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Palliative Care Patients in the Emergency Department

BEVERLEY J. LAWSON,
Dalhousie University Department of Family Medicine Halifax

FREDERICK I. BURGE,
Dalhousie University Department of Family Medicine, Halifax

PAUL MCINTYRE,
Department of Palliative Care, Capital District Health Authority, Halifax

SIMON FIELD, and
Dalhousie University, Department of Emergency Medicine, Halifax

DAVID MAXWELL
Dalhousie University, Department of Family Medicine, Halifax, Nova Scotia, Canada

Abstract

Although end-of-life care is not a primary function of the emergency department (ED), in reality, many access this department in the later stages of illness. In this study, ED use by patients registered with the Capital Health Integrated Palliative Care Service (CHIPCS) is examined and CHIPCS patient characteristics associated with ED use identified. Overall, 27% of patients made at least one ED visit while registered with CHIPCS; 54% of these resulted in a hospital admission. ED visiting was not associated with time of day or day of the week. Multivariate logistic regression results suggest older patients were significantly less likely to make an ED visit. Making an ED visit was associated with hospital death, rural residence (particularly for women), and having a parent or relative other than a spouse or child as the primary caregiver. Further research may suggest strategies to reduce unnecessary ED visits during the end of life.

INTRODUCTION

The emergency department (ED) is most often thought of as the scene of care following a traumatic or acute event. However, many patients seeking care in the ED have advanced chronic illness and require aid for symptom distress, are experiencing acute change in their health status, or were brought to the ED by caregivers who can no longer physically care for or psychologically cope with the patient (1–3). Some who enter the ED may be transferred to alternative inpatient units or discharged home, while others arrive during the terminal stages of life. Some may even die in the ED. Although end-of-life care is not a primary function of the ED, in reality, many access this department in the later stages of illness (1,4).

The relationship between emergency medicine and palliative care is generally understudied, despite the frequency of visits by palliative patients to various departments (1). For instance, 57% of adult cancer patients in Nova Scotia are reported to have made at least one ED visit during their last six months of life (5), while 27% of all cancer patients in Ontario went to an ED at least once during their last two weeks of life (6). In the United States (7), Earle reports

7.2% to 9.1% of seniors with specific cancers made more than one visit to the ED during their last 12 months of life. In addition to symptom relief and caregiver inability to cope (2,3), anecdotal experience suggest other factors contributing to this usage may be related to time of day, days of the week, holidays, accessibility of other care providers, and the inability to be admitted as an inpatient by conventional routes. General consensus is that the ED is not necessarily the most appropriate site for assessment and management of palliative care patients (1,2,4), yet it appears that this is a common point of contact between the health care system and the palliative patient. Diagnosis, treatment initiation, and therapies aimed at cure are the norm in the ED, whereas those near death require plans devoted to care and comfort (1,3). Terminal patients and grieving family often share physical space with others who present to the ED for acute care. Therefore, there is a need to address anecdotal beliefs and report what is presently known about the ED experience of palliative patients.

Since patients with advanced illness who visit the ED have a greater likelihood of spending more time as a hospital inpatient during the end of life (5), it becomes relevant, given the economic consequences for the system, to better understand which patient characteristics are associated with visiting the ED, a potential gateway to admission. Although some visits to the ED are necessary and appropriate, identification of a preventable ED visit could prove beneficial for both the system (financially and in future planning) and the patient (reduced stress, quality of care).

In Nova Scotia, we know that cancer patients who had been registered with a comprehensive palliative care service make significantly fewer ED visits than patients not participating in the service (5), and that more than 90% of patients enrolled in the program have a diagnosis of cancer (8,9). There is also strong evidence that patients receiving in-home palliative care (10) and those with a palliative care assessment during the last two weeks of life (6) are also less likely to visit the ED.

Given the lack of research exploring the use of the ED by palliative patients, this study presents the initial step in an examination of ED use by patients believed to be approaching the end of life and who are registered with the Capital Health Integrated Palliative Care Service (CHIPCS). We report ED visits made by CHIPCS patients and patient characteristics associated with ED use.

