

Thematic reviews of patient safety incidents as a tool for systems thinking: a quality improvement report

Samantha Machen

To cite: Machen S. Thematic reviews of patient safety incidents as a tool for systems thinking: a quality improvement report. *BMJ Open Quality* 2023;12:e002020. doi:10.1136/bmjopen-2022-002020

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-002020>).

Received 20 June 2022
Accepted 12 April 2023

ABSTRACT

Ensuring organisations learn from patient safety incidents is a key aim for healthcare organisations. The role that human factors and systems thinking can have to enable organisations learn from incidents is well acknowledged. A systems approach can help organisations focus less on individual fallibility and more on setting up resilient and safe systems. Investigation of incidents has previously been rooted in reductionist methodologies, for example, seeking to find the 'root cause' to individual incidents. While healthcare has embraced, in some contexts, the option for system-based methodologies—for example, SEIPS and Accimaps—these methodologies and frameworks still operate from a single incident perspective. It has long been acknowledged that healthcare organisations should focus on near misses and low harms with the same emphasis as incidents resulting in high harm. However, logistically, investigating all incidents in the same way is difficult. This paper puts forward an argument for themed reviews of patient safety incidents and provides an illustrative template for theming incidents using a human factors classification tool. This allows groups of incidents relating to the same portfolio, for example, medication errors, falls, pressure ulcer, diagnostic error, to be analysed at the same time and result in recommendations based on a larger sample size of incidents and based on a systems approach. This paper will present extracts of the themed review template trialled and argues that thematic reviews, in this context, allowed for a better understanding of the system of safety around the mismanagement of the deteriorating patient.

INTRODUCTION

Across patient safety portfolios worldwide, both research and policy, there has been a move to focusing on 'systems' when investigating incidents.^{1–4} This is in comparison to more traditional approaches to safety management—for example, looking for a 'root cause' or attributing blame to an individual at the 'sharp end' of an incident.⁵ With national and international policy suggesting the need for a human factors approach to incident investigation,^{3 6} and safety science identifying the need to focus both prospective and retrospective perspectives of safety,^{7 8} practitioners are looking for tools that help them demystify how they can incorporate systems thinking to inform safety

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Previous research relating to investigation into patient safety incidents has identified the need for systems-based investigation versus person-focused investigation to ensure improvement to systems of safety. Currently, there is no way to group incidents together to theme incidents through a validated systems lens.

WHAT THIS STUDY ADDS

⇒ This improvement report presents a worked example of how a thematic review template would be used and compares findings and recommendations based on the themed review template versus individual investigations. The template provides the opportunity for investigator(s) to aggregate incidents and guide investigators to provide more system-focused findings and recommendations.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This thematic review paper is the first documented attempt to provide a template for patient safety practitioners to group together patient safety events and guide investigators towards a focus on systems of safety and not individuals. This addresses a key gap in safety science literature and poses the emergent method of investigating using thematic reviews can be useful in helping appreciate context and safety issues from a systems lens.

recommendations following incidents and improve the safety and quality of care delivered. This paper will propose the benefit of themed reviews for the investigation of multiple incidents and signpost to an example of a template based on a human factors classification of contributory factors. This paper argues that the thematic review approach to a cluster of safety incidents allows for a better focus on system and therefore may be a helpful tool in encouraging system-focused recommendations versus person-focused recommendations.

Background to the problem: how do we learn from when things go wrong in healthcare?

Patient safety is a prominent focus for healthcare providers, regulators and commissioners.



© Author(s) (or their employer(s)) 2023. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

Department of Applied Health Research, UCL, London, UK

Correspondence to

Dr Samantha Machen;
samantha.machen.16@ucl.ac.uk

Since the seminar publication of *To err is human*, the role of errors in healthcare was pushed into the public eye—for example, with the National Academy of Science estimating in this publication, in the late 1990s, that between 44 000 and 120 000 Americans die due to ‘people making mistakes’.⁹ While between the late 20th century to the current day, there has been significant academic contributions to argue healthcare incidents are greater than ‘mistakes’, the focus on ‘people making mistakes’ has been hard to remove from the discourse of patient safety. Reason’s principles of error management, and the famous metaphor of the ‘Swiss cheese’ that ensued, argued that errors were symptomatic of latent failures embedded in systems of work.¹⁰ Reason argued that when these latent failures, lying dormant, aligned, catastrophic errors could follow and our knee-jerk reactions to these catastrophes could result on us focusing on the individuals at the ‘sharp end’ of the system.¹¹ However, currently, insight into patient safety incident management still identifies that blame of individuals is commonplace in the response to errors despite the movement towards ‘systems thinking’.^{12 13}

Systems thinking, in its simplest, is appreciating both the explicit and tacit processes that surround a system of work. Embracing systems thinking is almost synonymous with embracing the complexity of healthcare and appreciating that incidents in healthcare may not follow a linear causation process.¹⁴ To fully appreciate the system in healthcare incident investigation demands a system-focused investigatory method and it has long been argued that the prominent approach to investigation in healthcare, the root cause analysis (RCA), does not fully allow for a systems focus.⁵ This is because, in part, the RCA method argues for incidents to be reduced to the key ‘root’ of the problem or context. The sharp end of a failing system may relate to an individual omission—for example, failing to prescribe or administer a drug—and therefore, the RCA investigatory method can result in person-focus findings and person-centred recommendations. However, this individual omission is likely symptomatic of a much more complex problem.¹⁵ Indeed, in a systematic review conducted by Martin-Delgado *et al*, it was argued that while RCA was a useful tool to understand a specific incident, it was less useful in implementing improvement and recommendations that would prevent their recurrence.¹⁶ Investigations that are based on systems-focused methodologies or frameworks, for example, Accimaps and System Engineering Initiative for Patient Safety (SEIPS),^{17 18} have been argued to result in actions or recommendations that are more likely to result in sustained improvements to the overall system of safety.¹⁹

