Patient Safety in Anesthesia

Learning from the Culture of High-Reliability Organizations

Suzanne M. Wright, PhD, CRNA

KEYWORDS

• Patient safety • Human error • Human factors • Education and training
• Complex systems • High-reliability organizations

KEY POINTS

- Reason's Swiss cheese theory of human error describes errors as results of active failures coming into contact with latent factors.
- It is conceivable that human factors, such as fatigue, stress, production pressure, and situation awareness, are latent factors in clinical practice.
- As a health care specialty, anesthesiology is recognized as a leader in patient safety.
- It is important to maintain awareness of the vulnerabilities associated with clinical practice and evidence-based strategies and thought processes that have the potential to promote optimal and reliable performance.

Over the past 2 decades, there has been an increased awareness of and interest in patient safety and improved patient outcomes. In 1999, the National Academy of Sciences' Institute of Medicine report "To Err is Human: Building a Safer Health System" revealed a growing body of evidence substantiating medical error as a leading cause of death and injury in the United States.[1] The report addresses the impact of human factors and organizational issues on errors and safety and estimates that up to 770,000 patients are injured and between 44,000 and 98,000 patients die each year from preventable medical errors. Medical errors cost our nation close to $38 billion each year; about $17 billion of those costs are associated with preventable human errors.[1]

According to The Joint Commission,[2] US hospitals continue to demonstrate steady improvements in health care quality and patient safety. These improvements have

The author has no conflicts to disclose.
Department of Nurse Anesthesia, School of Allied Health Professions, Virginia Commonwealth University, 1200 East Broad Street, Richmond, VA 23298, USA
E-mail address: smwright@vcu.edu

Crit Care Nurs Clin N Am 27 (2015) 1–16
http://dx.doi.org/10.1016/j.cnc.2014.10.010 **ccnursing.theclinics.com**
0899-5885/15/$ – see front matter

resulted in saved lives, better health, enhanced quality of life, and lower health care costs. Although this progress is encouraging, much room for improvement remains.[2] The Joint Commission Sentinel Event database lists perioperative complications among documented adverse events that lead to serious patient injury and death. Perioperative human factors with a disposition to error are showcased in the database and include, for example, inadequate communication, incorrect assessment of a patient's physical condition, and inadequate orientation and training of health care professionals.

Health care in the United States is the output of a large and complex system composed of many interacting, interrelated, and interdependent parts. Just as our health care system is a complex arrangement in which health care is delivered, the practice of anesthesia is a complex arrangement in which anesthesia is delivered.[3] An understanding of complex systems is necessary to realize the potential for human error in such dynamic environments. Comprehension of the mechanisms of human error is important when the consequences of a failed system are potentially devastating.

In this article, the most current understanding of human factors, complex systems, and safety principles borrowed from high-reliability organizations (HRO) is provided as a foundation to examine the dynamic and vulnerable nature of anesthesia practice. HROs—industries that deliver reliable performances in the face of complex working environments—can serve as models of safety for our health care system until plausible explanations for patient harm are better understood.

A HISTORY OF HUMAN ERROR IN MEDICINE

Since the early 1990s, there has been a resolute effort by scientists and health care leaders to study the impact of human error on health care outcomes. For example, Leape and colleagues[4] supported the development of a disciplined approach to safety in medicine by identifying and evaluating failures in the system that predispose humans to make errors leading to adverse events. This initiative contributed to improvements in communication among health care providers, such as computerized physician order entry methods, a model that is ubiquitously employed today.

With the publication of the Institute of Medicine's seminal report "To Err is Human: Building a Safer Health System," the state of patient safety at the end of the 20th century was revealed.[1] The report, highlighting a best evidence review of the literature on the potential for patient harm, explores and summarizes recommended changes necessary to prevent and mitigate the effects of injury and death secondary to errors. This publication in many ways lead to the establishment of patient safety organizations, which create blame-free environments for reporting medical errors that may compromise quality of care and patient outcomes.[5]

In the early 2000s, the Agency for Healthcare Research and Quality commissioned the first evidence-based practice center with the purpose of critically reviewing scientific evidence surrounding practices relevant to improving patient safety and minimizing human error.[6] These critical analyses were monumental in creating a list of evidence-based practices for implementation in hospitals throughout the United States. This program, spearheaded by the Agency for Healthcare Research and Quality, sparked interest in examining human error and safety practices in industries outside of health care.[5]

The patient safety movement has generated many promising efforts in improving quality and reducing error, but many agree there is still work to be done.[7] A culture of safety that includes the prevention of error, early detection of error, and minimizing