What can Critical Care Learn From HRO

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Drs Manser, Gaba and Lighthall review how high reliability organization theory can be applied to improve patient safety and quality of care.

Introduction

The public expects that healthcare should be a high reliability undertaking with little risk of preventable harm. Other industries, such as commercial and military aviation or nuclear power production have come to grips with the routine conduct of activities that bear intrinsic hazard. At their best, organizations in these domains have been described as High Reliability Organizations (HRO).

Of course, healthcare is not the same as generating electricity, flying airliners, or building a space station. For one thing we do not design or manufacture human beings, nor do we receive an official instruction manual. Also, unlike some other industries in which the activities are relatively "elective" (the airliner doesn't have to fly from New York to Chicago tonight) in healthcare there are situations in which procedures must be performed even if the hazards are particularly high. Nonetheless, healthcare still has much to accomplish to qualify as a high reliability undertaking, and we have much to learn from HRO theory (Gaba 2001).

What Lessons Can We Learn from HRO Theory?

HRO theory (HROT) is now a complex amalgam of approaches and viewpoints (Roberts 1990; Weick and Sutcliffe 2001). In general terms, HROT states that appropriate organizational control can yield nearly failure free results despite high hazard and high tempo, if the organization (and overall industry) embodies characteristics listed in Table 1.

The emphasis on systems does not mean that people and their skills are unimportant. Systems are made up of people working in organizations. The dynamism, complexity, and risk in industries of high intrinsic hazard requires special attention to decision making processes of individual personnel and the teams they work in. In fact, it appears that well-functioning clinical "microsystems" within healthcare institutions may be the best current examples of HROs in healthcare (Mohr and Batalden 2002; Nelson et al. 2002). Such HRO-like microsystems are still found only sporadically.

Creating High Reliability Characteristics in IC

Overview

Using the framework above and what we know about care delivery in intensive care units, it is possible to map out a few categories of activity that would be seen if critical care were a high reliability organization. These areas of activity could be termed overall quality improvement, practice improvement, and performance analysis. It is immediately obvious that these categories are intertwined, but will be separated here for purposes of clearer discussion.

Quality Improvement Activities

In medicine there is often a huge gulf between credible evidence of measures that can improve patient safety and survival, and actual practice change. Examples pertinent to critical care include programmes for reducing catheter related bloodstream infections, tight glycaemic control, protective lung ventilation, perioperative bet blockade, and specific early haemodynamic management of severe sepsis. Evaluation of clinical evidence and generation of relevant local data to analyze for applicability should be an ongoing effort of patient safety and quality improvement. Having the personnel and data collection procedures in place to make these assessments in a timely manner is the type of proactive self awareness that characterizes an HRO.

Practice Improvement

Medical training is based on the intensive learning of basic science concepts and is followed by a variably structured apprenticeship. In the ICU and in other environments, the practice of medicine is based on teamwork and cooperation between multiple disciplines. Across the board, medicine offers incredibly little exposure to team management, communication, and group processes. HROT highlights that team skills are not acquired unless specifically taught. HROs recognize that intensive training and performance assessment in both routine work and in simulations and drills pays off. HROs ensure that teams and work units hone their skills during routine operations. They debrief themselves routinely and keep track of individual and team performance. For example, every Naval aviator – regardless of experience level or seniority - is graded on every carrier landing. HROs also use simulation and drills extensively to ensure maximum readiness for critical but uncommon situations and to optimize team performance. Training is built into the work environment – it is not an add-on for the individual. The emphasis is on training the system, not just individuals. Moreover, training continues for the entirety of one's career and is not limited to those learning the job. In healthcare the nursing profession adheres to these principles more avidly than does medicine. Physicians rely on a fairly weak and haphazard system of "continuing medical education" to maintain individual abilities.

This system is largely at the discretion of the individual, their time and expense. There is little systematic training of teams.

From the earliest training on, doctors, nurses and other healthcare workers should not only be taught basic knowledge and skills that traditionally define medical competence but also the concepts hat are essential to teamwork: effective communication and coordination, establishing and maintaining shared situation awareness, joint decision making and problem solving, and conflict resolution. To be most effective, the training of team skills should – like all training

– be recurrent rather than a one-time event. Team training needs to be integrated at different levels of training and should continue throughout one's career. Based on the concept of crew resource management from aviation, Howard et al. (1992) introduced a similar training paradigm to medicine with anaesthesia crisis resource management (ACRM).The latter is a comprehensive curriculum that examines the sources of errors as well as training in communication, leadership, dynamic planning and decision making, workload management, and teamwork as tools for effective crisis management (Gaba et al. 1994). The teaching points are practiced during simulations and discussed during video-assisted debriefing sessions.

The ACRM concept has since been adopted by many different medical disciplines including critical care. Courses have to be tailored to the specific challenges to teamwork in critical care by involving different medical and allied health professions in training activities.

In bridging the gaps between the current system of medical practice and that of an HRO, teamwork in high frequency (septic shock, myocardial infarction), high risk (massive haemorrhage), and even rare but catastrophic conditions (cardiac tamponade, anaphylaxis), would provide an unmistakably high yield to all involved. The use of human patient simulation with videotaped debriefing has become the state of the art method for immersive and simulation learning for crisis management in the ICU (Lighthall 2004).

Performance Assessment

Although assessment of team performance in healthcare is considered important, tested and validated methodologies for evaluating not only clinical or technical performance, but also skills that are needed for effective crisis resource management and good teamwork, are scarce. Review of critical events immediately after the fact is considered a valuable experience from many points of view including error reduction, performance modification and improvement, and processing of a stressful event. Review of near misses, even if anonymously submitted, opens a constructive dialog that encourages error reporting and ensures that future patients derive the maximum benefit from known errors. Cultural changes that encourage such reporting rather than generating shame are of obvious value.

The experience in simulation training has led many to believe that the educational value is bidirectional. Simulations often reveal shortcomings in how trainees are prepared to manage certain situations, and shortcomings of the system at large (Hammond 2004; Helmreich 2000; Lighthall 2004). Our experience suggests that to be maximally effective, it is important that simulation activities bring together the multiple professions present in the critical care unit.

Summary

HROs have employed a number of common sense practices as part of their everyday operation without asking for evidence to justify their use. While there is great evidence that medical errors are common, we don't incorporate findings from well designed studies into clinical practice as efficiently as possible, and we don't train practitioners to act as teams despite the fact that this is how many conditions are managed. Because many ICUs function as a closed shop and are attended to by subcultures of larger departments and professions, and because the patients are at a higher overall risk for adverse events, there may be greater interest and potential to apply HRO concepts to this domain of healthcare. In this article we emphasized the role of self-examination and multidisciplinary, multiprofessional team training as the centrepieces of quality improvement, practice improvement, and performance assessment. Improved cooperation amongst all stakeholders in a critical care unit will create a greater sense of shared purpose and move towards achieving higher reliability in the realm of patient safety.

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