Chapter

Learning from Errors

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Abstract

The authors of this chapter have worked in emergency care in 5 countries on 4 continents in the past 9 years. In their experience, acute care anywhere in the world shares two main features; strong teamwork and tremendous mental, physical, and psychological stress. The significant workload, both on individual and team levels, render the care system vulnerable to human errors, which can unfortunately be detrimental to patients and staff alike. Due to the commonalities it is not surprising that health care professionals tend to make similar mistakes irrespective of economic, cultural, religious aspect or healthcare settings. We opine that mistakes are not necessarily and exclusively bad things, but invaluable opportunities for improvement. In this chapter, the authors aim to introduce the concept of learning from errors to the readers. Numerous studies and books have already been published on the subject, so anyone could rightfully ask, why read another study? The answer is straightforward, unlike other articles, this chapter invites the reader to work together with the authors through a real-world case. The text will guide the reader through the topic painlessly in a step-by-step fashion offering plenty of opportunity to practice and reflect on the newly acquired knowledge. Global healthcare is facing significant changes these days. Learning from errors may be the initial step to help move away from the blame and shame culture and build a new system which should be based on solid partnership and respect between patients and carers. Such a new, supportive and compassionate system could provide higher quality care and at the same time, protect practitioners from burnout and stress ensuring that healthcare jobs are not only work but a life-long fulfilling career.

Keywords: human factors, human error, adverse event, risk assessment, root cause analysis, feedback loop

1. Introduction

What is human error and how can we learn from them?

According to UK hospital literature data, at least one in ten patients is certain to suffer some level of harm during their care [1]. If true, it is a terrifying proposition, resulting in about 600,000 incidents per year in Great Britain alone. This is in comparison to the aviation industry, where fatalities have never exceeded 0.6 cases per million flights (14 deaths) [Civil Aviation Authority]. In the aviation sector, each incident must be investigated by law, however, there are no similar legal obligations for health care providers despite the significantly higher numbers of incidents and fatalities.

How can we improve healthcare related harm? Shall we introduce additional protocols and checklists similar to practice ibn the aviation sector? Does each complaint or error need a thorough analysis to better understand what could have led to the incident at both individual and organisational level? Is this data applicable to

different health care systems or UK specific? If this proportion of harm is not country specific, how can we learn from each other?

The authors opine that there is no single good answer, but rather a series of answers, which together can help to understand and solve the problem of accidental, preventable harm in healthcare. In this chapter, we present a real-life incident and aim to guide the reader to implement both an industrial and a health care related algorithm to recognise, analyse and synthesise the learning points of the exemplary error. We also would like to spark further discussions and invite any interested readers to a best practice sharing session at the end of the chapter. We encourage everybody to join/start any blog in this topic to spread the word about the importance of learning from errors in health care.

The fast pace of modern medicine is mostly driven by patient's demand for a quick fix, however this tempo does not result in a faultless operation. The often-unreasonable hurry is likely one of the reasons why the emergency speciality has unfortunately claimed a silver medallist position on the podium of litigation, not far behind the surgical disciplines [2, 3]. Clearly, other factors, like the immense stress, the constant pressure to make back-to-back decisions and perform various procedures under severe time pressure are also inherently incident prone. Speed comes at a price that is mostly paid by the patient but often the health care provider as well (second victim). The other element that attracts mistakes is the number of interruptions during the process of care. A typical patient journey in the emergency department includes countless stops, each with a brief handover between providers of different qualifications (ambulance, triage nurse, doctor, etc.). Handovers are knowingly dangerous in medicine. Everyone knows the Chinese whisper when a sentence conveyed ear-to-ear in a line of people. By the time the message reaches the end, the original text is barely recognisable. Unsurprisingly, according to regulatory bodies, one of the most common errors in emergency departments is loss of data [4, 5].

