The safety of emergency medicine

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▶ Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/emermed-2014-204564).

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Received 4 December 2014
Revised 5 October 2015
Accepted 7 October 2015
Published Online First 4 November 2015

ABSTRACT

The patient safety movement has been active for over a decade, but the issue of patient safety in emergency care and the emergency department (ED) has only recently been brought into the forefront. The ED environment has traditionally been considered unsafe, but there is little data to support this assertion. This paper reviews the literature on patient safety and highlights the challenges associated with using the current evidence base to inform practice due to the variability in methods of measuring safety. Studies looking at safety in the ED report low rates for adverse events ranging from 3.6 to 32.6 events per 1000 attendances. The wide variation in reported rates on adverse events reflects the significant differences in methods of reporting and classifying safety incidents and harm between departments; standardisation in the ED context is urgently required to allow comparisons to be made between departments and to quantify the impact of specific interventions. We outline the key factors in emergency care which may hinder the provision of safer care and consider solutions which have evolved or been proposed to identify and mitigate against harm. Interventions such as team training, telephone follow-up, ED pharmacist interventions and rounding, all show some evidence of improving safety in the ED. We further highlight the need for a collaborative whole system approach as almost half of safety incidents in the ED are attributable to external factors, particularly those related to information flow, crowding, demand and boarding.

INTRODUCTION

In 1999, the Institute of Medicine in the USA published 'To Err Is Human' which highlighted the extent of harm in healthcare settings and called for action on patient safety across all healthcare settings.[1] In 2000, the UK Department of Health published 'An Organisation with a Memory', bringing the issue of preventable patient harm in the NHS into the forefront.[2] Both of these reports were preceded by large Australian and US studies which quantified the number of adverse events occurring within their healthcare systems.[3 4] An international systematic review which included both of these studies reported a median in-hospital adverse event rate of 9.2%, a median percentage of preventability of 43.5%, with just over 7% of adverse events leading to fatalities.[5] In the UK, it is estimated that the cost of preventable adverse events to the NHS is £1 billion on lost bed-days alone.[6] In 2013/2014, the UK NHS Litigation Authority received over 11 000 new clinical negligence claims and up to 2014 it has spent £17 billion on claims.[7] Estimates from the US quote a figure of $55.6 billion in annual medical liability system costs.[8]

Patient safety is, simply put, the means by which we avoid harming patients in our care. Emergency medicine (EM) is traditionally considered a complex, hazardous, high intensity and inherently high-risk speciality[9] with the environment of the emergency department (ED) differing significantly from the ordered and cognitively less-challenging traditional care environments such as wards, operating theatres and outpatient clinics.[10 11] Rising ED attendances, combined with exit block, resulting in ED crowding, are international issues, adding further to the challenges of minimising adverse events and assuring patient safety.[12] In the UK, attendances are increasing at an annual rate of 5%,[13] with safety additionally challenged by a shortage of trained emergency physicians (EPs).[14]

Despite these seemingly chaotic conditions, historical data suggest that the ED accounts for only about 3% of all hospital safety incidents.[3 4] The applicability of these data to current ED practice is limited by the fact that it was derived from random record reviews of hospitalised (admitted) patients over two decades ago. The purpose of this paper is to review more recent sources of data on safety in the ED, to identify the features of EM which make it unsafe and the mechanisms that have evolved to mitigate against error as the specialty has developed.

METHODS

Two authors (SR and HQ) searched the Cochrane Library, MEDLINE, CINAHL, Scopus, Google scholar and EMBASE for original research or review articles from 1990 to January 2015. We searched for data on the incidence of adverse events and errors in addition to studies looking at causes and proposed solutions for ED safety incidents. We also looked specifically for evidence of interventions which had been proposed or tested. Broad search terms and the explode (exp) device were used to increase search sensitivity. The following keywords were searched in title, keywords and abstract: exp.emergency department/emergency medicine, accident and emergency, A&E, ED, ER, EM combined with exp.safety/, harm, error, negligence, near miss, serious, untoward or adverse events. Publications with English abstracts were reviewed for relevance and full text articles were retrieved.

