

Appendix I

ICES Databases and their use in this study

ICES Databases	Description	Study variables
Client Agency Program Enrolment (CAPE) Database	CAPE provides information on primary care physicians' care organization and remuneration model. This data was provided by the (former) Ontario Ministry of Health and Long-Term Care (MOHLTC).	Physician remuneration for capitation-based models
Continuing Care Reporting System (CCRS)	CCRS is updated quarterly and contains demographic, administrative, clinical and resource utilization information on those in continuing care services in hospitals or long-term care homes.	Identifying institutional deaths in long-term care
Corporate Provider Database (CPDB)	CPBD provides practice information on providers' practice characteristics in Ontario. This data is updated quarterly.	Physician group practice and remuneration model
Discharge Abstract Database (DAD)	The DAD includes information on all hospitalizations based on a retrospective chart review including International Classification of Diseases-10 (ICD-10) diagnoses codes (up to 16 diagnoses codes for each discharge record), procedures performed during hospitalization, physician providing care, hospital administrative information, and patients' demographic information.	Hospitalizations and hospital deaths
Drug Identification Number (DIN) database	The DIN provides information on drugs administered in Ontario for controlled substances and for patients eligible for publicly covered benefits.	Medication claims Chronic conditions - multimorbidity score
Home Care Database (HCD)	The HCD provides clinical information for planning and reporting, information on assessments, admission to programs and service records.	Cohort creation – those who were enrolled in home care
Inter Resident Assessment Instrument (RAI) - Home Care Source (HSSO) – (RAIHC)	The Inter RAI-HC, included information from January 2018 and is a standardized clinical assessment that collects clinical and caregiver information for patients living at home with formal services.	Detailed clinical and caregiver information for sensitivity analyses
Local Health Integration Network (LHIN) data	The LHIN provides health service availability and the geographic bounds of the designated LHINs in Ontario.	Geographic distribution
National Ambulatory Care Reporting System (NACRS)	The NACRS holds data on visits to healthcare institutions. This includes demographics, the setting visited (e.g., day surgery, emergency department, cancer care unit), and clinical data (e.g., diagnosis, treatment).	Emergency department visits and institutional deaths
Ontario Health Insurance Plan (OHIP) Claims Database	The OHIP database holds all billing claims paid for by the Ontario Health Insurance Plan. Each record represents the delivery of a service from a particular physician to a particular patient and includes the date, the fee paid, and the number of times it was billed.	Home visit delivery (primary outcome), billing percentage - palliative care designation, institutional deaths in designated Palliative Care Unit.

Ontario Drug Benefits (ODB)	The ODB provides information on drugs administered in Ontario to patients eligible for publicly covered benefits (those <25 or >65 years of age or eligible for disability).	Medication claims Chronic conditions - multimorbidity score
Registered Persons Database (RPDB)	The RPDB holds information on each individual who has ever had an active Ontario health card number. This data was provided by the (former) Ministry of Health and Long-Term Care (MOHLTC). The most relevant information in this dataset are demographic information, geographic information, and eligibility of OHIP coverage.	Age, sex, postal code, death information
Statistics Canada - Postal Code Conversion File Plus (PCCF+)	This is an ICES derived macro designed to link PCCF files to other census geographic identifiers and was used to create urban/rural flags, neighbourhood income quintiles, dissemination area/enumeration area, census division, and latitude/longitude. This macro is updated according to changes in census data from which it is derived.	Converts postal code from the RPDB to determine: Rurality, Income quintile, Census division, LHIN, population size of practice location

Appendix II

The billing fee codes used to identify a physician home visit from the Ontario Health Insurance Plan (OHIP) database