Human errors are events when a planned action fails to achieve the desired result due to a human failure. In this chapter we introduce both an ergonomic based industrial approach and hospital protocols used in the UK. Both methods are excellent not only for recognising an error or even a near miss. They are also useful at mitigating consequential damage, mapping the factors leading to the incident, and also preventing possible future occurrences and instigating the necessary corrective measures (**Figure 1**). The explicit goal of the ergonomic approach is the optimization of equipment design and reduction of work-related stress to minimise chances of human errors (International Civil Aviation Organisation). Even though similar initiatives are seen in medicine, as of yet there is no overarching authority to enforce necessary measures.

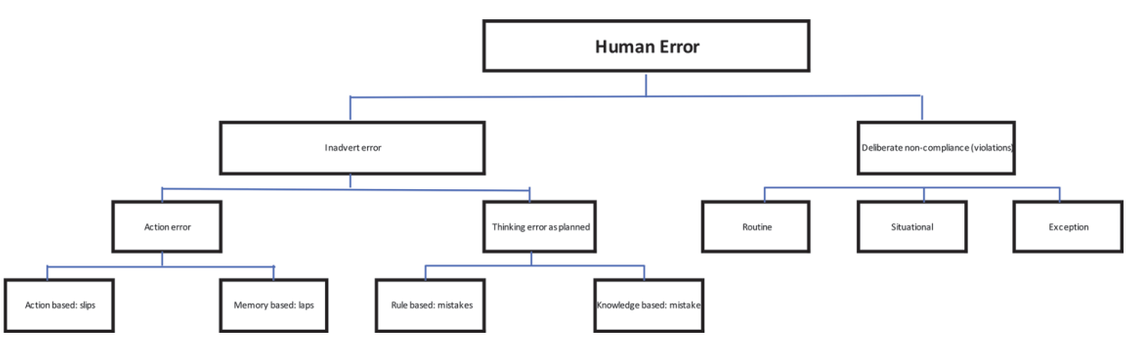

Figure 1.
Ergonomic flowchart for processing human omission categories.

1.1 Adverse event recognition

In the UK, Australia, Canada and the USA, dedicated systems are in place to facilitate incident recognition and reporting. Most enable users to anonymously (or named) report any adverse occurrence. The systems are designed to alert manager levels and prompt actions according to pre-set protocols.

In the next paragraphs, we present an incident from a real ED (**Box 1** and **2**). The reader will be asked to review the incident and use their experience to work up the error as normal (according to local protocols/experience). An ergonomic flow chart will then be shown and the reader should compare the two approaches and mark their thoughts in the below workbook.

Incident Log entry: A patient complained to a senior nurse on the Clinical Decision Unit of the Emergency Department during a busy shift. The nurse made an entry to the incident log saying: "*a patient complained that the senior doctor referred her to Mental Health Services without consulting her*".

Box 1.
The summary of the clinical incident.

Workbook 1.

Result of the usual approach:
Result of the ergonomic approach:
Result of the repeated ergonomic assessment:

Broader context (for those unfamiliar with UK Mental Health protocols)
The Mental Capacity Act (MCA) was designed to protect and empower people who may lack the mental capacity to make their own decisions about their care and treatment. It applies to people aged 16 and over. The MCA refers to decisions about day-to-day situations and giving consent to medical interventions including surgery. There are 5 principles of the MCA and all practitioners must act in the best interest of the patients and presume that anybody under their care has the capacity to make a decision themselves, unless it's proved otherwise. Furthermore, any health care worker must make sure to help people make their own decisions, whenever it is feasible.
In this case, despite the registrar believing to have acted in the best interest of the patient, he breached the protocols by not discussing his working diagnosis of potential postpartum depression and the steps he deemed necessary to help the patient. As the MCA states people must be encouraged "to express their preferences for care and treatment" the registrar should have discussed all available options detailing the presumed benefit and exploring the patient's understanding of the help offered. In addition, the registrar should have assessed potential cultural barriers, as in some cases, depression (or any mental health diagnosis) might be seen stigmatising and shameful.