We also hand searched reference lists of retrieved key articles. In addition, articles and reference lists from the Institute of Medicine, National Patient Safety Agency, NHS Litigation Authority, WHO Patient Safety, Australian Patient Safety Foundation and Canadian Patient Safety Institute were reviewed. A narrative review of the relevant literature is presented. No formal quality assessment of individual studies was undertaken due to the markedly heterogeneous nature and methodology of these reports.

Linked

▶ http://dx.doi.org/10.1136/emermed-2014-204604
▶ http://dx.doi.org/10.1136/emermed-2016-205696

CrossMark

To cite: Ramlakhan S, Qayyum H, Burke D, *et al*. *Emerg Med J* 2016;**33**:293–299.

WHICH FEATURES OF EM IMPACTS ON SAFETY?

Most patient safety incidents are caused by a series of individual factors contributing to a chain of events leading to the incident. It is important to understand and appreciate how each contributing factor is related to the final event, even if individual factors may seem insignificant when looked at in isolation. Methods such as root cause analysis (see online supplementary appendix 1) can identify contributory factors and themes leading to safety incidents; these factors may be classified generically[15] or in an ED-specific context.[16]

Adverse events related to missed diagnosis, for example, are typically the result of failures in the diagnostic process and are usually due to several contributory factors.[17] Given the uniquely complex nature and high-risk[9] operating characteristics of EM, combined with often incomplete patient information, it is not difficult to appreciate how these make the speciality one which may be described as prone to error.[18] Although there have been no studies which identify specific features of the ED which make it particularly susceptible to error, several authors have described common factors which intuitively make errors more likely to occur when compared with other care settings.[19 20] Some of these factors are common to other non-medical settings—the similarities to the aviation industry being commonly cited.[21 22] Table 1 summarises the factors that have been suggested in the literature and solutions that have been proposed or trialled to address them.

To the outsider, the ED can appear to be a chaotic and stressful environment, particularly in the context of patient safety. It is constantly in a state of flux, with inconsistent patient flows and widely variable patient acuity.[27] Patients may move between several locations during a single episode, for example, from the waiting room to a cubicle, radiology and observation unit all in the space of a few hours. ED staff shifts often overlap, so a number of healthcare providers may interact with a patient during an attendance with multiple handoffs. In addition, visitors, ambulance staff and transient ED and inpatient clinicians are often present in the main ED at any given time. Strong team-working, high physician accessibility and flexible task allocation have naturally evolved in EDs to adapt to the unpredictability and variability in demand and working environment. Teamwork training has been shown to reduce errors[24] but the demands placed on staffing EDs mean that clinician team members are often unfamiliar with each other.[28] Relatively fixed additional specialist staff can impact on safety, for example, pharmacists working in the ED are associated with a reduction in medication incidents.[25]

ED patients are mainly high acuity, and this is associated with a higher incidence of safety incidents.[4 23] Undifferentiated or non-specific patient presentations as well as atypical symptoms make the diagnostic process particularly challenging. An increase in non-urgent use of the ED also contributes to the likelihood of error as it contributes to the increasing volume of attendances and increases the demand on fixed resources, thereby reducing the time available per patient encounter overall.[29]

Information gaps are common in patients presenting as emergencies, as primary care, nursing home or inpatient notes are often unavailable on presentation.[30 31] This uncertainty, coupled with the time limits for assessment and decision-making, increases the likelihood of error, as often clinicians only have a fraction of the history on which to base decisions.[10] System-wide integrated patient information have been proposed as a solution; however, these have only been implemented in few settings.