METHODS

Subjects

Subjects included all patients admitted to the CHIPCS between January 1, 1999, and December 31, 2005, who had died during that period, and who resided in the immediate geographic region served by the Queen Elizabeth II Health Sciences Centre (QEIIHSC) ED. The QEIIHSC is the major tertiary centre for the region and for all of Nova Scotia. It provides services exclusively to the adult population. It is also home to the CHIPCS. The multidisciplinary palliative care program (PCP) at the QEIIHSC opened in 1988 and has grown to include patient care at home, an outpatient clinic, an inpatient palliative care unit, and care on other acute care units within QEII sites. In 2004, the program was renamed the CHIPCS, marking the introduction of an integrated service model—a partnership between the Capital District Health Authority (CDHA) and the Nova Scotia Department of Health continuing care program, the latter coordinating homecare and long-term residential care.

Data

Patient level data for this retrospective study were extracted from two CDHA administrative health databases: the CHIPCS database, and the emergency department information system of the QEIIHSC, Halifax, Nova Scotia. These files were augmented with the addition of limited 2001 Canadian census information.

Measures

From QEIIHSC ED information system, the number of unique ED visits made by each subject from the date of initial CHIPCS registration to death was counted, as well as the timing of such visits (time of day, day of week), mode of arrival to the ED, triage score by Canadian Triage and Acuity Scale (CTAS) (11), the total wait time experienced in the ED before being discharged, location to which the patient was discharged, major complaint on arrival, and outcome. Using this information, the number of days from each subject's last ED registration to death was calculated.

The CHIPCS database provided the date of registration with the program for each patient, and demographic and limited caregiver information. Patients are registered within the database only after an initial consultation and assessment by program staff. Variables extracted for this study included sex, date of birth, date of death, postal code, diagnosis, reason for referral, caregiver status, whether the caregiver lived with the patient, and location of death. A survival-time variable was created representing the total number of days between CHIPCS registration and death. The CHIPCS database also provided the ability to determine the number of days each patient was actively followed by the program at home, in long-term care, or as a hospital inpatient following initial registration with the service (service use). Hospital inpatient information is particularly important to this study since not all CHIPCS patients have an equal potential for ED visits. For example, patients spending more time at home have the potential to make more ED visits than those who have been hospitalized. ED "potential time" was therefore defined as each patient's total survival time in the CHIPCS program minus time spent as a hospital inpatient during that same period.

Indicators of urban or rural residence and of income using neighbourhood income information (enumeration area median income, grouped into quintiles) were created using 2001 Canadian census information and linked to patient information by each individual's postal code.

Due to the highly skewed distribution of the total number of ED visits made by patients (many with 0 visits), a dichotomous variable was created to denote whether or not the patient had made at least one visit to the ED while a CHIPCS patient. This information was linked to the file containing individual level patient characteristics from the CHIPCS database and neighbourhood information for subsequent analysis.

Analysis

The secondary data analysis began with a descriptive examination of all ED visit information for all identified registered CHIPCS patients. Next, CHIPCS patients were limited to those with at least a one-day opportunity to make an ED visit in order to identify patient characteristics associated with potential ED utilization. Using this limited file, cross-tabulations and chi-square measures of association examining ED use and patient characteristic were examined. This was followed by crude (univariate) and then multivariate logistic regression analysis techniques to examine the association between CHIPCS patients making at least one ED visit and patient characteristics while adjusting for variability in ED potential time. Manual backwards elimination modelling was used to develop the most parsimonious multivariate model of ED use. The initial model began with all available variables found to be significantly associated at the 0.1 level of significance in the crude analysis, and plausible interaction terms. Because the interaction of sex by age proved to significantly affect ED use, the multivariate analysis was further stratified by sex. Although most variables retained in these final regression models were significant independent factors associated with ED use at the 0.05 level of significance, others were retained for purposes of comparison between the sexes. SAS software was used to perform all analyses (12).

Ethics approval for this study was provided by the Capital District Health Authority Research Ethics Board, Halifax, Nova Scotia.

