

package of services" for health centres and units across the country—this definition does not itself bring such services to all areas, but it is a step in that direction. They rejected certification, stronger licensing, and accreditation at this stage, and decided to trial a quality management system in selected districts. Past experience has been that large numbers of standards have been developed but not followed. The trials have chosen a few health conditions where following standard procedures would make care more effective—for example, the diagnosis and treatment of acute respiratory tract infection. The emphasis is on training, supportive supervision, and action using problem solving methods to ensure these few standards are followed, then to add more standards.

One reason for choosing this approach is that it is a small achievable step which may help with the problem of motivation and incentives for health workers. Workers are finding that more effective care means more patients and higher incomes. Supervisors are more welcome and are being questioned about correct procedures for other treatments. Other approaches are being used to upgrade clinical skills and to address problems of morale and discipline. There are lessons

for the West in the careful way in which policy makers with few resources analysed which issues were amenable to action and which issues were too large to take on in the early stages of the programme. There are also lessons from the way in which the donor who contributed to this programme helped address the sustainability issue: how successful projects could be transferred into routine operations with the resources to support continued quality activities.

This approach is not typical of all developing countries, but what is typical is the way in which colleagues in these countries are adapting and experimenting with quality methods. They are increasingly sceptical of "quality packages" from the West which are said to cure the ills of their health systems. Certainly many quality methods transferred from the West are unaffordable or unsustainable, and many do not translate. This raises the question of whether there is an equivalent to Maslow's "hierarchy of needs" for quality methods—where certain steps need to be taken first before using the methods of more sophisticated continuous quality improvement or other approaches? Or are the new approaches being developed

suited to the different cultures and limited resources, but could also be effective in the West?

Quality methods are severely tested in developing countries and, as in the West, many do not work in certain cultural and economic circumstances. However, the need to improve quality in these countries is as pressing, if not more so, than in the West. Some able colleagues are adapting and pioneering new methods and new approaches to using these methods, from which the West can learn. It is to be hoped that more reports of these programmes and experiments could be published in international quality journals. Dialogue and debate about effective methods in different circumstances would be of benefit, especially to patients in these countries and, in the long term, to patients in the West.

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Patient safety
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From patients to politicians: a cognitive engineering view of patient safety

K J Vicente
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Sizeable and long lasting reductions in adverse events cannot be realized unless decision makers at all levels pay attention to the global system phenomenon of inadvertent harm to patients.

Many healthcare providers now know that patient safety poses a significant risk to public health. The American statistics in particular are frequently cited: preventable medical error is the eighth leading cause of death, it is responsible for 44 000-98 000 deaths annually in hospitals alone, and it results in patient injuries that cost between \$17 billion and \$29 billion annually.¹

Virtually all of the medical experts who have written on this topic have stated that the key to improving patient safety is to apply system design principles from human factors engineering.^{1,2} This discipline aims to tailor the design

of technology to conform to human nature rather than expect people to conform and adapt to technology. By doing so, systems become easier for people to work in, ultimately reducing error. Human factors techniques have been applied to other industries, such as nuclear power and aviation, and have been very successful in reducing error and improving safety in these contexts.

If the magnitude of the problem is significant and widely known, and if there is a consensus on the likely remedy, then why has not more progress been made on improving patient safety? One possibility is that human factors engineering has traditionally been primarily

concerned with "knobs and dials" or "graphical user interface (GUI)" interventions to improve the usability of equipment and software. Clearly, this narrow focus does not address most of the threats to patient safety; as a result, many healthcare providers see patient safety and human factors engineering as specialist concerns that are outside their sphere of action and responsibility. This attitude is a legitimate response to the narrow traditional approach to human factors, but it does not apply to cognitive engineering—a newer cognate discipline that has evolved to address the limitations of the traditional approach.³

A state of the art cognitive engineering approach begins with a much broader systems perspective, identifying the various actors—individuals, computer systems, and organizations—in a complex sociotechnical meta-system.^{4,5} Figure 1 provides a representative example, although the precise number of levels and their labels can vary across industries. In the context of health care, this hierarchy would include, from bottom to top: patients, providers, department managers, hospital CEOs and CFOs, professional regulators and associations, and government (that is, civil servants and politicians). Knowingly or not, each of these individuals and stakeholders makes decisions that affect patient safety.

