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**Editorial**  
**Éditorial**

## Building the high-reliability surgical team

Every surgeon has begun his or her career as a medical undergraduate with a keen awareness of the basis for our assessments in the domains of knowledge, skills and attitudes. It is this last domain in which psychological and human factors are crucial to good outcomes of medical performance. In this issue of the *Canadian Journal of Surgery* (page 22), Mark Fleming and colleagues<sup>1</sup> describe how they investigated the interpersonal competencies of cardiac surgery teams as a means to identify team members' attitudes toward teamwork. This is a most timely report, because it tackles some of the fundamental reasons for medical errors such as those reported in the Canadian Adverse Events Study.<sup>2</sup> Using the Operating Room Management Attitudes Questionnaire (ORMAQ) to study cardiac surgery team members, including surgeons, nurses, perfusionists, anesthesiologists and residents, the investigators demonstrated inherent group differences based upon factors such as seniority and occupational group membership. Respondents in the study reported that the most frequent types of error included miscommunication, performing actions at the incorrect time and failing to follow established procedures. If we hypothesize that patient safety can be improved by optimizing team skills in the areas of communication, leadership and cooperation, surgeons should promptly adopt new practices. Indeed, recent studies show that insufficient communication is a contributing factor in 60%–80% of adverse events in medicine.<sup>3</sup> In order to implement improved team performance, some key steps can be taken

in our departments to improve team training, provide audits of team performance and pursue new opportunities for funding of improved patient safety.

Improved team training in medical education is an obvious place to start. Surgical teams share many domains with aviation where the concepts of "Crew Resource Management" have been developed to utilize clinical data, equipment and resources toward an ultimate goal of safe management. Several examples of such training are familiar to surgeons including trauma team training according to Advanced Trauma Life Support (ATLS) principles, emergency department triage training simulation and several examples of safety protocols for general anesthesia. The principles of crew training and development hinge upon the qualities of leadership, "followership," communication and cooperation. Using these principles, Østergaard and associates implemented team training in medical education in Denmark.<sup>4</sup> Training is done using the anchoring principle of simulation together with learning objectives, educational tools and evaluation. There is no doubt that full-scale simulation training improves outcomes for learners, but skeptics will ask if this approach also improves patient outcomes and increases safety for patients. Intuitively, this makes a great deal of sense, although there are few data to support this statement. Nevertheless, senior surgical team members should encourage this type of development.

Of interest in their study, Fleming and colleagues<sup>1</sup> report that compliance with rules, procedures and

policies was described as deficient by one-third of respondents. This finding is in accord with our own experience with the recent implementation of a policy for correct side and site marking. Audits in our experience reveal that up to 40% of the time the “time out” part of the policy (in which the surgical team verifies verbally that the correct patient, correct operation and correct side are being treated just before the incision is made) is not followed. More than one of us has even been ridiculed for conducting the activity! Should we address this failure to follow policy correctly with a “carrot or a stick” approach? Perhaps as a regular part of feedback to the surgical team, we need to use enabling technology as a way of reducing medical error. For example, some of our own operating rooms are now equipped with video surveillance that during an operative procedure can confidentially record events simultaneously related to the patient’s vital signs and to the activities of the operating surgeons, anesthesiologists, trainees and operating room nurses. With multipanel simultaneous recording in these domains, the entire team could receive and review direct feedback on ways to improve adherence to safety protocols. Some centres have already started this approach for minimally invasive

surgery (Dr. Gerald Fried, McGill University, Montréal, Que.: personal communication, 2005). Such technology could help us add sophistication to the tired “morbidity and mortality” rounds format that is currently used in many institutions.

A final comment pertains to the pursuit of knowledge of systems to improve patient safety through team-based training. Responding to reports of adverse outcomes in patients,<sup>2</sup> some federal and provincial ministries have expressed interest in supporting research to improve patient safety. For example, a chair in patient safety research has recently been established through partnership between the British Columbia Ministry of Health and the Departments of Anesthesia and of Pharmacology and Therapeutics at the University of British Columbia. Such a research initiative rightfully extends across multiple medical departments including anesthesia and surgery. These initiatives will prove essential to show a clear relation between team-based training and improved patient outcomes. This will also inform change in our medical education curricula particularly as our new teams of resident trainees, nursing staff and health professionals mature in their future career practices.

In summary, Fleming and associ-

ates<sup>1</sup> have given us some crucial insight into cardiac surgery team behaviour that has far-reaching implications for patient outcomes and future research. The challenge for surgeons is to become involved in evaluation strategies to assess our own performance in team skills. After all, every surgeon has a vested interest in teamwork that leads to safer patient outcomes!

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## References

1. Fleming M, Smith S, Slaunwhite J, et al. Investigating interpersonal competencies of cardiac surgery teams. *Can J Surg* 2006;49(1):22-30.
2. Baker GR, Norton P, Flintoff V, et al. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. *CMAJ* 2004;170:1678-86.
3. Kohn LT, Corrigan JM, Donaldson MS. *To err is human: building a safer health system*. Washington: National Academy Press; 1999.
4. Østergaard HT, Østergaard D, Lippert A. Implementation of team training in medical education in Denmark. *Qual Saf Health Care* 2004;13:91-5.