A STRATEGY FOR SAFETY

Chris Frerk and **Fiona Kelly** explain how new guidelines for implementation of human factors in anaesthesia are already creating positive change across healthcare

The deaths of Elaine Bromiley and Gordon Ewing, which occurred following complications during routine surgery more than a decade ago, were recognised by the anaesthetic profession as having human factors issues as major contributory factors. Following these deaths, the president of the UK Difficult Airway Society (DAS) contacted us, saying that although he knew human factors was important in anaesthesia, he wasn't exactly sure what it was or what could be done to improve things. He asked if we could help, with our remit being to produce a set of guidelines 'for anaesthetists and the teams that we work with'.

We knew that these two high-profile deaths were inevitably the tip of a much larger iceberg of harm and near misses, that there would be no quick fixes and that producing comprehensive human factors guidance would not be something that healthcare staff could achieve without accessing specialist knowledge and expertise. We therefore drew together a multi-professional group that included NHS clinical staff, an industrial psychologist with human factors expertise, a chartered human factors scientist and an implementation psychologist. We were determined to avoid producing a report that would sit on a shelf and gather dust and therefore focused on developing recommendations that were relevant to everyday healthcare staff working on the 'shop floor'.

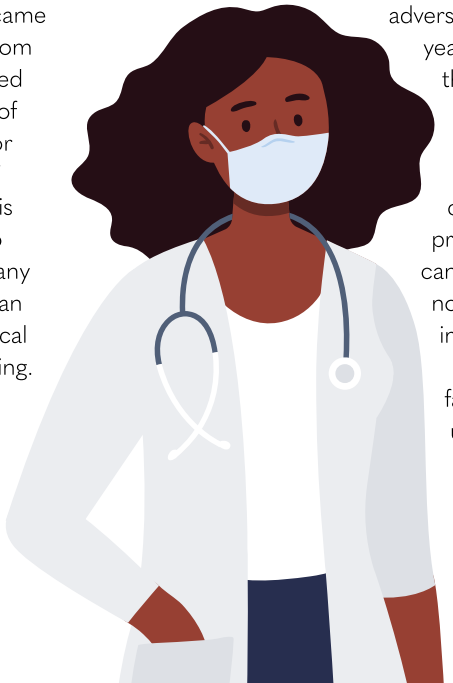
Anaesthetists are doctors and make up the largest medical specialty in most acute hospitals. We work within multidisciplinary teams in many different areas, including operating theatres, intensive care units, pain clinics, maternity units and as part of resuscitation teams. It's estimated that 85% of patients admitted to hospital in the UK will have input into their care from an anaesthetist during their stay.

Anaesthetic departments have had an acquaintance with human factors for many years, starting with an almost 'cut and paste' model from part of the airline industry involving adoption of simulation and non-technical skills training. High and low fidelity simulation systems became increasingly available from 1997 onwards, associated with the development of a specific framework for assessing anaesthetists' non-technical skills. This possibly contributed to a misconception by many anaesthetists that human factors and non-technical skills were the same thing.

An important part of our work was busting that myth, and particularly emphasising the prime importance of design and 'designing out' the possibility of adverse events wherever possible. Healthcare is among the most complex of complex sociotechnical systems, with enormous gaps between work-as-imagined and work-as-done, and where workarounds are normalised throughout organisations. Individual healthcare staff make their own trade-offs to try to provide the best care for the greatest number of patients. There's an increasing mismatch between capacity and demand in the NHS, without the ability to buy in capacity from elsewhere and with a moral dilemma about who we might have to deny service to. We also have multiple regulators, meaning that identifying clear plans for what to do and what not to do is difficult at many levels.

Although this description may seem like an almost perfect scenario for human factors interventions, the reality is that the scale and magnitude of problems can be overwhelming: a typical hospital may have thousands of adverse events reported every year, with more than 100 of these likely to be classified as serious. While this has always been the case, healthcare workers are currently facing enormous production pressure, which can make it feel like there's no capacity to work on improvement strategies.

To develop our human factors guidelines, we used a three-stage Delphi process to whittle down more than 40 potential recommendations to 12



About the authors

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themes. For each of these 12 themes, we included practical suggestions for actions for individuals as well as system level interventions which ergonomists would easily recognise. This was important because there are real and perceived limits to authority for staff to make any changes in work systems in healthcare. We made it clear that one column of our table of recommendations contained system recommendations that would require senior managerial/committee permission and would likely take months or even years to embed, while the other column contained many simple practical actions that any worker could do the following day without requiring permission.

The guideline paper has had 14 citations and more than 20,000 full text views in the six months since its publication in January 2023, and our team have found it incredibly rewarding to hear stories of how things are changing as a result of this work:

- We emphasised the importance of design of medical equipment and have been overwhelmed by the response from industry, the national anaesthetic equipment association and the Safety in Anaesthesia Liaison Group. Representatives from many companies have been in touch, asking how they can contact human factors experts to help them during their equipment design and production process.
- We were delighted to hear that one drug manufacturer has introduced strategies suggested in our guideline paper even without national recommendations that mandate they do so. These include colour coding drug ampoules and packaging to match internationally agreed standards and designing products with the name of the drug in a larger font than the company logo. They're also performing usability testing in low level lighting conditions and in timed trials to simulate a pressurised work environment. Another drug manufacturer has designed pre-filled syringes using the same colour coding system, with varying shape and size depending on the drug.
- Clinicians in one hospital are working with their estates departments, influencing them to change building design layout of new clinical areas based on human factors principles.
- National anaesthetic organisations have approached us regarding the introduction of mandatory team training and the logistics of doing so – something never thought possible in the past.

Our professional body, the Royal College of Anaesthetists, is discussing whether it might mandate adoption of the human factors guidance as part of national best practice standards for anaesthetic departments.

Other specialties within healthcare, including surgery, acute medicine and emergency medicine, have also approached us, confirming our belief that an understanding of human factors is relevant to those in healthcare in the broader sense and not just to anaesthetists.

We wrote these guidelines being mindful that, for full implementation, non-clinical managers and colleagues in procurement, pharmacy, education and industry would also need to engage with the principles. We have been heartened to hear that this is happening in some hospitals.

We believe that successfully embedding human factors strategies into healthcare will depend on clinicians like us working closely with human factors experts, and it has been heartening to see many NHS Trusts advertising and employing human factors professionals as senior members of their teams. We hope our guidelines are the start of wider adoption of human factors science within the NHS, and that this will be associated with improved safety of our patients and wellbeing of our staff.

If you're a newly qualified human factors professional or an experienced chartered ergonomist, and are considering working in healthcare, we'd love to have you on board. There are roles in event investigation, health and safety and manual handling, and high level roles in organisational development, systems improvement and patient safety. If you find yourself working in healthcare, come and say hello to your colleagues in anaesthesia – we'll be there to welcome you and help you integrate into the complex "socio" aspect of our local complex socio-technical system. ■

FURTHER READING
Read the guidance at bit.ly/HFanaesthesia