Population-based studies on Health care at the End-of-life

Peter Tanuseputro, Sarah Beach, Mathieu Chalifoux, Doug Manuel, Walter Wodchis, Hsien Seow, Amy Hsu, Susan Bronskill, others…

CAHSPR Presentation

May 2015

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health system performance research network

HSPRN

- Health System Performance Research Network (HSPRN)
- Currently funded by an Ontario MOHLTC Grant
- Network of researchers who work closely with policy/provider decision-makers to find ways to better manage the health system
- Focus: complex individuals who require care from many different providers
  - youth transitioning to adulthood, younger and mid-life adults, older adults with multi-morbidity

Background

- Aging population
  - Decreasing birth rate
  - Extension of life expectancy
  - Aging of baby boomers

- Concerns regarding sustainability of health care system

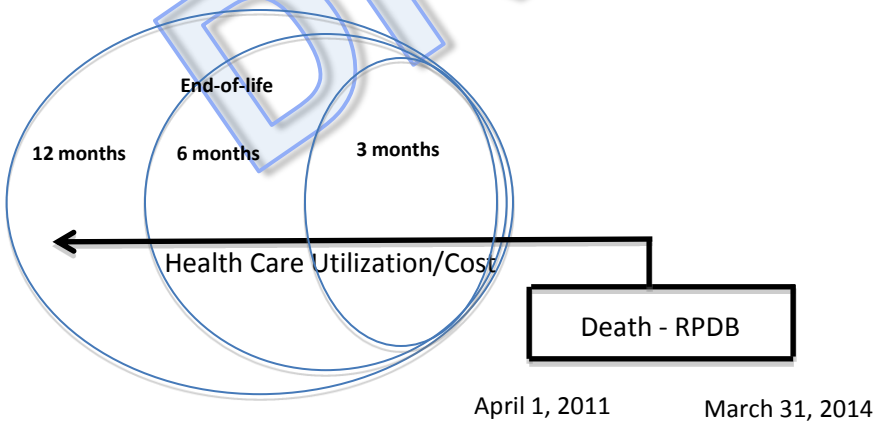
- As population ages concerns about the need for additional resources – both in acute care & continuing care sector; but…..

Research Questions

- 1) Is this concern justified in Ontario/Canada?
- 2) What is the relative cost of acute care, continuing care, and outpatient care at the end of life?
- 3) Beyond costs, what can we say about:
  - Where the population is dying
  - Where the population is spending their last days of life

EOL Cohort – Approach

- Retrospective cohort approach
- All deaths in Ontario between Fiscal Year 2011 to 2013: 264,755 deaths
- 12 month look back



Methods – Data Sources

- Looked across all health sectors available at ICES

- Linked at the individual level across broad health care sectors
  - "Continuing care": Long-term care (LTC), complex continuing care (CCC), Home care, Rehab
  - "Acute care": Hospital admission, Intensive Care Unit (ICU), Emergency Room (ER)
  - "Outpatient care": Physician visits/claims, outpatient hospital visits, select: drugs, non-physician, labs, devices

“Last month of life costs health-care system $14K on average: report”

NATIONAL POST

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

Peter Tanuseputro[1,2,3], Walter P Wodchis[3,4,8], Rob Fowler[5], Peter Walker[1], Yu Qing Bai[4], Sue E. Bronskill[3,4], Douglas Manuel[1,2,3,6,7]

PLOS ONE

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A population-based examination of interventions near the end-of-life and their effect on location of death

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Location of Death

- Interaction between illness, individual, and environment

- Influenced by:
  - Socioeconomic characteristics
  - Available support networks
  - Functional needs
  - Care needs
  - Healthcare system

- Many interventions are geared towards shifting care away from inappropriate settings

- Examine where people are dying
  - Most express desire to die at home

Methods

- Retrospective cohort study
- FY: 2010 to 2012
- 5 locations:
  - "Institution": Acute care, CCC, Rehab
  - "Home": ***LTC***, Home Care, Other

Location of Death – Overall

Location of Death	Number	%
Acute Care	120,984	45.7%
Complex Continuing Care	20,259	7.7%
Rehab	421	0.2%
Long-term Care	46,165	17.4%
Home Care	27,916	10.5%
Other	49,010	18.5%
Institution	141,664	53.5%
Home	123,091	46.5%
Total	264,755	100.0%