Problem description

Dekker and Hollnagel identify that for every ‘accident’, there could be 10 incidents, 30 near misses and 600 unsafe acts associated with that 1 accident.²⁰ In healthcare, this accident would likely to be an incident causing

death or severe harm, and incident referring to incidents reported with low or no harm to a patient. For example, for an administration error, there may be multiple times where the wrong drug could have been administered, but a safety barrier alerted staff to this, and it was logged as a near miss. Similarly, there may have been hundreds of times where the second checking of certain processes was missing, lax, performed under suboptimal conditions, or done while performing other tasks. In the latter two cases, these near-misses and unsafe acts may not have caused harm, and therefore, may not have alerted the organisation to investigate, compared with the one case where harm occurred to the patient. While there has been acceptance that near-misses and low harm incidents are as important as incidents resulting in harm,²¹ practice across healthcare has seen more resource being earmarked for investigating incidents that result in harm. For example, from 2015 to July 2022, the National Health Service (NHS) was contractually obliged to investigate ‘serious incidents’ (categorised by harm to the patient) via an RCA-style investigatory method²² before adopting a more systems-focused policy from August 2022.²³

While we have seen a movement to adopt system-focused methods for investigating incidents, healthcare organisations still have little support in templates or guidance on how they can group together incidents and focus on the system of safety via a triangulation of near misses, low harm incidents and adverse events resulting in harm. Systems of safety are complex, and therefore, triangulating, and aggregating incidents pertaining to the same system of safety can provide an insight into the parts of the system that are failing and why. If incidents pertaining to the same system, all with individual insights with varying impacts on patient care, are aggregated, then we would be able to appreciate in what context a part of a system or process fails and how this affects other interconnecting parts of the system. This is almost akin to providing an insight into a stress test of a system—with the focus on how resilient the components of the system are in different contexts. This paper argues that a focus on systems is only part of the solution to understanding safety in healthcare, and the missing piece in this quandary is the need to group together multiple incidents in a systematic and system-focused way. The next section will present the themed review tool and then go on to argue how its use in a real-world example presents and encourages system-focused, valid and specific recommendations. The example used in this case was conducted in a multidisciplinary team with varying levels of knowledge of safety science, working in an acute healthcare setting.

Intervention: a themed review template for use in healthcare Design and format

The themed review template can be found as online supplemental material to this paper. The template is set up into five stages: (1) description of the reference cases, (2) description of the safety system, (3) classification of contributory factors for reference cases, (4)

E.g. A system of safety for falls below:

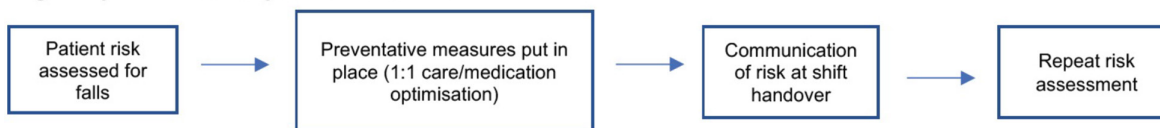


Figure 1 Example of stage 2 and mapping a system of safety.

narrative analysis and (5) safety recommendations based on the thematic review. Each stage is narrated to include instructions to the investigator on how they complete the individual steps. Stage 1 refers to noting down the reference cases to note key descriptions for each incident, for example, harm occurred to patient or date of incident. Stage 2 refers to the description of the safety system before any theming of the incidents together. To describe the safety system the template guides the investigator to process map the system of safety, with two examples. The mapping of systems is important in understanding better how a system of safety is set up for areas of care—for example, falls management—and this stage provides a critical eye on what the system of safety is in reality. This refers to Shorrock's work on varieties of human work²⁴—where there may be a dichotomy between work as prescribed (ie, the designed system of safety) and work as done (ie, the reality of work on a day-to-day basis). This stage asks for a mapping of the system into compartments and then guides the investigator in filling in an 'after action review' style format to identify how, across the reference cases, these stages are failing. The aim of this stage is to critique the stages of a system that may be overly relied on but not actually be contributing to overall safety—referred to as 'safety clutter'.²⁵ An example of this stage can be seen below in figure 1 with the example of management of the risk of falls. Each box will have an in-depth review of how this aspect of the system was engaged with for each reference case which then paves the way for stage 3, the classification of contributory factors for each reference case.

Stage 3 aims to help investigators categorise factors that affected each reference case. The importance of this stage is to ensure that the investigator(s) are encouraged to think wider than the individuals involved in the reference cases when thinking about where things went wrong in a safety event. To do this, it was important that a framework could be selected to allow for this which would aid the initial thematic analysis of multiple safety incidents. Unlike the research sphere where Braun and Clarke's work on thematic analysis paved the way for sound methodological analysis of narrative data,¹⁹ currently little guidance exists for practitioners to conduct sound thematic reviews on narrative data surrounding safety incidents. While Braun and Clarke's six steps for thematic analysis has been shown to provide a robust and thorough methodology, there is a pragmatic concern that this methodology of analysis and theming is not appropriate for use in this context. For example, narrative data for each safety incident may be incomplete and of differing standard when compared and grouped. This is unlike

thematic analysis methods which use the same data set which has been guided and generated by the same epistemology, methodology, and methods. However, there are lessons we can learn from thematic analysis and apply to this context.

First, healthcare incidents and data collected from incident investigations have large elements of description to them—for example, categorisation of where the incident happened, the harm level, the part of the system that failed (eg, traditional 'root causes'), and foci for improvement, and therefore, themed reviews of multiple safety incidents may benefit from deductive analysis based on set criteria.²⁶ Following this deductive approach for the development of the themed review template, it was necessary to find a universal code or framework that allows the investigator to categorise cross-cutting themes that are pertinent to a particular aspect of safety. In practical terms, this meant identifying a framework that would be applicable to themed review of multiple safety incidents portfolios, for example, medication errors, diagnostic errors, management of a septic patient. The final framework chosen was the contributory and mitigations factors classification²⁷ although other frameworks considered included SIEPS¹⁸ and The Yorkshire Contributory Factors framework.²⁸ The contributory and mitigations factors classification has similar benefits to the aforementioned considered approaches in that it provides different categories of factors affecting safety at different 'levels' in the system. However, its main benefit and reason for inclusion is its clear and simple components within each 'level' of the system. These three levels relate to (1) organisational factors, (2) task/environment factors and (3) individual factors and each level has three subgroups and explicit components. An example of a subgroup of (2) task/environment factors can be seen below in figure 2—a subgroup referring to task factors.