RESULTS

Between January 1, 1999, and December 31, 2005, 4,444 patients residing in the geographic area served by the QEIIHSC ED were registered with CHIPCS and died during that same period. Overall, 1,182 (26.6%) identified patients made one or more ED visits. In total, 2,103 ED visits were made by these 1,182 people over the seven-year study period. CHIPCS patients who made at least one ED visit averaged 1.8 visits (SD 1.6; median 1). The most frequent mode of transport to the ED was by emergency medical services (57%); just over half of visits (54%) resulted in a hospital admission (Table 1). Wait time between ED registration and discharge from the ED averaged 6 hours 21 minutes (SD 5 hours 20 minutes) and ranged from 0 hours to 53 hours 33 minutes. Visits to the ED by day of the week were relatively stable with a slight increase on Sunday. Over a 24-hour period, the number of visits increased gradually from early morning hours to the evening. Twenty-four percent cited pain as the primary reason for going to the ED (abdominal pain 10%; other pain 14%), followed by shortness of breath (21.5%). Six percent of CHIPCS patients died the same day as their last ED discharge date, another 10%, within one or two days from discharge. Table 1 further describes visits made to the ED.

Not all CHIPCS patients had the potential to make an ED visit. Some patients (n=1,223) were hospital inpatients during the full time period from CHIPCS registration to death. Although a small proportion of this group (5.4%) did have on record at least one ED visit, the date of that visit coincided with CHIPCS program registration and/or admission to hospital, so these patients were not included in subsequent analyses.

In total, 3,221 CHIPCS patients had the potential to make at least one ED visit during the time period from CHIPCS registration to death (survival time). Mean survival time was 132.7 days (SD 194.4 days) with a median survival of 68 days. Thirty-four percent (n=1,116) of this patient subgroup made at least one ED visit (mean 0.6 visits; SD 1.3; mode 0). Patient characteristics by whether or not an ED visit was made are presented in Table 2. Patients who made at least one visit to the ED tended to be younger than those who did not (mean age: 68 years vs. 71 years, $p<0.05$), experienced a palliative hospital unit death (36%) or acute hospital unit death (34%), and had a longer survival time (47% survived at least 121 days). Patients with at least one ED visit spent more time as a hospital inpatient overall (median 12 days) than patients who made no visits (median 2 days). Patients with at least one ED visit tended to have more potential time to make an ED visit, (potential ED days, median 89.5) than those making no ED visits (potential ED days, median 41).

Table 3 summarizes the results of the logistic regression analyses to identify patient characteristics associated with having made at least one ED visit following enrolment in the CHIPCS program. Although the interaction of sex by age proved to be a significant factor, for comparison purposes, the results of the main effects final model are shown along with models for men and women separately. For all patients, those who died in hospital, in either an acute care unit or in the inpatient palliative care unit, were more than three times as likely to have made at least one ED visit than those who died at home (for an acute hospital death: adjusted odds ratio [AOR] 3.5, 95% confidence interval [CI] 2.8, 4.3; for a palliative care unit death: AOR 3.3, 95%CI 2.7, 4.0). Patients cared for by a parent or other relative were more likely to visit the ED compared to those whose caregiver was a spouse or partner (AOR 1.5, 95%CI 1.1, 1.9). Patients residing in a rural location were also more likely to make ED visits (AOR 1.3, 95%CI 1.0, 1.6). Compared to younger patients (aged 65 years or less), older patients tended to be less likely to make an ED visit. As one would expect, patients with fewer potential ED days were less likely to make a visit.

By sex, it appears that age is a significant factor for women only. Among women, the oldest age group (ages 85 years and older) was 40% less likely to make at least one ED visit than were younger women (<65 years), whereas for men, ED visits by the elderly were similar to those by the younger age groups. Rural residency also proved to be an important characteristic for women. Compared to their urban counterparts, females living in rural areas were 60% more likely to make at least one ED visit. This was not a significant factor for men. ED visits by both men and women who died as a hospital inpatient in either an acute care unit or the palliative care unit proved similar. Although we did not have sufficient numbers to reach statistical significance in our model, the direction of the association of death within a long-term care facility and ED visits by women and men differed. There is some evidence to suggest females dying in a long-term care facility made fewer ED visit than those who experienced a home death (AOR 0.5, 95%CI 0.2, 1.2), whereas men dying in a long-term care facility tended to make more visits than those who died at home (AOR 1.4, 95%CI 0.8, 2.7).