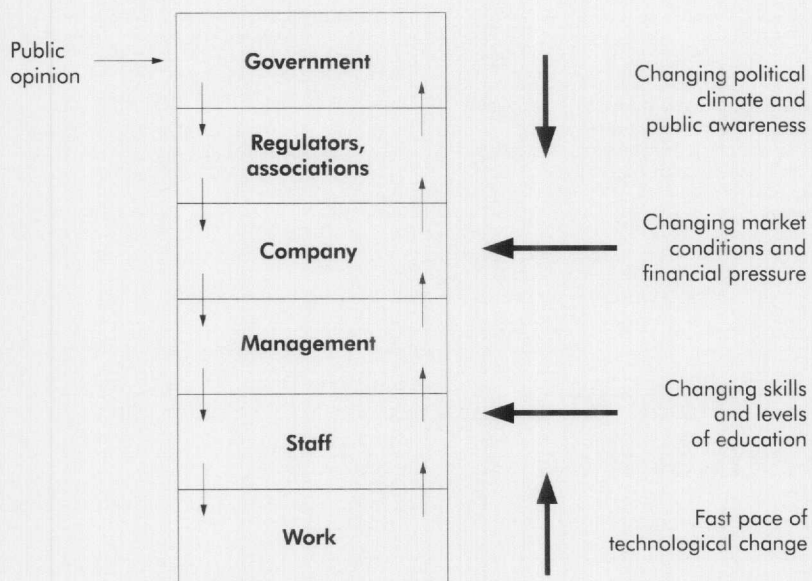


Figure 1 Various levels of a complex sociotechnical system involved in risk management. Adapted from Rasmussen.⁴

The growing literature on patient safety has started to address each of these levels. At the level of the individual worker, our work at the University of Toronto has shown how medical devices could be designed to make them easier for providers to use, thereby reducing errors that have been described in reports of patient deaths.⁶ This is the traditional realm of human factors engineering. At the management level, researchers at Stanford University have developed training programs that help anesthesiologists to manage team communication and coordination, thereby complementing more traditional training programs that focus on individual medical skills.⁷ At the organizational level, the US Veterans Administration has pioneered a radically different risk management policy that has led to a more humane health care environment in addition to reducing legal costs.⁸ Finally, at the government level, a researcher at Pepperdine University has documented how some aspects of the US legal system provide impediments to improving patient safety, thereby pointing the way towards reform.⁹

“Horizontal” research at each of these levels is necessary to improve patient safety. Cognitive engineering does not, and cannot, take the place of these multidisciplinary safety initiatives but, because of its broad systems view, it points to a critical factor that is overlooked by all horizontal research efforts—the additional need for “vertical” integration across the levels in fig 1. Decisions at higher levels should propagate down the hierarchy, whereas information about the current state of affairs should propagate up the hierarchy. These interdependencies across levels of the hierarchy are critical to the successful functioning of a healthcare system as a

whole. Even if researchers do an excellent job at conducting horizontal research on a particular topic, they may have little impact on patient safety unless vertical integration is also achieved. For example, the Stanford team has conducted pioneering research on training crisis resource management skills but, unlike aviation, this type of training is not yet legally mandated in health care. Because of this mismatch between the management level and the regulatory and government levels in fig 1, research at the management level has not had as much impact on patient safety as it can or should. Many other examples of lack of vertical integration in healthcare systems could be cited. Given the available evidence from other safety-critical industries, there are strong reasons to believe that these mismatches are the most significant contributors to adverse events.⁴⁻¹⁰ It may be the lack of coordination across levels, not the individual levels themselves, that poses the greatest threat to patient safety.

“Patient safety is everyone’s business . . . from patients to politicians”

Unfortunately, the holy grail of vertical integration is becoming more important yet more difficult to achieve. As shown on the right of fig 1, the various layers of a complex sociotechnical system are increasingly subjected to external forces that stress healthcare systems. Examples of such perturbations are:

- changing political climate and public awareness;
- changing market conditions and financial pressures;

- changing competencies and levels of education; and
- changes in technological complexity.

In today’s dynamic society, these external forces are stronger and change more frequently than ever before. When different levels of the system are being subjected to different pressures, each operating at different time scales, it is imperative that efforts to improve patient safety within a level be coordinated with the changing constraints imposed by other levels. To take a simple example, if hospital managers decide to reduce nursing staff levels to cope with budget cuts passed on from above, then the mental workload experienced by individual nurses will increase, making it even more important that medical devices be designed to minimize mental effort. Without coordinating the changes at various levels of healthcare systems, the external forces acting on the system may unintentionally be “preparing the stage for an accident”.⁴

Patient safety is—and will continue to be—everyone’s business, all the way from patients to politicians. Sizeable and long lasting reductions in adverse events cannot be realized unless decision makers at all levels pay attention, not just to their immediate local concerns, but also to the global system phenomenon of inadvertent harm to patients. The rationale behind this fundamental lesson from cognitive engineering can be revealed by a simple rhetorical acid test: if all you have are (patient) safety departments and specialists, then what does that say about all of your other departments and specialists?

