Palliative Home Care and Emergency Department Visits in the Last 30 and 90 Days of Life

A Retrospective Cohort Study of Cancer Patients

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Introduction

Specialist Palliative Care in Calgary

- In the Calgary Zone of Alberta Health Services, the specialist palliative care (PC) service includes:
  - (1) PC consult teams
  - (2) a tertiary PC unit
  - (3) hospices (institutional and community-based)
  - (4) pain and symptom clinics
  - (5) palliative home care*
    - Distinct from generalist home care

Introduction
Palliative Home Care versus Generalist Home Care

- Only palliative home care falls under the umbrella of the specialist PC program
  - All other patients receiving home care receive generalist home care (integrated home care)

Introduction
Distinguishing Palliative Home Care

	Palliative Home Care	Generalist Home Care
Personal + healthcare services	Yes	Yes
Available 24/7	Yes	Yes
Improve quality of life	Yes	Yes
Manage symptoms at home	Yes	Yes
Prevent unnecessary acute care resource use	Yes	Yes
Most responsible physician → family physician or oncologist	Yes	Yes
Staff with PC expertise	**Yes**	**No**
Staff have lower caseloads	**Yes**	**No**
Support with end-of-life concerns	**Yes**	**Maybe**

Introduction
Benefits of Palliative Home Care

- Broadly improves outcomes for patients approaching the end-of-life

- Crucial for optimizing quality of life and reducing end-of-life suffering

- Prevents expensive acute care resource use at the end-of-life

Introduction
Benefits of Palliative Home Care

- We may not be utilizing palliative home care services effectively

- Examine factors associated with with extent of utilization of home care → benchmark for improving access

Introduction
Unanswered Questions

- Why…
  - … are some cancer patients more likely to be referred to palliative home care?
  - … are some cancer patients more likely to be referred to generalist home care?
  - … do some cancer patients receive no home care at all?
- Especially when disease duration is long
  - More time should = patient match to appropriate home care
- Ideally, increased patient complexity merits more specialized home care
  - No home care < generalist home care < palliative home care

Introduction
Existing Literature

- Few existing publications
  - Analyze the separate associations of <u>each kind of home care</u> with emergency department use at the end of life
  - Examine the association of home care with emergency department use at the end of life over <u>more than one time period</u>
- None combined these areas of interest by separately associating <u>each kind of home care</u> with emergency department use at the end of life, over <u>more than one time period</u>

Introduction
Examples of Previous Studies

- A Cochrane review in 2016 (four trials) described a high level of statistical heterogeneity in analyses of hospital admissions for home-based end-of-life care.[1]

- Another study in Ontario reported that patients receiving visits from community-based specialist PC teams had a lower risk of hospital or emergency department (ED) visits in the last 2 weeks of life.[2]

- In Belgium, patients using palliative HC had less ED visits in the last 2 weeks of life, but the results were not adjusted for duration of disease.[3]

- In Australia even though ED visits were shown to be less for cancer patients on palliative HC, the authors did not account for disease duration.[4]

Introduction
Summary

- Palliative home care exists in Calgary Zone
  - Demonstrated benefits
  - Potential underuse
  - Unsure if maximizing referrals
- Previous studies on home care and ED use inadequate

Objectives

- Determine if ED visits at end of life is associated with type of home care used

- We evaluated the association of home care delivery (palliative home care, generalist home care, and no home care) with ED visits (0 visits and ≥ 1 visit) in the 30 and 90 days prior to death

- We focused on patients living with cancer ≥ 180 days after a diagnosis of cancer, to ensure all participants were eligible to be referred to home care services including palliative home care

Methods
Setting and Design

People who died of chronic disease in Calgary zone from 2008-2016

n = 47 169

Not assessed for eligibility n = 37 514

1. Non-cancer n = 28 906
2. Lived less than 180 days after diagnosis of cancer n = 5871
3. No available diagnosis date n = 2737

Assessed for eligibility

n = 9655

Excluded n = 2679

1. Died before 2008 or after 2015; data not available/ diagnosis date incomplete n = 952
2. Patients outside of metro Calgary zone; no access to palliative home care n = 1727

