing = nursing services for which an established (flat) rate per home care visit is charged; shift nursing = nursing services for which an hourly rate is charged.

†Nutritionist/dietitian, physiotherapist, occupational therapist, speech language therapist.

‡Social work, psychology, placement services, laboratory services and enterostomal therapy.

costs of home care across all phases of care, which appears to indicate that costs were associated with clinical needs.

The costs of home care in this colorectal cancer population were higher than those reported in a breast cancer cohort using similar methodologies.⁸ In that study, home care use and costs among breast cancer patients and controls were compared over the same period as in our study and in the population of Ontario. Fewer patients with colorectal cancer than with breast cancer used home care services (68.1% v. 75.4%). However, the number of visits per patient-year was higher among patients with colorectal cancer (27.5 v. 14.9 per patient-year). This difference is consistent with the difference in costs of home care services in each cohort (\$2180 per year among those with colorectal cancer v. \$1210 per year among those with breast cancer).

The regression analyses showed similarities in factors associated with the use of home care services in the breast cancer and colorectal cancer cohorts: in the initial and continuing phases of care in both cohorts, use of home care services was associated with older age, lower income, disease severity and history of

health care utilization. Unlike the terminal phase in our colorectal cancer cohort, where multiple factors contributed to significantly higher use of home care services and 30-day costs, the terminal phase in the breast cancer cohort had only disease stage III or higher as a contributing factor. The observed difference between the number of patients with breast cancer and the number with colorectal cancer who used home care services may have been due to management of surgical recovery or of adverse effects of the chemotherapy in the treatment of colorectal cancer. It may have also been due to a disparity in the dissemination and availability of resources to patients in the breast and colorectal cohorts. This could indicate a need for increased resource allocation of home care services to patients with colorectal cancer. Although colorectal cancer patients using home care services received more visits and incurred higher costs than those with breast cancer using home care services, fewer patients with colorectal cancer accessed these resources.

A number of studies have shown that care in the community is less expensive than institutional or residential care.¹⁰⁻¹⁴

Table 3: Home care services and costs* by phase of care† and stage of disease at diagnosis

Phase; variable	All stages	Stage I	Stage II	Stage III	Stage IV	Not staged
Initial care	<i>n</i> = 31 237	<i>n</i> = 4 940	<i>n</i> = 6 707	<i>n</i> = 7 277	<i>n</i> = 3 571	<i>n</i> = 8 742
Used home care services, no. (%)	18 574 (59.5)	2 009 (40.7)	4 034 (60.1)	5 665 (77.8)	2 733 (76.5)	4 133 (47.3)
No. of visits per 30 d						
Mean (95% CI)	3.4 (3.4–3.5)	2.1 (1.9–2.2)	3.3 (3.2–3.5)	4.1 (4.0–4.3)	4.8 (4.6–5.0)	3.2 (3.0–3.3)
Median (IQR)	1 (0–5)	0 (0–2)	1 (0–4)	3 (0–5)	3 (0–6)	0 (0–4)
Cost per 30 d, \$						
Mean (95% CI)	323 (318–329)	191 (181–201)	309 (299–320)	407 (397–418)	477 (459–495)	276 (266–287)
Median (IQR)	165 (0–469)	0 (0–256)	152 (0–453)	302 (104–545)	348 (86–654)	0 (0–379)
Continuing care	<i>n</i> = 27 861	<i>n</i> = 4 507	<i>n</i> = 6 137	<i>n</i> = 6 543	<i>n</i> = 2 629	<i>n</i> = 8 045
Used home care services, no. (%)	14 501 (52.0)	1 216 (27.0)	2 797 (45.6)	4 697 (71.8)	2 154 (81.9)	3 637 (45.2)
No. of visits per 30 d						
Mean (95% CI)	2.2 (2.1–2.3)	1.0 (1.0–1.2)	2.1 (1.9–2.2)	2.7 (2.6–2.9)	4.5 (4.2–4.8)	1.8 (1.7–1.9)
Median (IQR)	0 (0–2)	0 (0–0)	0 (0–1)	1 (0–3)	2 (0–5)	0 (0–1)
Cost per 30 d, \$						
Mean (95% CI)	160 (156–165)	71 (64–78)	142 (132–151)	211 (201–221)	370 (349–391)	115 (108–121)
Median (IQR)	10 (0–158)	0 (0–13)	0 (0–117)	69 (0–247)	202 (53–452)	0 (0–79)
Terminal care	<i>n</i> = 11 271	<i>n</i> = 454	<i>n</i> = 1 078	<i>n</i> = 1 640	<i>n</i> = 3 613	<i>n</i> = 4 486
Used home care services, no. (%)	7 619 (67.6)	237 (52.2)	724 (67.2)	1 202 (73.3)	2 866 (79.3)	2 590 (57.7)
No. of visits per 30 d						
Mean (95% CI)	6.9 (6.7–7.1)	4.2 (3.5–5.0)	6.3 (5.8–6.9)	6.9 (6.4–7.5)	8.4 (8.0–8.8)	6.2 (5.9–6.5)
Median (IQR)	2 (0–9)	0 (0–5)	2 (0–9)	3 (0–9)	5 (1–11)	1 (0–8)
Cost per 30 d, \$						
Mean (95% CI)	616 (597–635)	372 (301–443)	523 (475–571)	578 (539–618)	795 (759–831)	533 (502–565)
Median (IQR)	271 (0–835)	41 (0–492)	238 (0–731)	286 (0–819)	489 (107–1 057)	124 (0–675)