OHIP codes	Description
A900	Complex house call assessment (frail elderly or housebound patients)
A901*	House call assessment (usually billed with B997 or B998)
B960	Travel premium for Special Visits to Patient's Home: Weekdays Daytime (07:00- 17:00) Nonelective OR Elective home visit
B961	Travel premium for Special Visits to Patient's Home: Weekdays Daytime (07:00- 17:00) with Sacrifice of Office Hours Nonelective
B962	Travel premium for Special Visits to Patient's Home: Evenings (17:00- 24:00) Monday through Friday Nonelective
B963	Travel premium for Special Visits to Patient's Home: Sat., Sun. and Holidays (07:00- 24:00) Nonelective
B964	Travel premium for Special Visits to Patient's Home: Nights (00:00- 07:00) Nonelective
B966	Travel premium-palliative care home visit
B990	Special visit to patient's home, weekday/daytime
B992	Special visit to patient's home, weekday/daytime, sacrifice office hours
B993	Special Visits to Patient's Home (other than Long-Term Care Institution), weekends and holidays (non-elective)
B994	Special visit to patient's home, non-elective, evening hours
B996	Special visit to patient's home, night time (first patient)
B998	Special visit to patient's home, palliative care, days, evenings (from 2005)
B986	Travel premium for a geriatric home visit
B987	Geriatric home visit during the night (00:00- 07:00) (first patient)
B988	Geriatric home visit to patient's home on days, evenings, and holidays (07:00-24:00) (first patient)

Legend: OHIP=Ontario Health Insurance Plan,

*Removed from the Schedule of Benefits – effective October 1, 2019

Appendix III

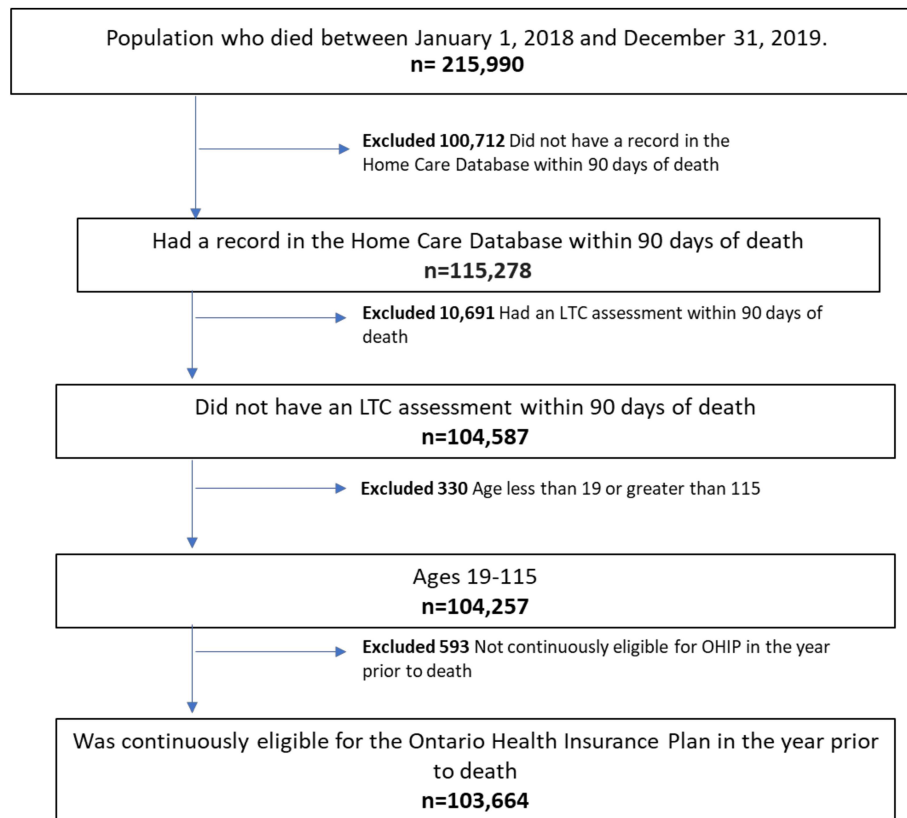
Home-based symptom management claims: common end-of-life symptoms and their respective pharmacological treatments captured in the Ontario Drug Benefits (ODB) database and the Drug Identification Number (DIN) database