Total recruited

n = 6976

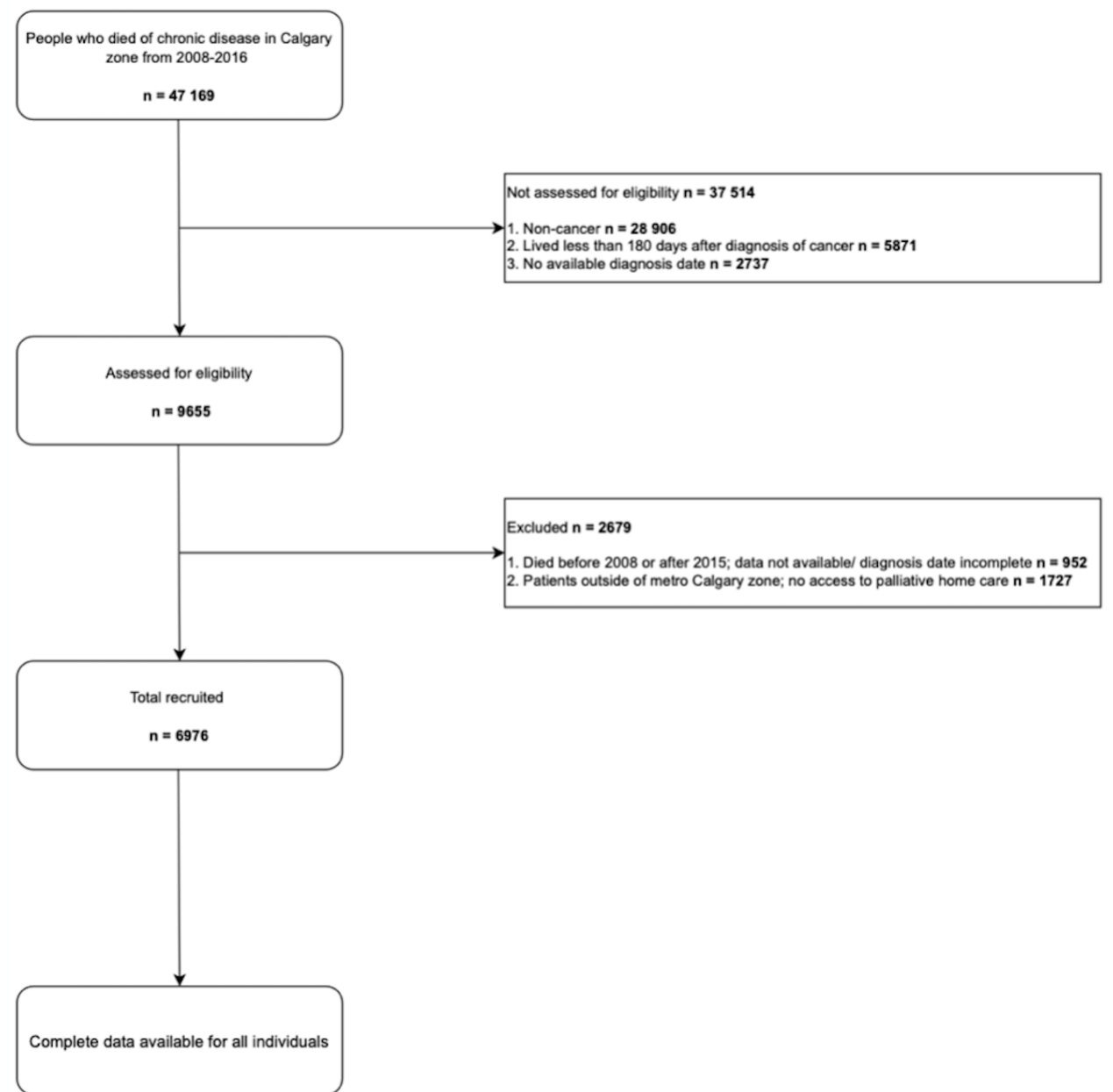Complete data available for all individuals

Figure 1: STROBE diagram

Methods
Primary Outcome and Exposure of Interest

- The first primary outcome was the number of decedents with ED visits in the last 30 days of life

- The second primary outcome was the number of decedents with ED visits in the last 90 days of life