In incident management, sometimes multiple answers are available for the same question. To give the benefit of doubt, the reader is asked to repeat the ergonomic exercise using the other arm of the process. If, during the above, the reader responded that the error was "Intentional Non-Compliance" (i.e., the junior doctor knowingly violated departmental regulations by failing to record vital parameters, to seek senior advice before transferring the patient and did not hand over the patient to the nurse in charge of the clinical decision unit) they should consider choosing the alternative path of "Inadvertent error/incomplete knowledge" (the junior was not aware of the regular transfer process and/or undervalued the patient's condition). One must realise that both solutions (and even a combination of the two) are equally conceivable however, each involves different corrective steps.

Example 1. The patient attended two consecutive days with back pain. She was post-partum (3 weeks) and was alone with her first baby. During her previous attendances she was sent home with analgesia and referral to physio. Last night was admitted for "rest and review" as she claimed that the pain killers were ineffective. In the morning ward round, the patient was seen by a locum registrar, who suspected social isolation (husband was abroad and there was no family support for the patient) and potential post-partum depression. The registrar ran his clinical judgement by the consultant in charge who agreed on referral to social/psychological support. The registrar called social services and was informed by a secretary that post-partum patients are seen by the Crisis Team. The secretary recorded the patient details and promised the registrar that someone will call him back from her team. After the referral was made the registrar tended to his further duties on the Clinical Decision Unit (CDU).

The incident log entry said: "*a patient complained that the senior doctor referred her to Mental Health Services without consulting with her*".

Question 1: What type of error do you anticipate?

- Poor handover.
- Records not available.
- Documentation/Tracking issue.

Box 2.
The full extent of the incident.

1.2 Background events and risk analysis

Once an incident was recognised, the immediate harm was mitigated the background and context needs further assessment. Again, the health care approach is different to the ergonomic one. Without a detailed understanding of the circumstances and background facts, causes cannot be fully determined. Without fully exploring the causes, potential future recurrence of similar incidents cannot be prevented. Therefore, it is in the best interest of any system to learn the crucial details.

The reader shall review the below two charts (**Figure 2**; **Table 1**) and mark their ideas on risk assessment in Workbook 2.

Workbook 2.

Ideas generated by the ergonomic approach
Ideas generated by the healthcare approach

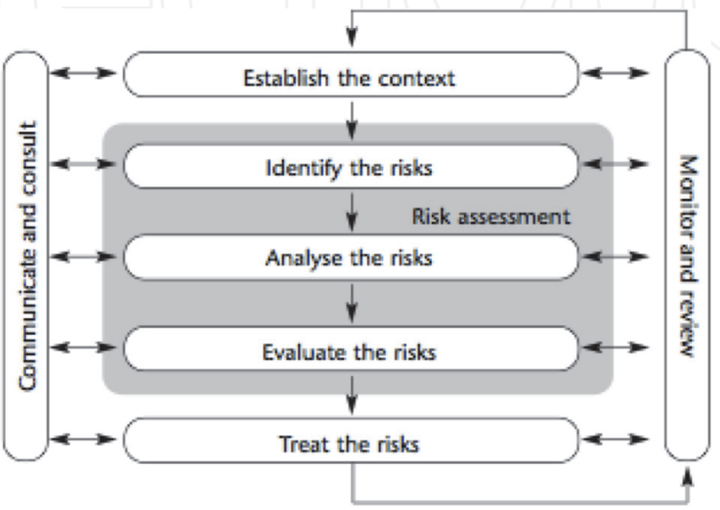

Figure 2.
Ergonomic flow chart for risk assessment.

Likelihood score	Rare	Unlikely	Possible	Likely	Almost certain
	Will probably never happen/ recur	Unlikely to happen again/ recur, but it may do so	Might happen or recur occasionally	Will probably happen/recur but it is not a pressing issue	Will surey happen/recur possibly frequently
Catastrophic	5	10	15	20	25
Major	4	8	12	16	20
Moderate	3	6	9	12	15
Minor	2	4	6	8	10
Negligible	1	2	3	4	5

Low risk = 1–3; Moderate risk = 4–6, High risk = 8–12; Extreme risk = 15–25.

