

## Online Data Supplement

**Title:** End-of-Life Care in Individuals with Respiratory Diseases: A Population Study Comparing the Dying Experience between Those with Chronic Obstructive Pulmonary Disease and Lung Cancer

**Authors:** Tetyana Kendzerska, Jason W. Nickerson, Amy T. Hsu, Andrea Gershon, Robert Talarico, Sunita Mulpuru, Smita Pakhale, Peter Tanuseputro

1. Descriptions of the databases used
2. **Table E1.** Codes used to identify the provision of palliative care in the last 90 days of life.
3. **Table E2.** Location of death, days spent in health care and health care cost by the receipt of palliative home care or physician home visits in the last 90 days of life and by the condition of interest.
4. **Table E3.** Adjusted odds of death in acute care by receipt of palliative home care and physician home visit in the last 90 days of life. Effects expressed as odds ratios and 95% confidence interval.
5. **Table E4.** Adjusted risks of longer time spent in a hospital (all-causes) by receipt of palliative home care and physician home visit in the last 90 days of life Outcome. Effects expressed as incidence risk ratio and 95% confidence interval.
6. **Table E5.** Adjusted rates of total healthcare cost by receipt of palliative home care and physician home visit in the last 90 days of life. Effects expressed as mean rate ratio and 95% confidence interval.
7. **Reference**

### **Descriptions of the databases used**

The main databases used were the Registered Persons Database, which includes demographic and all-cause mortality data; the Ontario Health Insurance Plan Database which contains all claims made by physicians (and other health care providers) for insured services; the Discharge Abstract Database which captures all provincial hospital admission discharge data; the National Ambulatory Care Reporting System, which contains information on emergency department and selected outpatient visits; the Continuing Care Reporting System, which contains resident information for all publicly-funded residential care homes with 24-hour nursing care and those in designated complex, sub-acute institutional care beds; the National Rehabilitation Reporting System, which provides data on adult inpatient rehabilitation care; the Home Care Database, which collects service data on home care services; the Ontario Cancer Registry, which provides information on all Ontario residents who have been newly diagnosed with cancer or who have died of cancer;<sup>1-4</sup> and the Ontario COPD Database which includes information on prevalent and incident COPD cases.<sup>5</sup> Details on databases used are available at <https://datadictionary.ices.on.ca>.

**Table E1.** Codes used to identify the provision of palliative care in the last 90 days of life.

<b>The provision of palliative care</b>	<b>Data Source</b>	<b>Definition</b>
<b>Physician Home Visit<sup>6</sup></b>	OHIP	<ul style="list-style-type: none"> <li>– A900 with (B966 B998 B997)</li> <li>– A901 with (B966 B998 B997)</li> <li>– A945 with any B code</li> <li>– K023 with A900 A901 or any B code</li> <li>– K015 with A900 A901 or any B code</li> <li>– B966</li> <li>– B998</li> <li>– B997</li> <li>– A900 A901 B960 B961 B962 B963 B964 B986 B987 B988 B990 B992 B993 B994 B996</li> </ul>
<b>Palliative Home Care<sup>7</sup></b>	HCD	<ul style="list-style-type: none"> <li>– SRC_admission = 95: Service recipient code (i.e. classification) of end of life on admission</li> <li>– Service_RPC = 95: Service care goal of end of life; patient provided service under end-of-life designation</li> <li>– SRC_discharge = 95: Service recipient code of end of life on discharge</li> </ul>

**Databases used:**

The Ontario Health Insurance Plan (OHIP) database

The Home Care Database (HCD)

**Table E2.** Location of death, days spent in health care and health care cost by the receipt of palliative home care or physician home visits in the last 90 days of life and by the condition of interest