While the use of such a deductive framework could be argued to hinder generation of contributory factors from an inductive perspective, the mitigation to this in the template was to include options for free text in stage 4. The template guides investigators to mark a X next to each reference case and criteria where this component affected the reference case.

Stage 4 is a more narrative and interpretive step where multiple reference cases are grouped together where the same contributory factor has been identified in stage 3. The aim of this stage is to encourage the investigator(s) to consider the commonalities and differences in the way the contributory factor affected each case. For illustration, in the example of figure 2 above and the task factor

Task factors	Components
Clinical condition	<ul style="list-style-type: none"> • Pre-existing co-morbidities • Complexity of condition • Seriousness of condition • Options available to treat condition
Plans, guidelines, policies, procedures and protocols	<ul style="list-style-type: none"> • Informative • Instructional • Representative • Routine use • Usability • Currency • Accuracy • Availability • Accessibility (ambiguous, complex, irrelevant, incorrect) • Monitoring • Review • Targeting/focus (ie audience)
Decision-making aids (information/results/tools/machines, etc)	<ul style="list-style-type: none"> • Available • Accessible • Working • Accurate • For prioritisation of tasks • Access to specialist advice • Access to technical information, flow charts and diagrams
Procedural or task design and clarity	<ul style="list-style-type: none"> • Task complexity • Task memorability • Understandable • Agreed with staff (feasibility) • Time allocation • Task sequencing/stage sequencing • Workload (under/over/balanced) • Compatibility of tasks/task stages • Competing task demands • Feedback from the task • Transferability to/from other situations • Influence on task/outcome • Automation • Audit, quality control, quality assurance

Figure 2 Example of contributory factors.

‘procedural or task design and clarity’, this may be noted multiple times as affecting multiple reference cases and incidents. Through a hypothetical example, this task clarity could relate to a themed review of mismanagement of septic patients and non-adherence to a policy like the sepsis bundle. Grouping together incidents where the policy, or task, was not adhered to allows us in this stage to consider many question—for example (1) what was the context around the patient’s deterioration? (2) what was the staffing on that shift and how did it affect ability to carry out task? (3) what were the reasons the task was not carried out as anticipated? (4) are these variations commonplace and this is the first time we have been alerted to them via an incident? Allowing for this interpretation is encouraging an appreciation of complexity within a system—that is, different parts of a system will interconnect in spontaneous ways depending on the context (eg, staffing/acuity of patients/staff experience) and grouping together a group of incidents can allow us an insight into the work as done and challenge assumptions around work as imagined. An example of this reflection could be a themed review of falls which identifies that in all incidents, the risk assessment was completed to the standards expected. Theming together these cases may encourage investigator(s) to then critically consider how risk assessments affect the safety system, and therefore, how reliable reliance on these measures are.

Stage 5 is the last stage of the themed review which refers to the safety recommendations following the themed review. These recommendations are adapted from Shand *et al*’s work²⁹ where these three recommendations refer to the improvements categorised into ‘fixes’, ‘improvements’ and ‘changes’. This useful framework for recommendations allows investigator(s) to appreciate the

complexity and challenges that come with improvement to systems of safety. ‘Further insight’ has been added to the categories of recommendations which identifies the possibility that the themed review has resulted in more questions than answers relating to a safety issue—and therefore, a recommendation could be to collect further safety insights for example, gathering staff insights into the system of safety via surveys or focus groups.

Example of use and impact on safety recommendations

This next section will identify the impact the themed review can have on understanding complex systems of safety and how recommendations can be more system-focused than person-focused. The need for recommendations to be system-focused is due to research identifying that person-focused recommendations are less likely to be successful in implementing change. The hierarchy of intervention effectiveness³⁰ is a useful framework when critically reviewing the recommendations that emerge after incident investigations. Through this framework, we can identify that reminding staff or creating checklists, defined as ‘people-focused’, are argued to be less effective than forcing functions or standardisation of processes, here defined as ‘systems-focused’. This is in part the argument for more systems-based investigations because they move investigators away from recommending person-focused solutions. However, it is argued that recommendations after investigations focus more on person-based solutions—for example, in research conducted by Woods *et al* analysing safety recommendations, 37% of all recommendations were person-focused, compared with 1% of recommendations focused on forcing functions—that is, changing the system to design the error out of the system.³¹ This in part may relate to the difficulty in being able to recommend solutions that are system focused.

Approaching safety issues via a thematic review approach may allow for a focus on the system rather than individuals. This is in part due to the fact that if incidents reoccur, in different contexts (eg, shift patterns or different professionals), then it is evident that an issue transcends individual accountability. The worked template presented in this paper illustrates how multiple incidents can be grouped together and analysed using a system-based classification tool. Shifting local and organisational norms away from individuals fallibility or ‘human error’ to systems thinking and ‘system failures’ is complex and difficult, and this approach is argued to encourage investigators of safety incidents to consider safety concerns through the lens of multiple incidents and failings, rather than one.

The themed review template, and its focus on multiple incidents and the contributory factors classification framework, allowed for a systems focus. As well as providing a worked example of a thematic review of six cases of deteriorating patient, it also compares findings for these six cases which were individually investigated. This was chosen as a method to identify if the thematic review approach allowed for a wider, systems, focus compared

System of safety for specific safety risk:

Deteriorating patient – system of safety

Safety barrier 1: Identification of clinical condition and deterioration and Action taken because of the clinical information e.g., acuity of patient resulting in increased observation

Safety barrier 2: Senior input into management of patient if necessary

Safety barrier 3: Movement of the patient into the correct environment (e.g., theatre/appropriate ward area)

Safety barrier 4: Involvement from another multi-disciplinary team

Figure 3 mapping a system of safety for deteriorating patients.

with all six incidents which were investigated in isolation of each other.

After noting the cases for inclusion in the review, the system of safety for management of deteriorating patient was mapped, which can be seen in [figure 3](#). This system of safety relates to the system barriers that exist to safeguard patients from mismanaged deterioration. Again, having a focus on system barriers early on in this template allowed for an initial appreciation of the role of system barriers or controls, rather than person-focused barriers or controls.