Pain Management	Drug Identification Numbers
Morphine (injectable)	00392561,00392588,00617288,02242484,09857226,09857227
Morphine (oral)	00614505,00690783,00591467,00591475,00607762,00607770,00614491,00621935,00690791
Hydromorphone (oral)	00786535,01916386
Hydromorphone (injectable):	02145901,02145928,02145936,02146126
Acetaminophen (oral)	02027801
Acetaminophen + codeine (oral)	00816027
Dexamethasone (oral):	00042560
Dexamethasone (injectable):	00664227, 01977547
Fentanyl (transdermal):	02282941,02282968,02282976,02282984,02314630,02314649,02314657,02314665,02341387,02341395,02341409,02341417,02275856,02327120,02327147,02327155,02327163,02330113,02330121,02330148,02330156,02386852,02386879,02386887,02396718,02396726,02396734,02396742,09857577,09857579,09857580,09857581,09857582,09857584,09857585,09857587,09857588,09857589,09857590,09857592, 02386844, 02275848, 01937413, 02280345, 01937405, 02341379, 02327112, 02311925
Delirium/agitation	
Lorazepam (injectable)	02243278,09857216
Lorazepam (sublingual)	02041464,02410753,00637742,00637750,00655740,00655759,00655767,00711101,00728187,00728195,00728209,02041413,02041421,02041448,02041456,02041472,02410761,02410745
Midazolam (injectable)	02240286,09857225,02242905,09857436,09857438,09857479
Haloperidol (injectable)	02130297,02130300,09853758,00808652
Phenobarbital (injectable)	02304090,09857296
Phenobarbital (oral)	00645575
Methotrimeprazine (injectable)	01927698
Olanzapine (ODT, sublingual)	02243086,02243087,02243088,02303191,02303205,02303213,02321343,02321351,02321378,02327562,02327570,02327589,02327775,02327783,02327791,02360616,02360624,02360632,02382709,02382717,02382725,02389088,02389096,02389118,02406624,02406632,02406640,02414090,02414104,02414112,02436965,02436973,02436981,02448726,02448734,02448742,02327597,02360640,02448750,02406659,02389126,02437007,02327805,02414120,02243089

Terminal Secretions/nausea	
Scopolamine (injectable)	09857384,09857385,00363839,09857213,00541869,00541877,02242810,02242811,09857236,09857237
Glycopyrrolate (injectable)	02039508,02382857,09857212,09857266,09857521
Metoclopramide (injectable)	02185431, 09857224
Metoclopramide (oral)	02230433
Furosemide (injectable)	00527033, 09857208
Furosemide (oral)	02224720
Atropine (sublingual)	00035017,02023695

Appendix IV

Cohort Creation Flowchart



Appendix V

Sensitivity analysis using clinical and caregiver variables based on the sub-set of the cohort of decedents who died between January 1, 2018 and December 31, 2019 who received formal home care services in their last 90 days of life with completed Resident Assessment Instrument (RAI) home care assessments.

Table 1: Baseline characteristics of the patients with a complete RAI home care assessment

