

# Healthcare versus industrial safety – the impact of cognitive distortion

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## SUMMARY

Healthcare has long been told that it must improve patient safety. To help improvement, there are repeated calls that it should seek to learn from other industries, such as aviation and nuclear, including around their use of near misses. Near misses are incidents that almost happened, and it is believed that learning from near misses can help avoid harmful incidents. This study, part of a larger project, aimed to understand industrial perceptions of their own safety and translation of safety ideas to healthcare, with a focus on near misses. A qualitative approach was undertaken with a scoping review and interviews with 35 participants across aviation, maritime, nuclear, and rail. Participants had reservations about healthcare translating safety ideas from their industries, with perceptions that healthcare is oversimplifying safety management, including how they learn from near misses. Healthcare may be prone to all-or-nothing thinking, limiting its ability to take evidence-based approaches to improving safety. Healthcare may benefit from considering and implementing safety management principles.

## KEYWORDS

Safety management, industrial safety, near miss

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## Background

The risk of harm to patients from the very processes meant to help them is well publicised. For years, healthcare has been challenged to do more to learn from patient safety incidents and to improve patient safety. However, progress with those improvements has been slow with continuing examples of harm occurring to patients.

In response to the ongoing risks to patient safety, healthcare has often turned to seek learning from Safety-Critical Industries (SCIs). At the end of the 1990's, international reports and the literature described how healthcare should seek to achieve the same safety records as aviation by emulating the industry's approach to safety (Donaldson, 2002; Kohn et al., 2000; Leape, 1994). Since then, examples of translation have included checklists and handovers, each with their own benefits and challenges (Catchpole et al., 2010; Catchpole and Russ, 2015).

A further example often encouraged for translation from SCIs is how they learn from 'near misses' (Donaldson, 2002). Near misses are incidents that almost happened, but for some intervention (Capucho, 2011). The World Health Organisation defines a near miss as 'an incident which did not reach the patient' (World Health Organization, 2010). The long-believed theory is that, by addressing the causes of near misses, incidents will be prevented (Heinrich et al., 1980); this theory is now considered contentious (Manuele, 2011). The literature describes how SCIs have cultures that support reporting of and learning from near misses, with positive impact on safety (Sutcliffe, 2011). However, despite the benefits, healthcare has made limited progress with learning from near misses (Feng et al., 2022; Woodier et al., 2023).

This study was part of a larger research project to understand how near misses are managed in SCIs and how that learning can be applied to healthcare (Woodier, 2023). In particular, this study aimed to understand industrial perceptions of their own safety, and the benefits and challenges of translating concepts, such as learning from near misses, to healthcare.

## **Methods**

This research took a qualitative approach, augmented by a scoping review.

### ***Scoping review***

The scoping review followed a defined methodology (Peters et al., 2020), with the aim of describing the literature around near-miss management in SCIs, published between 2000 and 2022. In-scope SCIs included those described as safety critical (Wears, 2012), high reliability (Sutcliffe, 2011), and/or ultrasafe (Vincent and Amalberti, 2016); lists of these SCIs are available (The Health Foundation, 2011). Databases searched included Ergonomics Abstracts, ProQuest, Scopus, and Web of Science. Data was extracted by the lead author and checked with fellow authors. The full protocol, search terms, and database list is published elsewhere (Woodier, 2023).

### ***Grounded theory***

The qualitative component of the research followed Grounded Theory (GT). A protocol was developed in line with a defined methodology (Chun Tie et al., 2019), and aligned with the Straussian stance. The primary aim of the GT was to develop a set of principles around how best near misses can be managed and learned from which can be translated to healthcare. Participants were safety leads across four SCIs – aviation, maritime, nuclear, and rail – these were selected for pragmatic reasons. Participants were asked to take part in a semi-structured interview following a pre-defined protocol that had been tested. Sampling was purposive and then became theoretical.

Analysis commenced following the first interview and proceeded alongside interviews. Open, axial, and selective coding with used with constant comparison. Independent analysis was undertaken by the lead author and verified by the second author. To support trustworthiness, theoretical sampling was used and saturation achieved, data was triangulated from various sources (interviews, documents, and memos), constant-comparison and coding paradigms were used, and participant verification was undertaken. Authors also engaged in reflexivity.

## **Results**

The scoping review included 108 articles from across a range of SCIs, predominantly the processing industries (n=31), maritime (n=22), and rail (n=16). Articles were mostly original research (n=88) from the United States of America. The full scoping review is reported elsewhere (Woodier, 2023), but helped inform the GT. The GT included 35 interviews as per table 1, with additional attendance of authors at national aviation and nuclear safety meetings. Analysis led to the development of 14 principles (Woodier, 2023), with the three pertinent to this publication described in the following sections.

