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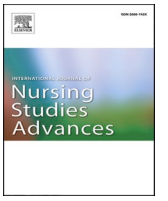

Development of an emergency department end of life care audit tool: A scoping review

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ABSTRACT

Introduction: Emergency departments frequently care for patients at the end of life and should have robust processes for reviewing delivery of care. The aim of this scoping review is to examine and collate the chart audit tools available to assess the quality of end of life care of patients who die in the emergency department, or, in the subsequent hospital admission.
Methods: A scoping review of the literature using the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) guidelines, and the methodological framework outlined by Arksey and O'Malley was conducted. Primary and secondary research, along with grey literature were searched. Both adult and paediatric populations were included. Databases Ovid Emcare, CINAHL and Medline were searched from 1961 to December 2022; followed by screening and appraisal. Articles were compared and data synthesised into categories.
Results: Fifty-eight articles were included generating three categories; contexts for end of life audit use, development and evaluation of audit tools, and audit characteristics / components. Four tools focused on the emergency department, however, did not comprehensively review both end of life and emergency department specific data. A draft audit tool for the emergency department was developed that consisted of the common elements to evaluate end of life care as identified in this review, emergency department-specific quality of care measures and the integration of the Criteria for Screening and Triaging to Appropriate aLternative care (CriSTAL) tool.
Conclusion: No audit tool to comprehensively review end of life care provided for patients at the end of life in the emergency department was found. We developed an audit tool based on best available evidence that now needs testing for validity, feasibility, and usability to evaluate end of life in the emergency department setting is required.

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What is already known

Emergency department presentations of people who require specialised end of life care is increasing

Some aspects of end of life care in the emergency department setting are unique and may influence the quality of care patients receive in the emergency department and beyond

Review of deaths in the emergency department often have a strong focus on detecting adverse events as opposed to evaluating the quality of end of life care

What this paper adds

There is no audit tool to comprehensively review end of life care in the emergency department that considers measures pertinent to this environment.

The most common review elements of end of life care identified in the review, alongside specialist literature were used develop an end of life audit tool to assess care in the emergency department.

1. Introduction

End of life care delivery in the emergency department is a rapidly growing area of clinical practice (Smith et al., 2012; Huang et al., 2020). Amid an ageing population with high burdens of serious health-related conditions, the number of emergency department presentations of people who require specialised end of life care is expected to continue to rise (World Health Organization, 2018; Australian Institute of Health and Welfare, 2016; Sleeman et al., 2019). Up to 75% of patients present to the emergency department in their last month of life, often on multiple occasions (Smith et al., 2012).

The development of national standards related to end of life care delivery is evolving in many countries (Australian Commission on Safety and Quality in Health Care, 2015, 2016b; Healthcare Improvement Scotland, 2013; Institute of Medicine of the National Academies, 2015; Irish Hospice Foundation, 2020; National Institute for Health and Care Excellence, 2011, 2017) and subsequently, the review of end of life care processes (Irish Hospice Foundation, 2013; NHS Benchmarking Network, 2019; Australian Commission on Safety and Quality in Health Care, 2019). Clinical audits have long been used in healthcare to review clinical care delivery against pre-determined standards and, to identify areas for improvement (Burgess, 2011; Crabtree et al., 2020). A 2021 review identified significant variability in the quality of care delivered for patients at their end of life in hospitals and determined much work is required to improve and streamline these processes (NHS Benchmarking Network, 2019; Royal College of Physicians, 2016; Bloomer et al., 2019; Whitehead et al., 2018; Heufel et al., 2022).

Historically, death review processes had a strong focus on detecting adverse events as opposed to evaluating the quality of end of life care (Higginson et al., 2012; Emergency Care Institute, 2021). This is improving with the development of audit tools to review the quality of end of life care, however most quality of end of life audit tools exclude patients who die in the ED or those who die in less than four hours (NHS Benchmarking Network, 2019; Australian Commission on Safety and Quality in Health Care, 2019; Royal College of Physicians, 2014). This omission is problematic. Firstly, as detailed above, an increasing number of patients are presenting to the ED with acute crises of chronic conditions who require end of life care (Smith et al., 2012; Huang et al., 2020). Secondly, access block is a considerable and ongoing problem for ED's worldwide, impeding appropriate patient transfer in a reasonable timeframe (Forero et al., 2011; Javidan et al., 2021). Among other concerns, this means that patients are often in the ED awaiting definitive care for extended periods of time (Forero et al., 2011; Javidan et al., 2021). Finally, care initiated in the ED impacts the patient trajectory and care once they depart ED and should be considered in any assessment of care.

With increasing numbers of patients presenting to the ED requiring end of life care, it is important to ensure robust review processes to evaluate the quality of care in the unique ED context so we can review and act to improve care. The ED setting is distinct from inpatient services in that there are aspects of care not applicable to inpatient services that may influence the quality of care patients receive (Austin et al., 2020; Schull et al., 2011). For example, a low triage category allocation could lead to delays in medical or nursing review and thus delays in timely symptom relief for a person at the end of life. The Australian Commission on Safety and Quality in Health Care (ACSQHC) (2015) states that "all deaths should be routinely reviewed to determine whether the safety and quality of the patient's end of life care were acceptable, and how they could have been improved", deaths in the ED should be no exception.

To contribute to best-practice end of life care in the ED setting a standardised, evidence-based audit tool is needed. A review of available end of life care chart audit tools to assess the ED care at end of life is required. The aim of this scoping review is to examine and collate chart audit tools available to assess the quality of end of life care of patients who die either in the ED, or, in the subsequent hospital admission.

2. Methods

A scoping review was conducted to map the body of research in this area and to identify gaps in existing knowledge. We used the methodological framework outlined by Arksey and O'Malley (2005), along with the recommendations reported by Pham et al. (2014). The following research questions have been used to inform this review;

1) What chart audit tools exist to evaluate end of life care for patients who present to the ED at the end of life and subsequently die in hospital?
2) What is the evidence to support the use of existing chart audit tools?
3) What are the common characteristics used to evaluate end of life care that would be suitable to review care in the ED?

2.1. Eligibility criteria

Primary and secondary research, including grey literature, that evaluated end of life care delivery in the acute care setting were included. Although our target population is patients who die in or soon after transfer from ED, we included all audit tools for the acute care setting as a preliminary search did not yield any ED specific tools. End of life was defined as the terminal phase of life when death is expected to occur in the short term (hours to days) as is often encountered in the ED. Table 1 shows the inclusion/exclusion criteria used to focus the review.

2.2. Search and screening strategy

Electronic databases Ovid Emcare, CINAHL and MEDLINE were searched, no date limit was applied and results ranged from 1961 to December 2022. We combined three sets of keywords and their associated variations: "end of life" (palliative care, terminal care, dying, death), "clinical audit" (medical audit, audit, clinical review, death review, quality review, case review) and "emergency department" (emergency ward, emergency room, emergency health service, emergency service hospital, hospital, acute care). In consultation with a librarian, Advanced Google Search was used to locate relevant grey literature that included government reports or policy documents from relevant government or industry bodies, to manage the extensive results, the first 100 results, sorted by relevance by Google, were screened for inclusion. A hand search of reference lists of relevant articles was also performed. Results were limited to English language.

Articles were imported into the online data screening and extraction tool Covidence™ and duplicates removed. Title and abstract screening were conducted by author MH, and articles removed based on the inclusion/exclusion criteria. Full text screening was then performed by authors MH and SK. Eighty-seven articles were selected for independent review by two authors (MH and SK), and articles were further excluded based on PICO criteria. Any disagreements were resolved by a third author (KC). The hand search generated two further studies for inclusion and eight pieces of work were included from the grey literature search. A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram represents the search strategy (Fig. 1) and guided the review process.

2.3. Quality assessment

Although quality assessment of studies is not deemed necessary for a scoping review in the original framework by Arksey and O'Malley (2005), recommendations from Daudt et al. (2013) and Pham et al. (2014) contradict this. While no study should be excluded based on quality to ensure the broad nature of a scoping review is maintained, a quality assessment should be included to highlight evidence base gaps (Pham et al., 2014; Daudt et al., 2013). In light of this, quality assessment using the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018) was undertaken and grey literature was appraised using the Accuracy, Authority, Coverage, Objectivity, Date, Significance (AACODS) checklist (Tyndall, 2010).

