

End-of-life care: A retrospective cohort study of older people who died within 48 hours of presentation to the emergency department

Sweeny, Amy L; Alsaba, Nemat; Grealish, Laurie; May, Katya; Huang, Ya-Ling; Ranse, Jamie; Denny, Kerina J; Lukin, Bill; Broadbent, Andrew; Burrows, Erin; Ranse, Kristen; Sunny, Linda; Khatri, Meghna; Crilly, Julia

Published in:
Emergency medicine Australasia : EMA

DOI:
[10.1111/1742-6723.14331](https://doi.org/10.1111/1742-6723.14331)

Licence:
CC BY-NC

[Link to output in Bond University research repository.](#)

Recommended citation(APA):

Sweeny, A. L., Alsaba, N., Grealish, L., May, K., Huang, Y-L., Ranse, J., Denny, K. J., Lukin, B., Broadbent, A., Burrows, E., Ranse, K., Sunny, L., Khatri, M., & Crilly, J. (2023). End-of-life care: A retrospective cohort study of older people who died within 48 hours of presentation to the emergency department. *Emergency medicine Australasia : EMA*, 1-11. Advance online publication. <https://doi.org/10.1111/1742-6723.14331>






General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

For more information, or if you believe that this document breaches copyright, please contact the Bond University research repository coordinator.

ORIGINAL RESEARCH

End-of-life care: A retrospective cohort study of older people who died within 48 hours of presentation to the emergency department

Amy L SWEENEY ^{1,2,3} Nemat ALSABA,^{1,3} Laurie GREALISH,^{2,4} Katya MAY,^{1,5} Ya-Ling HUANG,^{1,5,6} Jamie RANSE ^{1,2,5} Kerina J DENNY ^{7,8} Bill LUKIN ^{8,9} Andrew BROADBENT,^{3,10} Erin BURROWS,¹ Kristen RANSE,⁵ Linda SUNNY,^{3,11} Meghna KHATRI³ and Julia CRILLY ^{1,2,5}

¹Emergency Department, Gold Coast Hospital and Health Service, Gold Coast, Queensland, Australia, ²Menzies Health Institute Queensland, Griffith University, Gold Coast, Queensland, Australia, ³Faculty of Health Sciences and Medicine, Bond University, Gold Coast, Queensland, Australia, ⁴Nursing and Midwifery Research Unit, Gold Coast Hospital and Health Service, Gold Coast, Queensland, Australia, ⁵School of Nursing and Midwifery, Griffith University, Gold Coast, Queensland, Australia, ⁶Faculty of Health (Nursing), Southern Cross University, Gold Coast, Queensland, Australia, ⁷Department of Intensive Care Medicine, Gold Coast Hospital and Health Service, Gold Coast, Queensland, Australia, ⁸School of Medicine, The University of Queensland, Brisbane, Queensland, Australia, ⁹Royal Brisbane Residential Aged Care Assessment and Referral Service, Brisbane, Queensland, Australia, ¹⁰Supportive and Specialist Palliative Care, Gold Coast Hospital and Health Service, Gold Coast, Queensland, Australia, and ¹¹Lyell McEwin and Modbury Hospitals, Northern Adelaide Local Health Network, Adelaide, South Australia, Australia

Abstract

Objectives: To describe the characteristics of, and care provided to, older people who died within 48 h of ED presentation.

Methods: A descriptive retrospective cohort study of people 65 years and older presenting to two EDs in Queensland, Australia, between April 2018 and March 2019. Data from electronic medi-

cal records were collected and analysed.

Results: Two hundred and ninety-five older people who died within 48 h of ED presentation were included. Nearly all arrived by ambulance (92%, $n = 272$) and 36% ($n = 106$) were from aged care facilities. Three-quarters (75%, $n = 222$) were triaged into the most urgent triage categories (i.e. Australasian Triage Scale;

Key findings

- Over half (52%) of 295 older people who died within 48 h of ED presentation had one or more prior ED visits and/or hospitalisations.
- Management of some symptoms common at the end of life (including dyspnoea, anxiety and agitation) with medications, and PRN prescribing of these, occurred less frequently in ED compared to the wards.

Correspondence: Ms Amy L Sweeney, Emergency Department, Gold Coast Hospital and Health Service, Gold Coast, QLD 4215, Australia. Email: amy.sweeney@health.qld.gov.au

Amy L Sweeney, BSc, MPH, RN, Research Manager, Senior Lecturer, Honorary Adjunct Assistant Professor; Nemat Alsaba, MBBS, FACEM, Emergency Physician, Assistant Professor; Laurie Grealish, DipNurs, GradCertOncNurs, GradDipNursSt (Edn), MN, PhD, FACN, Associate Professor CNC Older Person (Education); Katya May, BA, MSN, PhD, Senior Lecturer, Nurse Researcher; Ya-Ling Huang, BN, MN, PhD, Nurse Researcher, Lecturer; Jamie Ranse, BNurs, GradCertClinEd, GradCertClinEpi, MCritCareNurs, PhD, Associate Professor; Kerina J Denny, MBBS, PhD, BSc (Hons), Fellow, Faculty Member; Bill Lukin, MBBS, FACEM, FChPallMed, Clinical Associate Professor, Lecturer, Staff Specialist; Andrew Broadbent, MBChB, BMedSc, MHM, FRACP, FACHPM, Director of Palliative Care, Associate Professor; Erin Burrows, BNurs, PGCertPH, PGCertNurs, Research Nurse; Kristen Ranse, BN, MN, PhD, Senior Lecturer; Linda Sunny, BMedSt/MD, Medical Student, PostGrad Resident; Meghna Khatri, BMedSt/MD, Medical Student; Julia Crilly, BNurs, MEmergN (Hons), PhD, Professor of Emergency Care.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

Accepted 27 September 2023

ATS 1/2). Fewer than half were previously independent with mobility (38%, $n = 111$) and activities of daily living (43%, $n = 128$). Sixty-one per cent ($n = 181$) had a pre-existing healthcare directive. Twenty-two per cent ($n = 66$) died in ED, most commonly due to pneumonia, intracerebral haemorrhage, cardiac arrest and/or sepsis. Over half had one or more ED visits (52%, $n = 154$) and/or hospital admissions (52%, $n = 152$) 6 months prior.