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Writing for *QSHC*

Writing for Quality and Safety in Health Care: it may be easier than you think

Tim Albert

We are keen to include more reports of experience of quality improvement: what works and what does not, how changes affect patient care, and how we can translate what we know into practice. But many of those involved in interesting projects tell us that they find it hard to start writing because, for example, they have insufficient time or are unfamiliar with the process. We asked Tim Albert, who provides courses and support programmes to those who wish to publish, to explain how to overcome such obstacles.

We know, often from bitter personal experience, that writing a paper can be a long and complex task, involving all kinds of skills (such as time management, negotiation skills and writing in simple language) that aren't necessarily taught to health professionals. But we want you to persevere because we feel there is a lot of interesting work going on out there that doesn't see the light of day. So the purpose of this article is to give added impetus to those who want to write for this journal but aren't quite sure how.

First, clarify your message. What is the story you want to tell? Express it in a single sentence of 10-14 words using simple language. Write it down. Ask your co-authors to help you to define and refine this message. Far from making your writing "simplistic", this will ensure precision and clarity; it will involve, for instance, making choices between small but important words such as "could", "should", and "will" that will make all the difference to the final article. Make sure you all agree before you move forward. If you cannot agree on 12 words now, you certainly will not be able to agree on 2000 later, and the importance of this step cannot be overstated. Get it right and you will sail on towards publication; get it wrong (or more likely fudge the issues) and you will invariably founder.

Once you have agreed on the message, find out which editor is likely to be interested in publishing it. A literature search will show which journals have published on this topic before: try to come in on the end of an ongoing debate. Read some back copies and get a feel for how articles are treated. Use any (legal) means to find out what the editors really want. The editors of *QSHC* have clear views: "There should be an 'Ah-ha!' factor" they say. "The people we want to read this journal include clinicians, the director of nursing, the medical director, and the chief executive—and we want to hear of them fighting over the latest issue because there is something in it for them . . . We want papers that say something about improving the quality and safety of health care, that have a clear message for people in other units". If targeting this journal, try writing a summary for the Action Points section on the back page; if your question is fuzzy and your action points non-existent, then your time will probably be better spent on other things. No amount of work can turn a coffee bean into a tea bag.

Once you have decided on your target journal, analyse the structure of articles already published in it. Many articles, including some in this journal, use the traditional IMRaD format. This is a tried and tested (though not overtly reader

friendly) model which has four main sections:

- (1) Introduction: 2-3 paragraphs, typically starting with a description of the topic and ending with a description of the intervention.
- (2) Methods: 7-8 paragraphs describing what they did.
- (3) Results: 7-8 paragraphs describing what they found.
- (4) Discussion: 6-7 paragraphs starting with a summary of what they found and ending with what it all means—in other words, the message.¹

This structure is not always appropriate for quality improvement articles, and in 1999 the editors decided to introduce an alternative structure for writing about local quality improvement work.² Our advice is to choose the one with which you feel more comfortable and fits your work. Decide how many sections you will need, the number of paragraphs in each, and where the key sentences should appear. Use this as a template to construct your own brief plan.

Then write. One way is to construct a cosy nest lined with your data and references, block off 3 or 4 hours of valuable time, and painstakingly construct the article by transferring words and numbers from one piece of paper to another. A better way is to find a quiet corner, block off about 10 minutes, and "free write" each of your sections at a time without hesitation, leaving blanks where necessary. This is a creative activity and some people admit they enjoy it. This "free writing" technique³ may make you profoundly uneasy, but you will find that what your first draft lacks in details (easily inserted later) it makes up for with focus and structure.

After a sensible interval (at least overnight) to increase the chances of objectivity, you will have to rewrite. Check your facts (and check them again—there is nothing that puts off an editor so much as a column of figures that does not add up!). Insert your references: doing them at this stage will ensure that they are used for their rightful purpose, which is to back up your statements. Make sure you have a "good English style", which is harder than it sounds because your co-authors will have different views. So follow the advice of the