

Chapter 2. Drawing on Safety Practices from Outside Health Care

The medical profession's previous inattention to medical error, along with other publicized deficiencies (such as a notable lag in adopting sophisticated information technologies) have invited unfavorable comparisons between health care and other complex industries.¹⁻⁵ The first of the two recent Institute of Medicine (IOM) reports on the quality of health care in America, *To Err is Human: Building a Safer Health System*,³ states that "health care is a decade or more behind other high-risk industries in its attention to ensuring basic safety." Consequently, one of the goals of this project was to search these other industries for evidence-based safety strategies that might be applied to health care.

The relatively short timeline of this project necessitated a focused approach to the search for potentially applicable patient safety practices from non-health care writings. Fortunately, many relevant practices have received at least some analysis or empirical study in the health care literature. As a practical solution we present original articles from outside health care as foundational and background material, rather than as a primary source of evidence. Specific topics and practices reviewed in *Making Health Care Safer* that clearly derive from fields outside health care include:

- Incident reporting (Chapter 4)
- Root cause analysis (Chapter 5)
- Computerized physician order entry and decision support as a means of reducing medication errors (Chapter 6)
- Automated medication dispensing systems (Chapter 11)
- Bar coding technology to avoid misidentification errors (Subchapter 43.1)
- Aviation-style preoperative checklists for anesthesia equipment (Chapter 23 and Subchapter 41.3)
- Promoting a "culture of safety" (Chapter 40)
- Crew resource management, a model for teamwork training and crisis response modeled after training approaches in aviation (Chapter 44)
- Simulators (of patients or clinical scenarios) as a training tool (Chapter 45)
- Human factors theory in the design of medical devices and alarms (Chapter 41)

Many readers may still wonder at the relative paucity of safety practices drawn from non-health care sources. While the headline-grabbing assessments of medicine's safety have been criticized by researchers and likely overstate the hazard to patients,⁶⁻⁸ it is undeniable that some industries, most notably commercial aviation, have safety records far superior to that of health care. One issue we faced in compiling this evidence-based review was the extent to which specific practices could be identified as playing a direct and measurable role in this achievement. Interestingly, the same issue—ascertaining a causative variable—arose in reviewing the literature on anesthesia, likely the one field of medicine with a safety record that rivals aviation's (see also Chapter 56).

As outlined in Chapter 24, significant complications attributable to anesthesia have decreased⁹⁻¹² to the point that major morbidity and mortality are now too rare to serve as practical endpoints for measuring the quality of anesthesia care, even in large multicenter studies.^{13,14} In attempting to account for this decrease, however, it is very difficult to find evidence supporting a causative role for even the most plausible candidates, such as widely utilized intraoperative monitoring standards.¹⁵ In other words, while the field of anesthesia has clearly made tremendous strides in improving patient safety over the past 50 years, it is hard to discern a particular, isolated practice that accounts for the clear and dramatic secular change in its safety. While at one level, a pragmatist might argue, “who cares, as long as it’s safe,” trying to adopt the lessons of anesthesia (or for that matter aviation) to the rest of health care is made more challenging by tenuous causality.

Some might argue that, rather than pinpointing specific practices to embrace from other industries, health care institutions should emulate organizational models that promote safety in complex, high-risk industries that manage to operate with high reliability.¹⁶ Analysis of detailed and interesting case studies¹⁷⁻²² have fueled a school of thought known as *high reliability theory*, whose proponents suggest a number of organizational features that likely reduce the risk of “organizational accidents” and other hazards. A cogently argued alternative position, often called *normal accident theory*, questions not only these prescriptions for organizational change, but fundamentally challenges the idea of high reliability in certain kinds of complex, “tightly coupled” organizations.^{23,24} These competing schools of thought offer interesting and valuable insights into the ways that organizational strategies foster safety, while cautioning about the ever-present threat of new sources of error that come with increasingly complex human and technical organizations. Unfortunately, this rich literature does not permit ready synthesis within the framework of evidence-based medicine, even using the less stringent standards we adopted in evaluating non-medical literature (see Chapters 1 and 3).

Even the more engineering-oriented of the disciplines with potential relevance to patient safety yielded a surprising lack of empirical evaluation of safety practices. For instance, numerous techniques for “human error identification” and “error mode prediction” purport to anticipate important errors and develop preventive measures prospectively.²⁵⁻²⁷ Their basic approach consists of breaking down the task of interest into component processes, and then assigning a measure of the likelihood of failure to each process. Many of the techniques mentioned in the literature have received little detailed description^{25,26} and few have received any formal validation (eg, by comparing predicted failures modes with observed errors).^{28,29} Even setting aside demands for validation, the impact of applying these techniques has not been assessed. Total quality management and continuous quality improvement techniques were championed as important tools for change in health care based on their presumed success in other industries, but evaluations of their impact on health care have revealed little evidence of success.³⁰⁻³³

In the end, we are left with our feet firmly planted in the middle of competing paradigms. One argues that an evidence-based, scientific approach has served health care well and should not be relaxed simply because a popular practice from a “safer” industry sounds attractive. The other counters that medicine’s slavish devotion to the scientific and epidemiologic method has placed us in a patient safety straightjacket, unable to consider the value of practices developed in other fields because of our myopic traditions and “reality.”

We see the merits in both arguments. Health care clearly has much to learn from other industries. Just as physicians must learn the “basic sciences” of immunology and molecular biology, providers and leaders interested in making health care safer must learn the “basic

sciences” of organizational theory and human factors engineering. Moreover, the “cases” presented on rounds should, in addition to classical clinical descriptions, also include the tragedy of the Challenger and the successes of Motorola. On the other hand, an unquestioning embrace of dozens of promising practices from other fields is likely to be wasteful, distracting, and potentially dangerous. We are drawn to a dictum from the Cold War era—“Trust, but verify.”

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