Conclusions: Identification of patients at end-of-life (EoL) is not always straightforward; consider recent reduction in independence and recent ED visits/hospital admissions. System-

based strategies that span pre-hospital, ED and in-patient care are recommended to facilitate EoL pathway implementation and care continuity.

Key words: *aged, critical illness, delivery of healthcare, emergency service, hospital, palliative care, terminal care.*

Introduction

Globally, our population is ageing. By 2050, the number of people aged 65 years and older is projected to double, increasing to 1.5 billion.¹ In Australia, people aged 65 years and older are over-represented in ED presentations. Although making up about 16% of the general population, they account for around 21% of ED presentations.² Similar observations are noted in other countries.^{3–5} Health service planning for older people using ED services is an essential area for consideration.⁶

The ED setting has traditionally been a place centred on rapid curative-focused interventions and care provision to patients with acute injury or illness. However, the ED is commonly utilised by people nearing end-of-life (EoL). Adults visit EDs on average 0.2–0.3 times annually.⁷ However, in the last year of life, this increases to 1.3–1.7 visits to ED.^{7,8} For people aged over 65 years, a longitudinal US population-based study found that 75% visited an ED in their last 6 months of life.⁹ ED clinicians are thus increasingly compelled to address the complex, symptom-focused management of older people living with multiple chronic diseases as they approach EoL rather than solely curative interventions.^{10,11} The application of EoL care in ED requires more attention.¹² EoL care is defined as: ‘support for people who are in the last months, weeks or days of life’, and begins when death is imminent, whether due to an advanced incurable condition or a sudden catastrophic event.¹³ For the purpose of this manuscript, EoL is limited to those imminently dying, that is, within 48 h, and can incorporate the palliative approach and specialist palliative care. A recent

systematic review concluded that providing palliative care from within ED is feasible, safe, and improves the quality of life for patients and families.¹⁴ However, only 10–41% of the population have prepared EoL care documentation,^{15,16} even among older people. Reasons proposed for this include fragmented health services, a reluctance to discuss dying (for clinicians, patients and/or their families), difficult/inaccurate prognostication, difficulty accepting prognosis and the curative focus of medicine.¹⁷ This lack of pre-planning, along with logistical barriers in accessing relevant EoL documentation when it exists,¹⁸ creates challenges for ED clinicians trying to determine the best plan of care for someone they met 10 min earlier.

Some progress has been made towards identifying EoL care practices within EDs, and factors influencing these practices.^{19,20} However, the integration of EoL care into ED, that is, the introduction of models of care,^{21–23} policies,²⁴ guidelines,²⁵ pathways^{26–28} and screening tools,^{29–31} is not well described.³² The aim of the present study was to (i) describe the characteristics of people aged 65 years and older who died within 48 h of ED presentation and (ii) describe how EoL practices were integrated into the care they received.

Methods

Design, setting and sample

This was a retrospective cohort study undertaken at two public hospital EDs (Site A and Site B) within the one health service which saw over 100 000 and 60 000 patients, respectively, in 2017–2018. Site A is a 750-bed tertiary-level facility; Site B is a 403-bed secondary-level facility. Both sites provide emergency, medical, and mental healthcare. The Specialist Palliative Care Service provides consultative services for both EDs that are located within the same health service. Although consults occur over both hospitals, only Site B has a permanent in-patient unit with Palliative Medicine physicians as the admitting specialist. Thus, a patient who is reviewed at Site A

may require transfer to Site B if specialist in-patient palliative care is required. However, the Specialist Palliative Care Team can similarly support other admitting clinicians in the provision of appropriate EoL management at Site A or B. Neither site had on-site 24/7 social worker services in the ED at the time of the present study. Further details of service availability can be found in Appendix S1. Both sites contain a short stay unit (SSU) or clinical decision unit (CDU) which is staffed by ED clinicians, considered part of ED for the present study. This southeast Queensland Hospital and Health Service has a catchment area of over 590 000 people with 16.4% aged 65 years or older.

All patients aged 65 years or older who presented to the EDs between 1 April 2018 and 31 March 2019, and who died within 48 h of ED triage during an episode of hospital-based care continuous with their ED presentation were included. The following exclusion criteria were applied: age <65 years; time between triage and death exceeded 48 h; dead on arrival or within 10 min of triage; transferred from another health service. The date and time of death were extracted from the death certificate in the electronic medical record (EMR).

Data collection

Demographic and clinical information were provided electronically by the Health Informatics and Business Analytics departments from two hospital databases: the Emergency Department Information System and the Hospital-Based Corporate Information System. Variables obtained electronically included: age, sex, arrival mode, Australasian Triage Scale (ATS), principal diagnosis and discharge destination (see Table S1 for complete list). Additional information was manually abstracted from the patient's EMR, including patient demographics (e.g. residential aged care residence), presentation characteristics (e.g. GCS score and comorbidities), advanced health directive (AHD) and acute resuscitation plan (ARP) information, indicators of

frailty status (e.g. mobility, ability to perform activities of daily living [ADLs] and cognitive function), interventions performed (e.g. placement of central line) and comfort measures provided (e.g. management of pain). Pre-existing ARPs or AHDs uploaded into the EMR from previous presentations/admissions can be accessed by ED clinicians. The abstraction quality assurance processes and data dictionary used are provided in Appendices S1–S3. Queensland Health's Care Plan for the Dying Person (CPDP)²⁸ was used as a resource to identify recommended care elements for abstraction. IBM SPSS v26 (IBM, Armonk, NY, USA) was used to perform descriptive and inferential analyses. Cohen's kappa was used to

measure inter-rater reliability on key variables abstracted. Further information on data analysis is provided in Appendix S1.

Ethics approval

The Hospital and Health Service Human Research Ethics Committee (2019/QGC/53211) and Griffith University Human Research Ethics Committees (2020/529) approved the present study.

Results

Two hundred and ninety-five older people met the inclusion criteria. Figure 1 displays the patient selection process.

The majority of patients (60%, $n = 177$) died in a hospital ward. Sixty patients (20%) died in ED and an additional six patients (2%) died in an SSU managed by ED staff. Forty-six patients (16%) were admitted to and died in ICU. Six patients (2%) were cared for in ED, and able to be discharged to their place of residence where they subsequently died. Table 1 presents information regarding the place of death, first discharge destination and discharge speciality.

