#### The trajectory of health care at the end of life: an observational study of home care clients, stratified by their risk of death

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#### Introduction

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- Palliative care is an essential component of care for all people with a life-limiting illness.
- Early initiation of palliative care → improved end of life outcomes, such as improved quality of life, reduced distress and better symptom management.
- Only 14% of patients globally requiring palliative care at the end of life receive any palliative care services.<sup>1</sup>

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<sup>1</sup> Global Atlas on Palliative Care at the End of Life. World Hospice and Palliative Care Alliance; 2014. https://www.who.int/nmh/Global\_Atlas\_of\_Palliative\_Care.pdf

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## What is **RESPECT**?

Risk Evaluation for Support: Predictions for Elder-life in the Community Tool

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- A predictive algorithm that calculates a person's survival time.
- Developed using populationbased home care assessment data in Ontario, Canada.
- For older adults living in the community who are uncertain whether they are approaching the end of their life

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## **Objectives**

- Describe healthcare utilization patterns among home care users, stratified by their risk of death generated from RESPECT.
- To inform implementation activities in Ontario.

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Outcomes of interest within 6 months of a homecare assessment:

% home care clients with at least 1 healthcare service day	Intensity of healthcare use	Location of Death
Acute care hospitalizations	# of days in an acute care hospital	Acute care hospital
ED visits	# of days in the ED	Other institutions
Nursing home admissions	# of days in a nursing home	Nursing homes
Palliative home care visits	# of palliative home care visits	Community
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#### Methods

Retrospective cohort study of community-dwelling older adults (≥50 years of age) in Ontario, Canada who received at least one interRAI Home Care (interRAI HC) assessment between April 1, 2018 and September 30, 2019.



#### **Methods: Data Sources**

- Individual-level interRAI HC data was linked to other provincial health administrative databases at ICES including:
  - Discharge Abstract Database (CIHI-DAD) → Hospitalizations
  - National Ambulatory Care Reporting System (NARCS) → ED visits
  - Home Care Database (HCD) → Palliative home care visits
  - Continuing Care Reporting System (CCRS) → Nursing home admissions

#### **Methods: Cohort Classification**

Home Care Assessments

7 Mortality-Risk Profiles

Mortality-Risk Profile	Number of Assessments	Predicted 6-Month Mortality (%)	Median Survival (days)	Clinical Description of Risk Profile
Median survival <3 months	2,435	78.1% — 95.5%	36 — 84	Assessments likely at the end of life
Median survival between 3-6 months	3,651	58.6% — 71.8%	103 — 155	Assessments likely approaching the end of life
Median survival between 6-12 months	14,199	32.7% — 51.1%	187 — 356	Assessments likely in the last year of life
Predicted mortality risk between 20-30%	28,398	20.0% — 29.5%	408 — 604	Assessments with a moderate-high mortality risk
Predicted mortality risk between 10-20%	83,166	10.2% — 18.2%	655 — 1,024	Assessments with a moderate-low mortality risk
Predicted mortality risk between 5-10%	141,992	5.0% — 9.6%	1,050 — >1,465*	Assessments with a low mortality risk
Predicted mortality risk < 5%	131,848	1.5% — 4.8%	>1,480^ >1,413+	Assessments with a very low mortality risk

Note: Because follow up is censored by the end of study, we were unable to capture median survival for RESPECT risk bins 34 and onward. We therefore present the latest data point available in the specific risk bin indicating the relevant percentile captured.

\*43<sup>rd</sup> percentile in risk bin 40

^44<sup>th</sup> percentile in risk bin 41

<sup>+</sup>11<sup>th</sup> percentile in risk bin 61

#### **Cohort** (N=247,377)

Cohort definition	
Start Date	April 1, 2018
End Date	September 30, 2019
Six-month mortality	
# of deaths (assessments)	42,515.00
# of deaths (person)	35,497.00
No. of assessments	
# of assessments (total)	405,689
# of assessments per patient (Q1)	1
# of assessments per patient (median)	1
# of assessments per patient (Q3)	2
# of assessments per patient (min.)	1
# of assessments per patient (max.)	10

#### **Proportion of Decedents Across 7 Mortality Risk Profiles**

Risk Profiles	Proportion of Assessments Associated with a Death within 6 Months (%)
Median survival <3 months	73.6
Median survival 3-6 months	56.4
Median survival 6-12 months	40.2
Predicted mortality risk between 20-30%	25.6
Predicted mortality risk between 10-20%	14.8
Predicted mortality risk between 5-10%	6.9
Predicted mortality risk < 5%	2.7

Just over half of assessments with a median survival <3 months received at least 1 palliative home care visit, a proportion that declines with increasing survival and decreasing mortality risk.



Service allocation of palliative home care visits is consistent across mortality risk profiles despite differences in median survival and predicted mortality risk.

200 180 160 140 120 Sits Visits 80 **★**Mean 60 × × × × × 40 × × 20 0 Assessments Assessments Assessments Assessments Assessments Assessments Assessments likely at the likely in the last with a very low likely approaching with a with a with a low end of life the end of life year of life moderate-high moderate-low mortality risk mortality risk (Median Survival (Median Survival (Median Survival mortality risk mortality risk (5-10%) (<5%) 3-6 Months) 6-12 Months) (20-30%) (10-20%) <3 Months)

A) Palliative Home Care

RESPECT Mortality-Risk Profiles

Community-based deaths account for a larger proportion of deaths among assessments with a median survival of <3 months relative to other settings. Yet, this is still only 44%.