Then, each safety barrier was assessed using the reference cases. This allowed for investigators to assess the strength of all these barriers. For example, with safety barrier 2 (senior input into management of patient), it was identified that in all the six reference cases, there was a delay or omission in senior review. On top of this, the assessment of this safety barrier identified that there were different reasons why this senior review was omitted or delayed. These reasons related to lack of clear communication of patient status, differing mode of assessment, different data used to assess patient from senior medical team and conflicting information on what type of senior review was needed. At the first stage of this review, the complexity of this safety barrier is clear to see. For illustrative purposes, one of the recommendations from the original RCA was to ‘remind senior doctors to review patients who are at risk of deterioration’. This is a clear example

of how individual investigations versus a themed review of multiple investigations differs and how a themed review allows space for exploring the myriad of different reasons why senior review may not have been possible for deteriorating patients.

[Figure 4](#) is an extract from stage 3 of the themed review and identifies a worked example of assessing the contributory factors for the six included reference cases. This section identifies that staff supervision was a particular factor for four of the incidents.

Using the operational management factors domain as a continued example, stage 4 identifies a narrative review and an example of this in practice for this case can be seen in [figure 5](#). This narrative review asks for the investigator to assess the similarities, differences and contextual factors surrounding the reference cases. The nuances and similarities in the issue of senior review are explored, and this stage identified that the omission of a senior review was twofold—the lack of review in its entirety and the review being incomplete or not in person. This latter finding is useful as it identifies the work as done—where senior review may be completed over the telephone and in some cases, this is a patient safety risk due to inadequate holistic assessment of the patient.

For ease, so far this section has followed one factor identified in the themed review through all the stages of the review. In its entirety there were five key factors identified

Causal Factors	Domain	Components	Contributory, Causal and Mitigating Factors Analysis – for identified PROBLEMS/WEAKNESSES and STRENGTHS									
Incident numbers			1	2	3	4	5	6	7	8	9	10
CONTRIBUTORY and MITIGATING FACTORS > the PROBLEMS/WEAKNESSES and STRENGTHS identified (be none, one or more CF/MF in each category)	External Contextual Factors	National guidelines and policies										
		Economic and regulatory context										
		Societal factors										
		Total										
	Organisational Strategic Factors	Structure										
		Priorities/resource										
		Safety culture										
		Policies, standards, and goals										
		Total										
	Operational Management Factors	Safety focus										
		Work planning and delivering		x								
		Staffing levels and skill mix										
		Workload, shift pattern, hours of work			x							
		Training										
		Staff supervision		x		x	x	x				
		Staff competence						x				

Figure 4 Assessing contributory factors to the reference cases.

Operational Management Factors	<i>E.g., How did local organisational level factors (e.g., staffing, skill mix, training, and staff supervision) affect the reference cases?</i>
	All reference cases identify the impact of a lack of senior review. The impact of this was twofold a) there being a lack of review in its entirety which delayed the patients' care and may have contributed to deterioration or b) the patient was reviewed by a senior clinician, but it was not in person, or it was incomplete. For example, in reference case 6 the decision to de-escalate the patient was based on a remote decision based on one BP reading rather than a holistic assessment of the patient.

Figure 5 A breakdown of the narrative analysis step.

which shaped the recommendations in stage 5. A comparison of the safety recommendations from those from the themed review, versus the individual RCA investigations identify the focus the themed review placed on assessment and improvement of the system of safety. [table 1](#) below identifies a comparison of recommendations for the themed review versus individual RCA investigations.

The focus of this paper is not to formally evaluate if the template has an impact on the safety outcomes related to management of deteriorating patients but to identify if theming together incidents can facilitate systems-thinking and complexity in patient safety. [Table 1](#) identifies that the findings and recommendations from the thematic review were more systems-focused than individual incident investigation. Comparing this to the RCAs done for individual cases, the recommendations are person-focused and relate to reminding staff to follow policy—in this conduct observations at the correct time and review patients in the correct way—without understanding why there may be a dichotomy between the work as done versus the work as prescribed or imagined.

Limitations and focus for the future

With a movement towards systems-thinking in patient safety, thematic reviews as an investigatory approach provide an opportunity to look at a cluster of incidents through a system-focused lens. The purpose of this paper is to identify the merit of the investigatory approach and provide an example of a template used. A key limitation of this paper is the lack of usability assessment, which is an important facet of whether the tool works in practice. This was beyond the scope of this study; however, future research should look to ascertain what level of safety science or patient safety education is needed to engage with the concepts fully.

Another important consideration for the success of thematic reviews is the quality of investigation which is used as the data for the thematic review. For example, RCAs have been argued to reduce complex problems to simplistic or person-focused actions.⁵ Therefore, the quality of the investigation feeding the thematic review may inhibit the ability to ascertain system-based findings. This could be mitigated by keeping a constant skill level (eg, training skill) or investigating all the cases with

the same investigators with the requisite investigatory knowledge.

It is also important to remain pragmatic about the difficulties in improving aspects of patient safety following investigations. This paper argues that thematic reviews, as an investigatory method, provide a better understanding of the system of safety around safety concerns. However, the link to better insight and improved safety may be intuitive but certainly not linear. Therefore, it is also essential that future research into thematic reviews as an investigatory method focus on the impact of increased insight on more effective actions and recommendations and ultimately, safety outcome measures. The potential success of thematic reviews centres around better insight into a system of safety resulting in an ability to facilitate targeted improvement. However, evidence of this relationship is lacking, and therefore, this theoretical assumption should be tested across a range of different safety topics. A comparison between recommendations from thematic reviews versus individual investigations would be an important research focus and could identify if recommendations from themed reviews were more sustainable or effective over time.