Characteristics of older people who died within 48 h of triage

Table 2 presents characteristics of older people who died within 48 h of ED triage. The median age of this group was 81 years (interquartile range [IQR] 76–89), and 36% ($n = 106$) were from aged care facilities. In the 6 months preceding this final presentation, over half had one or more prior ED visits (52%, $n = 154$) and/or hospital admissions (52%, $n = 152$). Eighteen people (6%) were discharged and re-presented near EoL 48 h later. Nearly all arrived by ambulance (92%, $n = 272$) and almost half (48%, $n = 140$) presented with a GCS ≤ 12 . Three-quarters (75%, $n = 222$) were triaged into the most urgent triage categories (i.e. ATS 1/2). Less than half were previously independent with mobility (38%, $n = 111$) and ADLs (43%, $n = 128$). The most common reasons for death were pneumonia, atraumatic intracerebral haemorrhage, cardiac arrest and sepsis. Sixty-one per cent ($n = 181$) had a pre-existing healthcare directive in place (Table 2).

Comparisons of older people who died within the ED versus outside the ED

The likelihood of dying in ED *versus* elsewhere (hospital ward/ICU/home) was not significantly associated with age or sex. However, compared to people who died outside of ED, those who died in ED were significantly more likely to present with a GCS of 3 (odds ratio [OR] 5.9, 95% confidence interval [CI] 2.9–12.1).

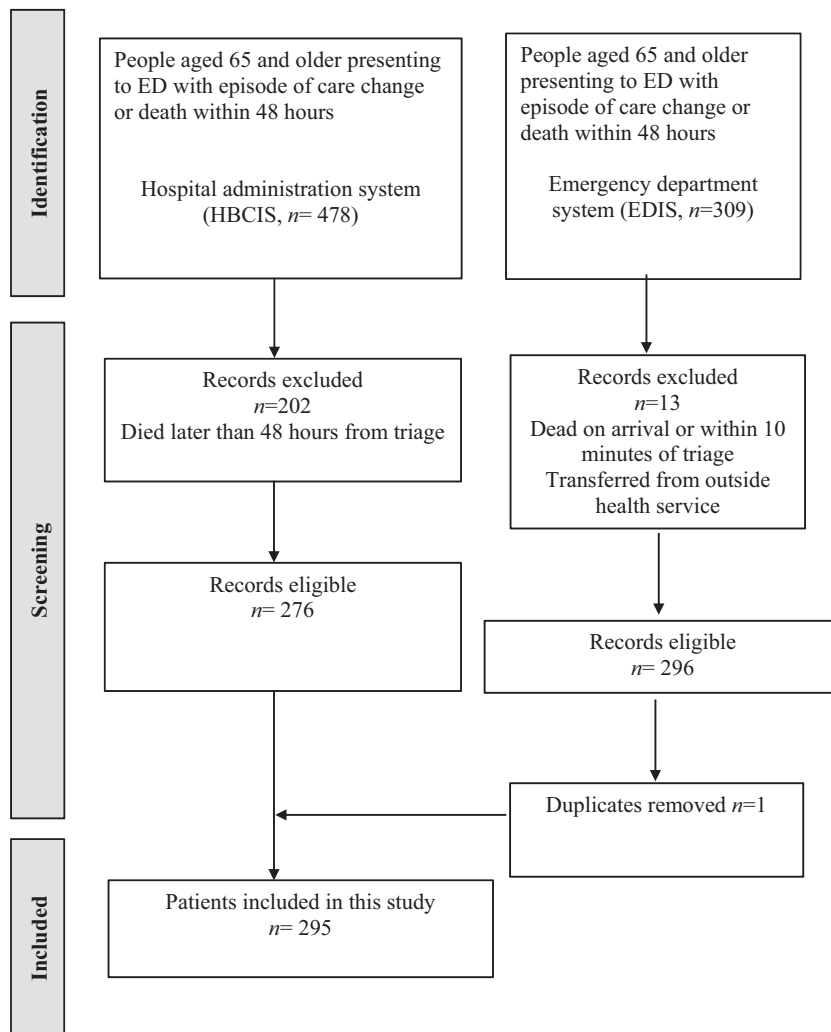


Figure 1. Flow chart of identification, screening and study inclusion of older people who died within 48 h of ED triage.

TABLE 1. Place of death, discharge destination and discharge speciality accepting care for older people who died within 48 h of ED triage

	<i>n</i>	%
Place of death		
Died in ED (includes SSU/CDU)	66	22.4
Died in ICU	46	15.6
Died in hospital ward (not in ED)	177	60.0
Died at place of residence	6	2.0
First discharge destination		
Admitted to ward	40	13.5
Admitted directly to ICU	30	10.1
Admitted via Theatre or Cardiac Catheter Suite	13	4.4
Admitted to SSU/CDU (ED)	39	13.2
Admitted to Medical Assessment Unit	111	37.6
Discharged to place of residence	1	0.3
Transferred to another hospital	1	0.3
Morgue	60	20.3
Discharge speciality		
Medical	154	52.2
Emergency medicine	60	20.3
Intensive care	48	16.3
Palliative care	24	8.1
Surgical	4	1.4
Geriatric	3	1.0
Oncology	2	0.7

CDU, clinical decision unit; SSU, short stay unit.

Nearly three-quarters (73%, $n = 48$ of 66) of patients who died in ED were triaged as ATS 1, compared to 32% ($n = 73$ of 229) triaged as ATS 1 who died elsewhere. Older people who died in ED were significantly more likely to be previously independent with mobility (OR 3.9, 95% CI 1.8–8.2) and ADLs (OR 2.6, 95% CI 1.3–5.1), and more likely to present with a cardiac arrest compared to those who died elsewhere. There was no association between time of triage (day: 07:00–18:59 *vs* night: 19:00–06:59) and whether the patient died in ED or on the ward in the present study. About 61% of patients (40 of 66 and 141 of 229) died during the day ($P = 0.887$).

Older people who died in ED were less likely to have been seen in the ED or hospital more than once in the last 6 months, to have any kind of EoL plan, or to have a ‘do not resuscitate’ status.

Health service process measures

Table 3 presents information regarding process measures for older people who died within 48 h, and by location of death. The median ED length of stay for all patients was 3.7 h (IQR 2.3–5.8). Patients 65 years or older who died in ED experienced a shorter time to be seen (median 0 *vs* 7 min), and a shorter ED length of stay (median 2.3 h *vs* 6.6 h) compared to those who died elsewhere ($P < 0.001$).