2.4. Data charting and synthesis

Data charting was completed using Covidence™ and tabulated in Microsoft Excel™. The data charting form was developed and reviewed by all three authors. Data such as author, year, country, study design, level of evidence, study aim, population, setting,

Table 1
Inclusion and exclusion criteria.

Inclusion	Exclusion
Both primary and secondary research All study designs including grey literature	Editorials, opinion pieces, commentaries, letters, conference papers
Adult and paediatric patients who died whilst admitted in hospital	Studies conducted in services other than acute hospitals
Medical record chart review to evaluate EOL care	Those which don't review the quality of EOL care delivery, for example, cause of death
Any publication date	
Publications from any geographical location	
Written in the English language	

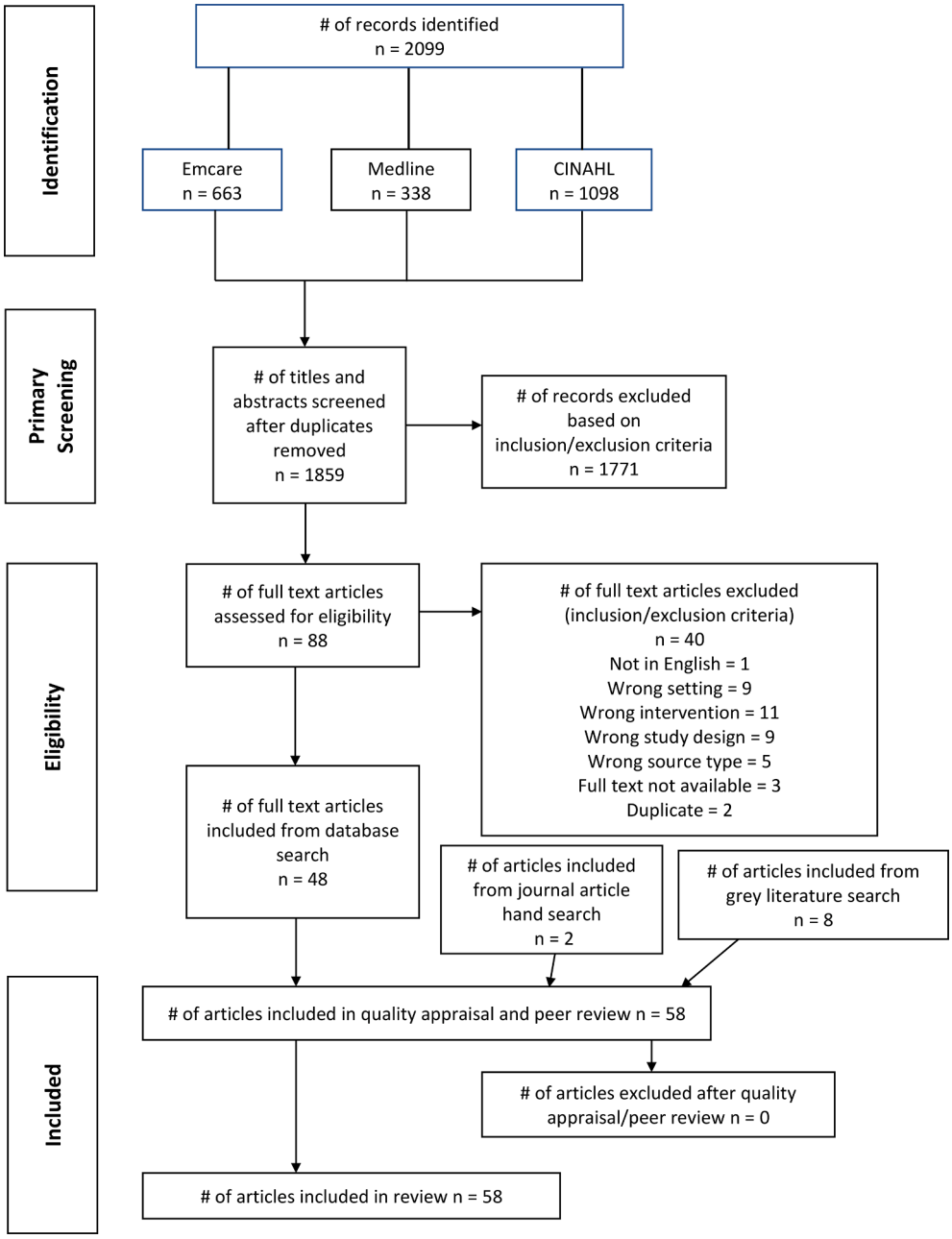

Fig 1. PRISMA diagram summary of search strategy and screening process.

results, limitations, and audit characteristics were populated. Author XX charted the data which was then independently reviewed by authors XX and XX. The National Health and Medical Research Council hierarchy of evidence was used for the classification of the level of evidence of each study (National Health and Medical Research Council, 2009). The authors organised and synthesised the data to identify commonalities and differences in the characteristics used to evaluate end of life care.

3. Results

The final review included 58 articles published between 1991 and 2022, with 42 of these published since 2010. Most of the included articles were from Australia (29%,17/58), the United Kingdom (UK) (26%,15/58) and the United States (24%,14/58). The results of the search and screening process are outlined in the PRISMA diagram (Fig. 1). Levels of evidence ranged between II (randomised controlled trial) and IV (case series) (National Health and Medical Research Council, 2009). Of these, only one of the included articles was a randomised controlled trial, one non-randomised experimental study, three case-control studies and five

cross-sectional studies. The remainder were low level evidence consisting of cohort studies, case series and grey literature. Quality appraisal was undertaken to enable comparison of the strengths and weaknesses of each article. There were 8 articles (14%, 8/58) appraised using the AACODS checklist. All eight articles were from reputable organisations however some lacked reference / bibliography list and not subject to the peer-review process. Fifty articles (86%, 50/58) were reviewed using the MMAT, the majority were a quantitative descriptive design (66%, 33/50). The most common strengths were the sampling strategies used, and many included well-defined populations. The most common weakness was incomplete data or risk of non-response bias. As suggested by the MMAT, no scoring was applied but rather a comparison of the results was undertaken within the data charting and synthesis process (Hong et al., 2018), a summary of the AACODS and MMAT quality appraisal can be found as supplementary material. A summary of the included studies and their characteristics is presented in Table 2. The following categories were developed from data synthesis (1) contexts for end of life audit use, (2) development and evaluation of audit tools, and (3) audit characteristics/components.

3.1. Contexts for end of life audit use

Of the fifty-eight articles included, only four (7%) specifically focused on the ED (Emergency Care Institute, 2021; Goh et al., 2021; Sadler et al., 2020; Paterson et al., 2009). One of these four, described the ED Death Audit Screening Tool, however, was primarily focused on mortality and morbidity review than end of life care quality (Emergency Care Institute, 2021). Of the remaining three articles, none included any ED specific data such as triage category or time-to-treatment times. The article by Paterson et al. (2009) only included those who were cared for on an end of life care pathway, missing patients who died but were not cared for on the pathway. Thirty (51%) of the articles either specifically excluded the ED or described work only conducted on an inpatient-ward (Royal College of Physicians, 2016, 2014; Costantini et al., 2014; Australian Commission on Safety and Quality in Health Care, 2016a, 2018; West et al., 2014; Veerbeek et al., 2006; Turner et al., 2020; Tsim and Davidson, 2014; Tan et al., 2006b; Tan and Cheang, 2016; Parish et al., 2006; Parikh et al., 2012; Osenga et al., 2016; Noble and Rees, 2006; Noble et al., 2015; Nadimi and Currow, 2011; McAdoo et al., 2012; Luhrs et al., 2005; King et al., 2020; Hinton and Fish, 2006; Hardy et al., 2007; Hanson et al., 2012; Grbich et al., 2006; Clark et al., 2014; Clark and Byfieldt, 2015; Carter and Guthrie, 2007b; Carson et al., 2000; Bookbinder et al., 2005; Keon-Cohen et al., 2022).

Throughout the UK there have been numerous national audits of end of life care delivery in a variety of settings, including acute hospitals, however some exclude the ED, and none include any ED specific data (NHS Benchmarking Network, 2019; Royal College of Physicians, 2016, 2014; Gambles et al., 2009; Johnstone et al., 2012; McKeown et al., 2015b). The Royal College of Physicians reported the National Care of the Dying Audit for Hospitals in England in 2014 and again in 2016 (Royal College of Physicians, 2016, 2014). The first audit conducted in 2014, excluded ED although this was revised in the 2016 audit to only exclude those who died in less than four hours, still missing many deaths that occur in ED (Royal College of Physicians, 2016, 2014). The ACSQHC End-of-life Care Audit Toolkit is widely available for acute care hospitals to review end of life care in Australia but excludes deaths in the ED (Bloomer et al., 2019; Australian Commission on Safety and Quality in Health Care, 2016a, 2018; King et al., 2020; Saunders et al., 2021b).