Location of Death - Predictors

Proportion dying in an institution by…

- Age: Lowest at extremes of age:
  - 43% (<45 yrs) → 60% (65-85) → 34% (95+)
- Time: 54.4% (2010) → 51.9% (2013)
- Chronic conditions
  - CHF, COPD, Cancer: 62%
  - Dementia: 39%

Location of Death - Predictors

- LHIN's:
  - Range: 45% to 60%
  - Champlain: 45%

- Those receiving Home Care in last 90 days:
  - 61% die in Institution
  - With palliative care (SRC 95 – end-of-life): 43%

Multivariable Model

- Outcome: **Risk of dying in an institution** (Acute care, CCC, Rehab)

- Adjusts for: Age, sex, income quintile, year, rurality, ADG score (Austin, van Walraven et al.)

Multivariable models

- Main 'exposures' of interest:
  - 1) Physician home visits*
  - 2) Palliative home care visits
  - 3) Rostering to family physician

*Adjust for home 1 week prior to death, and number of days at home in last 90 days

- Geographic variations
  - LHIN (compared to best performing): 2 at 80% higher, 1 at 100% higher risk

Multivariable Model

Reference Value	Parameter Variable	HR	Risk limits		Sig
Ages <19	19-44	**0.419**	0.37	0.476	**<.0001**
	45-54	**0.486**	0.431	0.548	**<.0001**
	55-64	**0.521**	0.464	0.586	**<.0001**
	65-74	**0.518**	0.462	0.581	**<.0001**
	75-84	**0.426**	0.38	0.477	**<.0001**
	85-94	**0.308**	0.275	0.346	**<.0001**
	95+	**0.229**	0.203	0.258	**<.0001**
Sex - Male	Sex - Female	**0.914**	0.895	0.934	**<.0001**
Income Quintile - Lowest	Low	**1.029**	0.997	1.062	0.0757
	Middle	**0.988**	0.956	1.02	0.4488
	High	**0.949**	0.919	0.981	**0.0018**
	Highest	**0.985**	0.953	1.018	0.3719
Rurality	Urban resident	**1.005**	0.976	1.035	0.7159
Year of Death - 2010	2011	**0.926**	0.901	0.953	**<.0001**
	2012	**0.905**	0.88	0.93	**<.0001**
	2013	**0.898**	0.862	0.935	**<.0001**
Primary Care Model - Rostered	Unrostered	**1.316**	1.284	1.349	**<.0001**
No Home Care In Past 365 Days	Home Care in past 365 days - Not Palliative	**1.099**	1.072	1.126	**<.0001**
	Home Care in past 365 days - Palliative	**0.498**	0.48	0.516	**<.0001**
0 Physician Home Visits	Non-Palliative Physician Home Visits	**0.515**	0.497	0.533	**<.0001**
	Palliative Physician Home Visits	**0.408**	0.391	0.426	**<.0001**
ADG Score		**1.030**	1.029	1.031	**<.0001**
Not at home 1 week before death	At home 1 week before death	**0.496**	0.479	0.515	**<.0001**
#Days at Home in the past month		**0.839**	0.837	0.842	**<.0001**