DISCUSSION

One-quarter of CHIPCS patients made at least one ED visit during the time period from their initial CHIPCS registration date to date of death (survival), a time period that varied widely between patients. Because of this variability, we cannot make direct comparisons of ED use in this group of patients with those reported in literature. For instance, in Ontario, 26% of all advanced cancer patients were found to have visited the ED in the last two weeks of life alone (6). In previous research, in which we focused on the association between family physician continuity and ED use for all Nova Scotians who died due to cancer, we found that 57% of subjects had made at least one visit to the ED during the last six months of life (5). This proportion is much higher than that reported here, due in part to the shorter observation period which averaged approximately two months but also, we suggest, due to the fact that all patients in this study were registered with the CHIPCS. In our previous work, we found that patients who were registered with the same palliative care program were 15% less likely to make an ED visit than those not registered with the program (5).

Consistent with our findings, an American study (7) reported a mean ED visit rate of 0.40 to 0.46 visits/patient in the last 30 days of life. The mean ED visit rate for all CHIPCS patients was relatively similar at 0.5 visits/patient for a median of 68 days.

It is interesting to note that little variability was observed with respect to ED visits being made across time, either by the time of day or day of the week, which may be an indication that there is no single time period where services to CHIPCS patients are lacking. By comparison, in previous rural palliative homecare research we found that the weekend and evenings were the time when most patients and families found it difficult to access care in the home setting (13). We wonder, however, if such even temporal use may actually reflect the ED being used as a site for clinical assessment purposes, regardless of whether this is planned or not. It may simply represent the route into hospital care that has become the chosen path, especially when one considers that 54% of all CHIPCS patients seen in ED are admitted.

Although coding of the major complaint or reason for presenting to ED was free text at the time of this study, the two most common reasons recorded were pain and shortness of breath (dyspnea). These reasons are supported by the work of Geraci et al. (14), who reported that dyspnea was an independent predictor of ED presentation and disease progression, and of Marco et al. (2) who reported that many go to the ED to improve tolerability of the dying process—for symptom relief and caregiver assurance about terminal symptoms. Indeed, 97% of lung cancer patients are reported to experience breathlessness at least once a day (15). Responding to those two symptoms better in the home or community setting can aid in the avoidance of ED visits. For instance, ED visits due to pain might be reduced if chronic pain control were administered continuously at the end of life and adjustments made immediately when breakthrough pain is experienced (16). Providing caregivers with information about how to reduce the perception of dyspnea might minimize distress associated with this symptom and hence prevent a visit to the ED (16).

Over half (57%) the patients were transported to the ED by emergency medical services (i.e., by ambulance). Given the frailty of those near death, one can understand why such form of transportation is so common. Prior to well-established triage practices, providers within the ED setting have observed, at least anecdotally, arrival by ambulance often meant patients would be seen more quickly than those arriving by car. Either way, such transportation indicates urgent physical needs of patients or urgent psychological needs of family caregivers.

Almost 16% of patients presenting to the ED died within two days; 6% on the day of the visit (Table 1, time from last ED discharge to death). Interestingly, fewer than 1% are recorded as having died in the ED (Table 1, outcome, patient expired). Although we do not know the details, this 1% potentially represents those who were “dead on arrival” plus others who died while in the ED. The other 5% were possibly admitted to the hospital but died the same day. This raises the question of what it might have been possible to do in the home to avoid such apparently futile transfers. It is important to note, however, that even the best clinician cannot predict the temporal course of terminal events. In addition, even if we do not consider the ED to be a desired place for the predictably dying, when it happens, Heaston et al.(17) report ED nurses feel special rooms should be available for the patient and family in order to grieve in a private, more comfortable setting.

These people are clearly assessed at the triage stage as being severely ill, with 90% being triage coded from CTAS Level 1 (see immediately) to CTAS Level 3 (urgent, see within 30 minutes). Such illness severity warrants rapid attention. This coding clearly identifies the palliative care patients who do present to ED as being very ill and likely needing medical attention for the presenting problem.

One of the objectives of CHIPCS is to reduce ED contact and the number of transitions (changes in care location and providers) experienced by patients during the end of life. The multivariate logistic regression modelling identifies several characteristics of patients associated with ED visiting. As in our previous research focused on end-of-life services, there are sex-specific issues (5,18). Age of women is an independent predictor of ED visits, but is not for men. Older females were significantly less likely to make ED visits than those <65 years of age, even after controlling for whether the patient had died in a long-term care facility or not. Perhaps caregivers for elderly women are making different decisions than are those for men. Although we have adjusted for whether or not the named caregiver was a spouse or other, we cannot comment on the decision-making choices of elderly husbands versus those of elderly wives. It is also possible that older women may be making different choices for themselves. There is mixed evidence in the literature as to whether women as a group prefer less aggressive treatment (19–21).