There were six articles (10%) specific to patients with cancer (Costantini et al., 2014; West et al., 2014; Veerbeek et al., 2006; Soares et al., 2020; Jacob et al., 2018; Dy et al., 2011), four (7%) for paediatrics or neonates (Osenga et al., 2016; Jacob et al., 2018; Tan et al., 2006a; Carter and Guthrie, 2007a), four (7%) for patients with chronic renal disease (Noble and Rees, 2006; Noble et al., 2015; McAdoo et al., 2012; Hinton and Fish, 2006), two (3%) for patients with COVID-19 (Turner et al., 2020; Alderman et al., 2020), and one (2%) for patients with dementia and a co-existing mental health illness (Sampson et al., 2012) one (2%) for veterans with hearing and vision loss (Carpenter et al., 2020) and one (2%) for surgical patients (Keon-Cohen et al., 2022).

3.2. Development of end of life audit tools

Twenty-one articles (36%) used existing audit tools in their evaluations or as a foundation for the development of their audit tool (Irish Hospice Foundation, 2013; Royal College of Physicians, 2016; Bloomer et al., 2019; Emergency Care Institute, 2021; Costantini et al., 2014; Australian Commission on Safety and Quality in Health Care, 2018; West et al., 2014; Parikh et al., 2012; Noble et al., 2015; Luhrs et al., 2005; King et al., 2020; Hardy et al., 2007; Carson et al., 2000; Bookbinder et al., 2005; Keon-Cohen et al., 2022; Gambles et al., 2009; Johnstone et al., 2012; Solloway et al., 2005; Saunders et al., 2021a; Minton et al., 2020; Le and Watt, 2010b) and 21 (36%) developed their own criteria using literature review, government or governing body standards and expert consultation, either alone or as a combination of approaches (NHS Benchmarking Network, 2019; Royal College of Physicians, 2014; Australian Commission on Safety and Quality in Health Care, 2016a; Veerbeek et al., 2006; Tsim and Davidson, 2014; Parish et al., 2006; Osenga et al., 2016; Hinton and Fish, 2006; Hanson et al., 2012; Grbich et al., 2006; Clark et al., 2014; Clark and Byfieldt, 2015; Dy et al., 2011; Carter and Guthrie, 2007a; Auret et al., 2015; Bookbinder et al., 2018; Dendaas et al., 2001; McKeown et al., 2015a; Pekmezaris et al., 2010; Safer Care Victoria 2019; Latimer, 1991). The remaining 16 articles (28%) did not report their process for development of the criteria used to review care (Goh et al., 2021; Sadler et al., 2020; Paterson et al., 2009; Turner et al., 2020; Tan et al., 2006b; Tan and Cheang, 2016; Noble et al., 2015; Nadimi and Currow, 2011; McAdoo et al., 2012; Soares et al., 2020; Jacob et al., 2018; Alderman et al., 2020; Sampson et al., 2012; Carpenter et al., 2020; Sepúlveda Sánchez et al., 2014; Kobewka et al., 2017).

Seven articles (12%) reported the use of existing clinical pathways, including the Liverpool Care Pathway (LCP) (5/7) (Paterson et al., 2009; Hinton and Fish, 2006; Hardy et al., 2007; Gambles et al., 2009; Le and Watt, 2010a) and the Palliative Care for Advanced Disease (PCAD) pathway (2/7) (Luhrs et al., 2005; Grbich et al., 2006). These pathways were used to provide a benchmark to compare care delivery. One article (2%) reported the use of a set of quality indicators, the Cancer Quality-ASSIST (Assessing Symptoms Side Effects and Indicators of Supportive Treatment) to develop their audit and enable a comparison of care against these indicators (Dy et al., 2011).

Table 2
Summary of literature review characteristics and findings.

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics								Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Alderman, 2020, UK	An audit of end-of-life symptom control in patients with corona virus disease 2019 (COVID-19) dying in a hospital in the United Kingdom	Case series	Assess the utility of a personalised EOL care plan and the effectiveness of a standardised EOL care treatment algorithm in patients with COVID-19.	Single site, hospital Patients with COVID-19 and on EOL care plan	√			√						Not specified
Auret, 2015, Australia	Advance care planning and end-of-life care in a network of rural Western Australian hospitals	Case series	Measure key indices of EOL care quality, documented ACP and the extent to which ACP's are associated with the type of EOL care received	Multiple sites, hospital Age >17yrs	√	√	√	√		√			√	Pre-testing Reliability testing
Australian Commission on Safety and Quality in Health Care, 2016, Australia	Summary report: Results of pilot of end-of-life care audit and survey tools	Grey literature	To summarise the process the Australian National University and the Canberra Hospital undertook in partnership with the Commission to pilot the audit tools.	Acute Hospitals Age >17yrs Excludes ED	√	√	√	√					√	Usability & reliability testing
Australian Commission on Safety and Quality in Health Care, 2018, Australia	Development of the End-of-life Care Audit Toolkit: Summary report	Grey literature	To describe the process to develop and test the audit tools and bring them together in an EOL Care Audit Toolkit	Acute hospitals Excludes ED and deaths <4 h	√	√	√	√					√	Usability & reliability testing
Bloomer, 2019, Australia	End-of-life care in hospital: an audit of care against Australian national guidelines	Case series	Map EOL care in acute hospital settings against Elements 1–5 of the ACSQHC Essential elements for safe and high-quality EOL care	Multiple sites, hospital	√	√	√			√		√		Pre-testing
Bookbinder, 2005, USA	Improving end-of-life care: development and pilot-test of a clinical pathway	Non-randomised experimental study	Develop a clinical pathway and a quality improvement strategy for implementation in a hospital setting, and present the results of a pilot test	Single site, hospital	√	√	√	√		√		√		Reliability testing

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Table 2 (*continued*)

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics									Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Bookbinder, 2018, USA	Development and Field Test of an Audit Tool and Tracer Methodology for Clinician Assessment of Quality in End-of-Life Care	Case series	To develop and validate a brief audit tool that can be used with tracer methodology to guide the assessment and rate the quality of end-of-life care.	Single site, hospital	√	√	√	√	√	√	√	√	√	Reliability & feasibility testing Time taken to complete audit
Carpenter, 2020, USA	A national study of end of life care among older Veterans with hearing and vision loss	Cross sectional study	Describe associations between hearing and vision loss and EOL care outcomes	Multiple sites, hospital Veterans with hearing and vision loss	√		√		√	√	√	√		Not specified
Carson, 2000, Canada	Measuring patient outcomes in palliative care: a reliability and validity study of the Support Team Assessment Schedule	Reliability / validity study	Evaluate the reliability and validity of the STAS when introduced in a different setting and with different populations from those for which it had been designed	Single site, hospital Patients receiving PC for one week			√	√	√			√	√	Reliability & validity testing Test-retest
Carter, 2007, USA	Utility of morbidity and mortality conference in end-of-life education in the neonatal intensive care unit	Case series	To assess the current documentation of comprehensive, interdisciplinary, palliative EOL care in the NICU and improve it relative to a historical background	Single site, NICU **Paediatrics**		√	√	√	√	√		√		Not specified
Clark, 2014, Australia	Dying in two acute hospitals: Would usual care meet Australian national clinical standards?	Case series	Describe the results of an audit undertaken to explore if there are any gaps between care delivery and the literature	Multiple sites, hospital Medical / surgical wards Age >17yrs	√	√	√	√						Not specified
Clark, 2015, Australia	Improving the quality of care delivered to people imminently dying in hospital by implementing a care bundle: an observational before and after feasibility study	Feasibility study	To develop a care bundle for the dying and then test the feasibility of this approach to improving care delivered to people identified as imminently dying in hospital	Single site, hospital Medical wards	√	√		√;				√		Not specified

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Table 2 (*continued*)