Few patients who died in ED received a continuous subcutaneous infusion (CSI), and/or were started on the CPDP ($n = 3$ and 5, respectively); most received these care elements on the ward. The time from triage to commencement of the CPDP for those placed on the pathway was a median of 7 h (IQR 3.5–16.0).

Seventy-five (25%) patients underwent one or more invasive treatments (i.e. intubation, insertion of a peripheral inserted central catheter, an interventional radiology procedure and/or surgery) in the 48 h between ED presentation and death. Specifically, 16% of patients received a central line ($n = 46$), 19% were intubated ($n = 57$) and 6% underwent an interventional radiology procedure, cardiac catheterisation or surgery ($n = 17$). Of the 57 patients intubated, 44% ($n = 25$) of these patients were intubated pre-hospital, 39% ($n = 22$) in the ED, and 17% ($n = 10$) were intubated after leaving ED (ICU or the operating theatre) (data not shown).

Symptoms experienced, and treatments provided, including by location of death

Information regarding EoL symptoms and their management and care provided as recommended by the CPDP²⁴ is presented in Table 4. Symptoms of pain, dyspnoea, anxiety, distress, inability to manage secretions and/or agitation were quite prevalent among patients at EoL, with 90% ($n = 264$) having one or more of these documented in their medical records. Of these, dyspnoea was the most common symptom (65%, $n = 192$), followed by agitation (51%, $n = 151$), pain (49%, $n = 145$) and difficulty clearing secretions (47%, $n = 138$). About half (51%, $n = 150$) were documented to have at least one episode of distress; 124 of these (89%) received symptom control management. A CSI pump was provided for 37% ($n = 108$) of this cohort, regardless of documented symptoms, commencing a median of 13.9 h (IQR 5.9–27.3) after triage.

TABLE 2. Demographic, healthcare utilisation and ED characteristics for older people who died within 48 h of triage

Characteristic	All deaths within 48 h (n = 295)		Died in ED (n = 66, 22.4%)		Died elsewhere† (n = 229, 77.6%)		OR (95% CI)	P-value
	n	%	n	%	n	%		
Median age in years (IQR)	81 (76–89)		81 (76–87.25)		82 (76–89)			0.608
Age group								
65–69	28	9.4	5	7.6	23	10.0	0.92 (0.29–2.93)	0.893
70–74	27	9.1	6	9.1	21	9.2	1.21 (0.40–3.66)	0.730
75–79	66	22.3	15	22.7	51	22.3	1.25 (0.53–2.93)	0.608
80–84	54	18.3	17	25.8	37	16.2	1.95 (0.83–4.58)	0.124
85–89	57	19.3	11	16.7	46	20.1	1.02 (0.41–2.53)	0.972
90+	63	21.3	12	18.2	51	22.3	1.00 (reference)	
Sex, male	154	52.2	32	48.5	122	53.3	0.83 (0.48–1.43)	0.492
Aged care facility resident								
Yes	106	35.9	18	27.3	88	38.4	0.60 (0.30–1.10)	0.096
No	189	64.1	66	72.7	141	61.6	1.00 (reference)	
Prior presentation to ED in previous 48 h								
Yes	18	6.1	4	6.1	14	6.1	1.0 (0.33–3.10)	1.00
No	277	93.9	62	93.9	215	93.9	1.0 (reference)	
Prior ED presentations in previous 6 months								
None	141	47.8	39	59.1	102	44.5	1.0 (reference)	
One	83	28.1	16	24.2	67	29.3	0.63 (0.32–1.20)	0.162
Two or more	71	24.1	11	16.7	60	26.2	0.48 (0.22–0.99)	0.048
Prior admissions in previous 6 months								
None	143	48.5	42	63.6	101	44.1	1.0 (reference)	
One	75	25.4	14	21.2	61	26.6	0.55 (0.27–1.09)	0.086
Two or more	77	26.1	10	15.2	67	29.3	0.36 (0.17–0.76)	0.006
Arrival mode								
Self-present	23	7.8	2	3.0	21	9.2	0.31 (0.07–1.4)	0.122
Ambulance	272	92.2	64	97.0	208	81.8	1.0 (reference)	
GCS on presentation								<0.001
≤3	48	16.3	25	37.9	23	10.0	5.9 (2.9–12.1)	
4–12	92	31.2	17	25.8	75	32.8	1.2 (0.6–2.5)	
13–15	155	52.5	24	36.4	131	57.2	1.0 (reference)	
Triage category								<0.001
1	121	41.1	48	72.7	73	31.9	5.3 (2.4–12.1)	<0.001
2	101	34.2	10	15.2	91	39.7	0.9 (0.3–2.4)	0.893
3–5	73	24.7	8	12.1	65	28.4	1.0 (reference)	
Frailty indicator: cognitive impairment								
Yes	107	36.2	16	24.2	91	39.7	0.5 (0.3–0.9)	0.021
No	188	63.7	50	75.8	138	61.3	1.0 (reference)	

(Continues)

TABLE 2. Continued

Characteristic	All deaths within 48 h (n = 295)		Died in ED (n = 66, 22.4%)		Died elsewhere† (n = 229, 77.6%)		OR (95% CI)	P-value
	n	%	n	%	n	%		
Frailty indicator: mobility								
Independent	111	37.6	40	60.6	70	30.6	3.9 (1.8–8.2)	<0.001
Assistance with mobility aid	94	31.8	14	21.2	81	35.4	1.2 (0.5–2.8)	0.705
Dependent on others to mobilise	45	15.2	2	3.0	43	18.8	1.0 (reference)	
No mobility	41	13.9	9	13.6	32	14.0	6.0 (1.2–29.9)	0.032
Unable to determine	4	1.4	1	1.5	3	1.3	Not included	
Frailty indicator: self-care with ADLs (dressing, bathing, feeding)								
Independent	128	43.3	41	62.1	87	38.0	2.6 (1.3–5.1)	0.006
Dependent for one or two ADLs	67	22.7	8	12.1	59	25.8	0.7 (0.3–1.9)	0.538
Fully dependent	91	30.8	14	21.2	77	33.6	1.0 (reference)	
Unable to determine	9	3.1	3	4.5	6	2.6	Not included	
Most frequently occurring diagnoses (ICD10)								
Pneumonia‡	31	10.5	2	3.0	29	12.7	0.27 (0.06–1.18)	0.081
Intracerebral haemorrhage – atraumatic (I61.9)	28	9.5	8	12.1	20	8.7	1.6 (0.6–3.8)	0.333
Cardiac arrest (I46.9)	23	7.8	16	24.2	7	3.1	8.9 (3.4–23.2)	<0.001
Septic shock (A41.9)	19	6.4	2	3.0	17	7.4	0.5 (0.1–2.1)	0.31
Palliative care (Z51.5)	13	4.4	1	1.5	12	5.2	0.3 (0.0–2.6)	0.287
None of the above	181	61.4	37	56.1	144	62.9	1.0 (reference)	
End-of-life planning								
Any pre-existing plan in place§	181	61.4	31	47.0	150	65.5	0.5 (0.3–0.8)	0.007
Pre-existing ARP including ceilings of care	116	39.3	17	25.8	99	48.2	0.13 (0.05–0.21)	<0.001
Patients with not-for-resuscitation status (either pre-existing or established this stay prior to death)	233	78.9	36	54.5	197	86.0	0.22 (0.1–0.4)	<0.001

