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REVIEW

Must we get it wrong again? A simple intervention to reduce medical error

Q2 Sophie Vaughan, Tristan Bate, Jonathan Round*

St. George's Hospital NHS Trust, United Kingdom

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SUMMARY

Despite medical error being common and important, healthcare workers understanding of the underlying causes is poor. Error recognition and avoidance is rarely taught on training courses, and systems designed to investigate or prevent errors in healthcare settings are still developing. Instead of using error avoidance strategies that were reactive, system focused or academic, we developed an approach to help practitioners identify when decisions are made during clinical situations, and understand what errors could potentially be made at each. There are three steps to our approach. First is the identification and classification of medical errors. Ten basic errors are described which participants then identify within clinical video or written case scenarios. Next, working in groups and using pre-written scenarios, participants identify switch points – the moments in a case where key decisions are made – and discuss the reasons behind each choice. Lastly, still working in groups, participants identify switch points in difficult cases from their own clinical experience and discuss choices made. This step also rehearses an open, non-judgemental approach to error. This approach can then be transposed into individual practice and be used in ward rounds, clinic, theatre, and any situation where clinical decision making occurs. If incorporated by a department it has the potential to dramatically alter the quality of clinical decisions and reduce the damaging effect of medical error.

Q1 1. Introduction

The devastating consequences and cost of medical errors has led to increasing demands for clinicians to better understand their causes.[1] Medical error has been classified into a large number of biases and faults, and approaches for error prevention are commonly based on these. Errors may also be classified into either 'person' or 'system' errors with very different error management strategies for each.[2] System errors occur when adequate safeguards are not put in place to avoid predictable human error. Best known is Reason's "Swiss Cheese" model for system safety in describing this approach.[2]

One approach acknowledges that humans will always make errors and therefore safety depends on creating a system to either make them impossible (an air hose cannot be put into an oxygen socket) or anticipate these errors with multiple checks or barriers to avoid them causing harm (two nurses checking the preparation of a drug).

There have been several high profile system errors, for example the intrathecal administration of vincristine or wrong site surgery.[3] However effective learning from and the elimination of these errors has been slow to achieve.[4]

Other strategies for reducing clinical errors focus on 'person errors', highlighting the importance of cognitive factors, especially those associated with failures in perception, in heuristics and in biases.[5] The use of a metacognitive, reflective approach to problem solving allows clinicians to step back from the immediate problem and reflect on the thinking process, in addition to other cognitive debiasing strategies.[6] The large number and range of cognitive errors described however makes them difficult to teach, recall or use in clinical practice.

Despite being a major cause of morbidity and mortality, there is comparatively little time devoted to medical error avoidance in undergraduate or postgraduate curricula.[7] Most published strategies have concentrated on curriculum development for undergraduates, including lectures, video based teaching and standardised patients.[8–11] Perhaps more for medical error than other topics, a longitudinal approach is needed, introducing key concepts to undergraduates and then integrating them into personal practice after graduation.

We devised a simple intervention designed to reduce medical errors. Its ease of use allows a facilitator with no specific training to run a session.

* Corresponding author. St George's, University of London, Department of Paediatric Intensive Care, Cranmer Terrace, Tooting, London SW17 0RE, United Kingdom.
E-mail address: jround@sgul.ac.uk (J. Round).

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It simplifies recognition of errors, enables participants to critically review their own cases and see when errors might occur during their work.

2. Teaching medical error avoidance

We run sessions either as a workshop or as a series of standalone short meetings. For each, the setting is important. Participants need to be able to freely speak and listen to each other, without interruption and without concern that their comments may be logged or used outside of the session.

Ground rules (Box 1) are set out at the beginning for clarity of purpose and so all can understand the format.

The facilitator outlines these first before embarking on a three step process (Fig. 1). Steps one and two are more theoretical, while step three relates to individual patients.

3. Identifying and understanding errors – the deadly ten

3.1. Understanding the errors

To simplify understanding and remember causes of error, participants are introduced to 'The deadly ten' (Box 2). In a workshop, this can be done with a short talk. Briefly, these errors are described below.

3.1.1. Sloth

This is defined as not doing what you should be doing because of the effort required or (perceived) inadequate reward. It includes not checking results, not asking for adequate information, not reviewing a patient. It leads to poor documentation and inadequate attention to detail. Often system errors such as poor staffing or onerous rotas may augment individual sloth.

3.1.2. Fixation

This error occurs when a particular diagnosis or analysis is firmly held onto, despite evidence against it. '*Anchoring*' is a cognitive bias where features in the initial presentation are overvalued above subsequent information.[6] Similarly '*Confirmation bias*' describes a preference for evidence supporting our beliefs over that opposing them. These short cut biases may save time and effort[12] but lead to decisions being taken before all the available evidence is considered.