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics									Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Costantini, 2014, Italy	Liverpool Care Pathway for patients with cancer in hospital: a cluster randomised trial	RCT	To assess the effectiveness of the LCP-I programme in improving the quality of end-of-life care	Single Hospital, multiple wards Patients with cancer	√		√	√				√	√	Not specified
Dendaas, 2001, USA	Responding to SUPPORT: An academic medical centre examines its end-of-life care practices	Case series	Describe the activities and findings of the hospital record audit	Single site, hospital	√	√	√	√				√		Not specified
Dy, 2011, USA	Quality of end-of-life care for patients with advanced cancer in an academic medical center	Case series	Evaluate key aspects of the quality of EOL care, focusing on the symptoms of cancer and information and care planning	Single site, hospital Patients with cancer	√		√							Not specified
Emergency Care Institute 2021, Australia	Standardised death reviews in EDs	Grey literature	Provides a structure for a review of current approaches to death reviews and implemented improvements to ensure it is consistent with best practice.	ED	√	√	√	√	√		√		√	Not specified
Gambles, 2009, UK	Continuous quality improvement in care of the dying with the Liverpool Care Pathway for the Dying Patient	Case series	Illustrate the usefulness of a continuous quality improvement approach in care of the dying	Multiple sites, hospital	√	√	√	√	√	√		√		Not specified
Goh, 2021, Singapore	A retrospective study on end-of-life care in the emergency department of a tertiary hospital in Singapore	Case series	To describe the characteristics and management of imminently dying patients	Single site, ED Age >16yrs	√		√	√					√	Not specified
Grbich, 2006, Australia	Communication and decision making for patients with end stage diseases in an acute care setting	Case series	Analyse the EOL care received by patients and identify areas for improvement	Single site, hospital Medical / surgical wards	√	√	√	√	√	√	√	√		Not specified

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Table 2 (*continued*)

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics									Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Hanson, 2012, USA	Measuring palliative care quality for seriously ill hospitalized patients	Cross sectional study	The aims of the current study were to examine the feasibility, inter-rater reliability, validity, and usability of the PEACE quality measures for seriously ill hospitalized patients	Single site, hospital Patients with stage IV carcinoma Excludes deaths <24 h	√		√	√	√	√				Feasibility, reliability, validity & usability testing
Hardy, 2007, Australia	Audit of the care of the dying in a network of hospitals and institutions in Queensland	Case series	To identify areas for improvement in the care of the dying across several different settings.	Multiple sites, hospitals, hospices & nursing home Excludes deaths <48 h	√	√	√	√	√	√		√		Not specified
Hinton, 2006, UK	A concept of nephrologic care at the end of life	Case series	An audit to highlight potential issues and areas for development post implementation of an EOL pathway	Single site, renal ward	√	√	√	√		√		√	√	Not specified
Irish Hospice Foundation, 2013, Ireland	End-of-Life Care Resource Folder: Audit & review of death	Grey literature	Resource providing details of recommenced audit components using dataset emerged from the National Audit of EOL Care in Hospitals in Ireland	Not specified	√		√	√		√	√	√		Not specified
Jacob, 2018, India	End-of-Life Treatments in pediatric Patients at a Government Tertiary Cancer center in India	Case series	Describe the EOL treatments, and demographics of children with cancer and to raise awareness about high-intensity tumour-specific EOL treatments	Single site, children's hospital **Paediatrics** with cancer	√			√						Not specified
Johnstone, 2012, UK	End of life care in Wales: evaluation of a care pathway-based implementation strategy	Case control study	Investigate whether implementation of the All-Wales EOL Pathway was associated with achievement of clinical standards for end-of-life care using data from a national audit, and to assess the implementation processes.	Multiple sites, Home, community hospital, General hospital, hospice & palliative care	√	√	√	√		√		√		Not specified

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First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics									Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Keon-Cohen, 2022, Australia	An audit of perioperative end-of-life care practices and documentation relating to patients who died in a surgical unit in three Victorian hospitals	Case series	To assess aspects of EOL care practices and documentation of deceased patients who had been admitted into surgical units.	Multiple sites, hospital, surgical wards	√	√	√	√						Not specified
King, 2020, Australia	End-of-life care and intensive care unit clinician involvement in a private acute care hospital: A retrospective descriptive medical record audit	Case series	Evaluate the quality of EOL care against an Australian National Standard and describe the characteristics of ICU clinician involvement in EOL care; and explore the factors associated with quality of EOL care.	Single site, hospital Excludes ED	√	√	√	√		√		√		Pre-testing
Kobewka, 2017, Canada	Quality gaps identified through mortality review	Case series	Report the findings of a review and our experience implementing the mortality and morbidity review process.	Multiple sites, hospital	√	√	√	√		√				Not specified
Latimer, 1991, Canada	Auditing the hospital care of dying patients	Case series	Describe the nature of the audit tool & the theoretical basis upon which it was developed, and presentation of an audit conducted in hospital.	Single site, hospital	√	√	√	√	√	√		√		Field-testing Time taken to complete audit
Le, 2010, Australia	Care of the dying in Australia's busiest hospital: benefits of palliative care consultation and methods to enhance access	Case series	Assess care provided to patients dying within hospital and understanding senior clinician decision-making around referral to palliative care.	Single site, hospital	√	√	√	√		√		√		Not specified
Luhrs, 2005, USA	Pilot of a pathway to improve the care of imminently dying oncology inpatients in a Veterans Affairs Medical centre	Case control study	Describe the translation of PCAD for use in a hospital and present the results of its implementation on an acute care oncology unit.	Single site, oncology ward	√	√		√						Not specified

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Table 2 (*continued*)

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics									Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
McAdoo, 2012, UK	Measuring the quality of end of life management in patients with advanced kidney disease: results from the pan-Thames renal audit group	Case series	To obtain a clinical perspective on the quality of EOL care provided to patients with CKD using a practical and easy to use proforma that was completed at the time of death by a member of the clinical team concerned.	Multiple sites, specialist renal wards Patients on dialysis / advanced CKD	√	√	√	√				√		Not specified
McKeown, 2015, USA	Determinants of care outcomes for patients who die in hospital in Ireland: A retrospective study	Cross sectional study	Assess patient experiences of dying in hospital (care outcomes) and the factors associated with variations in that experience (care inputs).	Multiple sites, acute and community hospitals	√	√	√	√	√	√	√	√	√	Pilot-testing
Minton, 2020, UK	Hospital deaths dashboard: Care indicators	Case series	Describe the quality improvement process for designing a purpose-built spreadsheet which is designed as an abbreviated version of the UK national audit tools.	Single site, hospital	√	√	√	√						Time taken to complete audit
Nadimi, 2011, Australia	As death approaches: a retrospective survey of the care of adults dying in Alice Springs Hospital	Case series	Document demographic, process, and outcomes data on EOL care in a regional hospital with large Aboriginal populations and to compare these three domains for Aboriginal and non-Aboriginal decedents.	Single site, hospital Age >17yrs Excludes deaths <48 h	√	√	√	√					√	Not specified
NHS Benchmarking Network, 2019, UK	National Audit of Care at the End of Life: First round of audit report	Grey literature	To measure the performance of hospitals against criteria relating to the five priorities, and relevant NICE guideline and quality standards	214 sites Excludes ED and deaths <4 h	√	√	√	√	√	√	√	√	√	Reliability testing

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Table 2 (*continued*)

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics									Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Noble, 2006, UK	Caring for people who are dying on renal wards: a retrospective study	Case series	Retrospective audit of renal patients to examine the care being offered to these patients in terms of meeting patient and carer need.	Single site, two renal wards	√		√	√		√				Not specified
Noble, 2015, UK	An appraisal of end-of-life care in persons with chronic kidney disease dying in hospital wards	Case series	Assess the EOL care provided by renal healthcare professionals to hospital in-patients with CKD, and their carer's.	Multiple sites, hospital Patients with CKD	√	√	√	√		√		√		Not specified
Osenga,2016, USA	A Comparison of Circumstances at the End of Life in a Hospital Setting for Children with Palliative Care Involvement Versus Those Without	Cohort study	Compare hospital based EOL care management for children who received a palliative care consult vs. those who did not and to identify key areas for clinical and quality improvement.	Single site, children's hospital **Paediatrics** Excludes ED and deaths <24 h	√		√	√		√			√	Pre-testing
Parikh, 2012, USA	Has there been any progress in improving the quality of hospitalised death? Replication of a US chart audit study	Cohort study	Describe the experience of dying in a US tertiary academic medical centre and to compare this experience with a historical decedent sample.	Multiple sites, hospital Age >17yrs Admitted => 48 h	√		√	√	√	√		√	√	Reliability testing
Parish, 2006, Australia	Dying for attention: palliative care in the acute setting	Case series	Analyse the EOL care received by patients	Single site, hospital	√	√	√	√	√	√		√		Not specified
Paterson, 2009, UK	Introduction of the Liverpool Care Pathway for end of life care to emergency medicine	Case series	A quality improvement report on the implementation of a modified LCP for the dying patient in an ED	Single site, ED	√		√	√						Not specified
Pekmezaris, 2010, USA	Transforming the mortality review conference to assess palliative care in the acute care setting: a feasibility study	Cohort study	Evaluate the impact of a hospital-based palliative care consultation service utilising a common practice: the resident mortality review conference.	Single site, hospital	√		√	√						Pre-testing

