Transforming Hospitals Into High Reliability Organizations

Introduction and Overview

The Institute of Medicine (IOM) and others have stressed the urgency of transforming hospitals into places where each patient receives the best quality care, every single time. This is a daunting challenge, and there are many reasons most hospital leaders would candidly admit that they are far from this goal. In conversations with leaders of hospitals with national reputations for their accomplishments in the areas of patient safety and quality, one recurring theme emerged: the need to change their systems and processes to achieve substantial increases in reliability over present levels. In their efforts to achieve these changes, innovators have looked outside the health care industry to identify examples of extremely high reliability organizations (HROs), which can, and do, achieve levels of reliability that are exceptionally high. Of course, commercial aviation, nuclear power, aircraft carriers, and other sectors known for high reliability differ from the health care system in critical ways. Concepts and approaches they have used cannot be directly duplicated in American hospitals. Instead, they needed to be applied and adapted to hospitals' challenges.

In September 2005, the Agency for Healthcare Research and Quality (AHRQ) convened a group of leaders from 19 hospital systems who were committed to the application of high reliability concepts. While some of the systems had national reputations for quality, others were less advanced. All, however, wanted to learn from each other—and from experts inside and outside of health care—about how they could apply concepts of high reliability organizing in ways that would make their hospitals better for their patients.

This document brings together many of the lessons that have been learned working with these systems for the past 18 months. It is important to stress a few things this document is not. It is *not*:

- A cookbook for producing high reliability. All hospitals are different and have different challenges, resource levels, and cultures. Any cookbook that prescribed exactly what you should do to become a high reliability organization is bound to fail.
- An exhaustive summary of the latest literature and theories about high reliability. We understand that readers of this document are focused on providing high-quality care (and staying solvent)—not on becoming experts in high reliability. We explain the concepts, cite sources where you can learn more, and focus on applications and insights that have proven the most valuable to the leaders with whom AHRQ has been working.
- A description of a new methodology for quality improvement. Different members of the HRO Network use approaches such as Six Sigma®, Lean, Baldrige, and Total Quality Management (TQM). High reliability concepts help focus attention on the mindset and

culture that is essential for any of these approaches to work. Although high reliability concepts are very useful, you should not view them as conflicting with strategies or vocabularies that you already may be using to promote quality and safety.

- A roadmap to help you arrive at a state of high reliability, in which your hospital has reached a permanent state of high reliability where patients always receive exactly the care they need and the care is provided in systems that have no inefficiencies or waste. High reliability organizing is an ongoing process that is never perfect, complete, or total. Commercial aviation is highly reliable in preventing crashes, but crashes still occur. And we may be willing to trust airlines to protect our lives but we are much less confident that we can trust them with our bags. This document will help explain the processes that you can use to improve the reliability of your hospital, and will help you understand why high reliability is a continuous action—not a program you can successfully implement and then move on to other things.

The purposes of this document are to:

- Define high reliability concepts and describe the importance of these concepts to hospitals such as yours. The first section of this document will give you a working understanding of the mindset needed for high reliability organizing and why this mindset is indispensable to efforts to improve patient safety and quality.
- Describe applications of high reliability concepts within the field of health care. The examples we describe in this section are drawn from the experiences of the systems who have participated in the AHRQ HRO Learning Network. These systems were able to invest considerable time and effort in learning from other industries and experimenting with a range of high reliability applications in their hospitals. They have been eager to share what they have learned through this process with each other, and with leaders from other hospital systems. We believe there is much to be gained from seeing how these hospitals dissected their problems and tried to fix them, as well as what they learned through this process about high reliability. These systems are among the first who have operationalized high reliability concepts within health care. Describing what they have done may help you identify your own opportunities to radically enhance the reliability of your own systems.
- Suggest applications of high reliability concepts that you may want to consider for your organization. This section is followed by an appendix that provides additional detail about the HRO Learning Network that AHRQ has sponsored.

Understanding High Reliability Organizations and Why They Matter

Challenges Calling for High Reliability

HROs are organizations with systems in place that are exceptionally consistent in accomplishing their goals and avoiding potentially catastrophic errors.[1] The industries first to embrace HRO concepts were those in which past failures had led to catastrophic consequences: airplane crashes, nuclear reactor meltdowns, and other such disasters. These industries found it essential to identify weak danger signals and to respond to these signals strongly so that system functioning could be maintained and disasters could be avoided.[2-3]

As the responses of these industries to risks were studied, a set of challenges was identified that all the organizations pursuing high reliability had in common.[4] Many of these characteristics exist in the average hospital as well.