- The primary exposure of interest was HC delivery (palliative HC, generalist HC, or none)

Methods
Sensitivity Analysis

- Palliative home care and generalist HC were analyzed as mutually exclusive categories

- A small subset of patients receiving generalist HC then transitioned to specialist palliative HC at a later date

  - Placed into palliative HC category

Methods
Statistical Analysis

- Descriptive statistics for each demographic and clinical characteristic, stratified by the primary exposure and primary outcomes

- Each variable was individually examined in SPSS for association with the primary exposure and primary outcome

Methods
Statistical Analysis

- Multivariable logistic regression was then used to assess the association of HC delivery with ED visits in the last 30 and 90 days of life, adjusting for covariates.

  - i.e. visited by a palliative home care provider [reference group] versus visited by a generalist home care provider, or never visited by a HC provider

  - i.e. no ED visit in the last 30 and 90 days before death [reference group] versus any ED visit in the 30 and 90 days before death

    - Separate model for 30 and 90 days

- Adjusted analysis: sex, age at death, disease duration, cancer type, year of death, CCI, median household income, timing of first palliative contact, LTC admission, and total ED visits between the last 90 days and one year of life (none, low [1-2], high [≥2]).

Results: Table 1
Patient Characteristics by Home Care Delivery

Patient characteristics		Total patients n = 6976	HC Delivery Palliative n = 3256 (47)	HC Delivery Generalist n = 2891 (41)	HC Delivery None n = 829 (12)	p value
Categorical variables (column %)						
Sex	Female	3428 (49)	1604 (49)	1445 (50)	379 (46)	0.09
	Male	3548 (51)	1652 (51)	1446 (50)	450 (54)	
Age at death	<60	1569 (22)	953 (29)	391 (14)	225 (27)	<0.01
	60-69	1617 (23)	877 (27)	540 (19)	200 (24)	
	70-79	1723 (25)	788 (24)	744 (26)	191 (23)	
	80-89	1666 (24)	569 (17)	932 (32)	165 (20)	
	>90	401 (6)	69 (2)	284 (10)	48 (6)	
Disease duration	6-12 months	1706 (24)	764 (23)	710 (25)	232 (28)	<0.01
	1-2 years	1782 (26)	839 (26)	742 (26)	201 (24)	
	2-5 years	1946 (28)	1007 (31)	735 (25)	204 (25)	
	≥ 5 years	1542 (22)	646 (20)	704 (24)	192 (23)	
Cancer	Breast	735 (11)	377 (12)	272 (9)	86 (10)	<0.01
	Central nervous system	214 (3)	94 (3)	85 (3)	35 (4)	
	Gastrointestinal	1823 (26)	931 (29)	707 (24)	185 (22)	
	Genitourinary	953 (14)	377 (12)	480 (17)	96 (12)	
	Gynecologic	477 (7)	205 (6)	210 (7)	62 (7)	
	Head and neck	237 (3)	103 (3)	113 (4)	21 (3)	
	Hematologic	649 (9)	207 (6)	316 (11)	126 (15)	
	Lung	1392 (20)	731 (22)	498 (17)	163 (20)	
	Other/unknown	496 (7)	231 (7)	210 (7)	55 (7)	
Location of death	Home	1194 (17)	762 (23)	382 (13)	50 (6)	<0.01
	Hospice	3350 (48)	1695 (52)	1383 (48)	272 (33)	
	Hospital	2032 (29)	741 (23)	872 (30)	419 (51)	
	Long-term care/supportive living	325 (5)	27 (1)	215 (7)	83 (10)	
	Other	75 (1)	31 (1)	39 (1)	5 (1)	
Year of death	2008	791 (11)	409 (13)	289 (10)	93 (11)	<0.01
	2009	888 (13)	429 (13)	337 (12)	122 (15)	
	2010	850 (12)	409 (13)	335 (12)	106 (13)	
	2011	803 (12)	387 (12)	329 (11)	87 (10)	
	2012	873 (13)	396 (12)	382 (13)	95 (11)	
	2013	901 (13)	423 (13)	369 (13)	109 (13)	
	2014	890 (13)	394 (12)	390 (13)	106 (13)	
	2015	980 (14)	409 (13)	460 (16)	111 (13)	
Charlson comorbidity index	0	5539 (79)	2779 (85)	2103 (73)	657 (79)	<0.01
	1 to 2	1082 (16)	367 (11)	583 (20)	132 (16)	
	>2	355 (5)	110 (3)	205 (7)	40 (5)	
Income level	Quintile 1	1394 (20)	571 (18)	639 (22)	184 (22)	<0.01
	Quintile 2	1811 (26)	853 (26)	752 (26)	206 (25)	
	Quintile 3	1437 (21)	672 (21)	606 (21)	159 (19)	
	Quintile 4	1050 (15)	518 (16)	401 (14)	131 (16)	
	Quintile 5	1284 (18)	642 (20)	493 (17)	149 (18)	
First palliative contact	> 90 days before death	2742 (39)	1482 (46)	1116 (39)	144 (17)	<0.01
	≤ 90 days before death	3299 (47)	1396 (43)	1447 (50)	456 (55)	
	none	935 (13)	378 (12)	328 (11)	229 (28)	
Long-term care admission	Yes	330 (5)	30 (1)	234 (8)	66 (8)	<0.01
	No	6646 (95)	3226 (99)	2657 (92)	763 (92)	
Emergency room visits (90-365 days before death)	none (0)	2650 (38)	1251 (38)	963 (33)	436 (53)	<0.01
	low (1- 2)	2951 (42)	1399 (43)	1254 (43)	298 (36)	
	high (≥ 3)	1375 (20)	606 (19)	674 (23)	95 (11)	

