ONE HOSPITAL'S JOURNEY TO

CREATE A CULTURE OF SAFETY

by

Margaret M. McGoldrick

Submitted to the Program of Organizational Dynamics
in the Graduate Division of the School of Arts and Sciences
in Partial Fulfillment of the Requirements for the Degree of
Master of Philosophy at the
University of Pennsylvania

Philadelphia, Pennsylvania

2010

ONE HOSPITAL'S JOURNEY TO

CREATE A CULTURE OF SAFETY

Approved by:

_____

Larry M. Star, PhD, Advisor

_____

Charles Bosk, PhD, Reader

_____

Michael Cohen, RPh, MS, ScD, Reader

ABSTRACT

The Institute of Medicine (IOM) reports in 1999, To Err is Human – Building a Safer Health System and 2001, Crossing the Quality Chasm sought to transform the culture of American hospitals. The culture of blame needed to become a culture of safety if we were ever to reduce and prevent errors and create a system of care organized around patient not provider needs.

Abington Memorial Hospital began its journey to create a culture of safety in December 1999 and today in 2010 we continue that journey. Much has been done and our organization has truly advanced in our transparency and focus on systems improvement. This paper describes our journey over the past decade and our strength of commitment to continuous improvement in search of perfect care for our patients.

ACKNOWLEDGEMENT

I want to thank Dr. Larry Starr, my capstone/thesis advisor and Dr. Charles Bosk and Michael Cohen, RPh, MS, ScD, my readers for their advice and guidance with this document.

LIST OF TABLES

TABLE		Page
1	Medical Errors Documented Sequence	2
2	Perrow's System Characteristics	7
3	Marine Industry Characteristics	12
4	Forces of Magnetism	36
5	IHI 100,000 Lives Campaign	38
6	AMH Patient Safety Lecturers	45

LIST OF FIGURES

FIGURE		Page
1	Cook’s Model	19
2	Hindsight Bias	20
3	The Sharp End and The Blunt End	22
4	AMH – FMEAs / Proactive Risk Assessments	42

TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENT	iv
LIST OF TABLES	v
LIST OF FIGURES	vi
CHAPTER	
1. Introduction	1
2. Accident Theory	4
3. Healthcare	14
4. High Reliability Organizations	17
5. A Culture Of Safety	23
REFERENCES	55
APPENDICES	
A	58
B	60

CHAPTER 1

INTRODUCTION

In December 1999 the Institute of Medicine (IOM) published To Err is Human – Building a Safer Health System. A wake-up call for American Healthcare, this document claimed that approximately 98,000 people each year were killed in U.S. hospitals because of healthcare workers' errors. These errors included, for example, medication problems, falls and procedures. There were also errors in judgment, knowledge deficits, and some lapses in thinking. Many people in healthcare contested the data, but no one could refute the overall premise. It was assumed that error had become acceptable in hospitals in large part because human beings are not perfect. We all make mistakes; therefore, there will be errors in healthcare. However, the IOM report changed that paradigm. It argued that with a systems approach, "care processes" could be designed to reduce many of the human errors in healthcare.

At Abington Memorial Hospital (AMH), a number of us read the report. We immediately accepted the basic premise that systems designed for safety would dramatically reduce the number of errors. This was because since 1991, Lucian Leape and his colleagues had been assiduously documenting the need for a systems approach to manage healthcare errors and particularly, medication errors, before the watershed IOM report was published. Table 1 summarizes some of the milestone events.

Table 1. Medical Errors Documented Sequence

1991	-	Lucian Leape, MD and 9 co-authors from the Harvard School of Public Health, published a study in the New England Journal of Medicine about the nature of adverse events in hospitalized patients.
1994	-	Boston Globe Reporter, Betsy Lehman died from a chemotherapy overdose at the Dana Farber Cancer Institute in Boston.
1995	-	Lucian Leape, MD and 18 co-authors published a study in JAMA about a systems analysis of adverse drug events.
1997	-	Lucian Leape, MD testified before Congress about hospital errors.
1998	-	IOM Quality of Health Care in America Committee was formed to develop a strategy that would result in a threshold improvement in the quality of healthcare over the next 10 years.
1999	-	IOM Report To Err is Human was released.

In the early 1990's, the press began to focus on individual errors and the Boston Globe ran a series on medical errors focusing on how errors could be prevented and the lack of regulatory oversight of hospital quality. The Globe used 2 years of the Massachusetts Department of Health (DOH) data of significant hospital incidents reported to the DOH. The series highlighted Betsy Lehman's death in 1994.

In September 1999, the Philadelphia Inquirer (Gerlin, 1999) ran a series written by Andrea Gerwin describing medical errors, focusing on how errors could be prevented, and the lack of regulatory oversight of hospital quality. The Inquirer used malpractice claims data for MCP Hospital obtained from Allegheny bankruptcy court documents. The series highlighted individual malpractice cases.

Both newspapers focused on the sensationalism around very disturbing cases of serious injury or death to innocent patients. Hospitals, administrators, and physicians wanted to do the right thing, improve care and reduce errors but a culture of safety requires transparency. The press and the trial lawyers also wanted transparency but also to provoke and punish those providers involved in errors.

At AMH, we set out to learn as much as we could as quickly as we could about this field. We pursued two routes: individual self-study, and group study through guest lectures, conferences and grand rounds. I began my own course of study with a review of the literature regarding accident theory.

CHAPTER 2

ACCIDENT THEORY

The Industrial Revolution was enabled in part with fossil fuel driven technology. This allowed production of massive amounts of electric power, harnessing natural forces, and technology involved in nuclear power, unleashing nature's force through manipulation of the atomic structure. Each of these sources of energy has its own set of risks and complications. Each could have devastating effects on the surrounding environment and people as the energy source is extracted from nature. The changes that resulted can be understood as due to the complexity and coupling of the technologies that evolved. In a linear relationship, such as a production line, products, services, people and processes are added one at a time. In a complex enterprise, multiple, simultaneous steps occur with no opportunity for anyone to see or follow all of the actions at one time. Complexity is beyond one's cognitive limits to process simultaneously.

The mechanisms that we have developed to assist us in producing, processing and creating output have become increasingly sophisticated. We have evolved from using rudimentary computers that were sophisticated typewriters and adding machines to microchips that can process and synthesize information far more efficiently than can the human mind. It is important to say that humans have created computers. We design them, build them, repair them, improve them, manage them, and they now can do many but not all tasks beyond human capability. They are faster and have greater memory capacity.