CONCLUSION

Since the seminal publication of 'To err is human', the healthcare industry has been striving to better understand safety and how to improve systems. Twenty-two years on since its publication, we are now seeing a move from linear thinking in safety (eg, there being one root cause to an error) to an appreciation of complexity and the need to focus on making systems safer rather than blaming individuals. However, while this appreciation may be apparent, we still need to enable practitioners to easily make sense of investigating different systems of safety. Indeed, from this year, NHS providers will be expected to group together incidents as per the new Patient Safety Incident Response Framework²³ to aid learning. Thematic reviews are an excellent way of helping practitioners understand a system of safety and they can use established methodology to view multiple incidents at once through a system-based methodology. Using thematic reviews will allow practitioners to understand what safety barriers are

Table 1 A comparison of findings and recommendations using the themed review versus individual RCA investigation

Safety barrier	Finding from themed review of 6 cases	Recommendations from themed review	Finding from individual RCAs	Recommendations from RCAs
Identification of deterioration and frequency of observations increased as per policy	In all 6 cases, frequency of observation was not increased in Emergency Department (ED) setting. This was in part because the policy for ED is different to ward areas, and nurses do not have technology to prompt them to (A) increase observation time and (B) remind nurses to carry out observations	Due to bed capacity, patients are staying in ED for longer. Therefore, they are 'ward' patients in the wrong clinical context. An improvement/change is needed to refocus how ED manage patients who are 'ward ready' but are waiting for a bed. There needs to be a classification system put in where nurses are prompted to observe patients more frequently for example, extend observation policy to include ED and provide ED with technology to prompt nurses to respond to high National Early Warning Score (NEWS)	1. Nurses did not increase observations as per observation policy 2. Nurse did not carry out more frequent observations	All RCA recommendations related to: ► Remind nurses to follow observation policy ► Disseminate reminders to wards of policy and frequency of observations
Senior review of patient	Variation in how senior review is conducted in the ED. In some cases, this senior review was done over the phone and therefore relied on all the information being passed to the senior reviewing clinician. In some cases, a decision to deescalate the patient's care was due to incomplete assessment of the patient from the senior clinician	A uniformed way of assessing patients from senior clinicians needs to be sought. There are benefits and negatives of physical versus remote review of patients. An improvement is needed to standardise or understand in what context a remote assessment is not appropriate. For senior consultant group to review with junior doctors to assess options for improvement	1. Senior doctor not able to attend patient to review 2. Senior review affected by anchoring bias of one blood pressure which was normal as this only information communicated by reviewer 3. Delay in doctor arriving to review patient due to operational pressures	1. Remind junior doctors of need to follow-up if they have concerns 2. Doctors to be reminded of need to use Situation, Background, Assessment, Recommendation (SBAR) communication when referring to senior review to ensure complete clinical picture 3. Dissemination of case to governance meeting to raise awareness
Involvement from other MDT, for example, outreach team	In all cases, had the patients been on an acute ward, they would have all been reviewed by an outreach team due to their high NEWS score. Outreach team of ED attend to patients and medical cover, however, for patients that are 'ward' ready but waiting for beds, this is a missed safety net	A change is needed to assess how outreach team can identify ED patients who, without bed pressures, would otherwise be on the ward. For outreach team and ED to devise an improvement plan for how operational management of these patients will change with current bed pressures in hospital	Nothing identified in 6 RCAs	Nothing identified in 6 RCAs
MDT, multidisciplinary team; RCA, root cause analysis.				

failing and ensure recommendations are based on this, allowing a move to more reliable and system-focused investigations for the future

Twitter Samantha Machen @samantha_machen

Contributors SM is the sole author and guarantor of this paper.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement No data are available.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

REFERENCES

- Clarkson J, Dean J, Ward J, et al. A systems approach to healthcare: from thinking to -practice. *Future Healthc J* 2018;5:151–5.
- Weaver S, Stewart K, Kay L. Systems-Based investigation of patient safety incidents. *Future Healthc J* 2021;8:e593–7.
- NHS England & Improvement. The NHS patient safety strategy. safer culture, safer systems, safer patients. 2019 Available: https://www.england.nhs.uk/wp-content/uploads/2020/08/190708_Patient_Safety_Strategy_for_website_v4.pdf
- Tetuan T, Ohm R, Kinzie L, et al. Does systems thinking improve the perception of safety culture and patient safety? *Journal of Nursing Regulation* 2017;8:31–9.
- Peerally MF, Carr S, Waring J, et al. The problem with root cause analysis. *BMJ Qual Saf* 2017;26:417–22.
- Government of Western Australia Department of Health. Patient safety – human factors. 2022. Available: https://ww2.health.wa.gov.au/Articles/N_R/Patient-safety/Human-factors
- Waterson P, Catchpole K. Human factors in healthcare: welcome progress, but still scratching the surface. *BMJ Qual Saf* 2016;25:480–4.
- Sujan MA, Huang H, Braithwaite J. Learning from incidents in health care: critique from a safety-II perspective. *Safety Science* 2017;99:115–21.
- Institute of Medicine. *To Err Is Human: Building a Safer Health System*. Washington, DC: The National Academies Press, 1999.
- Reason J. Human error: models and management. *BMJ* 2000;320:768–70.
- Cook RI, Woods DD. *Operating at the sharp end: The complexity of human error. Human error in medicine*. Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc, 1994: 255–310.
- Machen S, Jani Y, Turner S, et al. The role of organizational and professional cultures in medication safety: a scoping review of the literature. *Int J Qual Health Care* 2019;31:G146–57.
- Khatir N, Brown GD, Hicks LL. From a blame culture to a just culture in health care. *Health Care Manage Rev* 2009;34:312–22.
- Culwick MD, Endlich Y, Prineas SN. The bowtie diagram: a simple tool for analysis and planning in anesthesia. *Curr Opin Anaesthesiol* 2020;33:808–14.
- Vincent CA. Analysis of clinical incidents: a window on the system not a search for root causes. *Qual Saf Health Care* 2004;13:242–3.
- Martin-Delgado J, Martínez-García A, Aranaz JM, et al. How much of root cause analysis translates into improved patient safety: a systematic review. *Med Princ Pract* 2020;29:524–31.
- Waterson P, Jenkins DP, Salmon PM, et al. "Remixing Rasmuss": the evolution of accipmaps within systemic accident analysis. *Appl Ergon* 2017;59:483–503.
- Holden RJ, Carayon P, Gurses AP, et al. SEIPS 2.0: a human factors framework for studying and improving the work of healthcare professionals and patients. *Ergonomics* 2013;56:1669–86.
- Isherwood P, Waterson P. To err is system; a comparison of methodologies for the investigation of adverse outcomes in healthcare. *Journal of Patient Safety and Risk Management* 2021;26:64–73.
- Dekker S, Hollnagel E. *Resilience Engineering: New directions for measuring and maintaining safety in complex systems*. 2022.
- Yoon RS, Alaia MJ, Hutzler LH, et al. Using "near misses" analysis to prevent wrong-site surgery. *J Healthc Qual* 2015;37:126–32.
- NHS England. Serious incident framework. 2015. Available: <https://www.england.nhs.uk/wp-content/uploads/2020/08/serious-incident-framework.pdf>
- NHS. *Patient Safety Incident Response Framework*. 2022.
- Shorrock S. The varieties and archetypes of human work. n.d. Available: https://safetyanalysis.com/onewebmedia/Shorrock_Paper.pdf
- Rae AJ, Provan DJ, Weber DE, et al. Safety clutter: the accumulation and persistence of "afety" work that does not contribute to operational safety. *Policy and Practice in Health and Safety* 2018;16:194–211.
- Fereday J, Muir-Cochrane E. Demonstrating rigor using thematic analysis: a hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods* 2006;5:80–92.
- NHS England and Improvement. Contributory and mitigating factors classification. 2021. Available: https://www.england.nhs.uk/wp-content/uploads/2020/08/PSII_Contributory_and_Mitigation_Factors_Classification.pdf
- Lawton R, McEachan RRC, Giles SJ, et al. Development of an evidence-based framework of factors contributing to patient safety incidents in hospital settings: a systematic review. *BMJ Qual Saf* 2012;21:369–80.
- Shand J, Allwood D, Lee N, et al. Systematically capturing and acting on insights from front-line staff: the "bedside learning coordinator." *BMJ Qual Saf* 2021;30:509–12.
- Beard P, Hoffman C, Ste-Marie M. Incident analysis collaborating parties. 2012. Available: <https://www.patientsafetyinstitute.ca/en/toolsResources/IncidentAnalysis/Pages/incidentanalysis.aspx>
- Woods D, Holl J, Angst D. Improving clinical communication and patient safety: clinician-recommended solutions. In: *Advances in Patient Safety: New Directions and Alternative Approaches*. Rockville,