- **Hypercomplexity.** HROs exist in complex environments that depend on multiteam systems that must coordinate for safety. The safety of a hospitalized patient depends on the effective coordination of physicians, nurses, pharmacists, medical technicians, technicians who maintain equipment, support staff who provide meals and maintain the physical environment, and many others. Hypercomplexity describes hospitals as well as it describes nuclear power plants.
- **Tight coupling.** HROs consist of tightly coupled teams in which the members depend on tasks performed across their team. A safe surgery depends on the ability of nurses, medical technicians, the surgery team, housekeeping, and transport to coordinate their efforts so that the patient arrives in surgery at the right time, with the right preparation, and with the right tools and supplies available for the operation to proceed smoothly. Every hospital leader recognizes that this coordination is critical, but is often far from perfect.
- **Extreme hierarchical differentiation.** In HROs, roles are clearly differentiated and defined. Intensive coordination efforts are needed to keep members of the teams working cohesively. During times of crisis, however, decisionmaking is deferred to the most knowledgeable person on the team, regardless of their position in the organization.
- **Multiple decisionmakers in a complex communication network.** HROs consist of many decisionmakers working to make important, interconnected decisions. Like all hospitals, HROs must develop processes that allow these decisionmakers to communicate effectively with each other.
- **High degree of accountability.** HROs have a high degree of accountability when an error occurs that has severe consequences. In this respect, hospitals differ somewhat from many HROs, because medical errors tend to affect single patients rather than large groups of people at once. Moreover, despite flawless care, patients in hospitals do die, so distinguishing those whose deaths were inevitable from those whose deaths the hospital could have averted is not easy.
- **Need for frequent, immediate feedback.** HROs exist in industries where team members must receive frequent feedback at all times. This feedback and the opportunity to make continuous adjustments based on it are essential to anticipate and avert problems before they become crises. Hospitals also are filled with equipment and personnel offering this type of feedback to staff. For them to function as HROs they need systems and a mindset that will allow people to receive and respond to feedback, rather than being overwhelmed by information.

- **Compressed time constraints.** Time constraints are common to many industries, including health care. In HROs, the systems and culture allow people to identify when they lack time to reliably complete all needed tasks and obtain additional assistance. Hospital staff face the same challenge but do not always have staff with the resources and training needed to maintain high reliability when facing a significant time constraint.[3]

We suspect that the environmental challenges noted above describe your hospital, just as they describe the industries in which high reliability concepts were originally developed. From our conversations with health care leaders, we learned that two other challenges make high reliability in health care even more difficult—and important. These include:

- **Higher workforce mobility.** Hospitals tend to have a workforce that has higher turnover and less intact teams than many other industries. This makes training more critical (and expensive) and increases the importance of standardization of equipment and procedures.
- **Care of patients rather than machines.** Most of the industries emphasizing high reliability deal with machines and processes that are mechanical and whose design and condition are meticulously documented. At the heart of hospital care are patients, about which little is often known, and whose behavior (and whose families' behaviors) varies from others and can change over time. These factors create a degree of unpredictability that creates challenges for hospitals that other industries do not face.

High Reliability Organizing Concepts

Weick and Sutcliffe have identified five characteristics that need to guide the thinking of people in an HRO. We think it is important to emphasize that these are approaches to thinking about issues rather than behaviors, plans, checklists, etc. If a high reliability mindset does not exist among the people running an organization, no set of behaviors or rules will ever produce extremely high reliability.