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Table 2 (*continued*)

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics								Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Royal College of Physicians, 2014, UK	National care of the dying audit for hospitals, England	Grey literature	To report on an organisational audit that can help to improve the care for dying patients and those close to them in hospital settings.	150 acute hospitals Excludes ED and deaths <24 h	√	√	√	√		√		√	√	Reliability testing
Royal College of Physicians, 2016, UK	End of Life Care Audit Dying in Hospital: National report for England 2016	Grey literature	Audit to ensure that the five priorities of care for the dying person have been implemented and are monitored at a national level.	145 trusts Age >17yrs Excludes death <4 h	√	√	√	√		√		√	√	Reliability testing
Sadler, 2020, Saudi Arabia	Deaths in the emergency department: An assessment of patient's end-of-life trajectory and quality of care	Case series	Determine the incidence, nature, and illness trajectory of deaths in the ED and examine to which extent EOL discussions took place. Analyse the aggressiveness of the care; and determine if palliative care services were being consulted	Single site, ED	√	√	√	√		√				Not specified
Safer Care Victoria, 2019, Australia	Care of the dying person; Survey report	Grey literature	Summarise the first phase of a project to improve consistency in the use of best practice principles for EOL care in acute settings.	52 acute hospitals	√	√	√	√		√		√		Time taken to complete audit
Sampson, 2012, UK	Improving end of life care for people with dementia: a rapid participatory appraisal	Case series	Identify barriers for people with dementia and their carers to access good quality EOL care, identify cost-effective ways of service improvements and to assess the effectiveness of rapid participatory appraisal as a methodology for improving EOL care	Hospital, nursing homes and community Patients with dementia	√	√	√			√			√	Not specified
Saunders, 2021, Australia	Improving the safety and quality of end-of-life in an Australian private hospital setting: An audit of documented end-of-life care	Case series	Review audit findings of documented EOL care in a private hospital against the ACSQHC's processes of care for safe and high-quality EOL care and to identify areas for quality improvement.	Single site, hospital Excludes deaths <4 h	√	√	√	√		√		√		Pre-testing Time taken to complete audit

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Table 2 (*continued*)

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics								Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Sanchez, 2014, Spain	Impact of a legislative framework on quality of end-of-life care and dying in an acute hospital in Spain	Cross sectional study	Determine whether health professionals have incorporated legislation into their clinical practice and whether there have been improvements in decision-making procedures.	Single site, hospital Age >17yrs	√		√	√	√		√	√	√	Not specified
Soares, 2020, Brazil	Quality Indicators of End-of-Life Care among Privately Insured People with Cancer in Brazil	Cross sectional study	Examine administrative quality indicators of EOL care among privately insured people with cancer and to identify predictors of acute care utilisation	14 community hospitals Patients with cancer Age >17yrs	√			√					√	Not specified
Solloway, 2005, USA	A chart review of seven hundred eighty-two deaths in hospitals, nursing homes, and hospice/ home care	Case series	Determine if the experience of dying differed among settings in New Hampshire.	Hospitals, home care, nursing homes & hospice Age >17yrs	√		√	√	√	√		√	√	Not specified
Tan, 2006, USA	End-of-life decisions and palliative care in a children's hospital	Case series	Investigate the clinical and non-medical factors that may influence the nature of EOL care in children, including neonates.	Single site, children's hospital **Paediatrics**	√		√	√		√				Not specified
Tan, 2016, Australia	A single-centre retrospective analysis of interventions provided to geriatric inpatients receiving end-of-life care	Case series	Explore what interventions were being provided to inpatients receiving EOL and to assess the frequency EOL symptoms and effectiveness of pharmacological interventions.	Single site, hospital Age => 70yrs	√		√	√		√				Not specified
Tsim, 2014, UK	End-of-Life Care in a General Respiratory Ward in the United Kingdom	Case series	To assess EOL care in patients who were admitted and subsequently died in a general respiratory ward.	Single site, Respiratory ward	√		√	√						Not specified
Turner, 2020, UK	A Dual-centre Observational Review of Hospital-Based Palliative Care in Patients Dying With COVID-19	Case series	Present the results of an audit conducted to review the palliative care to patients with COVID-19.	2 Acute hospital wards Patients with COVID-19	√			√						Not specified

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Table 2 (*continued*)

First author, year, Country	Article title	Study design	Study details	Setting / Population	Audit characteristics									Audit evaluation
					Patient characteristics	Identification of dying	Communication and care planning	Physical care	Emotional	Spiritual, cultural, and religious	The environment	Needs of families and carers	Time frame for review	
Veerbeek, 2006, The Netherlands	Audit of the Liverpool Care Pathway for the Dying Patient in a Dutch cancer hospital	Case control study	An audit to assess the experiences with the LCP & compare the results with a comparable group of cancer patients in Liverpool.	Single site, hospital Patients with cancer Age >17yrs	√	√	√	√		√		√	√	Not specified
West, 2014, Italy	Feasibility of assessing quality of care at the end of life in two cluster trials using an after-death approach with multiple assessments	Feasibility study	To evaluate the feasibility of using one particular combination of assessment methods aimed at different proxy respondents to create a means of measuring quality of care at the EOL.	5 hospices & 16 medical wards Patients with cancer	√		√	√	√			√	√	Feasibility testing

Key: ACP = Advance Care Plan, ACSQHC = Australian Commission on Safety and Quality in Healthcare, CKD = Chronic Kidney Disease, COVID-19 = severe acute respiratory syndrome coronavirus 2, ED = Emergency Department, EOL = End Of Life, ICU = Intensive Care Unit, LCP = Liverpool Care Pathway, NICE = National Institute for health and Care Excellence, NICU = Neonatal Intensive Care Unit, PCAD = palliative care for advanced disease, PEACE = Prepare, Embrace, Attend, Communicate, Empower, STAS = Support Team Assessment Schedule, UK = United Kingdom, USA = United states of America.

3.3. Evaluation of audit tools

More than half (62%, 36/58) of the included articles did not include an evaluation of their tool, those that did primarily reported on usability and reliability. Field-testing or pre-testing of audit tools was reported in those that did not use an existing audit tool (15%, 9/58).

Inter-rater reliability was the most common form of evaluation in 16% of articles (9/58). The Royal College of Physicians reported the National Care of the Dying Audit for Hospitals in England in 2014 and in 2016 (Royal College of Physicians, 2016, 2014). Inter-rater reliability testing demonstrated acceptable levels of agreement with the majority of scores between good to very good (almost all computed kappa values over 0.60). The NHS Benchmarking Network conducted several rounds of the National Audit of Care at the End of Life (NACEL) beginning in 2018/2019 (NHS Benchmarking Network, 2019). Reliability testing reportedly obtained moderate to substantial levels of agreement (kappa between 0.41 and 0.61).

Surveys evaluating acceptability and usability were reported in 7% of articles (4/58). Gambles et al. (2009) reported on an earlier version of the National Care of the Dying Audit for Hospitals in England (based on the LCP standards) in 2006/2007. Questionnaires were sent to 115 participating staff post audit and 90% of respondents agreed that the audit report contained the right information and was useful and 88% thought that participation in the audit would make a difference to care of the dying in their organisation (Gambles et al., 2009). McKeown et al. (2015b) report on the National Audit of End-of-Life Care in Hospitals in Ireland, 2008/2009, used several surveys to review overall care completed by the nurses and doctors involved in the patient's care and bereaved relatives. They reported low levels of agreement between nurses, doctors and relatives on most aspects of care reviewed. Nurses and doctors scores were significantly higher to that of relatives indicating a possible element of bias in reporting on the care that they themselves provided (McKeown et al., 2015b).