EPs often simultaneously deal with a multiplicity of tasks and often manage several patients of varying acuity at the same time as supervising the delivery of patient care by more junior staff. Along with high patient volumes, time pressures and cognitive load, the huge number of decisions a EP needs to make during a shift leads to a high likelihood of error occurring.[18]

Handoffs are recognised as a potential hazard[32] with the care of an individual patient potentially involving several handoffs due to crowding and prolonged ED length of stay (LOS). Interruptions are common in the ED and may lead to increased risk to patients.[33 34] Combined with workload stress, this can cause a breakdown in safety and risk management

Table 1 Features of the emergency department (ED) that impact on safety

	Features that challenge patient safety	Features that mitigate or may improve safety
Patient	High acuity Undifferentiated Non-specific complaints Incomplete clinical information Altered mental status Communication/language barriers ED usage for non-urgent problems	Triage, senior front door assessment and early warning scores/triggers Use of system-wide electronic clinical records/alerts Standard clinical guidelines Telephone follow-up*[23]
Providers	Lack of experience Temporary staff Suboptimal supervision of complex and changing teams Shift work Multiple provider interactions and handoffs in a patient episode Dependence on external providers Lack of feedback and follow-up	Evolved induction programmes for temporary staff Strong teamwork,*[24] adaptability and accessibility across professional groups Senior sign off Pharmacist-led medication reconciliation*[25] Minimum nursing staff ratios Multi-speciality meetings and open feedback
Environment	Crowding Boarding Influx/changing rapidly	Flexible staff allocation matched to demand Information and communication technology support and tracking systems ED observation/inpatient units
Task	Interruptions Cognitive overload Time pressure Handovers of care	Rounding*[26] Systematic handoff Removal of unnecessary interruptions Safety culture

*Denotes an intervention with supporting evidence.

mechanisms.[35] Finally, shift work and resulting sleep deprivation have been shown to lead to cognitive impairment related to disruption of normal circadian rhythms.[27] Interventions using electronic tools[36] to assist with handoffs and reduce cognitive load have been proposed. Professional societies have also recognised the importance of improved working conditions in sustaining EPs careers and in safety.[37]

Many EDs are staffed predominantly by training grade physicians with a range of levels of experience. Increasingly, staff shortages mean that the use of temporary short-term staff is common in some settings. Staff inexperience is thought to be associated with preventable error.[4 18] Most emergencies are relatively rare; therefore, exposure and practice is accumulated over a longer period than more routine and common conditions. The quality of an ED clinician's decision-making is correlated with experience but the high workload and increasing dependence on few trained EPs to deliver the majority of care means that clinical supervision of inexperienced staff may be compromised. Enhanced supervision of trainees is unsurprisingly associated with better patient safety outcomes.[38] Comprehensive induction of clinical staff is well established in EDs and this has intuitively led to similar but abbreviated systems of induction for locum staff. Many departments have developed standard guidelines as well as safety net mechanisms for high-risk presentations, with interventions such as telephone follow-up[23] and trainee feedback shown to reduce adverse incidents.

The demands on the ED have no upper limit, and it has been described as being 'infinitely expansible'.[10] Crowding has become a universal problem faced by EDs and is one manifestation of increased demands placed on the whole healthcare system. ED crowding has been shown to be associated with increased inpatient mortality, unplanned returns and preventable errors.[39–42] Boarding of admitted patients in the ED has been well described and is associated with an increase in safety incidents.[43–45] EDs are dependent on the efficiency of other parts of the healthcare system for their efficient functioning. The ability to arrange follow-up in primary care, access investigations or admit patients is reliant on other providers and mostly out of the control of EPs. This lack of control can make transfer of care problematic, and cause delays in ongoing care with an increase in the risks involved. ED-based solutions such as regular clinical rounds[26] may reduce the risk of adverse incidents. However most solutions to crowding and boarding are system-based, with economic incentives along with bed occupancy and demand management the commonly used methods.[44] Observation units have been widely used to address issues with crowding and access block, but there is no evidence that they improve safety.[46] Time targets which focus on the ED in isolation have similarly failed to demonstrate an improvement in patient safety.[47]

Handover and referral in particular has been shown to be a particular area for potential safety incidents.[48 49] Paradoxically, the relative dependence on other providers also results in a lack of feedback on the outcomes of ED care which compromises learning, adoption and maintenance of safety practices and skills.[50] Structured handover[51] and educational interventions[48] to improve care transitions have been proposed to minimise safety risks associated with these transitions. Mandatory routine follow-up of patients by trainee EPs is common in some EM training programmes, but this is not universal.