Computers have transformed our lives but they also have transformed our designs. To stretch, to grow, to reach new levels we have taken our basic linear designs and created tightly coupled, very complex designs driven by computer technology to create outputs far greater than our traditional methodologies. For example, compare a coal-fired furnace designed to burn fossil fuels and generate heat that can be converted to a source of energy to a nuclear power plant that is designed to accelerate nuclear particles to create energy that can provide electricity for a region. Both are designed to be managed and maintained by humans; but the first is more linear and the second has a more geometric design. The key variables that differentiate the two are complexity and coupling.

Complexity involves numerous simultaneous and often interacting actions that must occur for the output to be obtained. Coupling is the interconnectivity of the actions and the time it takes for one action to trigger the subsequent action. Charles Perrow (1999) described these concepts in his book, Normal Accidents. He defines high-risk technologies as those that have "catastrophic potential, the ability to take the lives of hundreds of people at one time, or to shorten or cripple the lives of thousands or millions more." Perrow describes high-risk technologies such as nuclear power plants, chemical plants, space missions, dams, nuclear weapons, and genetic engineering.

Perrow (1999) presents the theory that interactive complexity and tightly coupled designs will inevitably produce accidents (errors). Given the design, he argues, these accidents are normal. Failure is expected to occur since nothing is perfect. What Perrow articulates is similar to James Reason's (2008) concept of

the Swiss Cheese Model (Reason, 1991) of error. Both purport that systems (including medical processes) involve multiple steps that are interconnected. A failure in one part of the process may be insignificant, even trivial, but when various parts fail, the cumulative failures can be catastrophic. It is the interaction of the multiple failures that explains the accident. The concept is particularly relevant in healthcare. Perrow (1999) notes, “Small failures abound in big systems. Reconstruction of patient accidents reveals the banality and triviality behind most catastrophes” (p. 9). Perrow describes the difference between “transformation” process and “additive” process. He notes, “Transformation systems are those where we cannot see what is going on; we generally know what works but not necessarily why. These systems are vulnerable to small failures that propagate unexpectedly because of complexity and tight coupling” (Perrow, 1999, p. 10).

One of the lessons of complex systems theory is that any part of the system might be interacting with other parts in unanticipated ways (Perrow, 1999, p. 21). It is the unexpected interactions of a small failure in the system that makes it prone to a system accident (Perrow, 1999, p. 61) which he defined as an unintended and untoward event. Complex interactions suggest that there are branching paths, feedback loops, jumps from one linear sequence to another because of proximity. The connections are not only adjacent and serial, but can multiply as other parts, units, or subsystems are reached. Only 1% of all possible parts or units in a linear system are capable of producing complex interactions, while 10% of those in a complex system are capable of doing so,

that 10% represents more than a tenfold increase in the potential for system accidents (Perrow, 75).

Perrow specifically defines linear interactions as those in expected and familiar production or sequence and those that are visible even if unplanned. Complex interactions are those of unfamiliar sequences of unplanned, unexpected sequences and are not visible or not immediately comprehensible (Perrow, 1999, p. 78).

The transformation process is a change in physical state and is often discovered through trial and error. Generally it refers to systems that transform raw materials, rather than fabricate or assemble parts of a system. Recombinant DNA technology, nuclear technology, and chemical plants involve transformation processes. Complex systems are described as systems with the characteristics noted in Table 2.

Table 2. Perrow's System Characteristics

- Proximity of parts or units not in a production sequence;
- Many common mode connections between components not in a production sequence;
- Unfamiliar or unintended feedback loops;
- Many control parameters with potential interactions;
- Indirect or inferential information sources;
- Limited understanding of some processes.

The characteristics in Table 2 (Perrow, 1999, p. 85-86) describe modern healthcare. The interactions and interconnectivity of subsystems within the human body do not always act as one would predict. The use of pharmacology to treat the human conditions is known to work but not always clearly understood as to how it works. Even more complex than the human body, which works in harmony, the care systems in hospitals are complex with many connections between medications, procedures, and patients and providers with varying interests. There are innumerable interactions not in a production sequence and with unintended feedback loops. Medical errors are a consequence of this complexity and our limited understanding of how all the subsystems interconnect.

I believe, these new systems are an outgrowth of our sophistication in designing more effective and efficient systems. Patients used to stay in the hospital 10 days on average. Now it is 4 – 5 days because we simultaneously treat their multiple conditions rather than sequentially treating and observing their healing process related to the treatment interventions. In our effort to increase our efficiency (less time) and effectiveness (better results) we have created unintended interactions and consequences as we simultaneously medicate and perform invasive procedures.

A more frightening yet exciting technology such as gene splicing has high risk. Scientists use enzymes to cut DNA into pieces and recombine the pieces with the DNA of a carrier or a vector. The recombined molecules are inserted into a host where they reproduce. One benefit is that human growth factors that were carried by a host bacteria could help treat children with growth disorders.

The concern arises when the unrestrained application of these techniques is considered. That is to say, the creation of a bacterial or viral vector that helps in one set of circumstances, could also be devastating if that vector creates an unexpected reaction and replicates beyond the scope of the original treatment. A viral, uncontrollable vector carrying growth factors could create a potent, lethal organism that potentially could be carcinogenic to humans. This is dangerous technology with tremendous opportunity to help patients; yet the uncertainty of understanding every mechanism involved in transformational, complex systems can result in accidents (Perrow, 1999, p. 297).

Diane Vaughan (1996) agrees with Perrow that there are inherent hazards in complex systems. She notes that our incremental approach to systems design creates an environment where signs of potential danger can be normalized and therefore, can have a catastrophic effect (Vaughan, 1996, p. XIV). She agrees that engineering designs are often biased toward optimizing existing hardware to "make them" work as opposed to designing something new based on what is desired. Safety is a concern. Yet, many new designs bring new uncertainties, not greater predictability. As argued in systems theory and supported by my experience in hospitals, a change introduced in one part of a system may have unpredictable ramifications for other parts (Vaughan, 1996, p. 116).

Frederick Taylor's work introduced scientific management into the workplace in the early 20th century. Taylor believed that "separation of conception from execution" created more innovative and efficient designs (Taylor, 1911, pg. 26). Workers lost control over their craft when planning

responsibilities were taken from the individual worker and shifted to managers, leaving the worker to follow orders. Managers were implementing plans without access to the full picture (Vaughan, 1996, p. 204).

In our efforts to achieve sophistication, we created divisions of specialized labor. This obfuscates individual responsibility for the overall product and creates discontinuities. Many people make decisions but they do not know how their actions connect to the actions of others or to the whole. The Challenger catastrophe on January 28, 1986 exemplified the inherent danger in incrementalism and discontinuity. A series of seemingly harmless decisions moved NASA toward a disastrous outcome on February 1, 2003 when the Space Shuttle Columbia exploded on re-entry (Vaughan, 1996, p. 408 – 409). These tragedies are examples of “system accidents” - multiple failures in interconnected subsystems.