## Implications

- Home care assessments identified to be likely at the end of life were more likely to receive palliative home care and less likely to receive institutional care provided in hospitals and nursing homes.
- However, only half assessments that represented someone who is likely at the end of life received at least 1 palliative care home visit before death

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#### Limitations

- Do not capture all pertinent information that could influence a patient's propensity for receiving home-based care
- Could not account for palliative care provided in institutions
- Unable to draw any inferences on the quality of care provided



# Thank you!

A **big thank you** to my colleagues and collaborators who contributed to this project.

Thank you to the funders; AMS and CIHR.

This study was supported by ICES, which is funded by an annual grant from the Ontario Ministry of Health and Long-Term Care (MOHLTC).

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#### Predicted 6-Month Mortality

Across 61 Risk Bins of RESPECT



#### Model Performance

- Discrimination
  - c-stat = 0.76
- Calibration
  - Calibration-in-the-large = 1.19 percentage points



#### Model Performance

Functional capacity based on the Instrumental Activities of Daily Living (IADL)



Functional capacity based on the Activities of Daily Living (ADL)



#### Diseases



#### Cox Proportional Hazards Regression Model for 6-Month Mortality

Predictors	Cohort			
	(N=405,689 assessments)			
	HR	(95% CI)		
Sex				
Female	1.000	(Referen	(Reference)	
Male	1.496	(1.460	- 1.532)	
Diseases				
Stroke	0.817	(0.792	- 0.844)	
Congestive heart failure (CHF)	1.458	(1.416	- 1.502)	
Coronary heart disease (CHD)	1.023	(0.998	- 1.049)	
Alzheimer disease or other dementias	0.936	(0.910	- 0.963)	
Multiple sclerosis	0.578	(0.500	- 0.668)	
Parkinson's	0.838	(0.794	- 0.884)	
Signs and symptoms of health instability				
Vomiting in at least 2 of the last 3 days	1.397	(1.239	- 1.574)	
Edema in at least 1 of the last 3 days	1.045	(1.020	- 1.070)	
Dyspnea (shortness of breath)	1.226	(1.195	- 1.256)	
Fluid intake less than four 8 oz cups per day (or less	1.210	(1.162	- 1.259)	
than 1000 cc per day) in last 3 days				
Weight loss of > 5% in the last 30 days or > 10% in	1.461	(1.417	- 1.506)	
the last 180 days				
	1.420	(1.373	- 1.468)	
Decrease in amount food or fluid usually consumed				
Clinician diagnosis of an end stage disease				
No	1.000	(Referen	nce)	
Yes	2.836	(2.718	- 2.959)	
No. of inpatient admissions over the past 90 days				
0+	1.000	(Referen	nce)	
1+	1 275	(1.245	- 1.307)	
2+	1.451	(1.386	- 1.519)	
3+	1.498	(1.399	- 1.603)	
No. of emergency department visits over past 90 d				
0+	1.000	(Referen	nce)	
1+	1.120	(1.091	- 1.151)	
2+	1.247	(1.190	- 1.306)	
3+	1.268	(1.197	- 1.344)	

Predictors	Cohort		
	(N=405,6	(N=405,689 assessments)	
	HR	(95% CI)	
Instrumental Activities of Daily Living (IADL)			
Self Performance and Capacity Scale			
0 = Independent in performing ordinary	1.000	(Reference)	1
housework, meal preparation or phone use			
1+	1.021	(0.889	- 1.174)
2+	1.032	(0.923	- 1.155)
3+	1 065	(0.952	- 1.191)
4+	1.229	(1.102	- 1.371)
5+	1.420	(1.277	- 1.580)
6 = Total dependence in performing	1.810	(1.623	- 2.018)
ordinary housework, meal preparation or			
phone use			
Activities of Daily Living (ADL) Self-			
performance Hierarchy scale			
0 = Independent in maintaining personal	1.000	(Reference)	
hygiene, toilet use, locomotion, and eating			
1+	0.925	(0.888	- 0.964)
2+	1.065	(1.029	- 1.104)
3+	1.187	(1.144	- 1.231)
4+	1.575	(1.511	- 1.643)
5+	1.977	(1.896	- 2.061)
6 = Total dependence in maintaining	3.234	(3.027	- 3.456)
personal hygiene, toilet use, locomotion,			
and eating			
Worsening ADL			
No	1.000	(Reference)	
Yes	1.417	(1.381	- 1.454)
Cognitive skills for daily decision-making			
Worsening decision-making capacity	1.024	(0.997	- 1.051)
Reason for assessment			
First assessment	1.000	(Reference)	1
Routine reassessment	0.941	(0.918	- 0.964)
Discharge assessment or discharge tracking	1.156	(0.736	- 1.816)
Significant change in status reassessment	1.240	(1.198	- 1.284)
Other (e.g. research)	1.059	(0.889	- 1.261)