Geography was a factor for females only. Women in rural locations of the region served by the QEIIHSC ED were 60% more likely to make a visit to the ED than were their urban counterparts. Because this result does not extend to males, we cannot assume this is simply a reflection of lack of services in rural areas, nor is this finding related to age, caregiver relationship, or other factors adjusted for in the model. Further research into the decisions made by women and men may be necessary to help identify reasons for this disparity by geography. It is also possible that our current finding is an artefact due to limited patient numbers residing in rural locales.

It is interesting that patients whose primary caregiver was a parent or other relative were more likely to visit the ED than those cared for by a spouse or partner. Initially, one may postulate that this group of caregivers did not reside with the patient and, thus, were less familiar with how to manage symptoms. However, in our multivariate analyses, residence of the caregiver did not prove to be a significant independent factor associated with ED visits. It may be that parents and relatives other than children were still less familiar with the disease progression or were less able to stay at home with their dying loved one than a spouse was. It makes sense to us that those with caregivers who were “less close” to the patient’s symptoms might end up bringing them to the ED more frequently.

One of the most important corroborations of the regression analyses was support from the descriptive finding that more than half of ED visits end with a hospital admission. CHIPCS patients who die in hospital, in either an acute care unit or the palliative care unit, are more than three times as likely to have made an ED visit as those who died at home. We suggest that perhaps patients who really are the most ill and in need of resources which, at this point in time, can only be provided in hospital, are appearing in the ED for assessment and admission. It may also suggest that these very ill people are passing through the ED for this assessment when it might be better to admit them directly to the hospital. The challenges of the direct hospital admission route include identification of better ways to assess and respond to acute situations in the community when evaluating whether admission is needed or not. In our community, it may also have been recognized by providers that the quickest route to hospital admission is through the ED.

Limitations

First, it is acknowledged that setting bounds on the region served by the QEIIHSC ED could miss some people who would go to that particular ED even though they had residence in other locales, as well as potentially exclude others who made the choice to seek emergency help in a smaller community-based ED. Secondly, there are limitations to the use of existing data files. These files do not capture all or even most of the individualized reasons for a patient going to the ED. Was it major symptom distress? Caregiver overload? A quicker way to be admitted as an inpatient? We also do not know if a call was initially made to a health care professional who advised the patient to go to the ED for care. Administrative databases do not provide us with an indicator of the severity of their disease or symptoms, how close to death the person actually is, or whether they have extended health care coverage. Further, the databases used in this project cannot tell us about other provincially funded health service use, such as whether the patient sees a family doctor or is being followed by continuing care in their home. Data available for this study do, however, provide an initial picture of service utilization by patients deemed clinically “palliative”, and some demographic indictors of increased ED use.

In this study, limiting patients to those registered with the CHIPCS allowed identification of those requiring palliation and near the end of life, but prevented our examining differences in ED use by patients not involved in the service. Past research has found cancer patients enrolled in the program tended to use the ED less frequently than patients not registered (5). To further this investigation, there is a need to extend the research to include all patients who died with chronic disease, as well as to select a control group of nonterminal patients in order to compare ED visit frequency.

CONCLUSION

Three-quarters of patients followed by our local comprehensive integrated palliative care program never used the ED in the last six months before death. For the remaining one-quarter who did, this study is an initial step in the quantification of that ED use, and has begun the task of examining demographic and caregiver variables which predispose CHIPCS patients to ED visits. Younger patients, women who live in rural locations, and those whose caregivers are parents or a relative (other than a child or spouse) are all more likely to visit the ED.

These results provide a base to begin development of future studies to further explore the quality of end-of-life care of palliative patients and their ED use. They also help us focus the development of policies and service models which may help allow very ill and frail patients to remain in their home setting, while promoting more efficient resource allocation. Potential changes in home management of CHIPCS patients would lead us to think about better “urgent” responsiveness to pain and dyspnea symptoms at home, and whether emergency medical services (paramedics) might be able to intervene. All of these strategies might help reduce ED use as well as result in greater patient and caregiver satisfaction.