The question is: how do we make systems in healthcare safer, reduce the risk of accidents occurring while offering advances in care? One challenge is to manage the complexities. Healthcare and, in particular, hospitals, are systems of care that have been incrementally designed. We change components of the system but we seldom redesign the process from start to finish. Incrementalism is inherent in healthcare because medicine is evidence based. Physicians are scientists who try new procedures or medicines and measure the effectiveness of the intervention. This is best measured by controlling for one change at a time so that results can be attributed to an intervention. This is an incremental process. In healthcare, we build upon what we know, what we have experience

with. The goal in systems design is to understand the connections and interactions between the parts with more predictive capabilities and to de-couple the process enough to build in safety.

The airline industry has accomplished this, and we can learn from them. The principle of high reliability training is part of the key to the airlines' success in safety improvements. High reliability teams work together under the auspices that anyone can challenge anyone and question anything if they believe safety would be impacted. This creates an environment where all participants are trained to observe small system failures that, if unnoticed, could cascade into larger failures or accidents. Each team member observes the system from their perspective. These multiple observers work together to intervene to stop errors or accidents from becoming catastrophes.

High reliability organizations proffer, according to Vaughn (1996), safety as a priority, decentralized decision making, enabling quick, flexible responses; intense discipline and training that maximizes uniform appropriate responses by those closest to the risk technology (p. 416). At the core of organizational problems are people who need to make decisions or judgments every day. We use our own mental models that reflect and are congruent with our experience (Perrow, 1999, p. 27).

Probably the best example of an industry that has created systems and teams that foster safety is the airline industry. The Federal Aviation Administration (FAA) is responsible for safety and facilitating air travel. The National Transportation Safety Board (NTSB), an independent board, conducts

investigations and prods the FAA to set new safety requirements. The Airline Pilots Association (ALPA) is a strong union that advocates for safe conditions and protests unsafe conditions. Although this structure provides for a strong emphasis on safety, the real advance came in 1975 when the Aviation Safety Reporting System (ASRS) was established by the FAA and the National Aeronautics and Space Administration (NASA). NASA supervises the system as an independent entity. The system guarantees immunity. No reporters can be penalized by the FAA even if they break federal laws (unless criminal activity is involved). Reports are de-identified usually in less than 4 days after an accident. Although pilots are still subject to discipline by their airlines, this kind of system seems to work. Reports abound and unsafe conditions are quickly corrected (Perrow, 1999, p. 169). This system incentivizes safety. These kinds of complex regulatory endeavors create a complex web of safety nets.

In contrast to the "safety focused" airline industry, the marine industry is characterized as an "error-inducing system", where risky behavior is often attributed to the "traditions of the sea." Errors in the marine industry are co-produced by several factors (see Table 3).

Table 3. Marine Industry Characteristics

- Centralized hierarchy headed by the captain;
- Long hours on duty;
- Insurance rates not tied to safety;
- Communication problems – native languages can differ between officers and crews;
- Crews rotate with each voyage with no incentive to maintain equipment;
- Nature rules with storms, waves, ice-covered decks, shifting narrow channels and fog (Perrow, 1999, p. 175).

The authoritarian structure aboard a ship is inappropriate for the complexities of today's sophisticated ships.

Medicine probably lies somewhere in between the airline industry and the marine industry in its culture of safety. Fundamentally, safety needs to be embedded in the culture of organizations. It needs to be part of learned behaviors, part of the value system, and generally a way of life. It needs to be ever present, permeating all that one does.

Healthcare has always been committed to safety because of the nature of the work, and because outcomes are often measured in mortality and morbidity. Mistakes are a normal occurrence in any work. Healthcare is no different. Every occupation has its mistake calculus, which is the probability of making a mistake and this depends on many factors including skills, frequency of performance, and the nature of the task. Medical work requires risky decision making in a complex system for which failure has consequences for human life. Marianna Paget (1988) in her book Unity of Mistakes, characterizes medical work as an activity that is exceptional, uncommon, and strange because it is error-ridden, uncertain, and practiced on the human body.

CHAPTER 3

HEALTHCARE

With the complexity and coupling of our increasingly sophisticated processes and technologies, small errors can cascade into catastrophes before we can anticipate or even see the error unfold. The challenge for healthcare systems and medical providers is to not only create greater safety through more in-depth understanding of the multiplicity of interactions in the care process but, more important, to design safety prospectively into the care process.

Hospitals are the most visible sector of the healthcare system in the United States. There are 5,000 acute care hospitals in this country, and these institutions play a central role in their communities. Like schools, religious organizations, and governmental agencies, hospitals are part of the infrastructure that interconnect communities. Doctors, nurses, and others provide care in ambulatory settings, but hospitals remain the focal point for the most complex, sophisticated, and innovative care. Hospitals are communities of people that bring together a broad range of workers organized to support the complexities of the 21st century care process. Both the technological side of care, referred to as "high tech" and the human side of care, called "high touch" are part of this enormously complex system of care. How do these high tech, high touch forces/elements contribute to safer care?

Since 1999, there has been a great deal of inquiry and study into the causes of medical error. In the 1990s, a series of sentinel events occurred and

thoughtful studies emerged (see Table 1), culminating in the IOM's report To Err is Human – Building a Safer Health System.

Across the U.S., this report was seen as a call to action. I have observed that our hospital is deeply committed to introspective review of our systems and a prioritization of patient safety as the leading edge of quality. I believe the commitment to quality has been the most important contribution modern hospitals have made to medicine. In 2000, patient safety became the focus of quality. In 2001, the IOM issued a second landmark report, Crossing the Quality Chasm. This report was another call for action to improve the U.S. healthcare delivery system as a whole, in all its quality dimensions, for all citizens. Physician groups, hospitals, and other healthcare organizations operate independently, often providing care without the benefit of complete information about the patient's condition, medical history, services provided in other settings, or medications prescribed by other clinicians. The report concluded that the current care systems could not adequately do the job. The linear approach to incremental changes as the method for improvement in efficiency and effectiveness was not working. Trying harder would not work. Redesign of the systems of care was what was needed to create an advanced, sophisticated, effective and efficient healthcare system for all U.S. citizens.

The IOM (2001) report, Crossing the Quality Chasm continued the IOM's focus on systems improvement. The breadth of recommendations spanned the "high tech" realm (evidence-based decision making) to the "high touch" realm

(care based on continuous healing relationships). The bar was raised again for health care providers.