Given the range of factors identified which impact on ED safety and the demonstrated variability in measures reported in the published literature, it would seem to follow that additional measures which reflect contributory factors may provide more useful information on ED safety than is currently available. Professional societies, such as the UK Royal College of Emergency Medicine, have developed safety toolkits which set about to describe the structures, processes and skills which characterise a 'safe' ED,[52] with metrics such as missed diagnosis rate, staff vacancy rates, information and communication technology system reliability and occupancy/boarding rates proposed to provide objective measures of ED safety. Regulatory bodies such as the US Joint Commission and Centres for Medicare and Medicaid Services have used measures such as notes availability, LOS and evaluation times in a similar way.[53] In many cases, however, quality standards and indicators are used as surrogate measures of safety. For example, in the UK[54] and USA, quality measures such as the aforementioned LOS, unplanned return visits and left without being seen (LWBS) rates have been used as markers of safety. Examination of the validity of these markers demonstrates that although LOS is associated with a higher risk of short-term adverse events, LWBS is not.[55] Data suggest that less than 5% of all return visits are associated with a safety incident. More recently, LOS has been challenged as a safety metric[56] underlining the need for a fuller understanding of indicators and potential high-impact interventions.

ERROR, HARM AND SAFETY INCIDENTS

Although the patient safety movement has been active for over a decade, there is still much variability in how information on incidents is captured, reported and classified. This is partly due to differences in how safety events are defined across different settings and countries and in the nomenclature surrounding patient safety. International consensus on the terms and classification of safety has been published,[57] though many reports still use traditional terms. This variability in terminology and reporting methods makes comparing and aggregating data from across different systems challenging.

In the UK, patient safety terms have been further simplified to allow consistency (box 1).

Much of the ED patient safety literature has focussed on error, with the assumption that error intuitively leads to harm. However, it is increasingly recognised that strategies to improve patient safety should focus on preventing errors per se as well as on preventing adverse events. Not all errors occurring in the ED lead to harm and not all harm is due to errors. Studies have consistently demonstrated a much higher incidence of error in EDs than of actual adverse events related to these errors.[61–63] In other words, the majority of ED errors do not result in an adverse event. This is reflected in the experience of the airline industry, where upwards of two-thirds of flights have reported errors but significant adverse events are rare.[64]

There is also the perspective that recognition of small recoverable errors is important in building resilience into systems, as they provide insight into where the boundaries of safe performance lies.[65] ED clinicians may make several small errors during a procedure or patient assessment, which have no negative outcome, but recognising such errors alerts them to the need to improve and to avoid more costly errors in the future.

Between 55% and 82% of adverse events occurring in the ED can be judged to be preventable or avoidable.[3 66] This figure is higher than reports from other areas of clinical practice[3 67] and supports the idea of EDs focussing and learning from safety incidents as well as from errors which may not have resulted in an adverse event. This approach relies on using reactive methods of analysis such as root cause analysis and significant event audit[58] which facilitates the allocation of resources

Box 1 Patient safety definitions

Current recommended terms

- *Patient safety*—the identification, analysis and management of patient-related risks and incidents, in order to make patient care safer and minimise harm to patients.[58]
- *Patient safety incident*—any unintended or unexpected incident(s) that could have or did lead to harm for one or more persons receiving healthcare.[58]
- *Never events*—serious incidents that are wholly preventable as guidance or safety recommendations that provide strong systemic protective barriers (successful, reliable and comprehensive safeguards or remedies) are available and should have been implemented by all healthcare providers.[59]

The following terms have been largely superseded in the UK; however, many studies still use them.