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Table 1

EMERGENCY DEPARTMENT VISITS BY ALL CAPITAL HEALTH INTEGRATED PALLIATIVE SERVICE (CHIPCS) PATIENTS (n=4,444)

Characteristic	Frequency (%)
Total ED visits (by unique patients)	
0	3,262 (73.4)
1	754 (17.0)
2	216 (4.9)
3	105 (2.4)
4	40 (0.9)
5 or more	67 (1.5)
mean (standard deviation)	0.5 (1.2)
median (range)	0 (0–18)
Day of week presenting to ED	
Monday	297 (14.1)
Tuesday	310 (14.8)
Wednesday	279 (13.3)
Thursday	277 (13.2)
Friday	304 (14.5)
Saturday	298 (14.2)
Sunday	337 (16.0)
ED registration during weekend	
yes	635 (30.2)
no	1,467 (69.8)
ED time of registration	
early morning (0:01–7:59)	385 (18.3)
morning (8:00–11:59)	502 (23.9)
afternoon (12:00–16:59)	582 (27.7)
evening (17:00–0:00)	633 (30.1)
ED after hours registration (17:00–7:59)	
yes	1,018 (48.4)
no	1,084 (51.6)
Mode of arrival to ED	
transport self	141 (6.7)
by a relative	722 (34.4)
emergency medical care	1,191 (56.7)
friend	37 (1.8)
other/taxi/police	9 (0.4)
Triage score[1]	
Level 1 (see immediately)	12 (0.6)
Level 2 (emergent, see ≤15 minutes)	804 (38.3)
Level 3 (urgent, see ≤30 minutes)	1,049 (49.9)

Characteristic	Frequency (%)
Level 4 (less urgent, see ≤60 minutes)	87 (4.1)
Level 5 (nonurgent, see ≤120 minutes)	7 (0.3)
missing	143 (6.8)
Diagnosis	
respiratory system	398 (18.9)
neoplasms	255 (12.1)
mental disorders	15 (0.7)
circulatory system	106 (5.0)
digestive system	85 (4.0)
genitoruinary system	67 (3.2)
musculoskeletal system	68 (3.2)
injury or poisoning	151 (7.2)
general symptoms, ill defined	437 (20.8)
other	81 (3.9)
missing	439 (20.9)
Major complaint	
shortness of breath	458 (21.5)
pain other than abdominal	293 (13.7)
abdominal pain	215 (10.1)
weakness/malaise/fatigue	164 (7.7)
confusion/unconscious/dizzy	110 (5.2)
nausea/vomiting	86 (4.0)
blocked tubes (e.g., feeding/catheters/drains)	80 (3.8)
bleeding	79 (3.7)
fever	42 (2.0)
falls/fractures/trauma/lacerations	41 (1.9)
other	563 (26.4)
Outcome	
admitted	1,128 (53.7)
treatment completed/d/c/home	832 (39.6)
treatment discontinued	38 (1.8)
patient died	14 (0.7)
clinic appointment scheduled	11 (0.5)
surgery required—sent to OR	5 (0.2)
left against medical advice	2 (0.1)
transferred to other service/hospital	2 (0.1)
missing	65 (3.1)
Wait time (between ED registration and discharge)	
<3 hours	490 (23.3)
3 to <5 hours	570 (27.1)
5 to <8 hours	557 (26.5)
8 or more hours	485 (23.1)

Characteristic	**Frequency (%)**
mean (SD) (hours:minutes)	6:21 (5:20)
median (range)	4:34 (0–53:33)
Time from last ED discharge to death	
same day	69 (5.9)
1–2 days	115 (9.8)
3–7 days	185 (15.7)
8–14 days	144 (12.2)
15–31 days	195 (16.6)
>31 days	470 (39.9)

Values are not exclusive and may reflect multiple visits; 1,182 unique patients made 2,103 visits over the seven-year period

[1] Canadian Emergency Department Triage and Acuity Scale (CTAS)