The development and testing of the ACSQHC End-of-life Care Audit Toolkit is discussed in two articles (Australian Commission on Safety and Quality in Health Care, 2016a, 2018) and a further three have used this audit tool in their own study (Bloomer et al., 2019; King et al., 2020; Saunders et al., 2021b). This tool was piloted in one hospital and received acceptable levels of reliability and usability by staff involved in data collection, it was then further tested in nine hospitals and evaluation workshops held with staff to refine the tool, overall, it was reported to be easy to use by staff and the data that is produced is useful in reviewing end of life care delivery (Australian Commission on Safety and Quality in Health Care, 2016a, 2018).

Field-testing or pre-testing was the most frequent form of evaluation reported in those articles which did not use an existing audit tool (16%, 9/58) (NHS Benchmarking Network, 2019; Royal College of Physicians, 2014; Australian Commission on Safety and Quality in Health Care, 2016a; Hanson et al., 2012; Auret et al., 2015; Bookbinder et al., 2018; Dendaas et al., 2001; McKeown et al., 2015a; Pekmezaris et al., 2010). This was reported by stating that the audit was tested on a certain number of medical records prior to the formal audit, and some had modified the tool if necessary. Of these, inter-rater reliability scoring was reported in five of the articles (9%), with all receiving kappa values over moderate agreement (0.41 to 0.60), to high agreement (>0.90) (NHS Benchmarking Network, 2019; Royal College of Physicians, 2014; Hanson et al., 2012; Auret et al., 2015; Bookbinder et al., 2018). Five articles (9%) reported on the time taken to complete the chart audit per patient, this was variable between four minutes and up to one hour (Saunders et al., 2021b; Minton et al., 2020; Safer Care Victoria, 2019; Latimer, 1991; Kobewka et al., 2017).

3.4. Audit characteristics/components

There were ten overarching categories of information collected in the audit tools; patient characteristics (96%, 56/58), physical components of care (91%, 53/58), communication and care planning (90%, 52/58), the needs of families and carers (56%, 32/58), the identification of dying (54%, 33/58), spiritual, cultural, and religious needs (52%, 30/58), emotional needs (30% 17, 58), the environment that death took place (14%, 8/58) and additionally, if the audits included a patient time frame for review (37%, 21/58) or any ED specific data (0%, 0/58). These categories were developed from the 258 different items extracted from the fifty-eight included articles, with a range of four to 80 items.

The most routinely collected data were patient characteristics, with 96% (56/58) of the included articles including age, sex, diagnosis, ethnicity, length of stay (LOS) and co-morbidities (Fig. 2a).

The physical care a patient experienced or received were audited in 91% (53/58) of the included articles. Most frequently assessed were symptom assessment, a review of investigations or procedures received, medication charting and use, a review of routine care such as vital signs, blood sugar levels, oxygen and oral antibiotic use, as well as whether the patient had received an Intensive Care Unit (ICU) review/admission (Fig. 2b).

The most prevalent physical element of care was symptom assessment, either the presence or absence of symptoms in 63% (36/58). There was considerable focus on reviewing specific symptoms known to be prevalent among patients who are at the end of life. In particular, pain (51%, 30/58), breathing difficulty (43%, 25/58), nausea/vomiting (43%, 25/58), agitation or delirium (38%, 22/58) and noisy breathing, death rattle or excess secretions (26%, 15/58). Bowel function (21%, 12/58), bladder function (12%, 7/58) and anxiety/distress (12%, 7/58) were also frequently mentioned. Seven (12%) of the 58 articles specifically reviewed not only the presence or absence of symptoms but asked how well symptoms were managed.

Investigations or procedures received by patients were the next most common physical care element in 48% (28/58). Like symptom assessment, some articles further defined the types of investigations or procedures received by the patient and this most frequently included blood tests (26%, 15/58), cardiopulmonary resuscitation (22%, 13/58), artificial hydration (21%, 12/58), intubation/mechanical ventilation (15%, 9/58), medical imaging (14%, 8/58), artificial nutrition (14%, 8/58), intravenous antibiotics (12%, 7/58), chemotherapy (10%, 6/58), non-invasive ventilation (7%, 5/58) and dialysis (7%, 5/28).

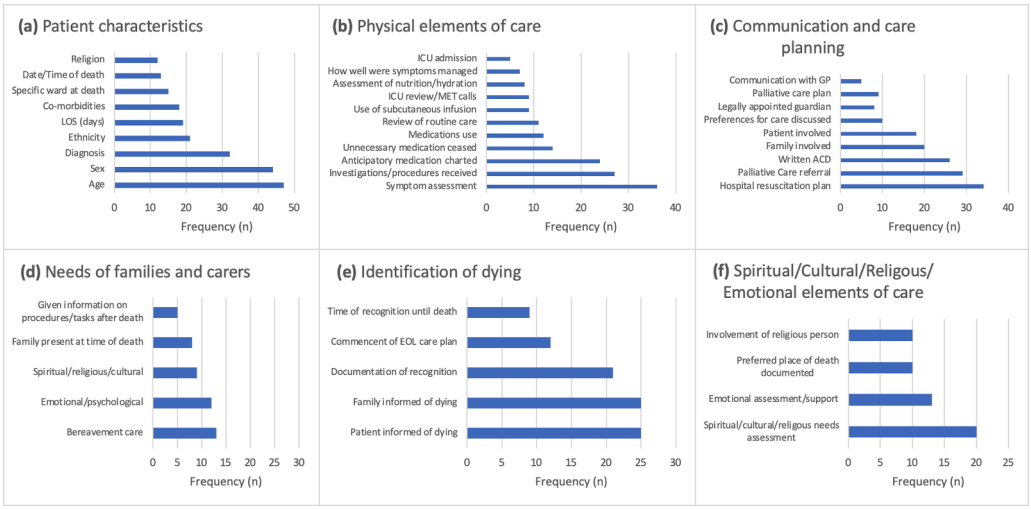

Fig. 2. Frequency (n) of the most common audit components found in the included articles.
Key: ACD = Advance Care Directive, EOL = End of Life, GP = General Practitioner, ICU = Intensive Care Unit, LOS = length of stay, MET = Medical Emergency Team.

Communication and care planning was present in 90% (52/58) of reviewed articles. The most prevalent of these was the presence of a hospital resuscitation plan, found in 59% (34/58), followed by a written Advance Care Directive (ACD) in 45% (26/58). Less commonly reviewed were whether the patient or family were involved in the care planning process (34%, 20/58), if there was a legally appointed guardian (14%, 8/58), whether the patient was supported by an individual end of life or palliative care plan (15%, 9/58) and if the patient's preferences for care or preferred place of death were discussed (17%, 10/58). Referrals to the palliative care team was the most reviewed discipline involved in the patient's care (50%, 29/58) followed by referrals to a social worker (10%, 6/58), a summary of the frequencies can be found in Fig. 2c.

The needs of families and carers was highlighted in the review as a frequent component of end of life care assessment, present in 56% (32/58) of the articles, such as bereavement care (22%, 13/58), emotional and psychological support (21%, 12/58), spiritual, cultural, and religious support (15%, 9/58), and family presence at the time of death (9%, 5/58) (Fig. 2d).

The identification of dying was reviewed by 57% (33/58) of the included articles. This most frequently included whether the patient and/or family were informed of the recognition that the patient was dying (43%, 25/58) (Fig. 2e).

The spiritual, cultural, and religious needs of the patient were reviewed in half (52%, 30/58) of the included articles, most frequently in the form of documented evidence of assessment or support (34%, 20/58) or the involvement of a religious person or hospital clergy (17%, 10/58). Evidence of assessment or support for emotional needs was less commonly reviewed, in only 30% (17/58) of the included articles. The environment in which the death took place reviewed in 14% (8/58) of the included articles, for example if the death took place in an area that provided privacy, peace and quiet. Only four (7%) of the articles reviewed whether the patients preferred place of death was adhered to or if there were attempts made at terminal discharge, a summary of the frequencies can be found in Fig. 2f.

A time frame for the review was stipulated in 37% (21/58), the most common time period was the last 48 h of the patient's life (14%, 8/58), followed by 24 h (7%, 5/58), the last week (7%, 5/58). Others ranged from the last thirty days to six months of life (5%, 3/58). No articles included any ED specific data such as triage category or time-to-treatment times.