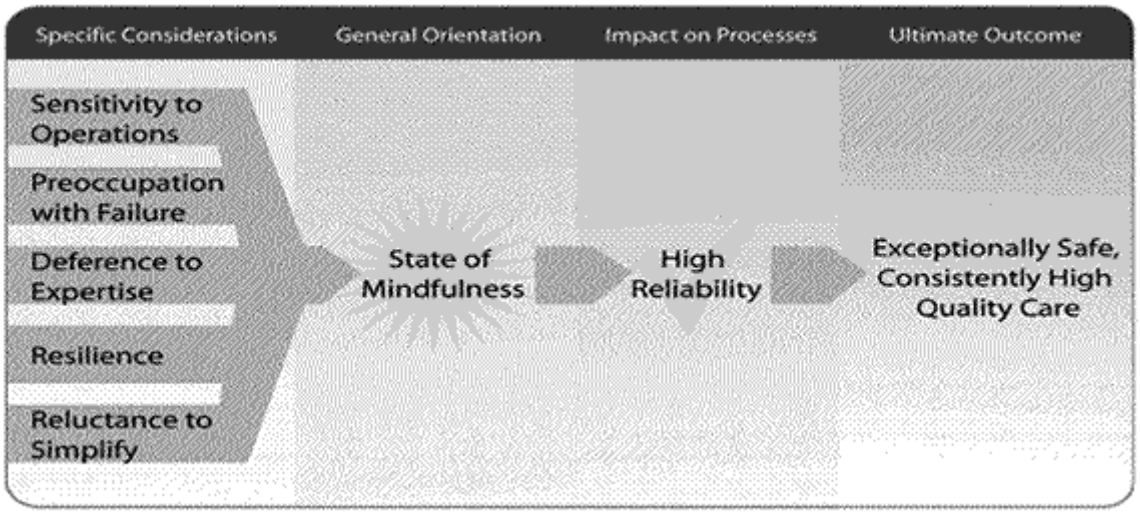

Figure 1. The five specific concepts that help create the state of mindfulness that is needed for reliability, which in turn is a prerequisite for safety[1]

Figure 1 illustrates the relationships between the five characteristics of mindfulness and the ultimate goal of health care organizations: exceptionally safe, consistently high-quality care. We regard these five characteristics as fundamental to successfully reengineering care processes to achieve exceptionally low levels of defects. Without a constant state of mindfulness, an organization cannot create or sustain highly reliable systems.

This section describes these five operational processes. A later section will apply them to health care operations more directly.

[1] A flowchart with 4 columns. The first column is titled: Specific Considerations. Five concepts are listed in the column: sensitivity to operations; preoccupation with failure; deference to expertise; resilience; and reluctance to simplify. The concepts flow into the second column, titled: General Orientation. There is a sunburst in the center of the column, with the words: State of Mindfulness. This flows into the third column, titled: Impact on Processes. There is a checkmark in the center of the column, with the words, High Reliability. This flows into the fourth column, titled: Ultimate Outcome. In the center are the words, Exceptionally Safe, Consistently High Quality Care.

1. Sensitivity to operations.

Figure 2. Sensitivity to operations

Sensitivity to operations encompasses more than checks of patient identity, vital signs, and medications. It includes awareness by staff, supervisors, and management of broader issues that can affect patient care, ranging from how long a person has been on duty, to the availability of needed supplies, to potential distractions.[2]

HROs recognize that manuals and policies constantly change, and are mindful of the complexity of the systems in which they work. HROs work quickly to identify anomalies and problems in their system to eliminate potential errors.[1] Maintaining "situational awareness" is important for staff at all levels because it is the only way anomalies, potential errors, and actual errors can be quickly identified and addressed. Sensitivity to operations will both reduce the number of errors and allow errors to be quickly identified and fixed before their consequences become larger. Figure 2 provides an illustrative picture and description.

2 A drawing of a man in a hospital bed surrounded by three staff members. The following objects in the room are circled: the face of one doctor, the folder in a doctor's hand, a clipboard, a cabinet, a monitor, pills and glass of water on a table, an infusion bag, a clock face, the identification tag on the patient's wrist.

2. Reluctance to simplify

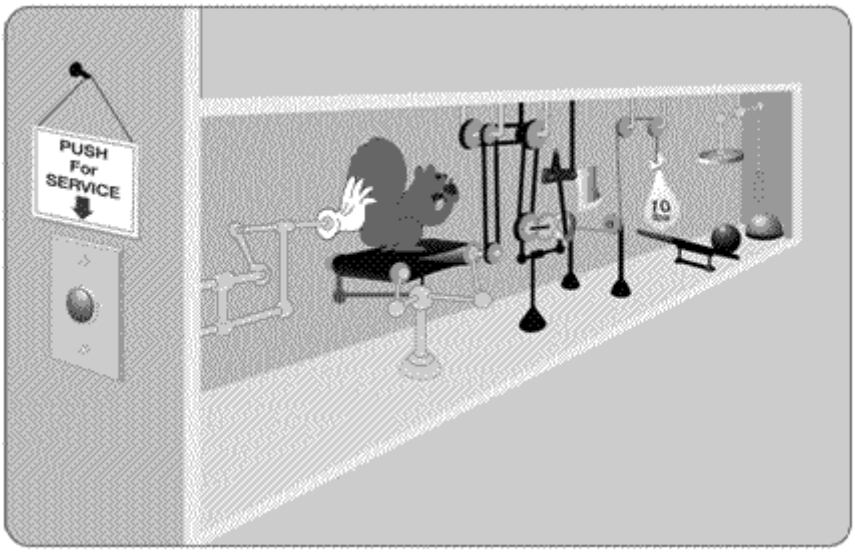

Figure 3. Reluctance to simplify

Oversimplifying explanations for how things work risks developing unworkable solutions and failing to understand all the ways in which a system may fail, placing a patient at risk.[3]