- *Error*—failure of a planned action to be completed as intended (error of execution) or use of a wrong plan to achieve an aim (error of planning); the accumulation or errors results in accidents.[1]
- *Adverse healthcare event*—an event or omission arising during clinical care and causing physical or psychological injury to a patient.[60] It is similar to the definition of Harm.
- *Healthcare near miss*—a situation in which an event or omission or a sequence of events or omissions, arising during clinical care fails to develop further, whether or not as a result of compensating action, thus preventing injury to a patient.[2]

towards mitigating or preventing incidents assessed to be of the highest potentially preventable risk to patients. Proactive approaches such as failure mode and effect analysis are promoted by some authors as a means of preventing safety incidents identified by the evaluation of a process.[68] These techniques tend to be resource-intensive and error-focussed but may identify some risks which are not revealed by reactive analysis. A summary of the above methods can be found in online supplementary appendix 1. Complementary data from other sources such as complaints, medicolegal or inquest cases may enhance understanding and identification of safety issues.[17 69]

HOW SAFE IS THE ED?

Published reports of the frequency of hospital errors and adverse events are summarised in table 2. Two of the studies compared the frequency of ED errors with other specialties and in these studies the frequency of errors in the ED was lower than in surgery, medicine or obstetrics and gynaecology. However, these data were all derived from retrospective reviews of inpatient notes and thus only included those patients admitted from the ED. Events occurring in non-admitted patients, the majority of ED patients, were not analysed. Retrospective case analyses are also more likely to find errors; hindsight bias may overestimate the incidence of adverse events as the error may not have actually caused an adverse outcome. In addition, it may influence how the identified errors are attributed to the adverse outcome.[65]

There have been several studies looking at the frequency and incidence of errors and adverse events in the undifferentiated ED patient population (table 3). The reported adverse event rates range from 0.36% to 3.26% of all ED attendances and 0.9% to 6% for discharged patients. Higher adverse event rates (4.1%–5%) have been demonstrated in higher risk conditions, in higher acuity areas and in higher triage categories.[23 70] Adverse events were also more common in older patients,[61 70] although this may be related to complexity and higher risk presentations.

Overall, the most common types of adverse events occurring in hospital inpatients were related to surgery and medication,[5] while in the ED setting, adverse events related to diagnostic issues and suboptimal management plans[17 61 66 70] predominate.

The preceding data must be interpreted in the light of the challenges faced by investigators and clinicians measuring ED patient safety in deriving an accurate incident rate.[75] Safety incidents in the ED are relatively uncommon occurrences even if errors are common. There are significant variations in how ED safety events are defined, identified and classified, with several studies using non-standard methods of case finding and with individual interpretation of outcomes and contributory factors. Most of the reported ED studies used a range of prospective methodologies to derive safety incident rates even though retrospective notes analyses may be well suited for determining such rates.[73] Prospective studies can actively seek errors which may overestimate the likelihood of a safety incident resulting. In addition, less significant errors are more likely to be reported. For practical reasons, studies may only be carried out for a relatively short time or at intervals, hence there is a chance of missing important safety incidents.

Furthermore, most patient safety surveillance systems rely on self-reporting. It is recognised that incident reporting systems may be poor at identifying patient safety incidents, particularly those resulting in harm.[76] The population at risk in the ED is relatively undefined and varies with age, acuity, presenting complaint and outcome, whether admitted or discharged. Some safety incidents may be attributed to the ED when they may have in fact involved other clinicians or external contributory

Table 2 EM patient safety incidents as a proportion of all hospital incidents and in comparison to selected speciality groups

Study	Setting*	Study design (number of records)†	Percentage of all adverse events by speciality group					
			EM	Surgery	Medicine	O&G	Anaesthetics	Paediatrics
Leape *et al*[4] 1991 USA	51 Acute hospitals	Retrospective random (30 195)	2.9 (in ED)	–	–	–	–	–
Wilson *et al*[3] 1995 Australia	28 Acute hospitals	Stratified random retrospective (14 184)	1.5	47	6.5	11.9	2.0	2.1
Thomas *et al*[67] 2000 USA	28 hospitals	Stratified random retrospective (14 700)	1.7‡	46.1	23.2	15.9	0.7	0.9