Table 1.
Incident likelihood and risk scoring (risk scoring = consequence x likelihood).

1.3 Investigating the causes

The UK hospital practice has currently advocated three methods to identify causation: the formal "Root Cause Analysis" (RCA), the "fishbone" approach, and the "5 - why" (5 W) method. There are no set rules as to when to implement a certain method, however, a rule of thumb is that an RCA is used to analyse complex, severe, and/or frequently recurring problems, while the "fishbone," or 5 W method, is reserved for simpler incidents [6–8].

As in our present example, the patient did not suffer permanent health impairment and the number of involved of staff was less than 5 people. The 5 W method was used in the investigation process. The advantages of this approach are that it does not take a long time but creates an opportunity for a layered analysis. The technique is simple; the investigator should ask a minimum of 5 questions starting with "Why". If the problem cannot be explored in depth even after the 5th question then either, additional questions can be raised or a new method is needed to investigate further. The disadvantage of the 5 W method is its subjectivity: no matter how unbiased the investigator, their cultural, cognitive, and emotional factors can affect the result. To address this source bias (if resources allow), two independent investigators are advised to be put on the case. Given the length of the article, the fishbone and RCA approach cannot be presented at this time, however, the reader is encouraged to review these methods based on the references provided.

The reader is asked to formulate their own 5 questions and enter in the workbook. Once finished, please review the questions raised by the hospital investigator (see **Table 2**). Compare the questions and make notes of the differences. What does the difference suggest to the reader?

Table 2 Summary of the given clinical incident according to the 5 W method.

Workbook 3.

Question 1.
Question 2.
Question 3.
Question 4.
Question 5.

The differences between the readers and the investigators questions:
1. **Why** was the patient admitted to CDU last night?
2. **Why** was her social circumstances and mental health status not assessed during prior visits?
3. **Why** did the registrar forget to tell the patient his suspicion of a potential post-partum depression?
4. **Why** did Crisis Team not call back the registrar?
5. **Why** did the registrar check back at the patient?
Please reflect on the differences

Question	Answer
Why was the patient admitted to CDU last night?	As the patient presented with the same complaints twice (unplanned return), per department policy she should have been seen by a consultant. The night shift was very busy, the consultant on call was unavailable, therefore the night registrar admitted the patient to the CDU.
Why was her social circumstances and mental health status not assessed during prior visits?	The patient was seen by two different juniors and the case was discussed with two different seniors. There was no mention of the social or mental health assessment as the juniors did not think about it.
Why did the registrar forget to tell the patient his suspicion of a potential post-partum depression?	The registrar was very busy with other patients and thought that once spoken to by someone from the Crisis Team he will discharge the patient with a home appointment with a counsellor.
Why did Crisis Team not call back the registrar?	The Crisis Team assessed another patient at the medical ward and thought to that they would quickly see the patient.
Why did the registrar check back at the patient?	The patient was seen by the Crisis. Team and as she refused any further intervention (she felt offended by the stigmatising label of depression) the CDU charge nurse offered her a self-discharge form. By the time the registrar returned to review, the patient had left.

Table 2.
Summary of the investigators "5-whys" of the above error.

1.4 Significance of the adverse events

The previous paragraphs helped the reader to review a real-world, potentially dangerous incident, identify the involved parties, have a detailed background check, categorise the error leading to the incident, perform a quick risk assessment, and address immediate threats. In the next section, we will determine the learning points and decide who shall learn to prevent further occurrences.

This is a key step in the process, as the severity of any particular incident is determined by the weight of the consequences and the frequency of potential reoccurrence. These evaluation steps will also reveal the nature of necessary corrective actions on both an individual and organisational level. In Anglo-Saxon areas, health care institutions use a very similar nomenclature/protocols for reporting incidents: minor events ("near miss", "quasi-damage", or "minimal damage") should only be reported to the immediate supervisor (as is practical, but preferably within 12 hours), whose task it is to investigate, resolve or take it forward. However, moderate/severe incidents should be reported immediately not only to the line manager, but the director in charge. In most cases, the reporting system automatically notifies the appropriate level. "Serious" or "catastrophic" events should be immediately taken to the hospital directorship level. The reader is asked to review

Likelihood score	Rare	Unlikely	Possible	Likely	Almost certain
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Table 3.
Incident likelihood and risk scoring (risk scoring = consequence x likelihood).