CHAPTER 4

HIGH RELIABILITY ORGANIZATIONS / HIGH RELIABILITY SYSTEMS DESIGNS

The healthcare industry, hospitals and doctors, responded to the IOM Report by beginning to educate themselves about the systems of care, and how redesign could improve safety and quality and approaches to managing risk and designs for safety. Economic pressures in the 1990s had taken much of the buffer out of the healthcare system. Hospitals consolidated into large systems. Hundreds of beds were reduced or redistributed to create greater efficiency, and redundancies in service offerings were eliminated or significantly diminished. The move to a more efficient model took the slack out of the system. Hospital departments had been compartmentalized which created some redundancy, and as those excesses were reduced, the system of care became more tightly coupled. The concept of “going solid” occurs when all units are filled and an even minor event in one unit may have a major effect on another unit. Without the simplicity and buffering of loose coupling, the system becomes brittle and difficult to manage. Accidents are more likely, more difficult to foresee, and harder to recover from (Cook, Rasmussen, 2005, p. 3). “Going solid” creates pressure, and practitioners push beyond the limits of the marginal boundary towards the unacceptable performance boundary. Organizations that operate beyond the marginal boundary are “flirting with the margin, which can lead to incremental adjustment of the marginal boundary outward. Relatively fixed

marginal boundaries and deliberately restricted operating point dynamics are the hallmark of high reliability organizations (HROs)" (Cook, Rasmussen, 2005, p. 3).

HROs are characterized by advanced technology requiring specialist understanding and high degrees of interdependence requiring generalist understanding. In complex, tightly coupled processes, tight coordination and control enhances performance reliability. One very important strategy for reducing the negative effects of complexity and coupling is redundancy. According to Roberts (1990), "if things are done quickly, many pairs of eyes serve as watchdogs, the many pairs of eyes are a substitute for unavailable time. In short, three pairs of eyes should be able to spot a problem that may take one pair of eyes longer to detect" (Roberts, 1990, p. 168).

Understanding models of safety has become key to advancing a culture of safety in hospitals. Proper resources and continuous re-evaluation of the most effective use of resources is essential. Healthy levels of redundancy or safety nets absent wasteful duplication is essential for reliable, safe systems of care. The balance between redundant safety nets and wasteful duplication is one of the most vexing issues for hospital leadership. How to deploy limited resources in the most effective proportions is an ongoing challenge.

The concepts of reliability and systems designed for appropriate redundancy that create safety nets to protect patients from errors is the fundamental premise that contemporary providers use in creating a culture of safety.

James Reason developed the Swiss Cheese Model in 1991 and many authors have modified the concept to describe system errors. R. I. Cook (2005) has used the concept to articulate goal conflicts, defenses, and latent failures (see Figure 1).

Figure 1. Cook's Model

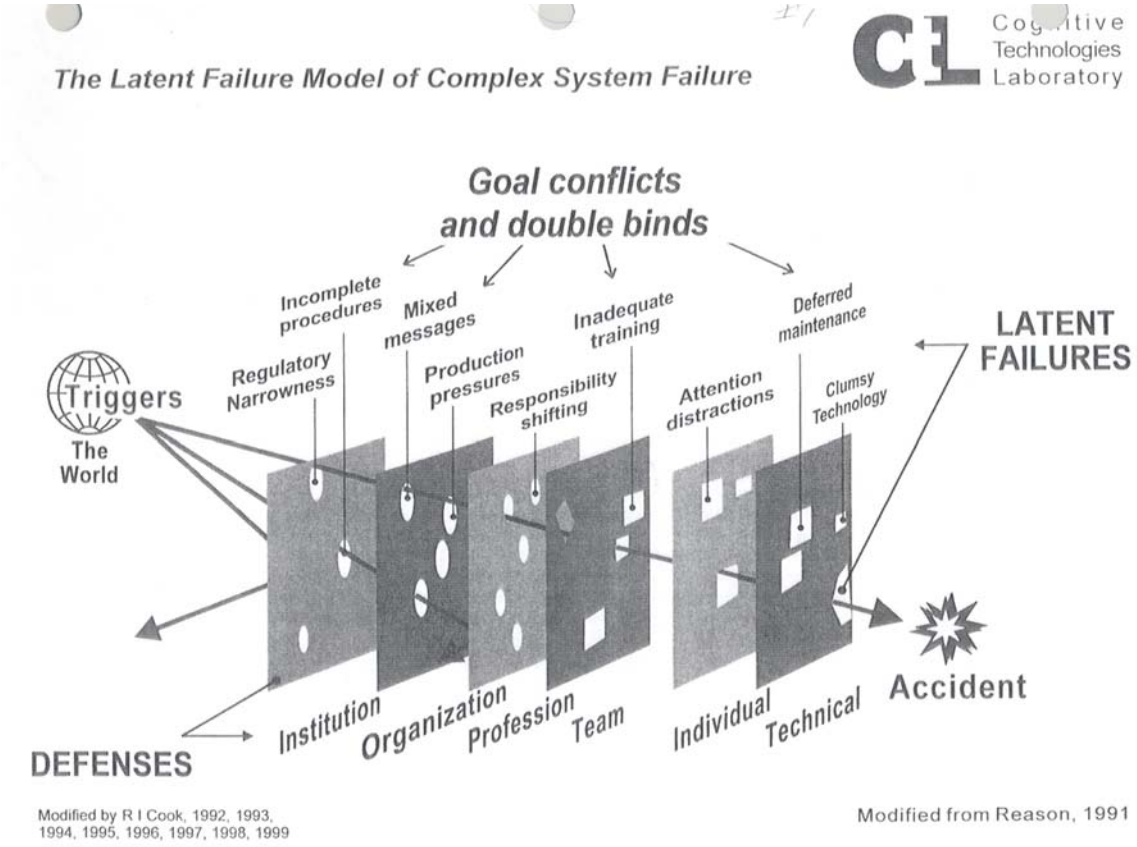
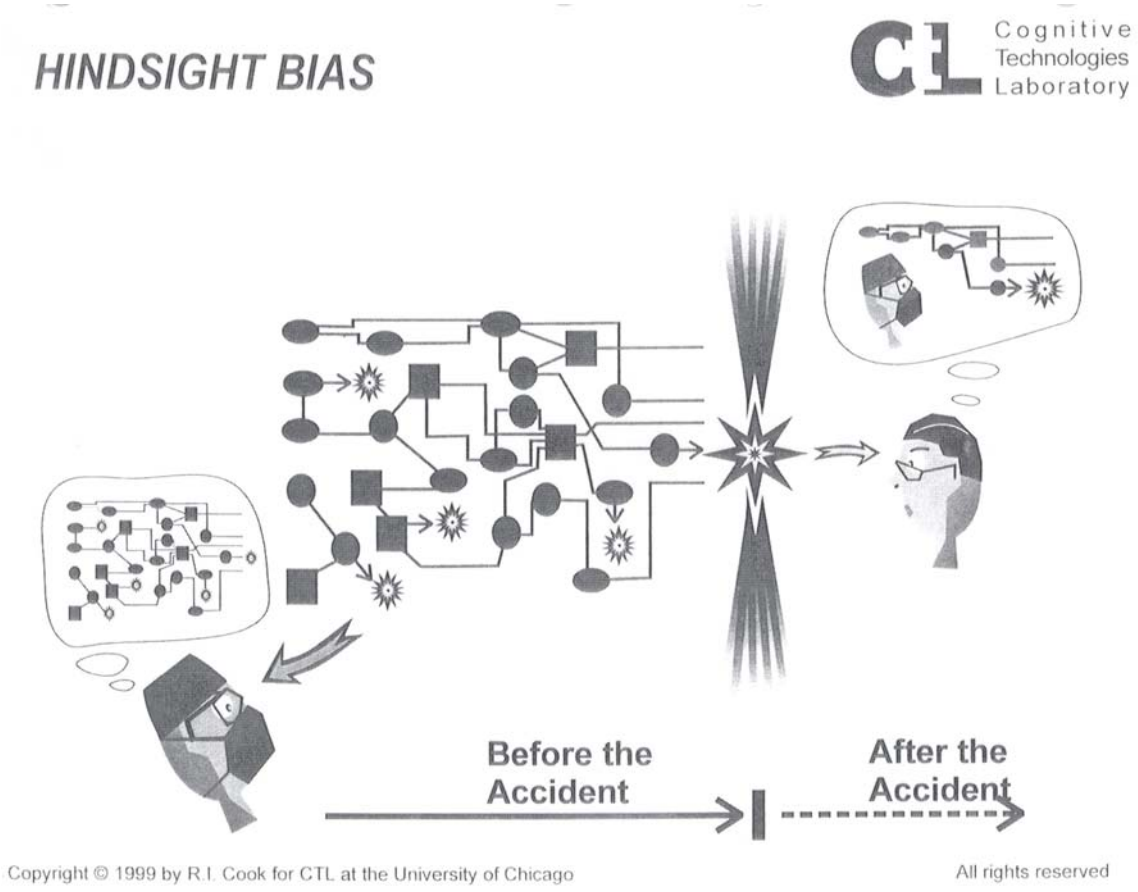