†Elsewhere: On ward, in ICU or at home. ‡Twelve cases of aspiration pneumonia (J69.0) and the rest unspecified (J18.9).

§Any of: Enduring Power of Attorney (EPOA), Statement of Choices (SoC) or Advance Health Directive (AHD). ADLs, activities of daily living; ARP, acute resuscitation plan; ICD10, international classification of diseases (10th edition); OR, odds ratio.

Thirty-five per cent of all patients ($n = 103$) were placed on the CPDP.²⁴ Most had family present at time of death (86%, $n = 253$), were nursed in a private room (77%, $n = 228$), and had a social work consult (72%, $n = 212$). One in eight had a specialist palliative care consult (14%, $n = 42$) during their last 48 h. Forty-seven per cent ($n = 138$) received a *Pro Re Nata*

(PRN) prescription for all three antianxiolytics, antisialagogues and analgesia.

Interventions and EoL care provided were also examined according to the location of death (Table 4 and Fig. 2). Initiation of the CPDP and prescription of symptom management medications were less common, whereas the patient was in ED. For patients dying in ED, symptoms of

pain were usually addressed, with 16 out of 18 patients with documented pain (89%) receiving analgesia. However, few who died in ED received treatment for documented anxiety (2 out of 8 patients [25%]), or agitation (3 out of 18 patients [17%]).

Additional characteristics, care elements and outcomes are presented in Tables S2 and S3.

TABLE 3. Process measures for older people who died within 48 h of ED triage, by location of death

	All patients (<i>n</i> = 295)		Died in ED (<i>n</i> = 66)		Died elsewhere† (<i>n</i> = 229)		<i>P</i> -value
	<i>n</i>	Median (IQR)	<i>n</i>	Median (IQR)	<i>n</i>	Median (IQR)	
ED waiting times							
Time from triage to first seen (min)	295	4 (0–21)	66	0.0 (0.0–4.25)	229	7.0 (0.0–29.0)	<0.001
ED length of stay (h)	295	3.7 (2.3–5.8)	66	2.3 (1.3–3.9)	229	6.6 (4.0–9.2)	<0.001
Time from triage to CSI device (h)	108	13.9 (5.9–27.3)	3	0.5 (0.32–2.3)	105	14.4 (6.3–27.5)	Not calculated due to small numbers
Time to commencement of CPDP pathway from triage (h)	103	7 (3.5–16.0)	5	0.8 (0.8–1.3)	98	7.9 (4.1–17.6)	Not calculated due to small numbers

†Elsewhere means ICU, ward or at home. CPDP, Care Plan for the Dying Person; CSI, continuous subcutaneous infusion.

Discussion

The present study revealed a variety of patient trajectories towards EoL, including unexpected life-limiting emergencies, acute exacerbations of chronic diseases, and patients more slowly and expectedly progressing towards EoL. The present study differs from previous literature regarding EoL experiences in the ED, in that previous research has largely focused on a specific disease subtype (e.g. advanced cancer or terminal illness). Indeed, the diversity in disease trajectories demonstrated in the current cohort highlights the unique challenges that ED-based clinicians face in both recognising, and thus caring for, patients approaching the final 48 h of their lives.

Although many older people presented with conditions conferring a high risk of imminent death (e.g. GCS 3, ATS 1, cardiac arrests and cerebrovascular events), about half of EoL presentations seemed to have a less noticeable, but telling, clinical picture. In particular, this latter group at EoL were older adults with a frailty indicator (such as some limitations in mobility or ADLs or cognitive impairment), many with advanced care planning, and many with one or more prior presentation or hospitalisation in the previous 6 months. This subset could be flagged at triage and targeted for goals of care discussions. ED

clinicians are also encouraged to join advanced care planning advocates and address the recognised barriers to advanced care planning.

Another potential approach to improve recognition and therefore care of patients at EoL would be to use a modified version of ‘the surprise criteria’.³³ ‘Surprise’ criteria have been previously applied to identify those patients who may die within the next year to direct appropriate palliative interventions, and have shown to portend an increased probability of death (OR [95% CI]) in the next year of 3.5 (1.4–9.1).³³ A modification, for example, ‘the surprise-ED criteria’, would change the time-frame from 12 months to 48 h; that is, the clinician would not be ‘surprised’ if the patient died in the next 48 h. For patients meeting ‘surprise-ED’ criteria, goals of care discussion, taking about 10 min to conduct according to one study,³⁴ could ensue. Sensitivity/specificity testing of this type of screen is recommended. Other innovative models to improve EoL recognition and care have recently emerged as a response to surges in critical COVID-19 cases. These include: embedding a palliative care clinician within the ED, including palliative care clinicians at handovers for ‘at risk’ patients, or the establishment of triggers for a speciality consult,²¹ which could be nurse-

initiated triggers.³⁵ Although these models may not be practical in non-pandemic settings, non-pandemic times, or for small institutions, they still may be beneficial in some settings or in some crisis situations.