quintile 1 (Q1) $0 - $71,680, Q2: $71,765 - $90,112, Q3: $90,197 - $108,032, Q4: $108083 - $128384, Q5: $128,512 - $519,168

Results: Table 2
Patient Characteristics by ED Visits

Patient characteristics		Patients with an ED visit			
		Last 30 days n = 2570 (37)	p value	Last 90 days n = 4493 (64)	p value
Categorical variables (% ED visits)					
Home care delivery	Palliative home care	1090 (33)		1921 (59)	
	Generalist home care	1085 (38)	<0.01	1983 (69)	<0.01
	No home care	395 (48)		589 (71)	
Sex	Female	1156 (34)	<0.01	2100 (61)	<0.01
	Male	1414 (40)		2393 (67)	
Age at death	<60	583 (37)		994 (63)	
	60-69	599 (37)		1036 (64)	
	70-79	659 (38)	0.04	1146 (67)	0.70
	80-89	609 (37)		1079 (65)	
	>90	120 (30)		238 (59)	
Disease duration	6-12 months	616 (36)		1088 (64)	
	1-2 years	642 (36)	0.60	1144 (64)	0.64
	2-5 years	735 (38)		1276 (66)	
	≥ 5 years	577 (37)		985 (64)	
Cancer	Breast	270 (37)		448 (61)	
	Central nervous system	49 (23)		110 (51)	
	Gastrointestinal	662 (36)		1178 (65)	
	Genitourinary	378 (40)		676 (71)	
	Gynecologic	148 (31)	<0.01	296 (62)	<0.01
	Head and neck	75 (32)		148 (62)	
	Hematologic	275 (42)		420 (65)	
	Lung	520 (37)		888 (64)	
	Other/unknown	193 (39)		329 (66)	
Location of death	Home	280 (23)		629 (53)	
	Hospice	755 (23)		1991 (59)	
	Hospital	1470 (72)	<0.01	1741 (86)	<0.01
	Long-term care/supportive living	50 (15)		96 (30)	
	Other	15 (20)		36 (48)	
Year of death	2008	273 (35)		482 (61)	
	2009	308 (35)		540 (61)	
	2010	299 (35)		536 (63)	
	2011	278 (35)		495 (62)	
	2012	314 (36)	<0.01	573 (66)	<0.01
	2013	340 (38)		593 (66)	
	2014	341 (38)		587 (66)	
	2015	417 (43)		687 (70)	
Charlson comorbidity index	0	1943 (35)		3401 (61)	
	1 to 2	470 (43)	<0.01	820 (76)	<0.01
	>2	157 (44)		272 (77)	
Income level	Quintile 1	526 (38)		926 (66)	
	Quintile 2	638 (35)		1140 (63)	
	Quintile 3	535 (37)	0.58	937 (65)	0.24
	Quintile 4	390 (37)		661 (63)	
	Quintile 5	481 (37)		829 (65)	
First palliative contact	> 90 days before death	723 (26)		524 (19)	
	≤ 90 days before death	1460 (44)	<0.01	2553 (77)	<0.01
	none	387 (41)		1416 (151)	
Long-term care admission	Yes	96 (29)	<0.01	4350 (1318)	<0.01
	No	2474 (37)		143 (2)	
Emergency room visits (90-365 days before death)	none (0)	1085 (41)		1708 (64)	
	low (1- 2)	1004 (34)	<0.01	1858 (63)	0.02
	high (≥ 3)	481 (35)		927 (67)	