Figure 1 presents how a series of slips or misses due to various pressures can lead to a system failure. In systems there are co-producing forces that cause system failure. It is the culmination and the sequence of slips that ultimately results in an accident. Embedded in this model is the understanding

that in a tightly coupled work process errors can compound quickly before they can be understood so that a failure can be avoided or prevented. A review of system failures produces hindsight bias. (See Figure 2). The source of error is clear after it has occurred but not as it is unfolding, otherwise we would interdict the process and prevent the error.

Figure 2. Hindsight Bias

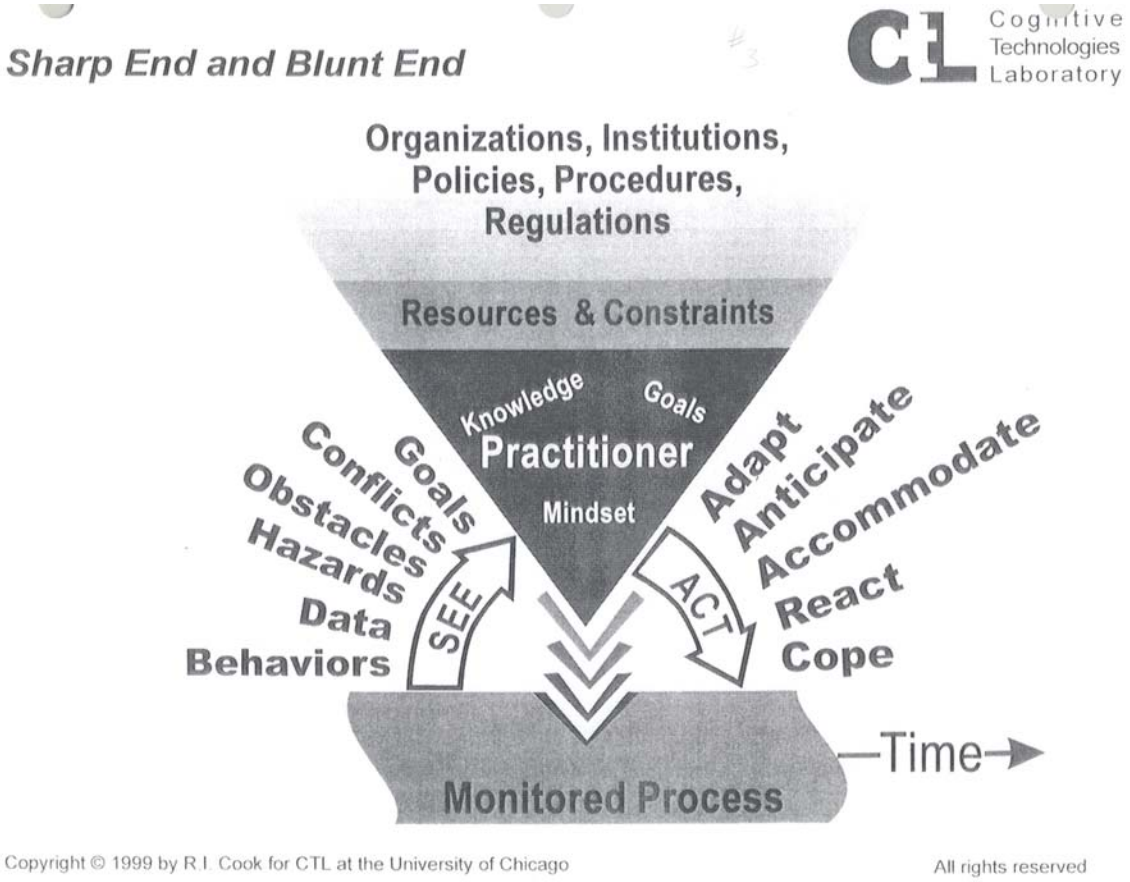


At AMH, most of our study of errors revolves around a retrospective understanding of incidents and redesign of systems to prevent error or system failure, but we have also moved to prospective review and design of new programs, procedures, or processes. We use the Failure Modes and Effects Analysis (FMEA) approach (Cohen, pg. 319). This has proved to be extremely

effective in understanding the flaws or weaknesses in our processes before patients are treated. This time consuming process serves as a laboratory for study and practice such as simulation and creates a safer process in advance of actual implementation.