Table 2

HALIFAX MUNICIPALITY RESIDENTS ADMITTED TO THE CAPITAL HEALTH INTEGRATED PALLIATIVE SERVICE (CHIPCS) WITH AT LEAST ONE DAY TO POTENTIALLY VISIT THE EMERGENCY DEPARTMENT (n=3,221)

Characteristic	**Number of Patients (%)**	
	No ED visits (n=2,105)	**At least one ED visit (n=1,116)**
Sex		
female	1,064 (50.6)	561 (50.3)
male	1,041 (49.5)	554 (49.7)
Age[§], years		
<65	612 (29.1)	418 (37.5)
65–74	571 (27.2)	282 (25.3)
75–84	614 (29.2)	297 (26.6)
85+	304 (14.5)	118 (10.6)
Year of admission to CHIPCS[†]		
1999	266 (12.6)	168 (15.1)
2000	326 (15.5)	163 (14.6)
2001	277 (13.2)	163 (14.6)
2002	310 (14.7)	201 (18.0)
2003	330 (15.7)	162 (14.5)
2004	339 (16.1)	151 (13.5)
2005	257 (12.2)	108 (9.7)
Year of death		
1999	197 (9.4)	96 (8.6)
2000	308 (14.6)	135 (12.1)
2001	283 (13.4)	153 (13.7)
2002	295 (14.0)	183 (16.4)
2003	337 (16.0)	190 (17.0)
2004	326 (15.5)	176 (15.8)
2005	359 (17.1)	183 (16.4)
Integrated program implementation[‡]		
pre (January 1999 to June 2004)	1,674 (79.5)	941 (84.3)
post (July 2004 to December 2005)	431 (20.5)	175 (15.7)
Survival[§] (days from admission to CHIPCS to death)		
0–30	697 (33.1)	147 (13.2)
31–60	471 (22.4)	183 (16.4)
61–90	271 (12.9)	142 (12.7)
91–120	173 (8.2)	116 (10.4)
121 +	493 (23.4)	528 (47.3)
Location of death[§]		
hospital death (not in PCP unit)	438 (20.8)	378 (33.9)

Characteristic	**Number of Patients (%)**	
	No ED visits (n=2,105)	**At least one ED visit (n=1,116)**
palliative care unit	437 (20.8)	406 (36.4)
home	1,137 (54.0)	302 (27.1)
long-term care facility	93 (4.4)	29 (2.6)
Census residency indicator		
urban	1,777 (84.4)	922 (82.6)
rural	268 (12.7)	169 (15.1)
missing	60 (2.9)	25 (2.2)
Neighbourhood income quintile		
low	396 (18.8)	234 (21.0)
lower middle	390 (18.5)	208 (18.6)
middle	426 (20.2)	214 (19.2)
upper middle	426 (20.2)	198 (17.7)
upper	407 (19.3)	237 (21.2)
missing	60 (2.9)	25 (2.2)
Diagnostic summary[*]		
cancer only	1,665 (79.8)	924 (83.3)
other disease, no cancer	213 (10.2)	106 (9.6)
cancer and other	208 (10.0)	79 (7.1)
Caregiver relationship[‡]		
spouse or common law spouse	1,088 (55.2)	563 (53.1)
child	638 (32.4)	305 (28.8)
parents/other relations	183 (9.3)	150 (14.1)
friend/other	61 (3.1)	43 (4.1)
Caregiver lives with patient		
yes	1,352 (64.2)	683 (61.2)
no	753 (35.8)	433 (38.8)
Primary reasons for referral to CHIPCS (responses are not exclusive)		
pain	880 (41.8)	439 (39.3)
other symptoms	1,063 (50.5)	529 (47.4)
support[*] (family/patient/staff)	784 (37.2)	407 (36.5)
home consultation/care	533 (25.3)	252 (22.6)
terminal/end of life care[§]	228 (10.8)	72 (6.5)
respite care	2 (0.1)	0 (0.0)
grief/bereavement	11 (0.5)	4 (0.4)
decision making	67 (3.2)	27 (2.4)
unclear[†]	29 (1.4)	4 (0.4)
'Potential ED' days[§] (total survival-total inpatient time following CHIPCS admission)		
1–31	898 (42.7)	260 (23.3)
32–93	655 (31.1)	313 (28.1)