Themed Review (TV) template

What is this for?

A themed review may be useful in understanding common links, themes, or issues within a cluster of investigations or incidents. It will seek to understand key barriers or facilitators to safety using reference cases (e.g. individual datix incidents or previous investigations).

What may benefit a themed review?

Grouped incidents, for example from the same portfolio like pressure ulcers, falls or deteriorating patient, may benefit from a themed review because they take the same safety concern and identify different reference cases and contexts. This helps the organisation make sense of the safety concern at different points of the system and with different aspects of variability e.g. staffing issues, high volume of acute patients. This is important, because safety incidents may occur when systems are 'pushed' or 'pressurised' and therefore our view of safety needs to be flexible to the variability around the context.

What should the output of a themed review be?

Themed reviews may identify fallibilities of the components of a safety system. For example, it may be that across all the reference cases a risk assessment was completed but the preventative measures were not actioned. Outputs of themed reviews can highlight these problems and identify safety recommendations. Themed reviews may provoke more questions than answers, and therefore may be best placed to link in to a quality improvement project for ongoing monitoring and PDSA-style improvement cycles. A themed review should be viewed as a diagnostic tool to help diagnose problems in the system, and therefore doing a themed review should **always** result in some improvement efforts after this diagnosis.

What are the stages of a thematic review?

Stage 1: Description of the reference cases

Stage 2: Description of the safety system

Stage 3: Relevant context to each reference case and key problems

Stage 4: Common themes across the reference cases – narrative analysis

Stage 5: Safety recommendations and future work

Stage 1: Description of the reference cases

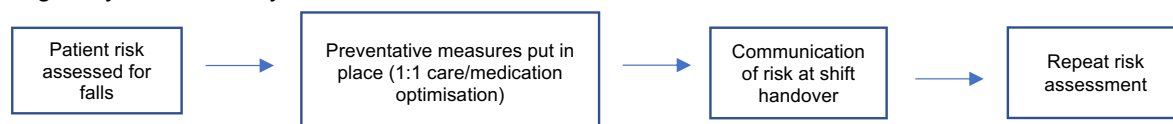
(In this stage, use the table below to list the reference cases using the headings. Remember, reference cases are the different incidents you are including in the themed review)

Date	Datix number	Harm	Description	Investigation level	Actions taken
<i>Date of reference case</i>	<i>Datix number for reference case</i>	<i>Harm level for reference case</i>	<i>Description of incident and findings of investigation (if applicable)</i>	<i>Level of investigation done (e.g. local investigation/RCA)</i>	<i>Actions taken as a result of individual incidents e.g. any recommendations/action plans from RCAs</i>

Stage 2: Description of safety system

(In this stage, describe the system of safety for the problem. That is, what safeguarding is in place to ensure patients' safety? This could be a list or a diagrammatic flow chart. Where there may be different systems in place (e.g. different processes for different locations or multiple safety risks), break them down in the box below.

E.g. A system of safety for falls below:



E.g. System of safety for deteriorating patient:

- Patient identified as being at risk of deterioration (clinical notes/observations)
- Clinical task of collecting observation data and calculating (NEWS2 score)
- Preventative/clinical measures put in place (e.g. increased observations/sepsis bundle)
- Senior review of deteriorating patient

System of safety for specific safety risk:

What is the difference between the incidents and the expected safety system? Use the template below to help identify across the different reference cases.

E.g. Safety barrier 1: Risk assessment for VTE

What is supposed to happen? *Risk assessment done within X hours*
What did happen? *Risk assessment delayed by Y hours*
Why did this happen? *Junior doctor not aware of need to do risk assessment before prescribing enoxaparin and is used to prescribing it for all patients. Limited time to do assessment before prescription given volume of patients in the ED department and pressure to reconcile medications*
What can we learn from this? *Importance of risk assessments prior to prescription was not clear to this prescriber. Need to identify why this is. Tendency to prescribe enoxaparin as a departmental norm.*

Safety barrier 1:

What was supposed to happen?	What did happen?
Why was there a difference?	What can we learn from this?

Safety barrier 2:

What was supposed to happen	What did happen
Why was there a difference?	What can we learn from this?

Safety barrier 3:

What was supposed to happen?	What did happen?
Why was there a difference?	What can we learn from this?

Safety barrier 4:

What was supposed to happen?	What did happen?
Why was there a difference?	What can we learn from this?

Safety barrier 5:

What was supposed to happen?	What did happen?
Why was there a difference?	What can we learn from this?

