

## Second stories, sharp ends: dissecting medical errors

The US Institute of Medicine (IOM) made headlines last November when it released its report, *To Err is Human: Building a Safer Health System*. In it, the authors estimated that between 44 000 and 98 000 people die each year in the USA because of medical errors (see also p 947–48). The authors' four-part plan, consisting of financial and regulatory incentives, is designed to create a "culture of safety" in which hazards and the likelihood of error would be minimised, instead of blame being assigned to individuals and the old standby, "human error", being used to explain every mishap away.

Will this approach work? Richard Cook, for one, is sceptical. Cook, an anaesthesiologist at the University of Chicago (IL, USA), has devoted more than a decade to the study of medical errors: how and why they occur, and how they can be prevented. In his opinion, the title of the IOM report encapsulates its theme: "If we could get rid of the errors committed by practitioners, then we would have safety." But, he says, "how error is to be prevented is never really specified in the report. There is very little there about how to actually improve safety."

According to Cook, medical errors—and how to prevent them—can best be understood by piecing together the "second story": the story that emerges after the "first story" that blames human error has faded. Often, first stories are misleading, incomplete, and virtually useless when trying to decide how to make a system safer. The subtle weaknesses of the system, invisible on superficial examination, that contribute to failures, and the steps that the human components of the system have taken to cope with those weaknesses lie in the second story, says Cook.

As an example, he describes the 1995 case of a Florida man, whose surgeon amputated the wrong leg and subsequently had his licence revoked. The first story is the simple cause-and-effect narrative: the surgeon was not paying attention and cut off the wrong leg. However, it emerged later that both of the patient's legs required amputation and that this had been discussed with him. His consent form and the operating-room schedule identified the contralateral leg as the one to be removed, and that leg was prepped and draped before the surgeon even arrived at the operating table. There is always an

inherent risk of operating on the wrong side, and in this case, the safeguards put in place to prevent this broke down. "Cases such as this point not so much to inadequate defences as to a systemic inability to maintain those defences in working order under pressure", says Cook.

Why do these defences break down? UK-based psychologists Charles Vincent and James Reason (University College London and the University of Manchester, respectively) say that to work this out, it is necessary to "focus on the human component within complex organisational systems", to look at the "human factors". This type of approach has been used in the investigation of high-profile disasters for years, but Cook and other anaesthetists were among the first to apply the human-factors approach to medical errors.

Many medical machines and monitors are now designed to minimise the risk of error, but Vincent and Reason—both of whom will be speaking at a UK conference on reducing medical errors on March 21 ([www.bmjpg.com](http://www.bmjpg.com))—have found that increasingly advanced equipment and automation "do not cure human-factors problems, they merely relocate them". In fact, it is much more effective to train people to work together in teams, they say. And just as a well-designed environment helps produce success, Vincent and Reason note that workplace conditions and the nature of the task heavily influence the chances of failure or error.

Human-factors specialists describe complex systems like health-care organisations as inverted pyramids. The broad blunt end on top consists of managers, administrators, and regulators: the people who set the policies and enforce the rules. The consequences of poor decisions made at this end are called latent failures, because they can lie dormant for a long time before they become visible.

Doctors and nurses are at the sharp end of the pyramid, interacting directly with patients. Their mistakes, called active failures, are more obvious because they usually have immediate, often serious, consequences. Safety researchers have come to realise that the behaviour of those at the sharp end must be viewed in the context of the demands and constraints established by the people at

the blunt end. Accident investigations reveal consistently that the ability of the people at the sharp end to prevent adverse incidents depends on a host of factors determined at the blunt end, rather than on isolated acts by any one individual.

### Spotlight should not always fall on medics

Cook maintains that complex systems fail when a series of latent failures, each insufficient to cause an accident by itself, come together. He likens this to a pile of Swiss cheese slices: the latent failures are the holes, and when they line up, they form a tunnel through which safety falls. The result: an accident. No one person is to blame, yet all too often organisations respond to disaster by finding a culprit to blame, re-training the staff, issuing new regulations, and investing in "safer" technology. This sort of reaction is all the more likely because of what Cook calls "hind-sight bias": the tendency to allow one's knowledge of the outcome to bias one's view of the events leading up to that outcome. But this reaction tends to obscure the complexities that actually led to the disaster, makes the system even more complex, and consequently introduces new opportunities for failure.

In the end, says Cook, safety is a dynamic quality created by people on the sharp end. One of the drawbacks of the IOM report, he believes, is that it places no value on trying to learn how health-care practitioners already grapple successfully with safety issues. Whenever a medical student learns a new clinical task, "the first lesson you learn is how to do it safely". Thus, he concludes, the future of research on patients' safety should focus not so much on how to prevent failure, but on what it is that permits health-care practitioners to be successful so much of the time.

Norra MacReady