3.1.3. Communication breakdown

Often, within a team, there is sufficient information to manage the patient successfully. However if this information is not released or does not reach its destination at the right time, there is communication breakdown. So unclear instructions, poor listening and not considering other opinions leads to poor communication and increases risk of error.

Box 1. Ground rules.

- Acknowledge that
  - We are all prone to medical error
  - Understanding error helps prevent future errors
  - Medical error is everyone's responsibility
- Comments and opinions should remain confidential unless patient safety would be at risk
- Be honest about what you did or would do
- Listen to others to understand their viewpoints

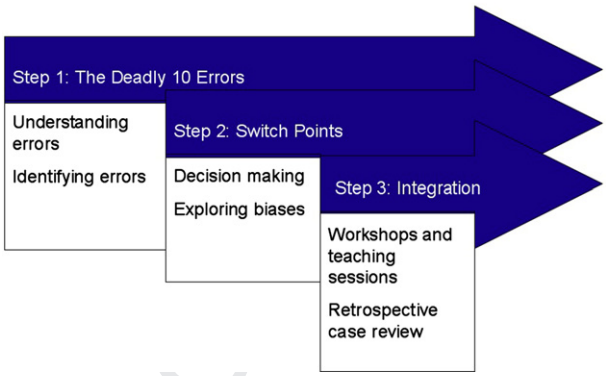

Fig. 1. The three step process.

3.1.4. Poor team working

Good team working prevents errors, allowing each team member to operate within their abilities, with sufficient time to discharge their duties. By contrast, if a team attempts to work with some members out of their depth and others underutilised, or with some having too much to do, then the team will be ineffective and inefficient. The team leader will need to be aware of team skills and the tasks required, to delegate tasks and monitor the function of the team. Lessons learnt from the aviation industry and motor racing have helped develop an engineering systems approach to health care[13] with training improving patient safety-related behaviour in hospitals.[14,15]

3.1.5. Playing the odds

Clinicians typically favour benign diagnoses over more serious ones, perhaps because they would not wish a more serious problem on their patient. They also tend to discount rare disorders, even when clinical features suggest that the rare disorder is present.

Failing to understand or remember the fundamental rules of probability can also cause significant errors.[6]

3.1.6. Bravado

Bravado leads to error when clinicians work beyond their competence or without adequate supervision. By contrast *Timidity* is an error where a clinician fails to take on a task they are trained for and positioned to do. Bravado is more common in groups where there is a strong hierarchical structure and little questioning.[16]

3.1.7. Ignorance

Simply a lack of knowledge, it also comprises *Unconscious Incompetence*, where one is not aware of the ignorance.[17,18]

Ignorance may not only affect our actual knowledge, but also our consideration of factors which may affect our judgement, such as fatigue or stress.

Box 2. The deadly ten errors.

1. Sloth
2. Fixation
3. Communication breakdown
4. Poor team working
5. Playing the odds
6. Bravado
7. Ignorance
8. Mis-triage
9. Lack of skill
10. System error

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3.1.8. Mis-triage

Real world medical systems typically involve multiple issues that have to be prioritised and reconsidered regularly. Over- or underestimation of the seriousness of a situation and lack of prioritisation occurs at many levels from a triage nurse in the Emergency Department to allocation of resources. Once wrongly estimated, it sets the pace and tone of subsequent interventions.

3.1.9. Lack of skill

A lack of skill can reflect lack of teaching or lack of practice, such as performing an operation only rarely. Simulation and skills training can offer the opportunity to teach and practice these skills in a safe environment.[19]

3.1.10. System error

Healthcare systems should be designed to minimise the risk of error, conscious of how humans will always make mistakes if there are enough choices to be made. A poorly designed system exposes staff to unnecessary decision making steps, confuses the decision maker with multiple distractions, allows dangerous choices to be easily made and lacks checks and safeguards to identify errors.

System error is a complex area, covering environmental, equipment or organisational failures.[4]

3.2. Identifying the errors

After an overview of these ten errors, participants learn to identify the errors in other people's scenarios. An effective way to do this in a workshop setting is 'medical error bingo'. Clinicians are given bingo cards containing the 10 errors which they then have to spot while watching short video clips chosen from popular medical TV dramas. (Fig. 2). An alternative is to use pre-prepared written scenarios.

4. Switch points – understanding decision making

Once practitioners are able to categorise and understand types of errors, the next step is to learn about the structure of a clinical case. Decisions are not made uniformly during cases, but at specific times, with 'doing' sections separating 'deciding' periods. We have termed the deciding times 'switch points'.

Decisions made at each of these points affect the clinical course, diagnosis and outcome. The type and timing of switch points will vary depending on the clinician, their workplace and their speciality, but common ones are shown in Fig. 3.

By identifying switch points and using a metacognitive approach to stop and analyse the thinking process and examine for likely cognitive biases, clinicians can detect and understand why errors can occur.