Note: CI = confidence interval, IQR = interquartile range.

*In 2009 Canadian dollars.

†Initial phase of care = 180 days after diagnosis, terminal phase = 180 days before death, continuing = interval between initial and terminal phases.

Some of the home care costing work has been nested under the palliative care or end-of-life umbrella.^{9,15,16} Walker and colleagues reported that the average home expenditure per patient for end-of-life care for a number of disease sites was \$15 866 over an average of 141 days of care; however, it is unclear how much home care activity contributed to this value.¹⁷ The overall cost calculated in our study would translate to an annual provincial cost of \$79 million if all 36 195 colorectal cancer patients over a 5-year period received home care from the province based on a net cost of \$2180 per patient-year. De Oliveira and colleagues¹⁸ examined the annual cost of health management across a number of disease sites in the first year after diagnosis: home care costs represented 7%–8% of overall health system costs. However, these results were not stratified by disease stage or analyzed by phase of care.

Limitations

Limitations of using administrative data exist. We did not have staging information for all patients. However, based on our analysis of the staging data available, it seems reasonable to assume that stage of disease influenced both the services needed and the cost allocation. More complete staging information for patients with colorectal cancer became available from Cancer Care Ontario as of 2007. Administrative data do not reveal the purpose of the home care service, the efficiency of delivery of services provided, the effectiveness or sufficiency of the care of the patient, the quality of the care or even appropriateness of home care. An examination of treatment management guidelines related to use of home care services and primary data collection would be required to determine the appropriateness of the care.