In the present study, 92% of older people at EoL arrived by ambulance and 75% were triaged as a category 1 or 2 (i.e. resuscitation or emergency), where medical assessment and treatment response should be immediate (for ATS 1), or within 10 min (for ATS 2). Nationally, 26% of all ED presentations arrived by ambulance and 15% were triaged as ATS 1 or 2. The opportunity for pre-hospital EoL assessment warrants exploration. Our cohort was older, with a greater proportion of ATS 1 and 2 patients compared to all presentations nationally. The median time to be seen of 4 min in the present study reflects these characteristics; nationwide, the median time to be seen in 2020–2021 was 18 min.² Further larger-scale research is needed to understand if the profile and process outcomes of older people at EoL found in our study cohort are reflected elsewhere.

Eighteen patients (6%) were discharged home 48 h prior to EoL representation. Further exploration into the circumstances around discharge and re-presentation in EoL situations is warranted to better understand

TABLE 4. End-of-life (EoL) care provided by place care initiated, and symptom management for older people who died within 48 h of triage

Indicator	Care provided (<i>n</i> = 295)		Care initiated in ED or SSU (<i>n</i> = 295)		Number eligible† for care initiation on ward <i>n</i>	Care initiated on ward (among eligible)		
	<i>n</i>	%	<i>n</i>	%		<i>n</i>	%	
On Care Plan for the Dying Person pathway	103	34.9	25	8.5	205	78	38	
Family present at bedside at time of death‡	253	85.8	48	72.7	229	205	89.5	
Not intubated	238	80.7	248	91.9	202	192	95	
Nursed in a private room§	228	77.3	41	13.9	188	187	99.5	
Face-to-face discussion, family and doctor‡	243	82.4	48	72.7	229	195	85.2	
Consult by palliative care	42	14.2	14	4.7	215	26	12.1	
Social work consult provided¶	212	71.9	125	42.4	163	76	46.6	
EoL symptom screening and prescribing								
Screened for pain in ED	211	71.5	211	71.5	ED-specific			
Recorded on presentation to ED	160	54.2	160	54.2				
Not recorded on presentation, but recorded later in ED	51	17.3	51	17.3				
No pain scores reported in ED	99	33.6	99	33.6				
PRN prescribing								
Prescribed PRN analgesia	227	76.9	142	48.1	116	85	73.3	
Prescribed PRN anxiolytic	173	58.6	74	25.1	175	97	55.4	
Prescribed PRN antisialagogue	149	50.5	70	23.7	177	77	43.5	
Prescribed all three above††	138	46.8	44	14.9	199	66	33.2	
Prescribed all three above or received a CSI device	183	62.0	45	15.3	184	104	56.5	
					Died in ED (<i>n</i> = 66)		Died elsewhere (<i>n</i> = 229)	
EoL symptom management			<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Received CSI device (regardless of documented symptoms)			108	36.6	10	15.2	98	42.8
Time from triage to CSI device (h)			13.9 (5.9–27.3)		0.5 (0.32–2.3)		14.4 (6.3–27.5)	
Any symptoms at any time documented‡‡			264	89.5	51	77.3	213	93.0
Of these, received CSI device			104	39.4	9	17.6	95	44.6
Pain present at any time			145	49.2	18	27.3	127	55.5
Of these, received analgesia			136	91.7	16	88.9	120	94.5
Anxiety present at any time			74	25.1	8	12.1	66	28.8
Received anxiolytic or antipsychotic			44	59.5	2	25.0	42	63.6
Agitation present at any time			151	51.2	18	27.3	133	58.1
Received anxiolytic or antipsychotic			99	65.6	3	16.7	96	72.2

EoL symptom management	n	%	Died in ED (n = 66)		Died elsewhere (n = 229)	
			n	%	n	%
Dyspnoea present at any time	192	65.1	40	60.6	152	66.4
Received analgesia	142	74.0	22	55.0	131	86.2
Difficulty clearing secretions present	138	46.8	18	27.3	120	52.4
Received CSI device§§ including antisialagogue	27	19.6	0	0.0	27	22.5
Number of episodes of distress documented						
One or two episodes	96	32.5	17	25.8	79	34.5
Received any symptom control medication	80	83.3	12	70.6	68	86.1
Three or more episodes	54	18.3	1	1.5	53	23.1
Received any symptom control medication	54	100.0	1	100.0	53	100.0

†Eligible population excludes those who already received this care in ED, or who died in ED. For the 'not intubated' indicator, eligible population also excludes 25 patients intubated prior to arrival in ED. ‡The location-specific denominator is patients dying in that setting (n = 66 ED, n = 229 ward/other). §Private room unable to be ascertained for 104 patients, whereas in ED. ¶Includes 11 families that received a first social work consultation after the patient died. ††Thirty-four patients received one or more medications in ED and others on ward and are not counted as receiving all three in either. ‡‡Any of: pain, dyspnoea, agitation, anxiety and inability to clear secretions. §§Oral administration not captured for this symptom. CSI, continuous subcutaneous infusion; PRN: *Pro Re Nata* = as required; SSU, short stay unit (considered part of ED).

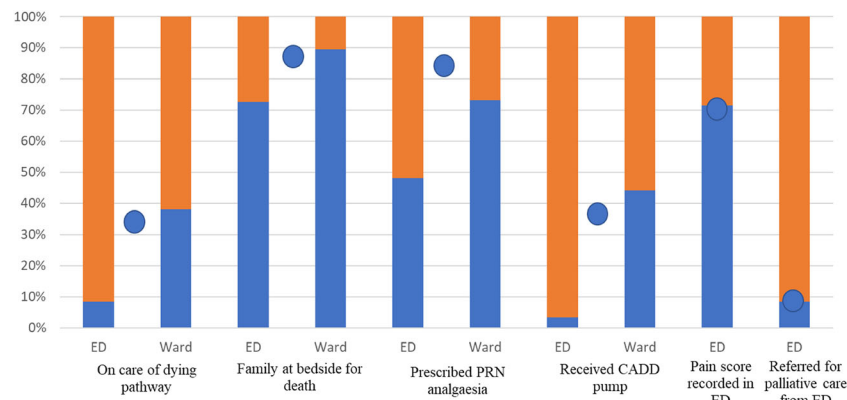


Figure 2. Proportion of older people with documentation indicating receiving an end-of-life care element by location care initiated, and for all older people who died within 48 h of ED presentation. (■) Received; (■) Did not receive; (●) Proportion of all older persons dying within 48 h with this care.

this, especially in the context of whether the re-presentation was 'planned' or 'unplanned'.³⁶

Our findings highlight some opportunities to enhance care for patients at EoL in the ED. Time in ED represents an excellent opportunity to plan symptom control. Poor symptom management at EoL (not specific to the ED context) has been identified as one of the most significant causes of dissatisfaction.¹² Our findings indicate

that the assessment and management of pain in the ED was common for people at EoL. The use of medication for alleviating other symptoms (such as dyspnoea, anxiety and/or agitation) was not reported as often; we did not collect data on non-pharmacological approaches for symptom management such as those that have been reported elsewhere to be beneficial.^{37,38} It should also be noted that some patients who died in the ED did so

during active resuscitation efforts, and that this group was not differentiated in the present study. It is worthwhile for EDs to consider auditing the group of patients who die in ED to identify whether the initiation of EoL care was possible on a case-by-case basis.