	COPD Only				Lung Cancer Only				COPD and Lung Cancer			
	Palliative Home Care Visit		Physician Home Visit		Palliative Home Care Visit		Physician Home Visit		Palliative Home Care Visit		Physician Home Visit	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
<i>Location of death, N (%)</i>												
<b>Acute care</b>	74,672 (56.76)	6,330 (32.55)	72,910 (55.93)	8,092 (39.22)	4,820 (64.68)	2,921 (35.68)	6,544 (60.77)	1,197 (24.58)	8,524 (66.13)	4,214 (37.65)	10,793 (62.15)	1,945 (28.96)
<b>Sub-acute care</b>	9,062 (6.89)	2,073 (10.66)	9,517 (7.30)	1,618 (7.84)	1,253 (16.81)	1,036 (12.66)	1,806 (16.77)	483 (9.92)	1,986 (15.41)	1,481 (13.23)	2,730 (15.72)	737 (10.97)
<b>Long-term care</b>	27,179 (20.66)	257 (1.32)	26,593 (20.40)	843 (4.09)	518 (6.95)	21 (0.26)	515 (4.78)	24 (0.49)	1,024 (7.94)	71 (0.63)	1,030 (5.93)	65 (0.97)
<b>Community</b>	20,640 (15.69)	10,786 (55.46)	21,347 (16.37)	10,079 (48.86)	861 (11.56)	4,208 (51.41)	1,904 (17.68)	3,165 (65.01)	1,356 (10.52)	5,426 (48.48)	2,813 (16.20)	3,969 (59.10)
<i>Days spent in health care in the last 90 days of life, days, mean (SD)</i>												
<b>Acute care</b>	13.39 (17.83)	13.82 (15.34)	13.55 (17.97)	12.76 (14.39)	15.98 (16.08)	12.57 (13.9)	15.87 (15.9)	10.49 (12.28)	16.4 (16.97)	13.27 (14.28)	16.3 (16.71)	11.45 (12.74)
<b>Sub-acute care</b>	3.57 (14.28)	2.9 (10.54)	3.67 (14.49)	2.26 (8.76)	5.19 (16.49)	2.97 (10.54)	4.9 (15.52)	2.1 (8.3)	5.38 (17.04)	3.18 (10.89)	5.11 (16.16)	2.41(8.8 8)
<b>Home care</b>	9.36 (19.41)	32.72 (26.41)	9.21 (18.85)	32.36 (28.28)	6.83 (14.41)	26.12 (22.04)	10.99 (17.19)	30.05 (23.01)	8.08 (16.14)	26.71 (22.42)	11.46 (17.97)	30.4 (23.52)
<b>Long-term care</b>	16.75 (22.72)	16.64 (18.66)	17.02 (22.94)	14.94 (17.06)	20.95 (22.26)	15.43 (17.25)	20.58 (21.51)	12.5 (14.66)	21.6 (23.29)	16.36 (17.83)	21.24 (22.57)	13.79 (15.43)
<i>Cost in the last 90 days of life, CA\$, mean (SD)*</i>												
<b>Cost</b>	29,401 (35,026)	28,431 (22,349)	29,778 (35,135)	26,105 (21,959)	32,113 (27,013)	28,796 (19,163)	32,117 (25,201)	26,527 (17,799)	32,692 (30,493)	28,664 (20,492)	32,453 (28,734)	26,598 (18,417)

\*All costs were expressed in 2015 Canadian dollars; we inflated past costs using health care-specific yearly consumer index reported by Statistics Canada

**Table E3.** Adjusted odds of death in acute care by receipt of palliative home care and physician home visit in the last 90 days of life. Effects expressed as odds ratios and 95% confidence interval.