Another very important concept in systems design for high reliability is that of “The Sharp End and The Blunt End.” Traditionally, the care process was the purview of the practitioner. Leadership, administration, and support services managed the overall operation and dealt with the physical assets, coordination of all work, and support of the caregivers (see Figure 3). The sharp end is where the care is rendered by practitioners. The blunt end is where resources and constraints are generated. Careful coordination between the two ends is essential in a culture of safety (Cook and Woods, 1994). The blunt end must support the providers in the design and resourcing of safe care processes, whether that involves training, education, staffing, technology, information systems, equipment, space, and emotional support.

Figure 3. The Sharp End and The Blunt End



AMH has worked very hard to create a culture where we are all responsible for safety. We play different roles but patient safety remains our stated primary priority, a core value for our entire organization – the Board of Trustees, the medical staff, leadership, our employees, and all the “stakeholders” who interact with our hospital are consequently part of the complexity problem.

CHAPTER 5

CULTURE OF SAFETY

In this section I describe AMH's journey to create a culture of safety, a journey that will never end but has had progressive successes to date.

After the publication of the IOM Report (1999), AMH rededicated itself to patient safety. We believed we had always been committed to creating a clinically safe environment for our patients, but the IOM Report was clearly a call to action. It all started with our CEO. He clearly articulated a vision for our hospital, a vision of a safer institution. He set the stage for what would be our journey to create a culture of safety. We developed a Patient Safety Oversight Peer Review Committee (PSOC) in December 1999. The committee was charged with two goals. First, to establish a systems approach to improving patient care and reducing medical errors beyond the existing performance improvement program; and second, to gather and review information for the purposes of evaluating and improving the quality of healthcare rendered through improved patient safety with the ultimate goal of reducing morbidity and mortality.

The PSOC was comprised of all of the elected leadership of the medical staff, the officers; all of the appointed leadership of the medical staff, the department chairs; hospital administration; nursing administration; the directors of risk management, performance improvement, clinical information, information systems, medical education, and pharmacy; and a trustee. The committee was co-chaired by the Chief of Staff (COS) and the Executive Vice President (COO). A subcommittee, the Patient Safety Committee (PSC), was established to

provide for greater study and implementation of the Oversight Committee's goals and objectives. It became evident early on that a Chief Patient Safety Officer (CSO) was needed so the Chairman of Medicine who also chaired the Pharmacy and Therapeutics Committee, assumed the role of CSO.

Our first goal was to consider the appropriate design and use of technology to achieve greater safety. The literature was clear: universal (mandatory) Computerized Physician Order Entry (CPOE) could reduce medication errors by 55% - 83% (Bates, 2007, p. 3). Some of the medical staff (40%) used the computer system to enter their orders but the majority (60%) did not. Almost all of the residents (90%) used the computer to enter orders. We set a goal in January 2000 to achieve universal CPOE by January 2001. The entire medical staff, nursing staff, and information systems staff moved into active implementation. There was a clear sense of momentum in the organization. To a person there was a strong drive to accelerate our efforts to achieve the central goal of universal CPOE. The CSO engaged the medical staff to accept the values and outcomes. Many physician opinion leaders, especially the Chief of Staff, championed the cause. The potential benefits were overwhelming: 70% reduction in medication errors. In a hospital with over 40,000 admissions, 100,000 emergency room visits, 5,200 births and millions of medication doses per year, the potential impact of CPOE on patient safety was tremendous.

Constant communication and measurement of milestones towards achieving the goal were instrumental in building peer pressure to bring all physicians on board. Our Patient Safety Newsletter served as the central

communiqué on techniques that were being employed and resources that were available to help and train physicians on the clinical computer system.

It took a year of intense focus to achieve this goal. The COS and CSO applied continuous peer pressure to capture the attention of every member of the medical staff. Individual meetings, extensive sharing of comparative data about who was using the computer for order entry and who was not, and personal training and attention was afforded the medical staff by nursing and information systems. “Super users” were available on the nursing units to give physicians personal tutorials. Our CSO wrote personal letters to physicians to articulate the value and importance of CPOE for patient safety. By January 2001, we had achieved our goal. Although much time and effort was spent convincing physicians CPOE was valuable and important for patient safety, there was a clear mandate that all physicians needed to place all of their orders via the computer when they were in the hospital. The computer was used for 85% of all orders and for 99% of medication orders. This was the best we could hope for until our web-enabled technology was installed in 2007 and physicians could enter orders into the computer from their homes or their offices. Accomplishment of this goal was a huge success for Abington Memorial Hospital. Only 5% of the hospitals in the country had universal, mandatory CPOE in 2001 and less than 10% have it today in 2010. With over 85% of our orders placed directly in the computer by the ordering physician, we moved our hospital to a higher level of safety.

Once we accomplished universal CPOE, we realized the power of this automation as a patient safety tool. We proceeded to contract with Eclipsys, a software vendor, for their full suite of products to ensure full integration of all our systems. Our analysis indicated their clinical system was the most sophisticated software for patient safety on the market in 2000. Warnings and alerts created a safety net for patients and providers. Critical lab values would automatically notify the attending physician. Lab data or drug interactions would appear on the computer screen as the physician was placing his/her orders. Evidence-based medicine protocols and templates could be automated to guide clinicians. The Clinical Alert and Decision Support system was originally developed at the Brigham and Women's Hospital in the 1990's. CPOE was an internally focused project for AMH. We capitalized on our commitment to quality of care. We needed to make it happen, and we did.

Our next major endeavor was to learn from the experts. In 2000, we invited the Institute for Safe Medication Practices (ISMP) into our hospital to review all of our medication processes. They spent three days with us and produced a thorough review of opportunities for improvement. We spent the next three years methodically and meticulously implementing the ISMP redesign recommendations. As an authority on medication safety, we distribute the ISMP newsletters, which contain the most current research on pharmaceutical and medication devices safety to medical staff members and distribute their nursing newsletter to our nurses. We are preparing to distribute the consumer newsletter

to our patients. We review our current systems based on the ISMP studies to identify needed system changes.

As we came to know the ISMP, we recognized what a truly remarkable organization it was. Our CSO served as a surveyor for them and our COO was appointed to the ISMP Board. We remain committed to learning from the experts.