Stage 3: Relevant context to each reference case and key problems

This stage refers to contributory factors (as classified by the contributory and mitigating factors classification here:

https://www.england.nhs.uk/wp-content/uploads/2020/08/PSII_Contributory_and_Mitigation_Factors_Classification.pdf)

For each incident, mark down the external context factors, organisational and strategic, workplace, equipment, and task factors that affected the safety incident. All components that fall under each group can be seen below.

External context factors	Components
National guidelines and policies	<ul style="list-style-type: none"> Impact of national policy/guidance (DHSC/professional colleges, etc) Locum/agency policy and usage Contractor related
Economic and regulatory context	<ul style="list-style-type: none"> Service provision Bed occupancy levels (opening/closures) Private finance initiative related Equipment loan related Financial constraints Resource constraints
Societal factors	<ul style="list-style-type: none"> Values Beliefs

Organisational and strategic	Components
Structure	<ul style="list-style-type: none"> Hierarchical structure (discussion, problem-sharing, etc) Roles, responsibilities and accountability Multidisciplinary working Clinical/managerial approaches Maintenance Service-level agreements/contractual arrangements Safety terms and conditions of contracts
Priorities/resource	<ul style="list-style-type: none"> Safety focus Finance focus External assessment focus Workforce resource management Estates and technology resource management
Safety culture	<ul style="list-style-type: none"> Safety/efficiency balance Commitment to safety Openness of culture and communication Risk tolerance Approach to escalation of concerns Leadership response to whistleblowing
Policy, standards and goals	<ul style="list-style-type: none"> Organisational processes (formal) Organisational processes (informal) Processes between/spanning organisations

Operational management factors	Components
Safety focus	<ul style="list-style-type: none"> Rule compliance Dealing with risks from past incidents Awareness of current practice Adherence to current practice Empowerment of staff to act
Work planning and delivery	<ul style="list-style-type: none"> Risk management plans Scheduling Incentive schemes Contingency planning
Staffing levels and skill mix	<ul style="list-style-type: none"> Skill mix Staff to patient ratio Workload/weighting/dependency Temporary staff Staff turnover
Workload, shift patterns, hours of work	<ul style="list-style-type: none"> Working hours Work breaks Workload (under/over/balanced) Extraneous tasks Social relaxation, rest and recuperation
Training design	<ul style="list-style-type: none"> Training needs analysis Training design Training/education content Targeted training Style of delivery Time of day provided
Training availability/accessibility	<ul style="list-style-type: none"> Training availability/accessibility Core skills training On the job training Emergency scenario training (skills drills) Team training Refresher training
Staff supervision	<ul style="list-style-type: none"> Orientation Personal supervision Monitoring of supervision (assessment) Mentorship
Staff competence	<ul style="list-style-type: none"> Knowledge Skill Experience Familiarity with task Competence testing and assessment

Workplace factors	Components
Environmental factors	<ul style="list-style-type: none"> • Capacity • Fixture or fitting • Separation • Safety • Cleanliness/hygiene • Temperature • Lighting • Noise levels • Distractions (audio) • Distractions (visual) • Ligature/anchor points
Design of physical environment	<ul style="list-style-type: none"> • Work area design (eg size, shape, visibility, screens, space, storage) • Security provision • Lines of sight • Use of colour contrast/patterns (walls/doors/flooring, etc) • Space design (adjustable furniture, panic buttons, positioning, etc)
Administrative factors	<ul style="list-style-type: none"> • Administrative work systems • Administrative infrastructure (phones, bleep systems, etc) • Administrative support

Equipment and technology factors	Components
Displays	<ul style="list-style-type: none"> • Information/feedback available • Information clarity • Information consistency • Information legibility • Information Interference • Information displays (colour, contrast, anti-glare screens, etc)
Integrity and maintenance	<ul style="list-style-type: none"> • Working order • Reliability • Safety features (fail to safe, etc) • Maintenance programme • Emergency back-up services (power, water, piped gases, etc)
Positioning and availability	<ul style="list-style-type: none"> • Availability • Accessibility • Position/placement • Storage • Emergency backup equipment
Usability/design	<ul style="list-style-type: none"> • Controls • Intuitiveness • Use of colour • Use of symbols • User manual • Detectability of problems • Use of items which have similar names or packaging • Compatibility

Team and social factors	Components
Culture	<ul style="list-style-type: none"> • Approach to newcomers • Approach to adverse events • Approach to conflict • Approach to rules/regulations • Approach to seeking support • Approach to interprofessional challenge • Interpersonal relationships • Power relationships
Team structure and consistency	<ul style="list-style-type: none"> • Shared understanding • Familiarity • Mutual respect • Clarity of roles and responsibilities • Congruence of roles and responsibilities • Informal support networks
Leadership	<ul style="list-style-type: none"> • Clinical leadership • Managerial leadership • Leadership impact • Leadership decision-making • Timeliness of leadership action • Respect for leadership • Formal support networks for staff
Communication management	<ul style="list-style-type: none"> • Communication strategy and policy documents • Involvement of patient/family/carers in treatment and decisions • Communication of risks to patient/family/carers • Communication of risks to staff • Communication of risks to the board • Information from patient/family/carers • Communication flow to staff up, down and across • Communication with other agencies (partnership working) • Measuring effectiveness of communication
Verbal communication	<ul style="list-style-type: none"> • Tone of voice • Style of verbal communication delivery • Use of language • Specificity • Direction • Channel/route • Verbal communication aids/equipment
Written communication	<ul style="list-style-type: none"> • Readability • Accessibility/availability • Collated • Completeness • Contemporaneous • Accuracy • Currency • Circulation of written information • Patient identification • Information to patients
Non-verbal communication	<ul style="list-style-type: none"> • Body language/gestures/facial expression

Task factors	Components
Clinical condition	<ul style="list-style-type: none"> • Pre-existing co-morbidities • Complexity of condition • Seriousness of condition • Options available to treat condition
Plans, guidelines, policies, procedures and protocols	<ul style="list-style-type: none"> • Informative • Instructional • Representative • Routine use • Usability • Currency • Accuracy • Availability • Accessibility (ambiguous, complex, irrelevant, incorrect) • Monitoring • Review • Targeting/focus (ie audience)
Decision-making aids (information/results/tools/machines, etc)	<ul style="list-style-type: none"> • Available • Accessible • Working • Accurate • For prioritisation of tasks • Access to specialist advice • Access to technical information, flow charts and diagrams
Procedural or task design and clarity	<ul style="list-style-type: none"> • Task complexity • Task memorability • Understandable • Agreed with staff (feasibility) • Time allocation • Task sequencing/stage sequencing • Workload (under/over/balanced) • Compatibility of tasks/task stages • Competing task demands • Feedback from the task • Transferability to/from other situations • Influence on task/outcome • Automation • Audit, quality control, quality assurance