Parameter	COPD only	Lung cancer only	COPD and lung cancer
	Odds Ratio (95% Confidence Interval)		
<i>Effect of palliative care</i>			
Physician Home Visits: Yes vs. No	0.65 (0.62-0.67)	0.30 (0.28-0.33)	0.37 (0.35-0.40)
Palliative Home Care vs. Non-Palliative Home Care	0.28 (0.27-0.29)	0.44 (0.40-0.47)	0.41 (0.38-0.44)
Palliative Home Care vs. No Home Care	0.54 (0.52-0.56)	0.43 (0.39-0.47)	0.43 (0.40-0.47)
Non-Palliative Home Care vs. No Home Care	1.94 (1.90-1.99)	0.99 (0.90-1.09)	1.06 (0.98-1.14)
<i>Covariates</i>			
Age, years			
50-59 vs <50	0.97 (0.88-1.07)	0.72 (0.59-0.88)	0.63 (0.46-0.85)
60-69 vs <50	1.04 (0.95-1.15)	0.61 (0.50-0.74)	0.53 (0.39-0.70)
70-79 vs <50	1.01 (0.92-1.11)	0.48 (0.39-0.58)	0.47 (0.35-0.63)
80-89 vs <50	0.67 (0.61-0.73)	0.38 (0.31-0.46)	0.36 (0.27-0.48)
90+ vs <50	0.40 (0.36-0.44)	0.21 (0.16-0.27)	0.22 (0.16-0.31)
Female vs Male	0.81 (0.79-0.82)	0.83 (0.77-0.89)	0.82 (0.77-0.86)
Rural vs Urban	1.07 (1.04-1.10)	1.31 (1.19-1.44)	1.37 (1.27-1.47)
Low vs Lowest	1.08 (1.05-1.12)	1.08 (0.97-1.20)	0.98 (0.91-1.06)
Middle vs Lowest	1.01 (0.98-1.05)	1.04 (0.94-1.16)	1.02 (0.94-1.11)
High vs Lowest	0.98 (0.95-1.01)	0.97 (0.87-1.08)	1.00 (0.92-1.08)
Highest vs Lowest	1.02 (0.99-1.06)	1.03 (0.93-1.16)	0.95 (0.87-1.03)
# of comorbidities vs none			
1	1.22 (1.00-1.49)	1.47 (0.88-2.43)	0.77 (0.19-3.04)
2	1.34 (1.11-1.62)	1.54 (0.93-2.54)	0.76 (0.19-2.97)
3	1.58 (1.31-1.90)	1.59 (0.96-2.62)	0.83 (0.21-3.25)
4	1.64 (1.36-1.97)	1.74 (1.06-2.88)	0.91 (0.23-3.57)
5	1.80 (1.50-2.17)	1.74 (1.05-2.89)	0.92 (0.23-3.60)
6	2.00 (1.66-2.40)	1.97 (1.18-3.28)	0.98 (0.25-3.86)
7	2.20 (1.83-2.65)	2.15 (1.27-3.64)	0.96 (0.24-3.78)
8	2.28 (1.89-2.74)	2.18 (1.25-3.81)	1.05 (0.27-4.14)
9	2.37 (1.97-2.86)	1.40 (0.73-2.69)	1.02 (0.26-4.02)
10+	2.40 (1.98-2.89)	1.36 (0.51-3.66)	1.02 (0.26-4.05)

**Table E4.** Adjusted risks of longer time spent in a hospital (all-causes) by receipt of palliative home care and physician home visit in the last 90 days of life. Effects expressed as incidence risk ratio and 95% confidence interval.