*Psychiatric,[3 4 67] day-case,[3] rehabilitation and drug/alcohol treatment[67] excluded.
†Two-stage review. Nurses using 18-point[3 4] or 15-point[67] criteria, followed by review by one[67] or two doctors.
‡3% occurred in ED.
ED, emergency department; EM, emergency medicine; O&G, obstetrics and gynaecology.

Table 3 Incidence of ED safety incidents

Study	Setting	Number of patients)/records (specific groups, if reported)	Study design	Criteria for safety incident	Adverse event rate (%) (95% CI, if reported)
Wolff and Bourke[62] 2002 Australia	Rural hospital	2575	Retrospective notes review of all ED attendances (3 months)	5-point screening criteria by risk manager and director of emergency	3.26
Fordyce *et al*[61] 2003 USA	Academic ED	1935	Prospective observational study of all ED attendances (1 week)	Any incident meeting the definition of error or adverse event[1]	0.36 (0.14 to 0.72) (error rate 18)
Chern *et al*[23] 2005 Taiwan	Tertiary ED	4139 (566 high-risk adults)	Prospective before and after study of discharged patients (50 alternate days)	Return visits with serious management error resulting in death or admission >3 days	0.9 (all discharged patients) 4.1 (high-risk discharged patients)
Forster *et al*[70] 2007 Canada	Urban academic hospital	399 (adults)	Prospective observational study of discharged patients (10 weeks). Telephone follow-up.	Experienced new or worsening symptoms; visited an ED; readmitted to hospital or died. Rated by two independent specialist physicians	6.0 (4 to 9) 4.0 (3 to 7) preventable
Hendrie *et al*[63] 2007 Australia	Tertiary academic urban ED	3332 (62.3% of all patients presenting during study period)	Prospective observational record review. Methodology based on Wilson *et al*[3]	Unintended injury or complication which resulted in death, disability or prolonged stay/prolonged natural history of disease	1.26
Thomas and Mackway-Jones[15] 2008 UK	Two teaching and two district hospitals	Total screened not reported	Mixed (interview and root cause analysis) observational over six 1-week periods at each ED	'Critical incident'—an event that had 'actual or potential harmful effects on the outcome of the management of a patient or group of patients'	1.19 to 1.59 (reported as a range).
Calder *et al*[66] 2010 Canada	Two tertiary EDs	503 (adults)	Prospective cohort of adults treated in resuscitation or observation area	17-point flagged outcomes identified by notes review or telephone. Rated by three independent EPs	8.5 (8.1 to 8.9) 4.8 preventable 5.0 attributable to ED care
Hall *et al*[71] 2010 USA	Tertiary urban academic ED	487 (15% of all attendances) sampled adult ED episodes	Prospective caregiver interviews to identify 'non-ideal' events over 15-week period.	'Non-ideal' event. Two subsequent independent assessments for harm	3.0
Camargo *et al*[72] 2012 USA	62 urban EDs	9821 records of patients with an index condition—MI, asthma or joint dislocation	Retrospective notes review of random patients with index conditions over a 12-month period	18-point notes screening and then paired physician review	4.1 (3.7 to 4.5) 5.5 (5.0 to 5.9) near misses
Kallberg *et al*[69] 2013 Sweden	All EDs (n=73) for centrally collected error and complaints data. 47 EDs for local incident reporting data	1 666 506 visits/year in 45 EDs returning data)	Retrospective descriptive data analysis from four regional and national registries managing complaints and medical errors (for 2009)	Different criteria for complaints and error. Detail not provided.	0.45
Calder *et al*[74] 2015 Canada	Two tertiary EDs	923 returns of discharged patients 13 495 attendances in study period. Number of discharges not reported	Prospective cohort of returns within 7 days identified by an electronic trigger tool. 5-week period	Adverse outcome related to the care received during the index visit. Screened by nurse and then by physician using standardised scale	5.7 (4.4 to 7.4) of all returns. 3.3 preventable

ED, emergency department.