Table 1: Summary of participants in the qualitative research

Industry	Organisation type	Participants (n=)
Aviation	Air traffic control	2
	Civil	4
	Military	3
	National bodies	4
Maritime	Merchant	3
	Military	1
	National bodies	3
Nuclear	Power	3
	Weapons	2
	National bodies	1
Rail	Operators	4
	Infrastructure	1
	National bodies	4

### ***Safety across an industry is not homogenous, with variation in maturity and cultures***

All participants agreed that their industries are ‘safety critical’ in that they are complex and potentially dangerous. However, some questioned whether their industries are truly ‘safe’ or whether this is a perception.

*“... you identified that this is a high-reliability industry, I’m not entirely convinced that that is the case... I don’t think we have ever really tested ourselves...” Aviation 1*

Several participants were concerned with “simple” external views, such as those described by healthcare policy bodies, that their industries are safety exemplars. In reality, they described variation in and across the industries with regards to safety. Higher levels of safety events were described to affect certain groups (e.g. workers versus users) and in certain parts of an industry (e.g. near collisions in general versus commercial aviation).

Safety maturity was also described to vary in respect to industrial proactivity in learning from events, such as near misses, and safety cultures. All participants agreed that it was harm that drives learning and safety change, rather than near misses.

*“... no doubt that the big bang incidents have had the biggest impact on change, leading to new technologies, prioritisation of safety, understanding data, high scrutiny...” Rail 1*

In respect to safety cultures, across all four industries some participants described them as reactive, poor at learning, and being “toxic.”

*“[We are] on a safety culture drive at present... prompted by poor reporting... needed to address walking past unsafe conditions, and not reporting on unsafe conditions on platforms.” Nuclear 1*

### ***Safety-management practice is not directly transferable from other industries to healthcare***

Participants were keen for industries to learn from each other. However, they were guarded around directly translating ideas to healthcare. Reservations were because of the significant contextual differences between industries, including their operating contexts, priorities, and ability to engineer improvements. Participants viewed healthcare as a particularly challenging context, less amenable

to the introduction of engineered controls and automatic detection systems, being more human orientated.

*“...the discrepancies and variables of risk in healthcare is much higher and is not as mechanistic as a lot of industries have and healthcare probably has a lot less control over those.” Nuclear 2*

Ultimately, several participants were concerned that healthcare did not always appreciate the differences in context between their industries, oversimplifying translation of safety ideas.

### ***Learning from near misses alone is unlikely to lead to safety improvements***

The majority of participants agreed that attempting to learn from near misses is appropriate, particularly because there are low numbers of significant incidents in their industries (with the exception of maritime). However, none were able to evidence that learning from near misses alone had directly led to improvements in safety. It was acknowledged that measuring and proving safety is challenging, but showing impact on other facets of quality may be possible.

*“How do you prove a negative? I have no idea, in the six years I have been doing it, how many lives I have saved?” Aviation 2*

*“... feel there is evidence of near misses and events having a positive effect on management and performance of the plants but not necessarily safety...” Nuclear 3*

During the interviews, some participants recognised that they had been making assumptions about the impact of learning from near misses on safety. Several also suggested that it is not learning from near misses alone that leads to safety improvements, rather it is how they contribute to collated safety intelligence for the monitoring, evaluation, and improvement of system safety, depending on the maturity of an organisation’s safety management system (SMS).

*“... safety management system overseeing this which incorporates all the safety processes with accountable/responsible people.” Nuclear 4*

## **Discussion**

Since the early 2000s there have been multiple reports highlighting the repeated harm that occurs to patients. Those reports often compare healthcare safety to that of other industries, with calls for healthcare to translate over safety learning and improvement ideas (Donaldson, 2002; Kohn et al., 2000; National Quality Board, 2013). However, the literature also describes reservations around translating ideas to healthcare because contexts are so very different (Gaba et al., 2003; Liberati et al., 2018; Macrae and Stewart, 2019). Healthcare is hindered by fragmented structures, significant variability, under regulation, and informal training (Gaba et al., 2003).

The reservations above do not mean that translation of safety ideas to healthcare should not occur – indeed there are examples of successful translations (Kapur et al., 2016). Rather translation needs to ensure that differences in contexts are addressed; where this has not happened translation has been of limited benefit (Catchpole and Russ, 2015; Kapur et al., 2016; Macrae and Stewart, 2019). In addition to not recognising contextual differences in industries, this study also found that healthcare may be making assumptions about safety and its management in the SCIs studied.