	<b>COPD only</b>	<b>Cancer only</b>	<b>COPD and cancer</b>
<b>Parameter</b>	<b>Incidence Risk Ratio (95% Confidence Interval)</b>		
<i>Effect of palliative care</i>			
<b>Physician Home Visits: Yes vs. No</b>	0.82 (0.80-0.83)	0.68 (0.65-0.71)	0.72 (0.70-0.75)
<b>Palliative Home Care vs. No Home Care</b>	1.82 (1.78-1.87)	1.08 (1.03-1.14)	1.18 (1.13-1.22)
<b>Palliative Home Care vs. Non-Palliative Home Care</b>	0.78 (0.76-0.80)	0.77 (0.74-0.81)	0.77 (0.74-0.80)
Non-Palliative Home Care vs. No Home Care	2.33 (2.30-2.37)	1.40 (1.33-1.48)	1.53 (1.47-1.59)
<i>Covariates</i>			
Age, years			
50-59 vs <50	0.88 (0.82-0.94)	0.85 (0.77-0.94)	0.87 (0.75-1.01)
60-69 vs <50	0.88 (0.83-0.94)	0.80 (0.72-0.88)	0.81 (0.70-0.94)
70-79 vs <50	0.81 (0.77-0.87)	0.76 (0.69-0.84)	0.75 (0.65-0.87)
80-89 vs <50	0.67 (0.63-0.72)	0.68 (0.61-0.75)	0.70 (0.60-0.80)
90+ vs <50	0.48 (0.45-0.51)	0.54 (0.48-0.62)	0.54 (0.46-0.64)
Female vs Male	0.88 (0.87-0.89)	1.03 (0.99-1.07)	0.99 (0.96-1.02)
Rural vs Urban	0.91 (0.89-0.93)	0.99 (0.94-1.04)	1.04 (1.00-1.08)
Low vs Lowest	1.02 (1.00-1.04)	0.97 (0.92-1.03)	0.98 (0.94-1.02)
Middle vs Lowest	0.99 (0.97-1.01)	0.93 (0.88-0.98)	0.96 (0.92-1.00)
High vs Lowest	0.98 (0.96-1.01)	0.96 (0.90-1.01)	0.96 (0.92-1.00)
Highest vs Lowest	0.99 (0.97-1.01)	0.96 (0.90-1.02)	0.98 (0.93-1.02)
# of comorbidities			
1	1.96 (1.70-2.24)	3.74 (2.77-5.06)	3.45 (1.60-7.46)
2	2.45 (2.15-2.80)	4.19 (3.11-5.66)	3.71 (1.73-7.98)
3	2.80 (2.46-3.19)	4.34 (3.22-5.85)	3.85 (1.79-8.27)
4	3.07 (2.70-3.50)	4.63 (3.43-6.25)	4.29 (2.00-9.22)
5	3.45 (3.03-3.92)	4.93 (3.65-6.66)	4.36 (2.03-9.36)
6	3.74 (3.28-4.25)	5.23 (3.86-7.08)	4.61 (2.15-9.90)
7	4.03 (3.54-4.59)	5.63 (4.13-7.68)	4.81 (2.24-10.33)
8	4.35 (3.82-4.95)	5.97 (4.32-8.27)	5.14 (2.39-11.05)
9	4.70 (4.12-5.35)	5.67 (3.92-8.21)	5.11 (2.38-11.01)
10+	5.04 (4.41-5.75)	5.53 (3.21-9.53)	5.78 (2.68-12.46)

**Table E5.** Adjusted rates of total healthcare cost by receipt of palliative home care and physician home visit in the last 90 days of life. Effects expressed as mean rate ratio and 95% confidence interval.