Individual patient factors	Components
Physical factors	<ul style="list-style-type: none"> • Physical health/condition • Nutrition/hydration • Age related • Body mass related
Social factors	<ul style="list-style-type: none"> • Cultural/religious beliefs • Language/communication • Lifestyle choices • Life events • Living accommodation • Support networks • Social protective factors (relevant to mental health services) • Risk tolerance • Engagement/motivation/compliance/concordance • Interpersonal relationships (staff-patient; patient-family; staff-family)
Psychological factors	<ul style="list-style-type: none"> • Mental health • Mental capacity • Learning disability • Intent (relevant to mental health services)

Individual staff factors	Components
Physical health	<ul style="list-style-type: none"> • General health (nutrition, hydration, wellness, fitness) • Health related conditions (eg eyesight, dyslexia)
Psychological/mental health	<ul style="list-style-type: none"> • Mental health • Mental alertness • Motivation level (boredom, complacency, low job satisfaction)
Social domestic factors	<ul style="list-style-type: none"> • Domestic (family related) • Lifestyle (financial, housing, etc) • Language
Personality factors	<ul style="list-style-type: none"> • Confidence • Risk awareness/risk tolerance
Social factors	<ul style="list-style-type: none"> • Motivation and values • Beliefs and expectations • Attitudes • Habits
Cognitive factors	<ul style="list-style-type: none"> • Focus/attention • Perception • Reasoning and decision-making • Group influence • Workload (underload/overload/well-balanced)

Mark the factors that affected each reference case based on the description above:

Causal Factors	Domain	Components	Contributory, Causal and Mitigating Factors Analysis – for identified PROBLEMS/WEAKNESSES and STRENGTHS									
Incident numbers			1	2	3	4	5	6	7	8	9	10
CONTRIBUTORY and MITIGATING FACTORS Described as they relate to the PROBLEMS/WEAKNESSES and STRENGTHS identified (NB: There may be none, one or more CF/MF in each category)	External Contextual Factors	National guidelines and policies										
		Economic and regulatory context										
		Societal factors										
		Total										
	Organisational Strategic Factors	Structure										
		Priorities/resource										
		Safety culture										
		Policies, standards, and goals										
		Total										
	Operational Management Factors	Safety focus										
		Workplanning and delivering										
		Staffing levels and skill mix										
		Workload, shift pattern, hours of work										
		Training										
		Staff supervision										
		Staff competence										
		Total										
	Workplace Factors	Environmement factors										
		Design of physical environment										
		Administrative factors										
		Total										
	Equipment & Technology Factors	Display										
		Integrity and maintenance										
		Positioning and availability										

		Usability/design										
	Total											
	Team & Social Factors	Culture										
		Team structure and consistency										
		Leadership										
		Communication management										
		Verbal communication										
		Written communication										
		Non-verbal communication										
		Total										
	Task Factors	Clinical condition										
		Plans/policies/procedures in place for task										
		Decision making aids										
		Procedural or task design and clarity										
	Total											
	Individual Patient Factors	Physical factors										
		Social factors										
		Psychological factors										
	Total											
	Individual Staff Factors	Physical health										
		Psychological factors										
		Social/domestic factors										
		Personality factors										
		Social factors										
		Cognitive factors										
Incident numbers			1	2	3	4	5	6	7	8	9	10

Stage 4: Narrative analysis

Use the space below to compile narrative data surrounding the above sections. For example, if 2 or more incidents have a X by the group, then clarify the similarities/differences in the boxes below:

External Contextual Factors	<i>E.g., How did national guidelines affect the reference cases?</i>
Organisational Strategic Factors	<i>E.g., How did local guidelines/organisational resource affect the reference cases?</i>
Operational Management Factors	<i>E.g., How did local organisational level factors (e.g. staffing, skill mix, training, and staff supervision) affect the reference cases?</i>
Workplace Factors	<i>E.g., How did environment factors/design of workplace affect the reference cases?</i>
Equipment & Technology Factors	<i>E.g., How did equipment/technology affect the reference cases?</i>
Team & Social Factors	<i>E.g., How did local team dynamics/team culture/leadership/communication affect the reference cases?</i>
Task Factors	<i>E.g., How did task clarity/decision-making prompts affect the reference cases?</i>

Individual Patient Factors	<i>E.g. How did individual patient factors (e.g. acuity/clinical/psychological) affect the reference cases?</i>
Individual Staff Factors	<i>E.g. How did individual staff factors (e.g. social/psychological) affect the reference cases?</i>

Stage 5: Safety recommendations

In this section, linking to the sections above, list the safety recommendations based on this thematic review.

Different types of safety recommendations:

Category	Definition	Example
<i>Fix</i>	Resolve problems in reliably doing what we said we would do. These were usually issues that could be resolved with rapid operational changes.	Linear or more 'simple' things you can do to help the process. E.g., if you identify that there are conflicting local policies which meant a clinician was confused with the task, then the fix would be to resolve the confusion by rewriting the policy
<i>Improvements</i>	Find better ways of delivering standard care; improve what is currently being done.	Where improvement need to be made in an already defined process. This may be linked to a Quality Improvement (QI) project and should involve metrics to measure improvements.
<i>Changes</i>	Significant changes in clinical or operational practice.	Where a system, process, or pathway needs to change. N.b. this should be based on multiple cases of evidence, rather than being linked to one case. Where change is needed, an output may be a task and finish group, and this will involve multiple stakeholders.
<i>Further insight</i>	Where investigations have resulted in more questions relating to a safety issue, it may be appropriate for a safety recommendation to involve gaining more insight	If you do an investigation for a particular safety risk but are not sure of the scale of the problem or the mechanism of action then collecting further data may then help identify safety recommendations later.

Safety recommendation	Category (Fix/improvement/change/further insight)	Date Due	Evidence	Owner

