

# The Health Care Cost of Dying in Ontario: A Retrospective Population-Based Cohort Study of the Last Year of Life

Peter Tanuseputro MD, MHC<sup>1,2,3</sup>, Walter Wodchis<sup>3,4</sup> PhD, MAE, MA, Rob Fowler MD, MSc<sup>3,5</sup>, Peter Walker MD<sup>1,6</sup>, Yu Qing Bai PhD<sup>4</sup>, Sue E. Bronskill PhD<sup>3,4</sup>, Douglas Manuel MD, MSc<sup>1,2,3,6,7,8</sup>

<sup>1</sup>Bruyère Research Institute, Bruyère Centre of Learning, Research and Innovation in Long-Term Care; <sup>2</sup>Ottawa Hospital Research Institute; <sup>3</sup>Institute for Clinical Evaluative Sciences; <sup>4</sup>Institute for Health Policy, Management & Evaluation, University of Toronto; <sup>5</sup>Department of Medicine and Department of Critical Care Medicine, Sunnybrook Hospital, University of Toronto; <sup>6</sup>Department of Medicine, University of Ottawa; <sup>7</sup>Health Analysis Division, Statistics Canada; <sup>8</sup>Department of Family Medicine, University of Ottawa



## BACKGROUND & OBJECTIVES

- Coordinated and appropriate health care across sectors is an ongoing challenge; this is especially true at the end of life, where health needs are high, and the need for continuing care rises.
- Data on health care use and cost at the end of life, however, are seldom reported at a population level, across a comprehensive array of health care sectors.
- Such data is needed to identify the level of care being provided and potential areas where care can be optimized.
- Study Objective:** To describe health care use and the associated cost to the health care system for all Ontario decedents in their last year of life.

This study is part of a series of projects that will describe end-of-life care in Ontario. This includes an examination of factors that influence health care use and cost, and reporting on indicators that measure the performance of the health care system at the end-of-life.

## DATA SOURCES

Table 1: Databases used to record health care use and cost at the end-of-life

| Health Care Sector      | Database  | Description   |
|-------------------------|---|---|
| Continuing Care         |   |   |
| Long-term Care          | Continuing Care Reporting System (CCRS)                     | Resident information for over 600 publicly funded residential care homes with 24-hour nursing care  |
| Complex Continuing Care | CCRS  | Hospitalized patients who are deemed to be in a non-acute, alternate level of care  |
| Home Care               | Home Care Database (HCD)                                    | Data from the Ontario Association of Community Care Access Centers, responsible for providing publicly funded home care   |
| Rehabilitation          | National Rehabilitation Reporting System (NRRS)             | Data from participating adult inpatient rehabilitation facilities and programs across Canada  |
| Acute Care              |   |   |
| Inpatient without ICU   | CIHI-DAD*   | Administrative, clinical, and demographic data on hospital discharges   |
| Inpatient with ICU      | CIHI-DAD  | Individuals with at least one Intensive Care Unit (ICU) visit   |
| Emergency Department    | National Ambulatory Care Reporting System (NACRS)           | Emergency department visits   |
| Outpatient Care         |   |   |
| Outpatient clinics      | NACRS   | Outpatient visits held in hospitals, including dialysis clinics and cancer care clinics   |
| Physician Billings      | Ontario Health Insurance Plan (OHIP) Claims Database        | Claims data for approximately 98% of physicians in Ontario  |
| Non-Physician Billings  | OHIP  | Health professionals for provincial insured clients/services, such as select midwives, oral surgeons, chiropractors, optometrists, and physiotherapists. Some care may occur for inpatients   |
| Laboratory              | OHIP  | Outpatient laboratory services. Does not include laboratory services for inpatients   |
| Drugs/Devices           | Ontario Drug Benefit (ODB), Assistive Devices Program (ADP) | Drugs for those over 65 years, on social assistance, residents of LTC, home care recipients, Trillium drug program and special drug program recipients for those qualifying for assistance. Select medically-necessary devices including home oxygen and respiratory devices. |