Our next major advance in patient safety was to begin to participate in every relevant learning collaborative that we could at the local, state, and even national level. We worked with the Healthcare Improvement Foundation (HCIF), a collaborative of the Delaware Valley Healthcare Council in Southeastern Pennsylvania, and the ISMP, on medication safety. We worked with the Hospital Association of Pennsylvania's Patient Safety Collaborative. We worked with the Voluntary Hospitals of America Patient Safety Clinical Advantage Program. We organized teams, sent representatives, and tried to learn everything we could to enhance our knowledge of patient safety and to share whatever knowledge we had. Our CPOE success was of great interest to other hospitals. This was all part of our research initiative in our journey to create a culture of safety.

During this phase in our development, we voluntarily participated in all reporting programs that were available to us – MedMARX for medication errors, MERIT for medication and medical errors, as well as the State of Pennsylvania Act 51 Reporting of Sentinel Events, and State of Pennsylvania Act 13 for reporting of all types of events, those that have caused harm as well as those

with the potential to cause harm to patients. We educated our staff about the need to report so that we could redesign systems flaws and prevent future errors.

We could only correct systems that we discussed and agreed needed to be changed. We modified our incident report form and created a Safety Assurance Form changing the intonation of reporting. This produced a doubling in reporting of our “no harm” incidents (those that could have caused harm but did not) which allowed us to change systems before errors occurred. As we talked more openly about specific errors, reporting all sentinel or significant events to our trustees, we all became more comfortable focusing on systems improvement and not individual blame. This was one of our most difficult challenges. As with many organizations, we tend to focus on parts and are defensive about errors which leads us to blame causes on one aberrant individual. We emphasized that we were committed to moving away from the traditional linear analytic thinking approach of finding the weakest link that caused the error in the process of care. That weakest link could have been a piece of equipment or it could have been a person. As we moved beyond blame and beyond the person, we came to understand our problems as systemic and as having many co-producing, interacting causes. To formalize our commitment to redesigning systems not focusing on people, we developed a Culture of Safety Policy which articulated our transition to a deeper understanding of the co-produced causes of error. This new framework of thinking required greater, in-depth study into how errors occur.

The more we studied, the more complex the care process appeared. One segment of work was inextricably tied to other sequences of work. The concept of coupling became more evident. The combination of complexity and coupling can be fertile ground for small errors to cascade into a catastrophe before we can see the error unfolding.

James Reason's (2008) Swiss Cheese Theory illustrates a model of medical errors: one small error after another can snowball into a tragic accident. Our goal was to create nets of safety throughout our processes to prevent small errors from accumulating into sentinel events that cause real harm to patients. Education of all clinical employees and the medical staff was important to identification of near misses, accidents waiting to happen. When the staff caught a minor error before it evolved into a serious error, reporting was usually lacking because there was no evidence of harm to the patient.

These incidents are fertile ground for system management. We encouraged the staff to report anything that not only caused harm to a patient but could have caused harm to patients. Thanking and even celebrating staff who took the time to report issues was one way to encourage more reporting. We located Patient Safety Suggestion Boxes where anyone could report any issue anonymously all over the hospital and on our ambulatory campuses. Employees began to share ideas. Our relentless focus on patient safety reporting system changes led to people at all levels becoming more aware of patient safety and many began to understand their role in making our hospital one of the safest in the country.

Our first priority was to change the framework of thinking about patient safety. Beginning in July 2000, every employee received a copy of our annual goals, and each year they would see patient safety as the number one priority. We established an Employee Patient Safety Committee. This committee evolved into a robust, energized group of patient safety liaisons, one from each nursing unit and each clinical department. They were interested, excited, open-minded, and would soon feel empowered. Along with their department managers they were the patient safety "go to" person for their work unit. They would share information and educate staff as well as absorb information and transmit data to those who needed to allocate resources to correct systems. They were catalysts for change. The CSO chaired the group with one of our nursing directors and several senior managers were part of this group so we could support their needs, reinforce the importance of their role, and hopefully unleash the grassroots energy to create safety awareness at all times.

Almost two years into our exploration of patient safety as our number one focus, we were accumulating so much data, information, issues, comments, and extramural directives and newsletters such as ISMP publications, that we needed a better way to prioritize and assimilate the opportunities for improvement. Our Vice President for Professional Services took responsibility for organizing all sources of input into an "Integrated Patient Safety Summary Report." This report would serve as our working document for all sources of patient safety opportunities. The report tracked each stage of every issue: identification, further study needed, team assembled and finally, stages of implementation.

Each issue was assigned, tracked and implemented. Issue after issue was addressed. This was a focused effort to transform ideas and suggestions into work routines. This was where the system changes came to life. A diligent group of professionals from performance assessment, nursing, medical staff and administration were dedicated and committed to making our hospital one of the safest in the country. The Vice President for Professional Services, CSO and Directors of Nursing provided exemplary leadership and drive.

As we continued to try to engage all employees and medical staff to become involved, we developed and distributed an AMH Patient Safety Handbook to all employees. The handbook described our culture of safety and our reporting and disclosure philosophy. Each employee was required to read the handbook and sign off that they understood the contents. A Patient Safety Plan was developed and distributed to all members of the medical staff requesting a signed acknowledgement of their support of the plan. A Patient Safety Award was developed that was to be given to individuals who advanced patient safety at AMH.

Patient safety awareness was enhanced through distribution of a “Safety First” pin to those involved on the various patient safety committees. A poster board display placed in the hospital lobby illustrating patient safety accomplishments at AMH further illustrated our commitment to advancing patient safety.

In the late fall of 2002, we entered a new phase in our development. We won the Delaware Valley Healthcare Council’s first Medication Safety Award for

our automated inpatient coumadin management and monitoring program. This recognition by our peer hospitals in Southeastern Pennsylvania was particularly meaningful and spurred us on. At the annual Eclipsys meeting, we won the Stellar Award for our work in implementing the Eclipsys clinical system that took our automation of safety through CPOE to a new level with the sophistication of the Eclipsys software. Both of these honors pushed us to merge these two initiatives to develop a virtual coumadin clinic, a web-based coumadin management program for our network of owned physician practices. We had begun to tap the talent within our clinical ranks. One of our very gifted clinicians created the software to merge our inpatient coumadin management program and the web-enabled Eclipsys system to take safety into the ambulatory setting. Within six months, 70% of our patients were within the therapeutic range up from 40% prior to automating the monitoring. For this innovative use of technology to support clinicians monitoring patients on coumadin in the ambulatory setting, we were recognized as a finalist for the 2003 VHA Leadership Award for Clinical Effectiveness for a Single Hospital, and we were awarded the very prestigious, 2003 John M. Eisenberg Award for Systems Innovation from The Joint Commission and National Quality Forum.