4. Discussion and development of an ED end of life audit tool

Of the 58 articles reporting end of life care audit processes in acute hospital settings only four focused on care in the ED (Emergency Care Institute, 2021; Goh et al., 2021; Sadler et al., 2020; Paterson et al., 2009), but did not include ED specific performance data, omitting the unique differences in clinical care provision that this environment often necessitates. While no existing audit tool was identified appropriate for our purpose, this review has allowed us to identify the most common characteristics / components used to review end of life care to develop a tool to audit the quality of end of life care provided in the ED. Patient characteristics, the physical elements of care, care planning and the identification of dying were the most frequently reviewed elements of end of life care. Least frequently, was the spiritual, religious, cultural, and emotional elements of care and the needs of families and carers.

We integrated end of life quality standards from Australia and the UK, and the results of this review to develop an audit tool to evaluate end of life care in the ED. The proposed audit tool contains inclusion/exclusion criteria and has seven sections. Included within these are; (1) the common elements to evaluate end of life care as identified in this review, (2) ED-specific quality of care measures and (3) the integration of the Criteria for Screening and Triaging to Appropriate aLternative care (CriSTAL tool). There is emerging evidence for the use of screening tools in identifying patients at the end of life, however this continues to be difficult in the ED setting and no one tool to identify patients can thus far be proposed (Australasian College for Emergency Medicine, 2020). The CriSTAL

Table 3
Proposed components of the ED EOL audit tool.

Item	Justification
Audit identifier number	Unique number used to identify each record
Audit category for patient (Died in ED; Died on inpatient ward; Died in ICU)	Variable for identifying the area that the patient died in
Section 1: Patient characteristics	To describe the population and to enable monitoring of factors that contribute to poor or optimal EOL care (Pardey, 2006).
■ Sex	
■ Religion	
■ Indigenous status	
■ Date of birth	
■ Age	
■ Diagnosis	
■ Co-morbidities	
■ Where was the patient prior to hospital admission?	
■ How many times was the patient admitted to an acute hospital in the 12 months prior to this hospital admission?	
Section 2: Circumstances of death	To develop a chronology and to enable monitoring of factors that contribute to poor or optimal EOL care.
■ Date and time of death	
■ Cause of death (if differs from diagnosis)	
■ Speciality with overall responsibility for the patients care at time of death	
■ Specific ward patient died	
Section 3: ED performance	To develop a chronology and compare the patient journey to established ED performance measures (Streiner et al., 2015; Ouchi et al., 2019; Stefanini et al., 2018; Núñez et al., 2018; Wiler et al., 2015; Sørup et al., 2013). The ED setting differs from the inpatient environment, this requires a focus on measures that are unique to this setting and influence care delivery (Austin et al., 2020; Schull et al., 2011).
■ Mode of arrival	
■ Date and time of triage	
■ Triage category	
■ Was triage category appropriate based on triage information/ observations?	
■ Presenting complaint	
■ Time of first nurse treatment	
■ Type of treatment initiated	
■ Time of medical officer	
■ Depart ready time	
■ Date and time of transfer to ward; if left ED	
■ Time spent in ED (hrs)	
Section 4: Communication and care planning	The patient should be an active participant of their healthcare journey, including preparing for the EOL. Where this is not possible, a substitute decision maker should be identified and consulted. Existing advance care directives should be identified, and care planning should be collaborative with the patient and their family / carer and documented / communicated to all staff involved in the patient's care (Australian Commission on Safety and Quality in Health Care, 2016b).
■ Did the patient have a legally appointed decision- maker documented?	
■ If yes, was the legally appointed decision maker consulted about health care decisions by the ED clinician?	
■ Prior to presentation was there a previous hospital resuscitation form on file?	
■ If yes, is there any evidence this was considered by the ED clinician?	
■ Prior to presentation was there any evidence of a written advance care plan or advance health directive?	
■ If yes, is there any evidence this was considered by the ED clinician?	
■ Was there any documentation indicating that the patient's preferences for care were discussed whilst in the ED? (Either with the patient or family/ carers)	
■ At any time was a resuscitation plan documented?	
■ Was the resuscitation plan documented in the ED?	
■ What limitations of medical treatment were explicitly stated in the documentation of the first resuscitation plan?	
■ Is there any documentation indicating the patient was involved in decision-making about the resuscitation plan?	
■ Is there any documentation indicating the family was involved in decision-making about the resuscitation plan?	
■ Was the resuscitation plan revised/change at any time during the admission?	
■ At any point was there evidence or conflicting orders that might create confusion about the patient's resuscitation status or the medical treatments that were limited?	
Section 5: Recognition of dying	To initiate appropriate EOL care at the right time, the recognition of dying is an important step (Australian Commission on Safety and Quality in Health Care, 2016b). ED clinicians should be proficient in identifying dying (Banks, 1998), the integration of the CriSTAL tool will determine if patients were at risk of dying on presentation to the ED and whether this was recognised (Australasian College for Emergency Medicine, 2013; Pardey, 2006).
■ Was the patient at high risk of dying (CriSTAL score >6) on arrival to the ED?	
■ Is there documented indication that the patient was actually dying?	
■ If yes, date/time:	
■ Time of recognition until death	
■ Is there evidence of communication with the patient and/or family that the patient was dying?	
■ Did the patient have a palliative/comfort care ONLY plan documented at any time during the admission?	
■ If yes, date/time:	
■ If a palliative/comfort care plan was documented, was it communicated to the patient and/or family?	
CriSTAL Score	

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Table 3 (*continued*)

Item	Justification
■ Age >65 ■ Admitted *via* the ED ■ NH resident / in supported accommodation ■ Meets >= 2 deterioration criteria on admission ■ Decreased LOC: GCS change >2 or AVPU = P or U ■ Systolic blood pressure <90 mmHg ■ Respiratory rate <5 or >30 per minute ■ Pulse rate <40 or >140 per minute ■ Need for oxygen therapy or known oxygen saturation <90% ■ Hypoglycaemia: BGL 1.0–4.0 mmol/L ■ Repeat or prolonged seizures (> once in 24 h or >5 min duration) ■ Low urinary output (<15 ml/h or <0.5 ml/kg/h) AND Other risk factors / predictors (Tick as many as relevant)Personal history of active disease ■ Advanced malignancy ■ Chronic kidney disease ■ Chronic heart failure ■ Chronic obstructive pulmonary disease ■ New cerebrovascular disease ■ Myocardial infarction (new or pre-existing history) ■ Moderate/severe liver disease ■ Evidence of cognitive impairment (e.g., long term mental disorders, dementia, behavioural alterations or disability from stroke) ■ Proteinuria on a spot urine sample: ++ or >30 mg albumin/g creatinine ■ Abnormal ECG (atrial fibrillation, ventricular tachycardia, other abnormal rhythm or >5 ectopics/min, changes to Q or ST waves) ■ Previous hospitalisation for at least one night in past year ■ Repeat ICU admission at previous hospitalisation AND Evidence of frailty (Clinical Frailty Score) 1 Very fit 2 Well 3 Managing well 4 Vulnerable 5 Mildly frail 6 Moderately frail 7 Severely frail 8 Very severely frail 9 Terminally ill TOTAL SCORE_____	
Section 6: Care delivery ■ Is there documented evidence of an assessment of the following needs: ○ Agitation/delirium ○ Anxiety/distress ○ Bladder function ○ Bowel function ○ Dyspnoea/Breathing difficulty ○ Emotional/psychological ○ Nausea/vomiting ○ Noisy breathing/death rattle/excess secretions ○ Nutrition/hydration ○ Pain ○ Social and practical needs ○ Spiritual/religious/cultural ■ Is there documented evidence that anticipatory medication was prescribed for symptoms likely to occur in the last days of life? ■ Is there documented evidence that unnecessary medications were ceased? ■ Was there use of a continuous subcutaneous syringe driver? ■ Were unnecessary routine care processes ceased when a decision for EOL care made? (Includes routine blood collection, observations, BSL, antibiotics) ■ Was specialist palliative care contacted for advice? ■ Did the patient receive any of the following interventions in their last 24 h of life? ○ CPR ○ Artificial nutrition ○ Blood tests ○ Chemotherapy ○ Dialysis ○ Intubation/mechanical ventilation ○ IVF/artificial hydration	A holistic assessment of needs is an integral component of EOL care delivery. Pre-empting, managing, and responding to distressing symptoms / concerns is essential for the prevention and relief of suffering at the EOL. Care should be delivered in an environment conducive to meet the needs of the patient and in line with patient preferences (Australian Commission on Safety and Quality in Health Care, 2016b)