quintile 1 (Q1) $0 - $71,680, Q2: $71,765 - $90,112, Q3: $90,197 - $108,032, Q4: $108083 - $128384, Q5: $128,512 - $519,168

Results: Table 3

Association Between Home Care Delivery And ED Visits in the Last 30 and 90 Days of Life

Patient characteristic		No. of patients 6976	ED Visits (Adjusted)	
			In last 30 days, Yes Odds Ratio (95% CI)	In last 90 days, Yes Odds Ratio (95% CI)
Categorical variables				
Home care delivery	Palliative HC		ref	ref
	Generalist HC		**1.19 (1.06-1.34)***	**1.48 (1.32-1.67)***
	No HC		**1.54 (1.31-1.82)***	**1.66 (1.39-1.99)***
Sex	Female		ref	ref
	Male		**1.25 (1.11-1.41)***	**1.17 (1.03-1.32)***
Age at death	<60		**1.79 (1.38-2.32)***	**1.44 (1.11-1.86)***
	60-69		**1.61 (1.25-2.07)***	**1.32 (1.02-1.70)***
	70-79		**1.61 (1.26-2.07)***	**1.40 (1.09-1.80)***
	80-89		**1.42 (1.12-1.83)***	1.22 (0.95-1.56)
	>90		ref	ref
Disease duration	6-12 months		0.98 (0.84-1.16)	0.92 (0.78-1.09)
	1-2 years		0.96 (0.82-1.12)	0.99 (0.84-1.16)
	2-5 years		1.04 (0.90-1.21)	1.11 (0.95-1.30)
	≥ 5 years		ref	ref
Cancer	Breast		ref	ref
	Central nervous system		**0.44 (0.30-0.64)***	**0.60 (0.43-0.85)***
	Gastrointestinal		0.88 (0.71-1.08)	1.05 (0.85-1.29)
	Genitourinary		0.95 (0.75-1.20)	**1.34 (1.05-1.71)***
	Gynecologic		**0.76 (0.59-0.98)***	0.99 (0.77-1.28)
	Head and neck		**0.66 (0.47-0.92)***	0.92 (0.66-1.29)
	Hematologic		0.93 (0.73-1.18)	0.81 (0.63-1.04)
	Lung		0.97 (0.78-1.19)	1.09 (0.88-1.35)
	Other/unknown		0.94 (0.73-1.21)	1.08 (0.83-1.41)
Year of death	2008		ref	ref
	2009		1.02 (0.83-1.25)	0.97 (0.79-1.20)
	2010		1.10 (0.89-1.35)	1.18 (0.95-1.45)
	2011		1.07 (0.86-1.32)	1.11 (0.89-1.37)
	2012		1.11 (0.90-1.37)	**1.25 (1.01-1.55)***
	2013		1.22 (0.99-1.50)	**1.26 (1.02-1.56)***
	2014		**1.27 (1.03-1.56)***	**1.31 (1.06-1.62)***
	2015		**1.52 (1.24-1.85)***	**1.60 (1.23-1.98)***
Charlson comorbidity index	0		ref	ref
	1 to 2		**1.44 (1.25-1.66)***	**1.89 (1.61-2.22)***
	>2		**1.41 (1.12-1.78)***	**2.05 (1.56-2.68)***
Income level	Quintile 1		ref	ref
	Quintile 2		0.91 (0.79-1.06)	0.87 (0.74-1.02)
	Quintile 3		0.98 (0.84-1.15)	0.92 (0.78-1.09)
	Quintile 4		0.98 (0.83-1.16)	0.85 (0.71-1.02)
	Quintile 5		1.01 (0.85-1.18)	0.94 (0.79-1.11)
First palliative contact	> 90 days before death		ref	ref
	≤ 90 days before death		**2.04 (1.81-2.29)***	**3.21 (2.85-3.62)***
	none		**1.83 (1.55-2.16)***	**1.31 (1.11-1.55)***
Long-term care admission	Yes		ref	ref
	No		**1.38 (1.06-1.80)***	**2.59 (2.01-3.34)***
Emergency room visits (90-365 days before death)	none (0)		ref	ref
	low (1- 2)		**0.81 (0.72-0.91)***	1.06 (0.94-1.19)
	high (≥ 3)		0.89 (0.77-1.04)	**1.37 (1.17-1.60)***