In a workshop we use pre-written clinical scenarios with poor outcomes. Scenarios can be obtained from our error website (www.jround.co.uk/error). The participants are divided into groups of 4–6, each with a flip chart. Groups map out the key steps in the pre-written scenario and identify switch points. (Fig. 4) Participants then discuss cognitive processes at switch points and explore why people might make poor choices at these points. The groups come together to share what they have learnt and to enable the facilitator to correct any misunderstandings.

5. Integrating into clinical practice

Having learnt how to identify errors and switch points in scenarios, the next step is to relate this to individual practice. Ultimately the aim is for clinicians to be able to do this on their own as they see their own patients prospectively. However, an effective way to start is to analyse their own cases retrospectively in a group. This step makes learning more personal. It also encourages collective ownership of safety and error, working to reduce the stigma of making mistakes.

Fig. 2. Bingo card for medical error bingo.

With a facilitator supporting the group, a participant chooses and presents a case which did not go well, from his or her own practice. Again using a flip chart, the clinical course is outlined and switch points are identified. The group discusses the case and is encouraged to consider different decisions that might have been made at each switch point. Effort is made to understand the reasons behind each of these decisions. Where errors were made, the facilitator invites the group to consider how they could be prevented in future.

At the end of this step, participants should be able to see how, within a real case, there are just a few key moments in which decisions are made, and that these choices can have a profound impact on the outcome. They will also understand more of why particular decisions are made, the types of errors that occur and how practice can be improved.

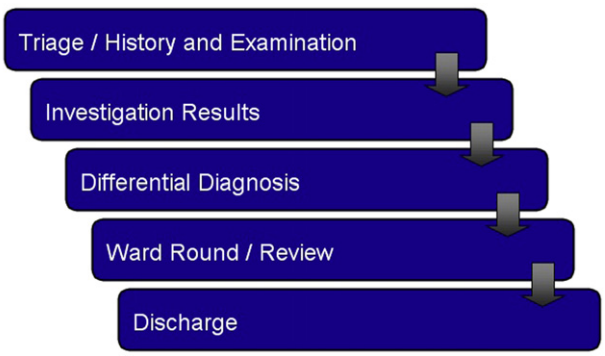

Fig. 3. Timing of common switch points.

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Fig. 4. Example of the key steps in a case, taken from a workshop.

Groups then feed back to the workshop and the facilitator draws key messages that all can take into their own clinical practice.

5.1. Prospective integration

The steps above can all be completed in a series of teaching sessions or a workshop, focussing on errors that have already happened. However, the key purpose of these sessions is to avoid errors occurring prospectively. This teaching strategy is designed to help practitioners understand how errors can happen, that errors happen at specific points in clinical work, and that there is a limited range of errors that can occur. With the knowledge and techniques learnt in the sessions, clinicians are better equipped to identify switch points as they are occurring, and are better able to stop and consider what errors might develop in a specific situation.

The ways in which this approach is integrated into individual practice depends on the specifics of each person's workplace and speciality. It is important that participants consider how they should to do this. Some examples are shown in Box 3.

6. Discussion

Despite being aware of the dangers inherent in medical processes, healthcare practitioners continue to make decisions that cause harm to patients. There is now a substantial and developing literature on medical error that highlights both the cognitive reasons behind poor decisions and the defences that healthcare systems can develop to minimise error. One of the remaining challenges for medical teachers is to instill protective cognitive strategies and error awareness into healthcare workers so that fewer poor decisions are made.[20]

In this paper we have presented an approach for teaching the basics of medical error. Either in a workshop or series of seminars, participants learn how to identify errors in scenarios, and to recognise them during an ongoing clinical case.

Our approach uses adult learning theory,[21] which emphasises that learners need to see the immediate relevance of the subject, that they should use their experience as a basis for learning and that teaching should focus on problem solving rather than content.

Box 3. Integration strategies.

- Weekly 'difficult patient' case review sessions
- Extended handover meeting
- Academic ward round
- Clinical governance meetings
- Simulation sessions

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This makes our workshops more suited to practitioners rather than students.

A major challenge facing medical team leaders is the integration of error prevention into regular departmental practice. Many hospitals use a reactive approach – exhaustively examining errors that have already occurred to develop 'systems' to prevent recurrence. Others put error prevention into a clinical governance box, where it fails to properly impact day to day practice.

For an area as important as error prevention, a multifaceted, integrated and continuous approach is needed. Following a workshop introduction, weekly meetings can be arranged. These would look at difficult cases in a non-judgemental way, examining the cognitive processes, and extrapolating 'take home messages'.

This approach can be integrated into individual decision making and be used on rounds, in clinic, in theatre, and wherever decision making occurs. Once incorporated by a department it can dramatically improve the quality of clinical decisions and reduce the devastating effect of medical error.

Conflict of interest statement

None.

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