Table 3, which summarises the categories used by a UK tertiary hospital. In the workbook please enter the differences between the reader's system and the UK system to reflect on the advantages/disadvantages of both.

Workbook 4.

Summary of the reader's local system
Reflection on differences between the UK and the reader's own system (if applicable)

1.5 Closing the loop, feedback to the team

Identifying and classifying adverse events, analysing the relevant risks, determining the likelihood of recurrence and determining lessons at both individual and organisational level is pointless without communicating the result to the individuals involved and (while maintaining anonymity) with the entire team. If this step is missed, the opportunity to learn from error will be lost forever, not to mention that the incident will surely reoccur [9].

In the author's experience, the UK is at the forefront of recognising, managing and learning from errors and incidents with a nearly two decade-long history in the NHS. The National Quality Committee issued a document in 2013 (Concordat 2013) promoting the culture of learning from errors, the importance of timely feedback and the culture of candour. While the concordat is mostly a manifesto, another national organisation, the National Reporting and Learning Service, developed a seven-step tool to help with the practical application of this relatively new concept into the day-to-day operation.

However, even the English system has minor flaws. NHS England does not have a uniform reporting system and procedure, rather, it is left to hospitals to choose the best method. Most Trusts have their own classification system, which may differ significantly from one another. Unfortunately, these differences can conceal system-wide problems, so many advocate the need in favour of a unified, national system. Inarguably, a single system, similar to aviation, would simplify detection, facilitate detection and management of adverse events, as well as provide all level healthcare staff with transferable skills that can be applied in practice and used anywhere in the country.

Using **Table 4** as a guide the reader should review the example of a clinical error and mark their recommendation in the workbook. Once the exercise is complete please review their answers against the hospital investigator's recommendations (**Table 5**) and reflect on the differences.

Workbook 5.

The reader's recommendations
Reflection on the differences

1.6 Barriers to learning from errors?

In the final section of the chapter we will have a quick trouble-shooting run-through to identify the potential barriers. At the moment, in the Anglo-Saxon territories incident recognition is based on voluntary reporting hence can only be as effective as often it is used.

The first difficulty stems from the inherent weakness of any self-reporting voluntary system; any non-mandatory, non-punitive, but at the same time non-incentivising activity depends solely on the level of motivation of those carrying out the activity. Not surprisingly, the sensitivity of hospital incident reporting systems (i.e. how many events does the system detect at all) is around 30% [10], while its specificity (i.e. how the detection rate relates to actual errors) is even lower: 14% [11].

To explain the poor sensitivity and specificity, similar answers were found throughout the world, regardless of political setting, religion, culture, or even

NRLS steps
Build a safety culture
Lead and support your staff
Integrate your risk management activity
Promote reporting
Involve and communicate with patients and the public
Learn and share safety lessons
Implement solutions to prevent harm

Table 4.
Summary of the NRLS 7 steps.

Trust measures to mitigate errors
No patient can self-discharge with an alleged mental health issue.
Patients with alleged mental health issues needs senior review prior discharge.
CDU Lead to revise CDU review policies and Mental Health Referral pathway.
Promote and appraise reporting.
Duty of Candour applies, patient shall be called and a formal letter might be considered.
Learning points to be discussed on nursing training day and junior teaching.
Compulsory CDU checklist prior to (self) discharge.