\*CIHI-DAD: Canadian Institute for Health Information-Discharge Abstract Database

## METHODS

- This retrospective cohort study identified all deaths in Ontario from April 1, 2010 to March 31, 2012.
- Using population-based health administrative databases linked at an individual level, we examined the health care use and cost of each decedent in their last year of life.
- We describe decedents and their incurred costs across socio-demographic characteristics. We then determined the proportion of decedents with at least one use in each health sector, and the average cost per user.
- The total and distribution of costs across health sectors were described for the last year of life, and by month leading to death.

## RESULTS

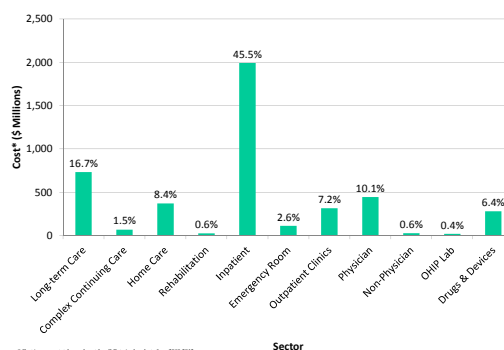
Table 2: Characteristics of health care users (1+ use) in the last year of life, by health care sector, Ontario decedents, 2010-2011

|                       | Decedents (n) | %     | Average Cost (\$) |
|-----------------------|---------------|-------|-------------------|
| All Decedents         | 177,817       | 100%  | 49,267            |
| Decedents with 1+ Use | 175,478       | 98.7% | 49,924            |
| Male                  | 86,514        | 49.3% | 49,325            |
| Female                | 88,964        | 50.7% | 50,507            |
| Age, yr*              |               |       |                   |
| <19                   | 1,984         | 1.1%  | 45,530            |
| 19-44                 | 5,229         | 3.0%  | 42,687            |
| 45-54                 | 9,183         | 5.2%  | 49,681            |
| 55-64                 | 18,151        | 10.3% | 53,713            |
| 65-74                 | 27,833        | 15.9% | 55,237            |
| 75-84                 | 48,784        | 27.8% | 51,789            |
| 85-94                 | 52,807        | 30.1% | 46,402            |
| 95+                   | 11,507        | 6.6%  | 43,599            |
| Neighbourhood Income* |               |       |                   |
| Quintile 1 (Q1)       | 40,363        | 23.0% | 51,023            |
| Q2                    | 36,399        | 20.7% | 49,822            |
| Q3                    | 33,476        | 19.1% | 49,440            |
| Q4                    | 32,658        | 18.6% | 50,229            |
| Q5                    | 30,880        | 17.6% | 49,311            |
| Rurality*             |               |       |                   |
| Urban                 | 148,931       | 84.9% | 50,758            |
| Rural                 | 25,693        | 14.6% | 45,668            |

\* Among decedents with 1+ health care use in the last year of life

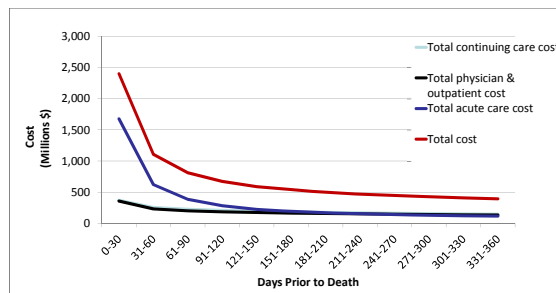
Table 3: Health care use (1+ use) and average cost in the last year of life, by health care sector, Ontario decedents, 2010-2011