	<b>COPD only</b>	<b>Lung cancer only</b>	<b>Lung cancer and COPD</b>
<b>Parameter</b>	<b>Mean Rate Ratio (95% Confidence Interval)</b>		
<i>Effect of palliative care</i>			
<b>Physician Home Visits: Yes vs. No</b>	0.82 (0.81-0.84)	0.84 (0.82-0.86)	0.85 (0.83-0.87)
<b>Palliative Home Care vs. No Home Care</b>	1.25 (1.23-1.28)	1.04 (1.01-1.07)	1.05 (1.02-1.08)
<b>Palliative Home Care vs. Non-Palliative Home Care</b>	0.89 (0.87-0.90)	0.87 (0.84-0.89)	0.85 (0.83-0.87)
Non-Palliative Home Care vs. No Home Care	1.41 (1.40-1.43)	1.20 (1.16-1.24)	1.24 (1.20-1.27)
<i>Covariates</i>			
Age, years			
50-59 vs <50	0.86 (0.82-0.90)	0.86 (0.81-0.92)	0.93 (0.84-1.03)
60-69 vs <50	0.82 (0.79-0.86)	0.81 (0.77-0.86)	0.84 (0.76-0.92)
70-79 vs <50	0.74 (0.71-0.77)	0.74 (0.70-0.78)	0.74 (0.67-0.81)
80-89 vs <50	0.59 (0.56-0.61)	0.62 (0.59-0.66)	0.63 (0.58-0.70)
90+ vs <50	0.47 (0.46-0.50)	0.51 (0.48-0.55)	0.54 (0.49-0.60)
Female vs Male	0.95 (0.94-0.96)	1.03 (1.01-1.05)	0.99 (0.97-1.01)
Rural vs Urban	0.84 (0.83-0.85)	0.88 (0.85-0.91)	0.89 (0.87-0.92)
Low vs Lowest	1.02 (1.01-1.04)	0.98 (0.94-1.01)	1.01 (0.98-1.03)
Middle vs Lowest	1.01 (0.99-1.02)	0.97 (0.94-1.01)	0.99 (0.97-1.02)
High vs Lowest	1.01 (0.99-1.02)	1.00 (0.97-1.04)	1.01 (0.98-1.04)
Highest vs Lowest	1.02 (1.01-1.04)	1.01 (0.97-1.04)	1.04 (1.01-1.07)
# of comorbidities			
1	1.76 (1.60-1.93)	3.63 (3.04-4.33)	3.98 (2.53-6.27)
2	2.24 (2.05-2.45)	3.96 (3.32-4.72)	4.08 (2.60-6.41)
3	2.52 (2.31-2.75)	4.04 (3.39-4.81)	4.41 (2.81-6.92)
4	2.79 (2.55-3.04)	4.33 (3.63-5.16)	4.66 (2.97-7.31)
5	3.08 (2.82-3.36)	4.58 (3.84-5.47)	4.79 (3.05-7.51)
6	3.34 (3.06-3.65)	4.73 (3.96-5.64)	5.03 (3.20-7.89)
7	3.56 (3.26-3.89)	5.13 (4.28-6.16)	5.29 (3.37-8.31)
8	3.83 (3.51-4.18)	5.33 (4.40-6.45)	5.61 (3.57-8.80)
9	4.09 (3.74-4.47)	5.69 (4.57-7.09)	5.64 (3.59-8.86)
10+	4.33 (3.96-4.73)	6.25 (4.52-8.65)	6.39 (4.06-10.05)

## References:

1. Robles SC, Marrett LD, Clarke EA, Risch HA. An application of capture-recapture methods to the estimation of completeness of cancer registration. *Journal of clinical epidemiology*. 1988;41(5):495-501.
2. McLaughlin JR, Kreiger N, Marrett LD, Holowaty EJ. Cancer incidence registration and trends in Ontario. *Eur J Cancer*. 1991;27(11):1520-1524.
3. Hall S, Schulze K, Groome P, Mackillop W, Holowaty E. Using cancer registry data for survival studies: the example of the Ontario Cancer Registry. *Journal of clinical epidemiology*. 2006;59(1):67-76.
4. Brenner DR, Tammemagi MC, Bull SB, Pinnaduwa D, Andrulis IL. Using cancer registry data: agreement in cause-of-death data between the Ontario Cancer Registry and a longitudinal study of breast cancer patients. *Chronic diseases in Canada*. 2009;30(1):16-19.
5. Gershon AS, Wang C, Guan J, Vasilevska-Ristovska J, Cicutto L, To T. Identifying individuals with physician diagnosed COPD in health administrative databases. *Copd*. 2009;6(5):388-394.
6. Brown CR, Hsu AT, Kendall C, et al. How are physicians delivering palliative care? A population-based retrospective cohort study describing the mix of generalist and specialist palliative care models in the last year of life. *Palliat Med*. 2018:269216318780223.
7. Tanuseputro P, Budhwani S, Bai YQ, Wodchis WP. Palliative care delivery across health sectors: A population-level observational study. *Palliative medicine*. 2017;31(3):247-257.