MANAGING SURGICAL RISK LIKE A MOUNTAIN GUIDE

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ABSTRACT: While the professions of surgery and mountain guiding may seem quite different, there appear to be many similar challenges faced by both groups. Ultimately, both surgeons and mountain guides are tasked with the care of human lives in high-stakes environments. This responsibility takes different forms, but several parallels can be drawn between the training, certification and professional development of both surgeons and guides. Medicine has a long tradition of borrowing concepts and learning from such parallel professions. We studied Canadian mountain guides to determine how their practices and approaches could be adapted to support surgical education and to ultimately promote patient safety. Multiple parallels emerged, including the duration and intensity of training, apprenticeship model, challenges surrounding equity, diversity and inclusion and the high stakes nature of competence. The most salient element however, was the guides' use of a highly structured, formalized approach to risk assessment and management that is lacking in surgery. By adapting these principles to the operating rooms, surgeons can improve how they think, talk and teach about risk and can provide safer operations for patients.

KEYWORDS: risk, decision making, safety, education

1. INTRODUCTION

The surgical profession has a long history of adapting useful insights from non-medical fields facing similar challenges. Lessons learned from these parallel professions, with the aviation industry as perhaps the most notable example, include checklists, safety briefings, and closed loop communication (Dubiel et al., 2025, Kapur et al., 2015).

The development of skills surrounding risk assessment and management are a fundamental aspect of surgical training and practice (Chand et al., 2007), but teaching surgical risk remains a challenge for surgical educators (Pauley et al., 2011, Tsang et al., 2023). Mountain guides present a previously unconsidered parallel profession with expertise in managing risk. At first glance, mountain guides and surgeons appear to have little in common. One practices in the operating room and the other in remote alpine environments. Yet both professions are fundamentally concerned with leading others safely through situations characterized by uncertainty, incomplete information, and potentially catastrophic consequences. Both require mastery of technical skills while simultaneously making continuous judgments regarding changing conditions.

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2. METHODS

Interviews were conducted with 21 members of the Association of Canadian Mountain Guides (ACMG), from three groups: apprentice guides, experienced guides and guide examiners. Participants were asked questions about their background, training experiences, examinations, successes and challenges, maintenance of competence, technical skills, decision-making, mentorship and apprenticeship and diversity. The 2024 ACMG Apprentice Rock Guide Course was observed. A grounded-theory approach was used to assess the data and feedback on the resulting themes was sought from both surgeons and mountain guides.

3. RESULTS

Multiple parallels emerged between the professions of mountain guides and surgeons. Both professions involve several years of pre-professional training in order to qualify to begin formal training. This is followed by a period of intense professional training, called residency in surgery and medicine, and apprenticeship in guiding. There is then

a progression to certification exams, followed by a need for life-long learning and continued professional development in order to maintain competence. Both surgeons and guides must master complex technical skills and a large knowledge base. Both groups must master complex decision making that can involve carefully planned complex operations/expeditions, and the need to respond to changing conditions and unexpected developments in the moment, requiring both conscious and subconscious information processing. Finally, a large set of issues are of increasing importance to both surgeons and guides, including stress and fatigue management, burnout, issues of equity/diversity/inclusion in fields traditionally dominated by White men, and the need for both groups to excel not just at the technical aspects of their job, but also as professionals, educators and advocates for safety and change.

Unlike surgeons, however, mountain guides have developed an unusually explicit language around risk. Studying the risk management practices of alpine mountain guides identifies a new potential model for surgical risk management. The approach to risk management demonstrated by mountain guides is depicted in Figure 1.

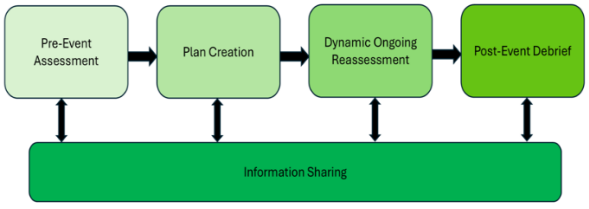

Figure 1. Theoretical model of mountain guide risk assessment and management.

This model serves as the framework which mountain guides use to evaluate and mitigate risk in the field, and it serves as the shared language by which mountain guide instructors give, and trainees receive, feedback on risk management.

4. DISCUSSION

Professions cannot hope to evolve and optimize their practices by only studying themselves. By looking outward, at parallel professions who have developed successful strategies to deal with shared challenges, we hope to take advantage of the developments and insights of others to improve ourselves.

Surgeons can benefit from learning from other professions, and mountain guides seem to be a prime example. The multiple similarities in training, technical and knowledge-based competencies, professional responsibility, and challenges related to stress, burn-out, diversity and inclusion mean that surgeons and guides face similar challenges and may benefit from each others' approaches. One such approach is the mountain guides' approach to risk assessment and management.

This model may serve as a framework for developing a deliberate and explicit language to discuss risk management in surgery. The most notable benefit of this is expected to be in the training of surgical residents. Risk management is a non-technical skill that remains difficult to teach to surgical residents (Pauley et al., 2011, Jacklin et al., 2008). Mountain guides leverage the deliberate structure of their approach to create a common understanding between mountain guide instructor and apprentice, facilitating learning. The model proposed here may have similar utility in the training of surgical residents and could serve as the foundation for generating new educational tools for teaching risk management.

Effective surgical risk management will always require experience. But experience alone need not remain the only teacher. If we as surgeons can describe expert risk management more explicitly we may become considerably better at teaching it to the next generation of surgeons.

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