*, 95% CI does not contain 1 (also bolded). quintile 1 (Q1) $0 - $71,680, Q2: $71,765 - $90,112, Q3: $90,197 - $108,032, Q4: $108083 - $128384, Q5: $128,512 - $519,168

Results
ED Visits in the Last 90 Days of Life

- Similar trends were observed in the unadjusted and adjusted analyses of ED visits in the last 90 days of life

- Overall, n= 4493 (64%) of all decedents visited the ED in the last 90 days of life

- Those on palliative HC were least likely to visit the ED (59%), while those without any HC were most likely to visit the ED (71%)

Results: Table 4
Sensitivity Analysis of Palliative Home Care Patients

Patient characteristics		No. of patients	ED Visits	
			ED visit in last 30 days, Yes	ED visit in last 90 days, Yes
		6976	2570 (37)	4493 (64)
Received palliative home care	*All*	3256 (47)	1090 (33)	1921 (60)
	Received only palliative home care	*2415 (35)*	*814 (34)*	*1413 (59)*
	Received generalist home care first	*841 (12)*	*276 (33)*	*508 (60)*

Discussion
Point #1

- *Recall*
  - *In the last 30 days of life, generalist home care exposure was associated with increased odds of visiting the ED (OR 1.19; 95%CI 1.06 to 1.34), as was receiving no home care (OR 1.54; 95%CI 1.31 to 1.82), when compared to those patients receiving palliative home care*

- This characterizes the palliative home care versus generalist home care distinction

- Potentially → lower caseloads of palliative home care case managers allows for more intensive support in order to keep patients in the community → less need for the ED in the last months of life

Discussion
Point #2

- *Recall*
  - *When compared to decedents with earlier first palliative contact (> 90 days before death), those patients who never accessed PC had increased odds of visiting the ED (OR 1.83; 95%CI 1.55 to 2.16), as did patients who first accessed PC ≤90 days before death (OR 2.04; 95%CI 1.81 to 2.29)*

- Both early PC and palliative HC service involvement are independently associated with less ED visits

- Similar results to Earp (et al.)

- This study extends this trend to the last 90 days of life

Discussion
Point #3

- *Recall*
  - *Similar trends were observed in the unadjusted and adjusted analyses of ED visits in the last 90 days of life*
  - *Overall, n= 4493 (64%) of all decedents visited the ED in the last 90 days of life*
  - *Those on palliative HC were least likely to visit the ED (59%), while those without any HC were most likely to visit the ED (71%)*
  - *Patients receiving generalist home care and no home care had increased ED visits compared to patients receiving palliative home care*
    - *Trend observed in both the last 30 and 90 days of life*
- Isolating results to the last 30 days of life limits the generalizability of findings
  - Additional 90-day measure ameliorates this problem
- Existing studies do not address this

Conclusion

- Should we increase palliative home care resources?
  - Those on generalist home care and no home care access the ED at higher rates
- Earlier hypothesis that only those with higher needs are accessing palliative home care
  - So why do those on generalist home care have higher ED visits?
- Should generalist home care receive more PC supports?

Future Work

- Equity in access to PC is under-researched

- Specific elements of the palliative HC program are most helpful in reducing ED use at the end-of-life

- Concrete ways to improve access

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Questions?

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