Characteristic	**Number of Patients (%)**	
	No ED visits (n=2,105)	**At least one ED visit (n=1,116)**
94+	552 (26.2)	543 (48.7)
‘Potential ED’ days[§]		
mean (standard deviation)	85.3 (131.8)	176.7 (250.8)
median (range)	41 (1–1,464)	89.5 (1–2,223)
Total acute hospital (inpatient) days[§]		
mean (standard deviation)	10.9 (21.1)	24.9 (45.2)
median (range)	2 (0–270)	12 (0–979)
Total days at home (excluding nursing home)[§]		
mean (standard deviation)	82.9 (129.9)	172.5 (246.8)
median (range)	39 (0–1,464)	86 (0–2,223)
Total days in a long term care facility		
mean (standard deviation)	2.3 (27.5)	4.0 (52.4)
median (range)	0 (0–854)	0 (0–1,534)

Note: Some frequencies may not add to total values due to missing data

Chi square tests of association, Wilcoxon rank sum scores:

[*] p<0.05;

[†] p<0.01;

[‡] p<0.001;

[§] p<0.0001

Table 3

CHARACTERISTICS ASSOCIATED WITH THE ODDS OF HAVING MADE AT LEAST ONE EMERGENCY DEPARTMENT (ED) VISIT FOLLOWING ENROLLMENT IN CHIPCS: ALL PATIENTS* AND BY SEX

Characteristic	**Odds Ratio; 95% Confidence Intervals**			
	All patients		**Female**	**Male**
	Unadjusted	**Adjusted**[2]	**Adjusted**[2]	**Adjusted**[2]
Sex (vs. male)				
female	1.0 (0.9, 1.1)	_	_	_
Age, years (vs. <65)				
65–74	0.7 (0.6, 0.9)	0.8 (0.6, 1.0)	0.7 (0.5, 0.9)	0.9 (0.7, 1.2)
75–84	0.7 (0.6, 0.9)	0.8 (0.7, 1.0)	0.9 (0.7, 1.3)	0.7 (0.5, 1.0)
85+	0.6 (0.4, 0.7)	0.7 (0.6, 1.0)	0.6 (0.4, 0.9)	1.0 (0.6, 1.5)
Location of death (vs. home)				
acute hospital death	3.2 (2.7, 3.9)	3.5 (2.8, 4.3)	3.6 (2.7, 4.8)	3.4 (2.5, 4.9)
hospital palliative care unit	3.5 (2.9, 4.2)	3.3 (2.7, 4.0)	3.1 (2.3, 4.1)	3.5 (2.7, 4.7)
long-term care facility	1.2 (0.8, 1.8)	1.0 (0.6, 1.7)	0.5 (0.2, 1.2)	1.4 (0.8, 2.7)
Census residency indicator (vs. urban)				
rural	1.2 (1.0, 1.5)	1.3 (1.0, 1.6)	1.6 (1.2, 2.3)	1.0 (0.7, 1.4)
Caregiver relationship (vs. spouse, partner)				
child	0.9 (0.8, 1.1)	1.0 (0.8, 1.2)	1.1 (0.8, 1.4)	1.0 (0.7, 1.4)
friend/other	1.4 (0.9, 2.0)	1.4 (0.9, 2.2)	1.6 (0.8, 3.2)	1.4 (0.8 2.5)
parents/other relations	1.6 (1.2, 2.0)	1.5 (1.1, 1.9)	1.4 (1.0, 2.0)	1.6 (1.1, 2.4)
Pain as primary reason for PCP referral (vs. no)				
yes	0.9 (0.8, 1.0)	0.8 (0.7, 1.0)	–	–
Potential ED days[1] (vs. 94+ days)				
1–31	0.3 (0.2, 0.4)	0.3 (0.2, 0.4)	0.3 (0.2, 0.4)	0.3 (0.2, 0.4)
32–93	0.5 (0.4, 0.6)	0.5 (0.4, 0.6)	0.5 (0.4, 0.7)	0.5 (0.4, 0.6)

Limited to patients with at least one day’s opportunity to make an ED visit (n=3,221)

[1] Potential ED days=total days from PCP admission to death minus total days as a hospital inpatient during this period

[2] Adjusted for all other characteristics in the models shown. Income, diagnosis, pain, other symptoms as primary reason for CHIPCS referral, and year of admission to the program did not add significantly to the models.