Patient characteristic		No home visit from NP or MD	Home visit from only NPs	Home visit from only MD	Home visit from both NP & MD	Total
	Overall	N=9,972	N=499	N=5,262	N=574	N=16,307
Sex	Female	4,897 (49.1%)	249 (49.9%)	2,825 (53.7%)	319 (55.6%)	8,290 (50.8%)
	Male	5,075 (50.9%)	250 (50.1%)	2,437 (46.3%)	255 (44.4%)	8,017 (49.2%)
Age (years)	Mean (SD)	80.95 (11.34)	79.04 (12.02)	83.13 (11.00)	81.14 (11.52)	81.60 (11.32)
	Median (Q1-Q3)	83 (74-89)	81 (72-88)	85 (78-91)	83 (75-89)	84 (75-90)
	18-44	62 (0.6%)	4 (0.8%)	24 (0.5%)	6 (1.0%)	96 (0.6%)
	45-54	180 (1.8%)	15 (3.0%)	77 (1.5%)	9 (1.6%)	281 (1.7%)
	55-64	654 (6.6%)	44 (8.8%)	243 (4.6%)	37 (6.4%)	978 (6.0%)
	65-74	1,625 (16.3%)	99 (19.8%)	690 (13.1%)	91 (15.9%)	2,505 (15.4%)
	75-84	3,003 (30.1%)	151 (30.3%)	1,408 (26.8%)	177 (30.8%)	4,739 (29.1%)
	85-94	3,704 (37.1%)	153 (30.7%)	2,245 (42.7%)	208 (36.2%)	6,310 (38.7%)
	95+	744 (7.5%)	33 (6.6%)	575 (10.9%)	46 (8.0%)	1,398 (8.6%)
Rurality, and Urban Income quintile	Missing postal code	32 (0.3%)	1 (0.2%)	16 (0.3%)	1 (0.2%)	50 (0.3%)
	Rural	1,420 (14.2%)	114 (22.8%)	654 (12.4%)	85 (14.8%)	2,273 (13.9%)
	Urban income quintile - 1	2,416 (24.2%)	84 (16.8%)	1,077 (20.5%)	119 (20.7%)	3,696 (22.7%)
	Urban income quintile - 2	1,948 (19.5%)	77 (15.4%)	1,081 (20.5%)	104 (18.1%)	3,210 (19.7%)
	Urban income quintile - 3	1,630 (16.3%)	90 (18.0%)	864 (16.4%)	87 (15.2%)	2,671 (16.4%)
	Urban income quintile - 4	1,335 (13.4%)	65 (13.0%)	845 (16.1%)	90 (15.7%)	2,335 (14.3%)
	Urban income quintile - 5	1,189 (11.9%)	68 (13.6%)	724 (13.8%)	88 (15.3%)	2,069 (12.7%)
	Urban- Missing Income - n (%)	2 (0.0%)	0 (0.0%)	1 (0.0%)	0 (0.0%)	3 (0.0%)
LHIN	Missing	1 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)
	1- Erie St. Clair	500 (5.0%)	100 (20.0%)	180 (3.4%)	120 (20.9%)	900 (5.5%)
	2- South West	809 (8.1%)	36 (7.2%)	386 (7.3%)	57 (9.9%)	1,288 (7.9%)
	3- Waterloo Wellington	393 (3.9%)	12 (2.4%)	202 (3.8%)	30 (5.2%)	637 (3.9%)
	4- Hamilton Niagara Haldimand Brant	1,310 (13.1%)	40 (8.0%)	563 (10.7%)	56 (9.8%)	1,969 (12.1%)

	5- Central West	360 (3.6%)	23 (4.6%)	264 (5.0%)	29 (5.1%)	676 (4.1%)
	6- Mississauga Halton	557 (5.6%)	52 (10.4%)	293 (5.6%)	64 (11.1%)	966 (5.9%)
	7- Toronto Central	571 (5.7%)	8 (1.6%)	453 (8.6%)	14 (2.4%)	1,046 (6.4%)
	8- Central	935 (9.4%)	25 (5.0%)	792 (15.1%)	57 (9.9%)	1,809 (11.1%)
	9- Central East	1,778 (17.8%)	69 (13.8%)	854 (16.2%)	39 (6.8%)	2,740 (16.8%)
	10- South East	631 (6.3%)	31 (6.2%)	374 (7.1%)	38 (6.6%)	1,074 (6.6%)
	11- Champlain	827 (8.3%)	16 (3.2%)	422 (8.0%)	30 (5.2%)	1,295 (7.9%)
	12- North Simcoe Muskoka	385 (3.9%)	7 (1.4%)	272 (5.2%)	18 (3.1%)	682 (4.2%)
	13- North East	647 (6.5%)	39 (7.8%)	177 (3.4%)	15 (2.6%)	878 (5.4%)
	14- North West	268 (2.7%)	41 (8.2%)	30 (0.6%)	7 (1.2%)	346 (2.1%)
Comorbidities	AMI	257 (2.6%)	14 (2.8%)	108 (2.1%)	8 (1.4%)	387 (2.4%)
	Coronary	4,365 (43.8%)	196 (39.3%)	2,236 (42.5%)	238 (41.5%)	7,035 (43.1%)
	CHF	3,954 (39.7%)	166 (33.3%)	2,032 (38.6%)	192 (33.4%)	6,344 (38.9%)
	Hypertension	8,436 (84.6%)	391 (78.4%)	4,432 (84.2%)	464 (80.8%)	13,723 (84.2%)
	Heart Diseases	8,855 (88.8%)	410 (82.2%)	4,659 (88.5%)	485 (84.5%)	14,409 (88.4%)
	Arrythmia	2,934 (29.4%)	119 (23.8%)	1,606 (30.5%)	143 (24.9%)	4,802 (29.4%)
	COPD	2,653 (26.6%)	145 (29.1%)	1,351 (25.7%)	124 (21.6%)	4,273 (26.2%)
	Asthma	1,751 (17.6%)	76 (15.2%)	940 (17.9%)	95 (16.6%)	2,862 (17.6%)
	Respiratory Diseases	3,447 (34.6%)	180 (36.1%)	1,772 (33.7%)	169 (29.4%)	5,568 (34.1%)
	Cancer	3,752 (37.6%)	280 (56.1%)	2,322 (44.1%)	324 (56.4%)	6,678 (41.0%)
	Dementia	2,862 (28.7%)	112 (22.4%)	1,601 (30.4%)	129 (22.5%)	4,704 (28.8%)
	Diabetes	4,382 (43.9%)	196 (39.3%)	2,077 (39.5%)	244 (42.5%)	6,899 (42.3%)
	Mental Health Conditions	3,658 (36.7%)	150 (30.1%)	1,764 (33.5%)	172 (30.0%)	5,744 (35.2%)
	Mood and anxiety disorders	5,512 (55.3%)	249 (49.9%)	2,933 (55.7%)	311 (54.2%)	9,005 (55.2%)
	Osteoarthritis	7,272 (72.9%)	344 (68.9%)	3,938 (74.8%)	427 (74.4%)	11,981 (73.5%)
	Osteoporosis	1,377 (13.8%)	72 (14.4%)	861 (16.4%)	89 (15.5%)	2,399 (14.7%)
	Renal failure	3,407 (34.2%)	135 (27.1%)	1,631 (31.0%)	169 (29.4%)	5,342 (32.8%)
	Rheumatoid Arthritis	406 (4.1%)	16 (3.2%)	195 (3.7%)	23 (4.0%)	640 (3.9%)
	Stroke	668 (6.7%)	25 (5.0%)	335 (6.4%)	39 (6.8%)	1,067 (6.5%)
Count of chronic conditions	Mean (SD)	5.78 (2.35)	5.38 (2.36)	5.77 (2.34)	5.56 (2.37)	5.76 (2.35)
	Missing	3 (0.0%)	3 (0.6%)	4 (0.1%)	1 (0.2%)	11 (0.1%)