Table 4: Regression analysis by phase of care*

Variable	Initial care		Continuing care		Terminal care	
	Parameter estimate (SE)	t value	Parameter estimate (SE)	t value	Parameter estimate (SE)	t value
Intercept	513.9 (18.4)	27.8‡	292.5 (20.5)	14.2‡	853.2 (91.3)	9.4‡
Male (v. female)	-26.4 (7.6)	-3.5‡	-37.8 (8.0)	-4.7‡	-104.1 (26.4)	-3.9‡
Age group, yr (v. 55–64)						
≤ 45	-20.1 (20.1)	-1.0	14.5 (20.7)	0.7	47.2 (85.5)	0.6
45–54	-9.6 (13.6)	-0.7	3.3 (14.0)	0.24	59.9 (55.8)	1.1
65–74	3.2 (10.6)	0.3	26.9 (11.0)	2.45§	-38.5 (41.4)	-0.9
75–84	-36.8 (11.1)	-3.3‡	44.7 (11.8)	3.8‡	47.5 (40.3)	1.2
≥ 85	-44.6 (15.4)	-2.9§	81.8 (17.0)	4.8‡	-11.2 (48.8)	-0.2
Income group (v. urban, highest)						
Urban, lowest	57.9 (13.0)	4.4‡	72.9 (13.8)	5.3‡	-80.9 (45.5)	-1.8
Urban, second lowest	54.3 (12.7)	4.3‡	40.6 (13.3)	3.1§	-36.6 (45.2)	-0.8
Urban, middle	42.1 (12.8)	3.3§	26.7 (13.6)	2.0§	40.9 (45.3)	0.9
Urban, second highest	28.2 (12.7)	2.2§	21.2 (13.4)	1.6	33.0 (46.0)	0.7
Rural residents	21.6 (12.8)	1.7	3.7 (13.5)	0.3	-89.7 (45.9)	-2.0
Resource utilization band† (v. highest)						
None	41.0 (40.2)	1.0	-18.0 (40.5)	-0.4	-34.4 (118.8)	-0.3
Healthy user	-87.8 (44.3)	-2.0§	-133.4 (45.6)	-2.9	64.3 (163.5)	0.4
Low	-95.1 (19.5)	-4.9‡	-97.0 (20.5)	-4.7‡	-12.3 (72.1)	-0.2
Moderate	-71.1 (10.5)	-6.8‡	-92.0 (11.2)	-8.2‡	-119.7 (34.1)	-3.5‡
High	-36.3 (11.5)	-3.2§	-77.9 (12.3)	-6.3‡	-76.6 (37.0)	-2.1§
Stage (v. stage I)						
II	47.4 (13.8)	3.4‡	56.8 (16.2)	3.5‡	69.4 (84.8)	0.82
III	55.4 (13.2)	4.2‡	50.6 (15.3)	3.3‡	81.8 (80.7)	1.01
IV	155.0 (15.0)	10.4‡	214.0 (17.1)	12.5‡	297.5 (77.2)	3.9‡
Not staged	113.1 (13.8)	8.2‡	-11.1 (15.6)	-0.7	205.2 (76.9)	2.7§

Note: SE = standard error.

*Initial phase of care = 180 days after diagnosis, terminal phase = 180 days before death, continuing = interval between initial and terminal phases.

†Resource utilization bands categorize patients according to their morbidity and corresponding expected use of health care resources; the bands range from 0 (none) to 5 (highest expected health care costs). See Methods for details.

‡p < 0.001.

§p < 0.05.

We created phases of care based on prior work.^{7,8} These phases were defined according to clinical and cost data, and thus the complexity of the disease and the care provided may not be fully captured by the 3 simple phases. In addition, we captured data only from the perspective of the health care system and did not include any services provided by family and friends who may have paid for these services out of pocket. A number of studies have examined informal care and have considered it costly.¹⁹⁻²² The data source also did not include privately funded home care services, which would require a prospective study of primary care and home care records or access to private insurers' databases.⁹ This evaluation is representative of only a select colorectal cancer population in Ontario during a specific time frame, and net costs were not calculated because there was no control group.

Stage of disease in this analysis was defined as disease extent at the time of diagnosis. Costs by stage were based on individuals remaining in their incident stage until death or the end of the follow-up period. For example, patients with stage II disease at diagnosis remained in the stage II group until they died or were lost to follow-up, regardless of their disease progression. Because information on resource utilization during disease progression is not collected in the Cancer Care Ontario database, the aggressive treatments used as the disease progressed may have resulted in an overestimation of home care services for earlier disease stages.

Conclusion

Our study examined the type and cost of home care services specific to the management of colorectal cancer by disease stage at diagnosis. About \$2000 dollars per patient-year was spent on home care services during the study period. In comparison with daily institutional costs, shifting health services to the community via home care services may represent potential savings to the health care system if quality services are available, effective and appropriate. From a policy point of view, this work provides us with an estimate of provincially funded home care used by patients with colorectal cancer diagnosed at various stages. Home care use and costs increased with increasing stage of disease at diagnosis. Decision-makers should take these data into consideration when planning home care strategies.

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