Table 4 UK costs attributable to negligence (1995 to 2014)*[7]

Specialty	Number of claims (%)	Cost of claims in £ (in thousands) (%)
Obstetrics and Gynaecology	37 528 (39.1)	7 995 414 (46.9)
Surgery	18 132 (18.9)	3 742 480 (21.9)
Medicine	17 479 (18.2)	2 685 261 (15.7)
Emergency Medicine†	11 676 (12.2)	1 333 960 (7.8)
Psychiatry	2483 (2.6)	270 981 (1.6)
Anaesthesia	2111 (2.2)	315 892 (1.9)

*Excludes claims below excess settled by individual hospitals.
†ED attendances in this period of approximately 300 million.
ED, emergency department.

factors. Studies suggest that only about half of safety incidents occurring in the ED are attributable to ED staff or processes.[67 77] Finally, the time period from exposure to adverse event is difficult to specify or predict, although the majority become apparent within 3–10 days of discharge from the ED.[23 25]

Although most routinely collected safety incident information is dependent on self-reporting, aggregated data may use complaints, inquests and legal proceedings to provide a fuller representation of safety.[78] Medicolegal claims, in particular, can provide a rich source of information.[17] Analysis of health service negligence claims can provide some insight into EM claims compared with other specialities. EM accounts for 12.2% of all UK claims (table 4), which is almost identical to Australian public sector EM claims (12.1%, 2008–2013).[79] EM has the lowest estimated cost per claim than all listed specialities except psychiatry, and this ranking almost exactly mirrors figures from the USA (approximate median EM payment, $90 000, median for all specialties $112 000).[80] The US data also demonstrate that the proportion of EPs facing a claim (7.7%) is lower than most listed specialities (marginally higher than anaesthesiology, which has a higher proportion of claims paid). Australian estimates based on 2013 data are similar, with 8.7% of practising EPs facing a claim.[79] These patterns may reflect more minor claims or perhaps are due to inherently safe practise which minimises significant harm.

The more recently available metrics seem to support the older data presented in table 1 and suggest that, when compared with other clinical areas or specialties, the ED is not particularly unsafe. The intuitive implication of this finding is that EM has evolved safe practices to mitigate against error or adverse events. It may also be that the current metrics used in measuring safety are inadequate. Complementary multi-source safety data using reactive analysis of complaints, safety incidents and legal cases combined with proactive collaborative system analysis may provide earlier, more sensitive identification of safety issues.

The variability in reported ED adverse incident rates would reinforce the idea that an understanding of the context and working environment of an individual ED is important in improving its safety profile. Measures to improve the safety of EDs must involve a collaborative approach with other parts of the acute hospital system in order to impact on safety incidents which occur in the ED but are attributed to other parts of the system. There are, however, common characteristics as discussed earlier which all EDs share that serve as a useful starting point in understanding how patient safety incidents may be addressed.

NEXT STEPS

Standardised methods and metrics for defining, identifying and measuring ED safety will facilitate the development and evaluation of interventions to improve patient safety. Research into the utility of new and existing pragmatic and contextual metrics as well as the effectiveness of implemented interventions or processes is needed. Consensus recommendations for ED safety research have been published[81 82] which reflect these and other areas for future work. There is some suggestion that current and proposed safety indicators, particularly those used by regulatory bodies primarily as quality markers, may need further validation.

Contributors SR and RB conceived the idea as part of their role on the RCEM Safer Care Committee. SR and HQ conducted the literature review. SR wrote the first draft. All authors contributed to subsequent drafts and the final manuscript.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

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Emerg Med J 2016 33: 293-299 originally published online November 3, 2015
doi: 10.1136/emermed-2014-204564