Changes in Health, End-Stage Disease, Signs and Symptoms Scale (i.e. health instability)	0 – No	822 (8.2%)	17 (3.4%)	335 (6.4%)	27 (4.7%)	1,201 (7.4%)
	1 – Minimal	1,779 (17.8%)	58 (11.6%)	769 (14.6%)	53 (9.2%)	2,659 (16.3%)
	2 – Low	2,803 (28.1%)	109 (21.8%)	1,293 (24.6%)	94 (16.4%)	4,299 (26.4%)
	3 – Moderate	2,775 (27.8%)	144 (28.9%)	1,462 (27.8%)	183 (31.9%)	4,564 (28.0%)
	4 – High	1,581 (15.9%)	116 (23.2%)	1,124 (21.4%)	157 (27.4%)	2,978 (18.3%)
	5 – Very High	209 (2.1%)	52 (10.4%)	275 (5.2%)	59 (10.3%)	595 (3.6%)
Activities of Daily Living (ADL) Hierarchy scale	0 – Independent	2,448 (24.5%)	134 (26.9%)	895 (17.0%)	124 (21.6%)	3,601 (22.1%)
	1 – Supervision	987 (9.9%)	38 (7.6%)	466 (8.9%)	43 (7.5%)	1,534 (9.4%)
	2 – Limited	1,788 (17.9%)	81 (16.2%)	860 (16.3%)	96 (16.7%)	2,825 (17.3%)
	3 – Extensive	1,879 (18.8%)	80 (16.0%)	958 (18.2%)	105 (18.3%)	3,022 (18.5%)
	4 – Maximal	1,209 (12.1%)	65 (13.0%)	804 (15.3%)	65 (11.3%)	2,143 (13.1%)
	5 – Dependent	1,330 (13.3%)	73 (14.6%)	941 (17.9%)	93 (16.2%)	2,437 (14.9%)
	6 – Total dependence	331 (3.3%)	28 (5.6%)	338 (6.4%)	48 (8.4%)	745 (4.6%)
Cognitive Performance Scale (i.e., Cognition)	0 – Intact	1,594 (16.0%)	118 (23.6%)	751 (14.3%)	131 (22.8%)	2,594 (15.9%)
	1 – Borderline intact	1,413 (14.2%)	75 (15.0%)	686 (13.0%)	105 (18.3%)	2,279 (14.0%)
	2 – Mild	4,199 (42.1%)	178 (35.7%)	2,188 (41.6%)	195 (34.0%)	6,760 (41.5%)
	3 – Moderate	1,305 (13.1%)	52 (10.4%)	653 (12.4%)	50 (8.7%)	2,060 (12.6%)
	4 – Moderate Severe	218 (2.2%)	12 (2.4%)	109 (2.1%)	13 (2.3%)	352 (2.2%)
	5 – Severe	934 (9.4%)	35 (7.0%)	577 (11.0%)	46 (8.0%)	1,592 (9.8%)
	6 – Very severe	309 (3.1%)	29 (5.8%)	298 (5.7%)	34 (5.9%)	670 (4.1%)
Two Key Informal Helpers - Lives With Person - Primary	0 – No	4,301 (43.1%)	163 (32.7%)	2,273 (43.2%)	207 (36.1%)	6,944 (42.6%)
	1 – Yes, 6 months or less	442 (4.4%)	34 (6.8%)	279 (5.3%)	26 (4.5%)	781 (4.8%)
	2 – Yes, more than 6 months	4,935 (49.5%)	294 (58.9%)	2,607 (49.5%)	334 (58.2%)	8,170 (50.1%)
	8 – No informal helper	294 (2.9%)	8 (1.6%)	103 (2.0%)	7 (1.2%)	412 (2.5%)
Informal Helper Status-Primary Informal Helper Expresses Feelings of Distress, A	Yes	4,103 (41.1%)	201 (40.3%)	2,282 (43.4%)	232 (40.4%)	6,818 (41.8%)