The findings of this study suggest that healthcare has an overgeneralised view of safety in industries such as aviation and nuclear, as evidenced by statements such as healthcare ‘... must learn where it can from... nuclear... rail, maritime, civil aviation...’ (National Quality Board, 2013). In reality,

participants described variation in safety within and across those industries and that it is too simplistic to assume an entire industry is safe. Examples of variation found included safety cultures and accident rates in aviation (commercial, business, and general), maritime (cruise, oil, and other merchant), nuclear (power, production, and weapons), and rail (passenger, freight, and night). Across the included industries, accident rates were higher amongst workers compared to service users, and organisational safety cultures were a concern of multiple participants; similar has been reported elsewhere (The Committee on Transportation and Infrastructure, 2020; The Guardian, 2023).

Despite the variation in safety described above, participants were positive about the safety of users of their industries, such as rail passengers. They provided insights into how safety had developed in their industries, with much advancement having been the result of learning following catastrophic events and the introduction of technological advances (Hudson, 2007). Harm is a great motivator of safety action, and in response participants had seen reductions in many safety events, some to as low as reasonably practicable. These reductions have provided the capacity for them to look at other types of events to continue to learn, such as near misses. In contrast, healthcare continues to have significant levels of harmful incidents to patients, and its safety actions often focus on people-orientated and administrative controls (Liberati et al., 2018). There may only be limited opportunity to engineer out some safety risks in healthcare, but stronger controls to hazards need to be found to make substantial safety improvements (Chartered Institute of Ergonomics & Human Factors, 2016).

The healthcare assumptions made about safety in other industries was further demonstrated by this study's findings related to near misses. Healthcare documents state that it 'should' or 'must' learn from near misses because SCIs have seen benefit. However, it is not clear whether SCIs seek to learn from near misses because they are safe (low levels of harmful safety events), or whether safety is the result of them learning from near misses – as described above, participants suggested it is the former. Participants were unable to evidence improvements in safety in their industries through reduction in harmful events as a result of learning from near misses alone; a search of the literature also demonstrates a similar lack of evidence (Woodier et al., 2024). Instead, where improvements in safety have been seen following reporting of near misses, this has likely been the result of collation of those near misses with other safety intelligence in SMSs. Positive investment in SMSs has led to positive returns in safety (Ali et al., 2022; Lee et al., 2012; Thomas, 2012), but healthcare has yet to implement SMSs (Dixon-Woods et al., 2014; Health Services Safety Investigations Body, 2023).

### ***Healthcare's cognitive distortion***

This study has provided challenge to long held healthcare beliefs around the value of learning from and translating safety ideas from SCIs. This is not to say ideas should not be translated, rather it is not as 'black and white' as healthcare policy documents may lead one to believe. If healthcare is considered as a whole, as a cognitive being, this study suggests it has distorted perceptions about how other industries learn and manage safety.

Distortions are a recognised cognitive phenomenon around how the surrounding world is interpreted, often driven by negative thoughts and associated emotion (Beck et al., 2005). Distortions can influence future beliefs and actions, potentially leading to unrealistic evaluation. Over the years healthcare and its staff have recurrently been criticised for not doing more to protect patients, while being compared to other 'safe' industries. Understandably, healthcare will therefore want to look for any opportunity to learn and do better. However, this is potentially leading to the

assumptions and oversimplification seen in this study with distortions such as overgeneralisation and all-or-nothing thinking.

Cognitive distortions of healthcare leaders have the potential to impact on decisions (Fernandez and Clerkin, 2021) and can be a barrier to organisational learning (Balarezo et al., 2023). Within the current context of high scrutiny, complex systems, and limited resource, decisions around how best to improve patient safety need to be evidence-based, rather than emotionally driven. However, there are several safety ideas being applied in healthcare that, when you dig a bit, have an absence of current evidence about their effectiveness – learning from near misses (Woodier, 2023), application of Safety II (Verhagen et al., 2022), and even the focus on culture (Dekker, 2019).

## Conclusions

The findings of this study pose questions for healthcare to reflect on around how it seeks to learn from SCIs, including around learn from near misses. Healthcare is at risk of all-or-nothing thinking – healthcare safety is terrible, aviation safety is the best, and healthcare must do what aviation does. In reality, as demonstrated by this study, real-world safety in SCIs varies and they are unlikely to be learning from near misses in isolation.

There are no doubt opportunities for healthcare to learn from SCIs, but healthcare must take a measured, evidence-based approach to safety to balance the limited resources available for safety improvement, against the potential value of following a course of action. There looks to be potential in healthcare seeking to implement safety management principles to support improvements in patient care.

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