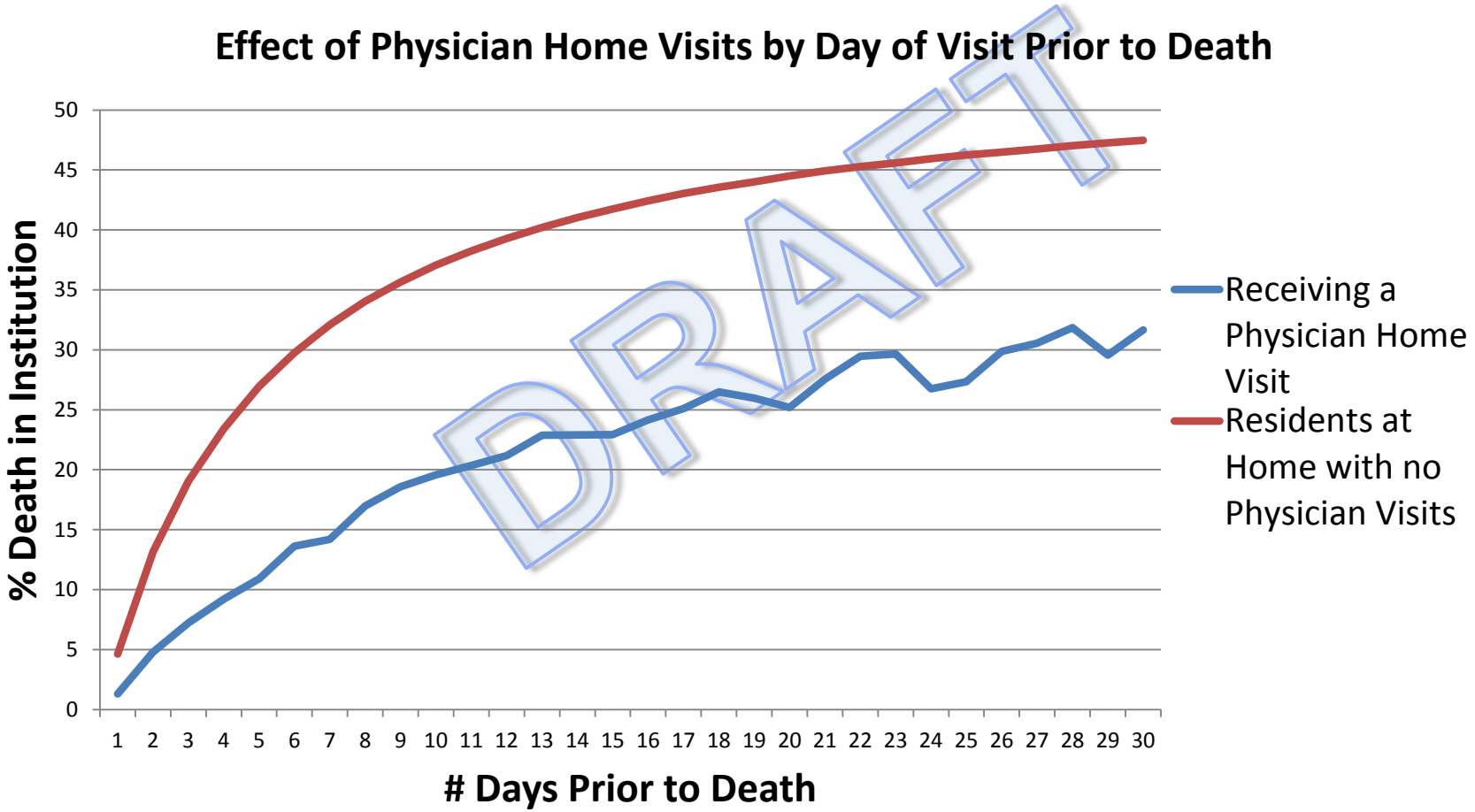
Multivariable Model

- 3) Rostering
  - Unrostered: 31.2% higher risk of institution death
    - 69,752 of 264,754 decedents = 26% of all decedents
- 2) Palliative home care
  - 50% lower risk
    - 48,583 of 160,793 home care recipients = 30%

Multivariable models

- 1) Physician home visits
  - About 50% lower risk when PC specialist not involved (Barbera et al.'s definition)
  - About 60% lower risk when PC specialist involved
  - What proportion receive visit in last year?
    - 20.6% of total population
      - 11.3% with no specialist, 9.3% with specialist

Physician home visits



Conclusions

- About half of Ontarians die in an acute care setting
  - More people are dying at "home" in recent years
- True that the sicker you are, the more likely you are to die in hospital but…
- LOD also determined by health system factors
  - LHINS
  - Palliative care home care
  - Primary care, including rostering & home visits

Places of Care: A Population Based Examination of Predictors to Where People Spend Their Last Days of Life

Peter Tanuseputro & Sarah Beach

CAHSPR Presentation

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Ottawa Hospital Research Institute
Institut de recherche de l'Hôpital d'Ottawa

Places of Care

- Where people spend their last days, weeks, months of life

- Those dying at home can spend much of their EOL days in hospital & vice versa

- Main Outcomes: days spent in any health care institution in last 30 and 90 days

Places of Care

- FY: 2010 to 2012
- 5 “institution” locations:
  - 1) Acute care (separate out ALC),
  - 2) Complex Continuing Care
  - 3) Rehab
  - 4) Emergency Room
  - 5) Long-term care: ***not*** included in final models
- Similar predictors