Table 5.
The investigators recommendation based on the above NRLS tool.

clinical setting, whether inpatient and outpatient care, hospital or GP practice. This similarity highlights the importance of the human factors in reporting. A USA primary care survey found [12] that the time spent writing a report was inversely proportional to the frequency of reporting. Iranian authors [13] found that hospital workers reported only half of serious medication errors. According to their results, fears of accusations, retaliation, and the reporting burden ("it takes too long to write") were the main disincentives behind non-reporting. It was also clear from the responses that almost all practitioners stated in unison that "there is no need to report if there was no problem with the patient". The barriers of reporting seem to be similar in Canada: according to a hospital study [14], the timing of the reports was proportionate with factors perceived important by the responders: incidents endangering patient or staff safety, while the time spent writing the report, or the user unfriendly reporting interface significantly slowed down reporting speed. According to the study, professional identity, lack of information, unclear organisational relationships, and fear of retaliation also proved to be important barriers. Another Iranian article [15] concluded that the main barriers to reporting were the lack of effective reporting systems, complicated forms and the lack of collegial support. They also concurred with other studies that incidents perceived as minor were less frequently reported. The study highlighted significant differences between genders and occupations: women tend to report earlier than men, and nursing staff are more likely to report in writing than doctors. Most studies emphasised that reporting success was also positively influenced by timely, useful feedback. This is probably a common human trait, and the lack of effective communication of results or recommendations can easily cool an individual's enthusiasm, as no one likes to work unnecessarily.

In conclusion, the success of reporting is proportional to low reporting burden and the accessibility to information. Thus, when designing an ideal system, cognitive- (understanding the importance) and emotional factors (enthusiasm, fear, satisfaction, etc.) as well as technological, organisational, and cultural aspects must be taken in consideration to facilitate easy and efficient reporting.

2. End note, wider context

By adopting the concept of learning from errors, medicine has taken the initial step to eliminate the "blame and shame" culture. However, there is still a long way ahead before openly admitting mistakes and capitalising on improvement potential of errors become the new norm. To build a new world, where the truth of "to err is human" is rediscovered, the full support of both mass and social media will also be needed. Presently, health-related news in the media can be frightening. Articles and interviews have never highlighted the fact that many important, forward moving changes in medicine were actually triggered by serious, even fatal errors. The attitude of the media and also the public opinion must be changed to acknowledge that it takes enormous courage and honour to openly admit mistakes instead of waiting out the consequences. Such moral strength may drive development in both individual and organisation level. Only such new, non-punitive but supportive systems are likely to be able to overcome deep-rooted emotional barriers such as fear, anxiety, guilt and appraise compassionate performance.

The authors of the chapter are also convinced that medical and media professionals alone will surely not be able to create this new system: the patients must to be given more weight in planning and design of care systems, as ultimately, we are working with them, not for them. In this new structure, patients (and caregivers) are more likely to receive high level of partnership-based carewith practitioners

standing a better chance that a one-off error may not be ruining an otherwise immaculate long service careers of dedicated, talented professionals who dedicate their time and knowledge to helping others [16, 17].

3. Tasks and exercises

3.1 Exercise 1

What systems are in place in your setting to report harm? How are Datix, RIDDOR and Patient Liaison reports are collated and reported to you and your team? How many entries did you make in the adverse event log during the last year? How many should you have reported?

3.2 Exercise 2

Please ensure you are familiar with the risk assessment tools in your department? Are there any differences compared comparing to the above model? Is your tool better or worse than the tool above?

3.3 Exercise 3

How are adverse events dealt with in your organisation? How are the learning points communicated to your team?

3.4 Exercise 4

Are you aware of the effectiveness of root cause analysis within your organisation? If yes, what is the result?

4. Questions to consolidate knowledge

4.1 Question 1

How would you manage your team and in similar situation described in Box 2?

- Give the patient a call to explain and apologise
- Have a hot debrief to all involved staff
- Ask reflections from each members of staff
- Run a cause analysis and discuss results with all involved parties via a cold debrief
- Feed-back results to the whole team on an appropriate forum/channel

4.2 Question 2

What are the most common strategies to communicate errors and consequent recommendations to the team in your organisation?

- Mortality and Morbidity meetings
- A folder left in the staff room
- Circulars/newsletters

DOI: http://dx.doi.org/10.5772/intechopen.94126

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