The Australian Commission on Safety and Quality in Health Care states: 'it should be as easy to access support for the provision of appropriate end-of-life care as it is to escalate care for reversible deterioration'.²⁵ ED clinicians are faced with a challenge to provide the appropriate care for patients, sometimes without knowing the patients' wishes. Updating patients' advance care plans and content at each healthcare encounter (primary or emergency care) will help identify those at EoL, and prepare patients and their carers. When accessing acute care is necessary, recognition of a dying patient (by a clinician or family member) could be a trigger for a 'Code Comfort'³⁹ much like a 'Code Blue' or a 'Trauma Alert', garrisoning the appropriate personnel, communication cascades and resources to co-develop goals of care and provide a good death in the preferred setting, as determined by the patient and family. Further operationalisation of EoL cares into a

structured 'code comfort' which can be activated, among other places, within the ED, warrants consideration.

Limitations

The present study presents data from two EDs/hospitals in southeast Queensland, Australia; findings may not be generalisable to other settings. With our reliance on retrospective documentation, we may have underestimated the true extent of some EoL care provided. We also did not qualify at the time of death whether active management was continuing or whether the patient had been changed to comfort management: this has implications for the interpretation of the findings. Furthermore, some older people discharged from ED who subsequently died in the next 48 h at home or elsewhere may have been missed.

Conclusions

The identification of some patients at EoL presenting to ED is not straightforward. System-based strategies (such as a 'code comfort') that span pre-hospital, ED, and in-patient care are recommended to facilitate timely symptom management, EoL pathway implementation and care continuity.

Acknowledgements

The authors acknowledge the financial support from the Emergency Medicine Foundation which assisted in the completion of this project. The funding agency did not have any role in the design of the study; collection, analysis and interpretation of data; or writing of this manuscript. Open access publishing facilitated by Bond University, as part of the Wiley - Bond University agreement via the Council of Australian University Librarians.

Competing interests

None declared.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The

data are not publicly available due to privacy or ethical restrictions.

References

1. United Nations, Department of Economic and Social Affairs, Population Division. World Population Ageing 2019: Highlights (ST/ESA/SER.A/430), 2019. [Cited 26 Oct 2022.] Available from URL: <https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf>
2. Australian Institute of Health and Welfare. Emergency Department Care 2020–21 data. [Updated 14 Jul 2022; cited 11 Aug 2022.] Available from URL: <https://www.aihw.gov.au/reports-data/myhospitals/sectors/emergency-department-care>
3. Ashman JJ, Schappert SM, Santo L. Emergency department visits among adults aged 60 and over: United States, 2014–2017. NCHS Data Brief no. 367. Hyattsville, MD: National Center for Health Statistics, 2020.
4. Gomes JC, Dias RD, de Barros JV, Velasco IT, Jacob FW. The growing impact of older patients in the emergency department: a 5-year retrospective analysis in Brazil. *BMC Emerg. Med.* 2020; 20: 1–2.
5. Ukkonen M, Jämsen E, Zeitlin R, Pauniah SL. Emergency department visits in older patients: a population-based survey. *BMC Emerg. Med.* 2019; 19: 1–8.
6. Australian Institute of Health and Welfare. Older Australians. [Updated 1 Dec 2021; cited 11 Aug 2022.] Available from URL: <https://www.aihw.gov.au/reports/older-people/older-australians/contents/summary>
7. Australian Institute of Health and Welfare. The last year of life: patterns in health service use and expenditure. [Updated 13 Jul 2022; cited 11 Aug 2022.] Available from URL: <https://www.aihw.gov.au/reports/life-expectancy-deaths/the-last-year-of-life-health-service-use-patterns/contents/summary>
8. Rosenwax LK, McNamara BA, Murray K, McCabe RJ, Aoun SM, Currow DC. Hospital and emergency department use in the last year of life: a baseline for future modifications to end-of-life care. *Med. J. Aust.* 2011; 194: 570–3.
9. Smith AK, McCarthy E, Weber E *et al.* Half of older Americans seen in emergency department in last month of life; most admitted to hospital, and many die there. *Health Aff.* 2012; 31: 1277–85.
10. Faulkner D, Law J. The 'unnecessary' use of emergency departments by older people: findings from hospital data, hospital staff and older people. *Aust. Health Rev.* 2015; 39: 544–51.
11. Lowthian JA, Curtis AJ, Cameron PA, Stoelwinder JU, Cooke MW, McNeil JJ. Systematic review of trends in emergency department attendances: an Australian perspective. *Emerg. Med. J.* 2011; 28: 373–7.
12. Australian Institute of Health and Welfare and Palliative care and End-of-Life Care Data Development Working Group. National Palliative Care and End-of-Life Care Information Priorities, Jan 2022 (page 8). Available from URL: <https://www.aihw.gov.au/getmedia/17b82c56-83ff-45dc-be93-392bc5669fab/national-palliative-care-and-end-of-life-care-information-priorities.pdf.aspx>
13. NHS. What end of life care involves. [Updated 6 Apr 2022; cited 4 Oct 2022.] Available from URL: <https://www.nhs.uk/conditions/end-of-life-care/what-it-involves-and-when-it-starts/>
14. Wilson JG, English DP, Owyang CG *et al.* End-of-life care, palliative care consultation, and palliative care referral in the emergency department: a systematic review. *J. Pain Symptom Manage.* 2020; 59: 372–83.
15. Grant MS, Back AL, Dettmar NS. Public perceptions of advance care planning, palliative care, and hospice: a scoping review. *J. Palliat. Med.* 2021; 24: 46–52.
16. Detering KM, Buck K, Ruseckaite R *et al.* Prevalence and correlates of advance care directives among older Australians accessing health and residential aged care services: multicentre audit study. *BMJ Open* 2019; 9: e025255.
17. Threapleton DE, Chung RY, Wong SYS *et al.* Care toward the