|                               | Health Care User (n) | Proportion of all Decedents | Average Cost Among Users (\$) |
|-------------------------------|----------------------|-----------------------------|-------------------------------|
| Continuing Care               |                      |                             |                               |
| Long-term Care                | 42,864               | 24.1%                       | 34,129                        |
| Complex Continuing Care       | 17,616               | 9.9%                        | 7,565                         |
| Home Care                     | 105,869              | 59.5%                       | 6,988                         |
| Rehabilitation                | 2,577                | 1.4%                        | 20,115                        |
| Acute Care                    |                      |                             |                               |
| Inpatient w/o ICU             | 94,624               | 53.2%                       | 22,378                        |
| Inpatient w/ ICU              | 37,016               | 20.8%                       | 50,393                        |
| Emergency Department          | 146,763              | 82.5%                       | 1,525                         |
| Outpatient Care               |                      |                             |                               |
| Outpatient clinics            | 59,341               | 33.4%                       | 10,598                        |
| Physician Billings            | 174,449              | 98.1%                       | 5,088                         |
| Non-physician Billings (OHIP) | 85,350               | 48.0%                       | 618                           |
| Laboratory (OHIP)             | 139,936              | 78.7%                       | 267                           |
| Drugs/Devices                 | 157,112              | 88.4%                       | 3,561                         |
| All Decedents                 | 177,817              | 100%                        | 49,924                        |



\* Cost is average total annual cost for all Ontario decedents from 2010-2012

Figure 1: Total and proportion of health care cost in the last 360 days of life, by health care sector, Ontario decedents, 2010-2011



Continuing Care = Long-term Care + Complex Continuing Care + Home Care + Rehabilitation

Acute Care = Hospitalizations + Emergency Room Visits

Physician + Outpatient = Physician + Non-physician visits + Labs + Drugs & Devices + Outpatient Visits

Figure 2: Health care cost leading to death, by health care sector groupings, Ontario, 2010-2011

## KEY FINDINGS

- Among 177,187 decedents, the average health care cost in the last year of life was \$49,267.
- The total annual cost for all sectors examined in the last year of life was \$4.7 billion.
- Costs varied by age at death, but not by sex. Costs did not vary across postal code derived income quintiles, but were less for among rural (\$45,668) as compared to urban residents (\$50,758).
- Inpatient care was incurred by 74% of decedents, at an average cost of \$30,255. Inpatient care consumed 45.5% of all costs and sharply rose in the last 120 days prior to death while other sectors remained relatively stable.
- More than three-quarters used physician services, medications/devices, laboratory services, and emergency rooms. These services combined comprised of less than 20% of total cost.
- Among decedents, 24% used long-term-care (LTC) and 60% used home care, at an average cost of \$34,129 and \$6,988 among users, respectively.

## IMPLICATIONS

- The cost of health care as death approaches is significant, but fairly stable with the exception of inpatient care in the last 120 days. Shifting the cost curve during this period will lead to substantial cost savings.
- The cost of LTC per patient is substantial when compared to average cost of home care.
- Introducing interventions that reduce hospitalizations and delay institutionalization will not only potentially improve the patient dying experience, but will also substantially reduce the costs associated with end-of-life care in Ontario.

## Future Work

- This work describes a population overview of health care use and cost in the last year of life in Ontario, Canada. These findings will lead to research that examine further variations in health care use and cost across meaningful subgroups such as health planning regions, disease cohorts, and places of care.
- Furthermore, we will examine the factors that potentially explain such variations, including the provision of end-of-life and palliative care.

## ACKNOWLEDGEMENTS

This research was supported by a research grant from the Ontario Ministry of Health and Long Term Care (MOHLTC) to the Health System Performance Research Network (HSPRN). The opinions, results and conclusions reported in this paper are those of the authors and are independent from the funding sources. No endorsement by the MOHLTC is intended or should be inferred. Dr. Tanuseputro is partially supported by the Bruyère Center for Learning, Research, and Innovation and the Population Health Intervention Research Network.

We would like to acknowledge the assistance of Jessica Goncalves, HSPRN in creating this poster.

Additional information:  
ptanuseputro@ohri.ca

