Safer Care Victoria

Introduction to human factors in adverse patient safety event reviews

- **Human factors studies the interaction between people and the systems in which they work**
- **Human error is a symptom of poor system design – it is not the cause of adverse patient safety events**
- **Designing systems around human capabilities improves safety**
- **Understanding the human factors contributing to adverse events helps support fair review processes**

OVERVIEW

Human factors refer to the environmental, organisational, human and job factors that influence human performance. The science of human factors applies theory, data and methodologies to understand interactions among humans and the systems in which they work[1].

Human factors acknowledge that complex systems designed by humans will never be perfect. It also recognises that making mistakes (human error) is a normal part of being human and is therefore inevitable[2]. Human factors attempt to understand human capabilities and limitations to improve the design of the workplace, equipment and processes, and thereby make systems more tolerant of error.

ADVERSE EVENT REVIEWS

Human factors are important to consider when conducting adverse patient safety event reviews for two main reasons.

System design influences human performance

Human factors help to understand how human performance is affected by the broader system, such as the design of the work environment, task complexity, organisational priorities, and technology.

Our ability to make rapid decisions and adapt to circumstances is essential when responding to high risk and time critical situations. However, the need for flexible and timely adaptation can occasionally contribute to adverse patient safety events. Knowing how natural human limitations such as memory capacity, fatigue and stress can affect clinical care and contribute to adverse patient safety events, can help us design systems in a way that supports human performance more effectively.

Coping with complexity

Human information processing capacity is, by nature, limited. Therefore, we have to take shortcuts when processing information and use rules of thumbs (heuristics) to cope with situational demands such as time pressure and information overload. These heuristics are influenced by a range of factors. Gaps between heuristics and normative behaviour can introduce biases that can contribute to inadequate decision-making. This does not only apply to clinical staff involved in an adverse event, but also to those reviewing adverse events. For more information, read our Cognitive bias factsheet.

Adverse event reviews require a systems perspective

Being human means that existing knowledge and preconceived ideas will influence what we look for and what we will find when undertaking reviews. Human factors provide us with a safety science lens, in addition to the clinical lens and patient experience lens, by understanding how systems factors affect human performance. This lens provides adverse patient safety event reviews with a stronger evidence base that ensures review outcomes are fair and result in improved systems safety. For more information, read our Just Culture factsheet.

BEYOND HUMAN ERROR

It is quite common in healthcare to attribute adverse events to human error. This often involves naming, blaming, shaming, retraining or even dismissing staff involved with an adverse patient safety event.

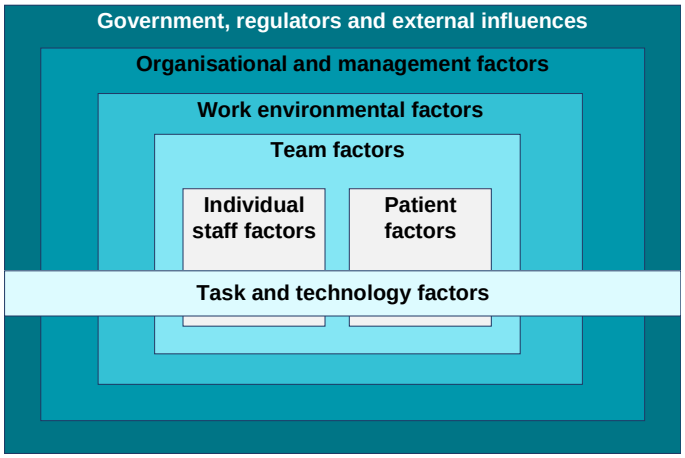
When reviewing adverse events, human performance cannot be viewed in isolation; it must be viewed in the context of the broader health system. Figure 1 is a visual

[1] International Ergonomics Association, see https://iea.cc/what-is-ergonomics/

[2] Kohn, L.T., Corrigan, J.M & Donaldson, M.S. (2000). To Err is Human – Building a safer health system. Washington, DC: National Academy Press.

representation of a health sociotechnical system based on the London protocol. It shows how human factors at different levels of the health system shape human performance and clinical care at the frontline. Table 1 provides examples for contributing factors at each level of the system.

Figure 1. The health sociotechnical system-based on the London protocol[3] – 'onion model'



Structured review methods and human factors

Structured review methods based in safety science support robust and systematic reviews of adverse patient safety events. However, there is variation in the extent the methods embed a human factors and systems thinking lens in their process.

Linear methods, such as root cause analysis, view adverse events as a linear sequence of events that can be traced back to root causes. Unless the review team actively applies systems thinking and considers the influence of human factors during the review process, linear methods risk oversimplifying complex circumstances.

Other review methods go beyond linear causation and consider the complexity of systems. These methods lend themselves more to human factors and systems thinking. Epidemiological models, such as the London Protocol[3], view the occurrence of adverse events as a combination of background conditions and active failures. System-based methods, such as AcciMap, view adverse events as emerging from interactions between systems factors. System-based methods truly embrace complexity by analysing interactions of contributing factors across the entire system.

Table 1. Contributing factors – London protocol

Government, regulators and external influences	Regulations, funding, links with external health services & colleges
Organisational and management factors	Financial resources & constraints, organisational structure, policies and standards, safety culture
Work environmental factors	Staffing, workload and shift patterns, design of equipment and environment
Team factors	Communication, supervision, team structure, leadership
Task and technology factors	Task design and clarity, availability and use of protocols, decision-making aids
Individual staff factors	Knowledge and skills, competence, physical & mental health
Patient factors	Condition (complexity & seriousness), language and communication & social factors

APPLYING HUMAN FACTORS

In addition to making review processes more robust and evidence based, human factors can also be applied to address safety issues (contributing factors) identified in the review.

For example, human factors can be applied to:

- grouping medical device interface buttons logically to help avoid staff accidentally pressing wrong buttons
- eliminating cross compatibility of tube connectors so they cannot accidentally be connected to a wrong device
- design scenario-based training and cognitive aids to support staff in making decisions under time pressure
- help organisations with fatigue risk management and design processes to effectively hand over clinical information.

These activities have become vulnerable to risk as a result of the increasing complexity of health systems.

For more ways that Human Factors can be applied to improve safety in healthcare, visit https://chfg.org/what-are-clinical-human-factors.

[3] Taylor-Adams, S & Vincent, C. (2001). Systems analysis of clinical incidents – The London Protocol, https://www.imperial.ac.uk/patient-safety-translational-researchcentre/education/training-materials-for-use-in-research-and-clinical-practice/the-london-protocol/

To receive this publication in an accessible format phone insert phone number, using the National Relay Service 13 36 77 if required, or email **info@safercare.vic.gov.au**

Authorised and published by the Victorian Government, 1 Treasury Place, Melbourne.

ISBN/ISSN number (online/print)

Available at www.safercare.vic.gov.au

VICTORIA State Government