Results - Overall

- Last 30 days (on average):
  - 15 days in any institution
    - 6 days in hospital (1 in ALC)
    - 6 days in LTC
    - 1.5 days in CCC
    - 1 day in ER
    - 0.2 days in rehab
  - 9 days in acute care institutions

Results – Last 90 days

- Last 90 days (on average):
  - 34 days in an institution
    - 10 days in Acute Care (2 in ALC)
    - 19 days in LTC
    - 3 in CCC
    - 2 in ER
  - 16 days in acute care institutions

Summary of Results

- NOT counting LTC, last 90 days
  - **16 days** in Acute Care Settings
  - By LHIN: Range from 14 to 20 days
  - Home care recipients: 21 days

- Build multivariate models.
- *Main outcome*: Number of acute care institution days in last 90 days of life

Multivariable model

- Model for accounting for:
  - Age, sex, neighborhood income quintile, rurality
  - # chronic conditions, cancer, use of LTC, ADG
  - Palliative home care, physician visits

- Main interventions:
  - Palliative home care
  - Physician home visits

Days in Institution; Home care

- 2 sets of models: 1 for home care recipients (half of decedents), 1 for all decedents

Reference Value	N	Parameter Variable	N	Hazard Ratio	p-value
Ages <19	464	19-44	2 296	-0.45138	0.7146
		45-54	6 275	-2.32849	**0.0472**
		55-64	14 767	-3.29047	**0.0044**
		65-74	24 195	-3.59789	**0.0018**
		75-84	41 229	-3.96172	**0.0006**
		85-94	38 850	-5.47635	**<.0001**
		95+	6 150	-7.96667	**<.0001**
Sex - Male	65 155	Sex - Female	69 073	0.43558	**0.0008**
Income Quintile - Lowest	29 354	Low	28 306	-0.36834	0.0587
		Middle	26 006	-0.64867	**0.0012**
		High	25 681	-0.63126	**0.0017**
		Highest	24 273	-1.10104	**<.0001**
Rurality	19 556	Urban resident	114 672	1.03007	**<.0001**

Results

Reference Value	N	Parameter Variable	N	Hazard Ratio	p-value
# of Chronic Conditions - 0 to 2	23 303	3	20 811	2.11398	**<.0001**
		4	22 527	3.17468	**<.0001**
		5	21 306	3.88783	**<.0001**
		6	18 273	4.91079	**<.0001**
		7+	28 008	6.45182	**<.0001**
Primary Care Model - Rostered	105 816	Unrostered	28 412	1.25892	**<.0001**
Never used LTC in past 90 days	119 280	Used LTC at some point in	14 948	-4.29309	**<.0001**
Does not have cancer	55 201	Has cancer	79 027	0.80111	**<.0001**

Results – Main exposures

Reference Value	N	Parameter Variable	N	Hazard Ratio	p-value
Never used palliative home care	87 614	Palliative home care initiated 0 - 1 month prior to death	12 636	-4.78837	**<.0001**
		Palliative home care initiated 1 - 3 months prior to death	12 518	-2.97009	**<.0001**
		Palliative home care initiated 3 - 6 months prior to death	7 830	-7.19408	**<.0001**
		Palliative home care initiated 6 - 12 months prior to death	6 561	-8.75253	**<.0001**
		Palliative home care initiated 12+ months prior to death	7 069	-9.03827	**<.0001**
0 Physician Home Visits	92024	1 Physician home visit	14667	-3.5651	**<.0001**
		2 Physician home visits	7647	-4.37355	**<.0001**
		3 - 4 Physician home visits	7995	-4.83842	**<.0001**
		5 - 6 Physician home visits	4030	-6.17563	**<.0001**
		7+ Physician home visits	7865	-6.97771	**<.0001**

Conclusions

- Ontarians spend significant number of days in institutions at the EOL
- Last 30 days, Ontarians spend:
  - 1 week in hospital; 50% in any institution
- Some important predictors:
  - Rostered to primary care physician
  - Receiving physician home visit
  - Receiving palliative home care

Conclusions

- Only a minority of the population receive palliative home care & physician home visits
- Even for those receiving home care:
  - 46,614 of 134,228 (35%) get palliative home care
  - 42,204 (31%) get a physician home visit in last yr

- **Room for improvement!**

THE END

QUESTIONS?

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