- end of life in older populations and its implementation facilitators and barriers: a scoping review. *J. Am. Med. Dir. Assoc.* 2017; **18**: 1000–9.
18. LaMantia MA, Scheunemann LP, Viera AJ *et al.* Interventions to improve transitional care between nursing homes and hospitals: a systematic review. *J. Am. Geriatr. Soc.* 2010; **58**: 777–82.
 19. Aquino J, Crilly J, Ranse K. The end-of-life care practices of emergency care nurses and the factors that influence these practices: an integrative review. *Int. Emerg. Nurs.* 2022; **63**: 101168.
 20. Aquino J, Crilly J, Ranse K. End-of-life care in emergency departments: a national cross-sectional survey of emergency care nurses. *Australas. Emerg. Care* 2022; **25**: 161–6.
 21. Aaronson EL, Daubman BR, Petrillo L *et al.* Emerging palliative care innovations in the ED: a qualitative analysis of programmatic elements during the COVID-19 pandemic. *J. Pain Symptom Manage.* 2021; **62**: 117–24.
 22. Grudzen CR, Stone SC, Morrison RS. The palliative care model for emergency department patients with advanced illness. *J. Palliat. Med.* 2011; **14**: 945–50.
 23. Maleckas E, Nolan B, Robson S, Craswell A. Queensland Health Clinical Excellence Queensland: Decision-making and End-of Life-care in Emergency (DandELinE) Toolkit. [Updated 3 Jan 2022; cited 15 Mar 2022.] Available from URL: <https://clinicalexcellence.qld.gov.au/improvement-exchange/terminal-phase-care-pathway-emergency-department>
 24. Australasian College for Emergency Medicine. Policy on end of life and palliative care in the emergency department (P455). *Emerg. Med. Australas.* 2016; **28**: 617–21.
 25. Australian Commission on Safety and Quality in Health Care. *National Consensus Statement: Essential Elements for Safe and High-Quality End-of-Life Care*. Sydney, NSW: ACSQHC. 2015. [Cited 15 Mar 2022.] Available from URL: <https://www.safetyandquality.gov.au/publications-and-resources/resource-library/national-consensus-statement-essential-elements-safe-and-high-quality-end-life-care>
 26. Ellershaw J, Foster A, Murphy D, Shea T, Overill S. Developing an integrated care pathway for the dying patient. *Eur. J. Palliat. Care* 1997; **4**: 203–7.
 27. Hendin A, Hartwick M, Healey A, Fischer L. Improving end-of-life care in the emergency department: development of a standardized approach to an imminently dying patient. *CJEM* 2020; **22**: 626–8.
 28. Queensland Government Clinical Excellence Queensland/Queensland Health. Care plan for the dying person. [Updated 23 Jan 2020; cited 15 Mar 2022.] Available from URL: <https://clinicalexcellence.qld.gov.au/resources/clinical-pathways/care-plan-dying-person#:~:text=The%20Care%20Plan%20for%20the,to%20deliver%20high%20quality%20care>
 29. Weissman DE, Meier DE. Identifying patients in need of a palliative care assessment in the hospital setting: a consensus report from the Center to Advance Palliative Care. *J. Palliat. Med.* 2011; **14**: 17–23.
 30. Cardona-Morrell M, Hillman K. Development of a tool for defining and identifying the dying patient in hospital: Criteria for Screening and Triaging to Appropriate Alternative care (CriSTAL). *BMJ Support. Palliat. Care* 2015; **5**: 78–90.
 31. The University of Edinburgh, SPICT™: Supportive and Palliative Care Indicators Tool. 2019, NHS Scotland: Edinburgh. [Cited 15 Mar 2022.] Available from URL: <https://www.spict.org.uk/>
 32. Huang YL, Alsaba N, Brookes G, Crilly J. End-of-life care for older people in the emergency department: a scoping review. *Emerg. Med. Australas.* 2020; **32**: 7–19.
 33. Moss AH, Ganjoo J, Sharma S *et al.* Utility of the “surprise” question to identify dialysis patients with high mortality. *Clin. J. Am. Soc. Nephrol.* 2008; **3**: 1379–84.
 34. Mills AC, Levinson M, Dunlop WA *et al.* Testing a new form to document ‘Goals-of-Care’ discussions regarding plans for end-of-life care for patients in an Australian emergency department. *Emerg. Med. Australas.* 2018; **30**: 777–84.
 35. Dundin A, Siegert C, Miller D *et al.* A pivot to palliative: an interdisciplinary program development in preparation for a coronavirus patient surge in the emergency department. *J. Emerg. Nurs.* 2020; **46**: 760–7.
 36. Victorian Auditor-General’s Office. Victoria Auditor-General’s Report. Efficiency and Effectiveness of Hospital Services: Emergency Care. October 2016: 2016–17:4. Available from URL: <https://www.audit.vic.gov.au/sites/default/files/20161026-Emergency-Care.pdf>
 37. Bissonnette J, Dumont E, Pinard AM, Landry M, Rainville P, Ogez D. Hypnosis and music interventions for anxiety, pain, sleep and well-being in palliative care: systematic review and meta-analysis. *BMJ Support. Palliat. Care* 2022; <http://dx.doi.org/10.1136/bmjspcare-2022-003551>.
 38. Lindqvist O, Tishelman C, Hagelin CL *et al.* Complexity in non-pharmacological caregiving activities at the end of life: an international qualitative study. *PLoS Med.* 2012; **9**: e1001173.
 39. Phipps MP, Phipps JD. Code comfort: a code blue alternative for patients with DNRs. 2014. Available from URL: <https://hbr.org/2014/12/code-comfort-a-code-blue-alternative-for-patients-with-dnrs>

Supporting information

Additional supporting information may be found in the online version of this article at the publisher’s web site:

Appendix S1. Supplementary methods information.

Appendix S2. EOL data variables – phase 2 – codes and definitions.

Appendix S3. Data dictionary for end-of-life care elements abstracted from the electronic medical record.

Table S1. Data collected from each health information system.

Table S2. Additional characteristics of 295 older people who died within 48 hours of ED triage.

Table S3. Additional elements of care of 295 older people who died within 48 hours of ED triage.