HROs refuse to simplify or ignore the explanations for difficulties and problems that they face.[5] These organizations accept that their work is complex and do not accept simplistic solutions for challenges confronting complex and adaptive systems.[5] They understand that their systems can fail in ways that have never happened before and that they cannot identify all the ways in which their systems could fail in the future.[5] This does not mean that HROs do not work to make processes as simple as possible. They do. It does mean that all staff members are encouraged to recognize the range of things that might go wrong and not assume that failures and potential failures are the result of a single, simple cause. HROs build diverse teams and use the experiences of team members who understand the complex nature of their field to continually refine their decisionmaking methods.[1] Figure 3 provides an illustrative picture and description.

[3] A drawing of a humorous production line. A gloved hand is pushing a squirrel holding a nut. There are many levers, pulleys, weights, hammers, and balls. The goal of the production line is not clear.

3. Preoccupation with failure

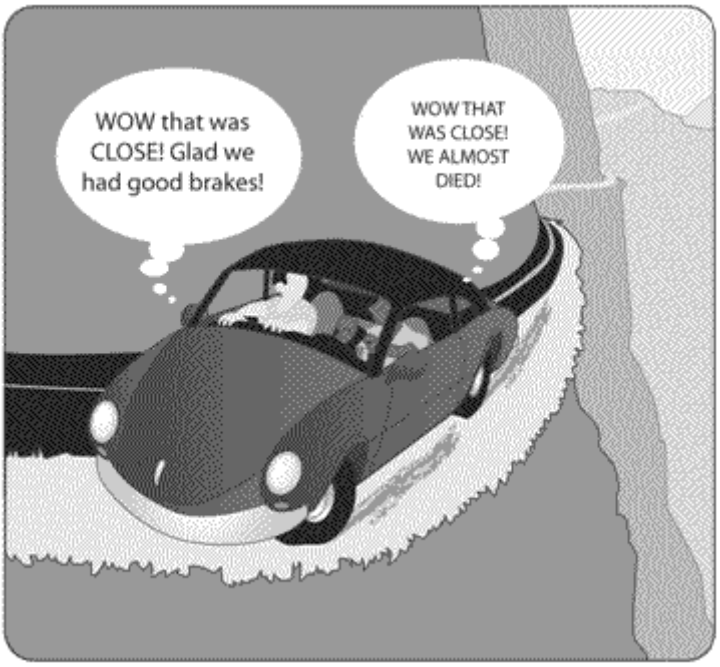

Figure 4. Preoccupation with failure

A preoccupation with failure means that near misses are viewed as invitations to improve rather than as proof that a system has enough checks to prevent a catastrophic failure.[4]

HROs are focused on predicting and eliminating catastrophes rather than reacting to them.[5] These organizations constantly entertain the thought that they may have missed something that places patients at risk. "Near misses" are viewed as opportunities to improve current systems by examining strengths, determining weaknesses, and devoting resources to improve and address them.[1,5] Near misses are not viewed as proof that the system has enough checks in it to prevent errors, because that approach encourages complacency rather than reliability. Instead, near misses are viewed as opportunities to better understand what went wrong in earlier stages that could be prevented in the future through improved processes. Figure 4 provides an illustrative picture and description.

4 A drawing of a car that has run off the road and is on the edge of a cliff. One passenger is thinking, "Wow that was close! Glad we had good brakes!"
The other passenger is thinking, "Wow that was close! We almost died!"