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Table 3 (*continued*)

Item	Justification
○ Medical imaging ○ Non-invasive ventilation ■ Is there any evidence that interventions were performed against documented wishes/ resuscitation plan? ■ Did the patient experience any MET calls / ICU review after they were transferred from the ED? ■ Is yes, date / time? ■ Was a palliative / comfort only plan initiated as a result of the MET call / ICU review? ■ Was the patient afforded sufficient peace, quiet and privacy in a single room at the time of death? ■ Is there evidence that the patients preferred place of death was documented? ■ Were attempts at terminal discharge made if this was in line with patient wishes? ■ If yes, but unable to facilitate, is there a reason why?	
Section 7: Families / carers ■ Were family present at time of death? ■ If no, is there evidence that they were contacted/offered to be present? ■ Is there documented evidence of an assessment of the following needs of families/carers: ○ Emotional/psychological ○ Spiritual/religious/cultural ○ Practical (e.g., food/drink) ■ Is there evidence the family were given information on procedures/tasks after death? ■ Is there evidence that bereavement care was offered?	Engaging with and supporting families / carers, including bereavement care after the death of the patient, is reflective of good EOL practices (Australian Commission on Safety and Quality in Health Care, 2016b).

tool is one such tool that has been validated to detect patients at risk of dying, however found difficulties prospectively using in the ED (Cardona et al., 2018, 2019). We consider the use such a tool may have in retrospective use to determine whether patients at risk of dying are being detected in the ED. The components of the proposed audit tool are defined and justified in Table 3. The next phase of this research program will be to refine and validate our tool. Validity and reliability testing are two ways in ensuring the consistency and accuracy of an audit tool and consequently the quality and precision of the output received from the audit (Huang and Brubaker, 2006; Banks, 1998; Streiner et al., 2015). Namely, both content and face validity, along with intra-rater and inter-rater reliability are required to ensure the audit tool is robust and effective (Huang and Brubaker, 2006; Banks, 1998; Streiner et al., 2015).

4.1. Inclusion/exclusion criterion for use of the ED end of life tool

The care of patients who die within 48 h of presentation to the ED will be evaluated using the proposed ED end of life care audit tool. This extended timeframe is suggested as if we were to only review deaths that occurred in ED, there is a possibility of not capturing patients whose quality of end of life care was directly influenced by the care given or decisions made in the ED. Patient trajectories are known to be influenced by the care they receive in ED and the recognition of patients who may be approaching the end of life and subsequent decision-making processes, such as goals of care planning, are imperative to the ED (Australasian College for Emergency Medicine, 2020; Ouchi et al., 2019). However, by including patients within this time frame, there will be some areas of the audit that may review end of life care delivered on an inpatient ward / ICU. As this is an ED focused tool the location the patient died will be emphasised, and some questions have been reframed for this purpose. For example, "Prior to presentation was there any evidence of a written advance care plan or advance health directive?" "If yes, is there any evidence this was considered by the ED clinician?". While the tool does focus on care delivery in the ED, if the patient died on an inpatient ward / ICU, should there be any concerns surrounding end of life care delivery found when conducting the audit, this can be forwarded to the respective ward / ICU for further review. Patients who died within 48 h of presentation to ED that are excluded are those who were dead on arrival or who experienced a sudden, unforeseen death. For example, a 40-year-old patient who presented to ED with an ST elevation myocardial infarct who was transferred to the catheterisation laboratory and died there.

4.2. ED specific measures

The ED is known to be a time-pressured and often chaotic environment that is rarely conducive to quality end of life care, yet the requirement to care for patients at the end of life in the ED is increasing (Smith et al., 2012; Huang et al., 2020; World Health Organization, 2018; Australian Institute of Health and Welfare, 2016; Sleeman et al., 2019). The ED is a unique care setting and the delivery of many types of care, including end of life care, can be influenced by factors that are not existent in a hospital ward setting. While not specific to end of life care there are processes used in the ED that may directly influence the quality of end of life care received. Existing approaches which evaluate ED specific performance and operations are commonly known as Key Performance Indicators (KPI). KPIs are developed to set benchmarks to allow a comparison of performance in meeting certain targets (Stefanini et al., 2018; Núñez et al., 2018). KPIs vary between institutions but are most frequently related to patient, organisational, and

operational measures (Stefanini et al., 2018; Wiler et al., 2015). Time measures in ED are frequently used as KPIs in determining patient care quality, for example, initial treatment times are used to evaluate the timeliness of care provided (Núñez et al., 2018; Sørup et al., 2013). Given the variance in performance measures that are used to evaluate ED care, a review of local policy related to KPIs was undertaken and a consensus approach used to determine those additional ED specific measures believed to be instrumental in reviewing end of life care in the ED, those deemed appropriate for our purpose have been included in the proposed audit tool and can be found in Table 3.

ED specific measures included in the proposed tool include triage category, wait times and type of treatment initiated, as well as other items which will enable the development of a chronology (Table 3). These items have been included in the proposed audit tool as these factors can directly impact the length of time a patient may wait for both nursing and medical care that is not applicable to the ward setting, where a patient is already under the care of a medical officer. For the patient at the end of life this might mean delays in the recognition of dying or timely symptom relief. The allocation of an appropriate triage category with a clinical tool to determine the urgency and maximum wait time for medical care is an important and commonly reviewed process in the ED (Australasian College for Emergency Medicine, 2013; Pardey, 2006). Locally, the Australasian Triage Scale (Pardey, 2006) is the tool used to triage and for the purpose of our proposed audit tool will be used to determine if the patient received an appropriate triage allocation that could influence the timeliness of care provision or treatments.

4.3. The CriSTAL tool

With the inclusion of patients who died within 48 h of admission it was important to maintain focus on the care provided in the ED. Patient trajectories are influenced by the care received in ED (Australasian College for Emergency Medicine, 2020; Ouchi et al., 2019). There is existing and ongoing research into screening tools to assist clinicians in recognising patients at risk of dying or with unmet palliative care needs, however there are none that can yet be suggested for routine use in local EDs (Arksey and O'Malley, 2005). The CriSTAL tool is one such tool that has been developed and validated for recognising patients at risk of dying and has been tested in the ED setting and reports both timeliness and ease of use (Pham et al., 2014; Daudt et al., 2013). Whilst it was found not suitable for prospective use in the ED, the recognition of dying and ensuing decision-making is pivotal to the patient journey and including the CriSTAL tool in the proposed audit will help us to determine if patients appropriate for end of life care are identified whilst in ED. The CriSTAL tool allocates one point for each of the criteria met and an overall score applied, a score greater than six indicates a patient at risk of dying within three months (Cardona et al., 2018, 2019). Cardona et al. (2019) recommend the use of the Clinical Frailty Score (CFS) instead of the FRIED score for assessing frailty when using the CriSTAL tool in the ED and this has been adapted into our proposed audit tool. For this paper, the CriSTAL tool has been left in its entirety in Table 3, however it is planned that in production of the proposed audit tool that this will be integrated into the data collection system.

Having an evidence-based chart audit tool that is suitable to review the quality of end of life care in the ED will allow ED clinicians to review current end of life care processes and identify areas for improvement (Burgess, 2011; Crabtree et al., 2020). This can inform future strategies that target service planning, policy and quality improvement.

5. Strengths and limitations

The scoping review methodology chosen for this review has enabled us to examine a large and varied body of literature and identify gaps in this research and area of clinical practice (Pham et al., 2014). Despite our attempts, this review may not have identified all literature pertaining to end of life chart audit tools or reviews. We may have missed some articles in the grey literature as only the top one hundred hits from the Advanced Google search were screened for inclusion. This paper is also limited to literature published in the English language.

6. Conclusions

There is no audit tool to comprehensively review end of life care in the ED that considers measures pertinent to the ED environment. This review identified the most common review elements of end of life care and presents the development of an audit tool appropriate for the ED. Future research will refine and test the tool in the ED setting for validity, feasibility, and usability.

CRediT authorship contribution statement

Melissa Heufel: Conceptualization, Methodology, Investigation, Writing – original draft, Visualization. **Sarah Kourouche:** Conceptualization, Methodology, Investigation, Writing – review & editing, Supervision. **Kate Curtis:** Conceptualization, Methodology, Investigation, Writing – review & editing, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Supplementary materials

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