Legend: MD=Physician, NP= Nurse Practitioner, SD=Standard Deviation, LHIN=Local Health Integration network, AMI = Acute Myocardial Infarction, CHF=Congestive Heart Failure, COPD=Chronic Obstructive Pulmonary Disease, ADL=Activities of Daily Living,

Table 2: Results of Sensitivity Analysis Regression Modelling on subset of cohort with an interRAI assessment completed within 90 days to include additional clinical and caregiver covariates*

	Nested Model – Clinical characteristics added to base model	Final Model – Nested model + caregiver variables
Exposure	Odds Ratio [95% CI]	Odds Ratio [95% CI]
Death in the Community		
Only NP	3.23 [2.56-4.07]	3.24 [2.57-4.09]
Only FP	3.41 [3.12-3.72]	3.40 [3.11-3.71]
Both NP and FP	5.99 [4.63-7.75]	6.01 [4.64-7.78]
Hospitalization		
Only NP	0.68 [0.54-0.86]	0.68 [0.54-0.86]
Only FP	0.62 [0.57-0.68]	0.62 [0.57-0.68]
Both NP and FP	0.44 [0.33-0.60]	0.44 [0.33-0.60]
ED visits		
Only NP	0.86 [0.63-1.16]	0.85 [0.63-1.16]
Only FP	0.91 [0.80-1.01]	0.90 [0.80-1.02]
Both NP and FP	0.71 [0.46-1.08]	0.70 [0.46-1.08]
Symptom Management		
Only NP	2.52 [2.00-3.17]	2.52 [1.99-3.17]
Only FP	2.06 [1.87-2.27]	2.06 [1.87-2.27]
Both NP and FP	3.46 [2.60-4.61]	3.43 [2.58-4.57]

Legend: CI=Confidence interval, NP=Nurse Practitioner, FP=Family Physician, ED=Emergency Department

*Adjusted for *age, sex, rurality, local health region, chronic conditions, formal home care hours occurring 90-22 days before death, previous hospitalizations and previous inpatient palliative care encounters occurring prior to the last 90 days of life, primary care model, and number of days spent in the community during the last 90 days of life and before the outcome occurred, Activities of Daily Living (ADL) self-performance score, the Changes in Health, End-Stage Disease and Signs and Symptoms (CHESS) Scale, and the Cognitive Performance Scale (CPS), the presence of a live-in caregiver and caregiver distress.*