4. Deference to expertise

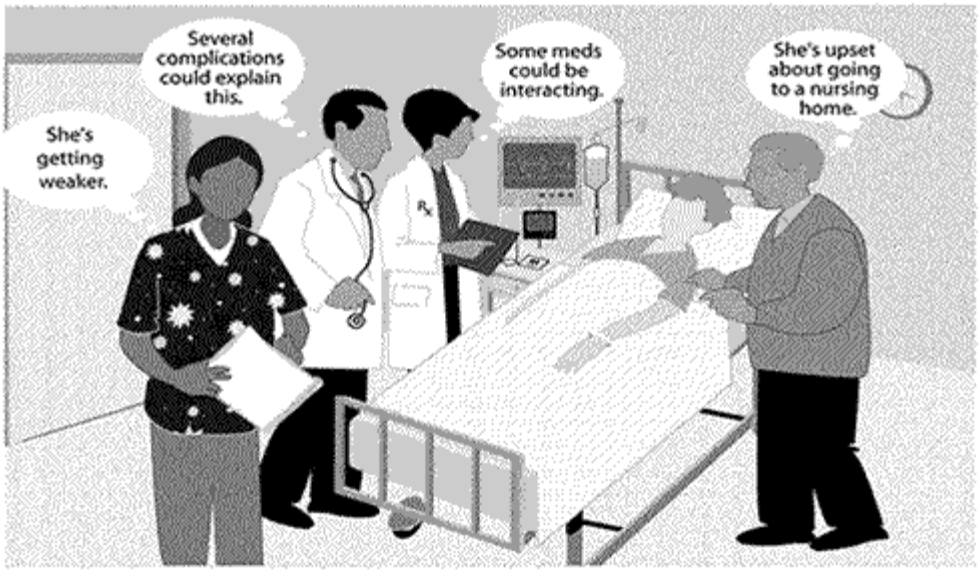

Figure 5. Deference to expertise

In many situations, different staff members as well as the patient and family may have information essential to providing ideal care. Deference to expertise entails recognizing the knowledge available form each person and deferring to whoever's expertise is most relevant to the choices being made.[5]

HROs cultivate a culture in which team members and organizational leaders defer to the person with the most knowledge relevant to the issue they are confronting. The most experienced person or the person highest in the organizational hierarchy does not necessarily have the information most critical to responding to a crisis.[1] A high reliability culture requires staff at every level to be comfortable sharing information and concerns with others—and to be commended when they do so. A deemphasis on hierarchy is essential for organizations to prevent and respond to problems most effectively.[5] Figure 5 provides an illustrative picture and description.

5 A drawing of a woman in a hospital bed surrounded by three staff members and a family member. The nurse is thinking, "She's getting weaker."
The doctor is thinking, "Several complications could explain this."
The pharmacist is thinking, "Some meds could be interacting."
The husband is thinking, "She's upset about going to a nursing home."

5. Resilience

Figure 6. Resilience
A good boater never leaves the dock without preparing for many situations that are unlikely but possible. Oars, pump, lifejacket, and fire extinguisher ensure that the boater can quickly respond to unexpected system failures.[6]

HROs pay close attention to their ability to quickly contain errors and improvise when difficulties occur. Thus, systems can function despite setbacks.[1,5] An HRO assumes that, despite considerable safeguards, the system may fail in unanticipated ways. They prepare for these failures by training staff to perform quick situational assessments, working effectively as a team that defers to expertise, and practicing responses to system failures.[5] Figure 6 provides an illustrative picture and description.

6 A drawing of a man in a small motor boat. The man is wearing a life jacket and the boat is equipped with a life buoy, fire extinguisher, oars, and a pump.

Use of High Reliability Concepts in Hospitals

Organizations have explicitly pursued high reliability concepts for more than 20 years, but these concepts have a shorter history within health care.[3] Reasons for interest are numerous. Lack of reliability contributes to medical errors, inconsistent quality, and inefficiencies. With scrutiny from a growing number of external stakeholders, hospitals must become more reliable to compete and to provide care that meets their patients' needs. Three specific trends in the overall environment have contributed to a growing emphasis on high reliability concepts:

- **Public awareness of medical errors and quality.** Never before have patients, their families, and other stakeholders known as much about the quality and existence of errors in hospitals. The IOM report made hospital errors a part of the public consciousness. Public reporting by the Centers for Medicare and Medicaid Services (CMS) and a growing number of States allows consumers to see and ask questions regarding care quality. Hospitals and the boards that govern them are using these data to compete in the marketplace, or these data are being used against them. Public advertising campaigns encourage consumers to request information from their providers.
- **Health information technology (HIT).** HIT has allowed some hospitals to more precisely monitor their systems of care, the dispensing of medications to patients, and the amount of system waste. These data have focused attention on the frequency with which ideal care is not provided to patients. HIT has also affected hospitals in another way. Hospitals embracing HIT have found that automating flawed systems can make their operations less efficient rather than more. Therefore, making systems reliable before they are automated has become a priority.
- **Emergence of quality improvement methodologies.** A wide range of specific improvement methods have been embraced within health care, ranging from total quality management and continuous quality improvement, to ISO and Six Sigma®, to Lean Thinking and Baldrige. Each of these methods has a distinct vocabulary, philosophy, and method, but they all emphasize the need to make all aspects of care better and more reliable than they currently are.