We wanted to ensure that we could bring evidence based medicine to our clinicians and used the literature to guide our processes of care. Medication ordering patterns were modified to create forcing functions not allowing physicians to order medications within a certain period of time after ordering other medications. Pharmacists ordered lab tests to ensure appropriate levels of

a drug. We provided handheld devices with medical literature reference software to all of our residents.

Always focusing on the handoffs (coupling interactions) from one provider to another we looked more carefully at the continuum of care that we were part of. As an institution with over 3,000 admissions from skilled nursing facilities (SNF) we needed a better tool to perfect the continuum of care from the hospital back into the SNFs. A universal computerized transfer and discharge summary was developed that built on our commitment to eliminate errors caused by poor penmanship.

We developed a system to fax all discharge instructions to primary care physicians to enhance communications and continuity of care. Our inpatient nurses developed a program where unit nurses called all discharged patients at home 2-3 days after discharge to follow up with patients regarding discharge instructions and medications.

About this time, we also began to use tools from other initiatives that were designed to modify our culture to improve services. We merged our well-developed patient satisfaction survey process with patient safety. We inserted a separate survey in our patient satisfaction survey and we collated those results ourselves. The questions queried patients on proper patient identification before every interaction, explanation of medications, and overall assessment of safety from the patient's perspective. The results were tabulated by nursing unit and distributed to all units. This was another tool to assess our effectiveness and to engage patients in the safety of their care.

One of our most intriguing initiatives grew out of the professional liability crisis in Pennsylvania. The Pew Charitable Trusts funded "The Project on Medical Liability in Pennsylvania." One aspect of the Project involved communication between caregivers and patients and their families.

We were invited to participate with three other hospitals in a Pew study on the "Effectiveness of Mediation as a Means of Resolving Disputes and Disclosing Errors." This study holds great promise as a methodology for understanding and communicating errors to patients, families, and hospital staff. After disclosing, apologizing, and explaining an error to a patient or family, mediation can provide a means for each party to express what they believe and/or need, and to help everyone to move on from the unfortunate situation. The process of open discussion helps both sides to better deal with their sorrow, anger, and frustration. In a particularly litigious state like Pennsylvania, this project was particularly challenging. To date, we have had many successful mediation interventions.

As we entered calendar year 2003, we once again tried to push ourselves to achieve a higher level of effectiveness. We worked with the VHA to implement team training for staff in our obstetrical units and in our Emergency Room. The IOM Report Crossing the Quality Chasm, spoke to the importance of effective teamwork and communication among the care team. This training was designed to ensure better teamwork in these high-risk services. Our CSO became our Chief of Staff. He and our CNO have role modeled a powerful partnership

between physicians and nurses training and rendering care to patients as a team.

In 2003, we were very proud to be nominated one of five finalists for the American Hospital Association's (AHA) newly established Quest for Quality Prize. This qualified us for a site visit from the AHA Quest for Quality Prize Survey Team. This prize is given to the institution that most effectively demonstrates a culture of safety throughout the organization. We rarely look forward to surveys but we were genuinely excited about this visit and you could sense our enthusiasm and energy for patient safety as we opened our institution to the Quality Prize Team. We were deeply honored when we were notified that we had been selected as the 2003 winner of the AHA Quest for Quality Prize. This award validated our efforts. Our passion for patient safety was discernable and readily evident to the reviewers.

In 2004, our hospital began a very important journey toward nursing excellence and empowerment, the Magnet Journey. The American Nurses Credentialing Center (ANCC) is the premier nursing credentialing organization in the world. They review and study hospitals across the country to try to identify why certain hospitals produced better, safer care, and lower nursing staff turnover rates. The nursing shortage had become acute in the early 2000s and nursing and hospital leaders were looking for strategies to improve their organizations' ability to care for a growing and aging population.

The ANCC identified 14 qualities that could be attributed to successful nursing departments, and these successful departments were, in turn, part of

successful hospitals. These qualities were identified as the Forces of Magnetism (see Table 4).

Table 4. Forces of Magnetism

Quality of Nursing Leadership
Organizational Structure
Management Style
Personnel Policies and Programs
Professional Models of Care
Quality of Care
Quality Improvement
Consultant and Resources
Autonomy
Community and the Healthcare Organization
Nurses as Teachers
Image of Nursing
Interdisciplinary Relationships
Professional Development

Magnet standards speak to excellence and quality in the care of patients. Magnet creates a learning environment, seeks community involvement and most importantly, empowers nurses in their role as the primary caregivers for patients in a hospital. This empowerment was an important component of our journey to create a culture of safety. Nurses prided themselves on the care they provided

and were responsible for articulating issues that comprised safety and quality. They also knew they would be supported by both nursing leadership and physician leadership if their challenges or questions were in the name of safety.

In 2005, AMH was awarded Magnet accreditation. We were the 84th hospital in the country and fourth in the State of Pennsylvania to achieve this important milestone. We were just reaccredited in 2008. There are currently just over 300 Magnet hospitals in the United States and just under 400 globally.

In our pursuit of safety, our nursing information system team came up with a very simple but elegant solution to a very vexing problem: how to effectively communicate to patients and their families about all of the tests, medications, and consultants that are scheduled for them during their hospital stay. The Patient Daily Summary (Appendix 1) was developed by pulling data from various parts of our electronic health record to create a daily schedule of all activities the patient can expect. It is printed, handed to the patient and the patient's nurse discusses the content and answers questions. The summary includes a brief explanation of medications and each test or procedure, including what is involved and the purpose of the test. Family members can review the summary when they visit. The use by the staff of this very simple document and the engagement of the patient and family has proven to be a very important communication tool for patients and encourages questions from patients and their families. Our nursing information system team felt empowered to find solutions to our communication issues. AMH enabled these employees with grant funding from our Innovator's Circle Program to test their ideas and create a prototype of their

Daily Care Plan and to pilot it with patients and families. It proved to be helpful based on feedback from our patients and we then implemented the plan across all nursing units for all inpatients. Once a year the American Nurses Credentialing Center (ANCC) awards the Magnet Prize to one organization for an innovative approach to better, safer care. In 2008, AMH was awarded the Magnet Prize for our Daily Care Plan. This was a very special recognition for our organization and particularly for our nurses and our clinical information systems team. The Magnet Prize recognized the strength and depth of excellence and commitment to safety in our nursing service.

In December 2004, the Institute for Healthcare Improvement introduced its two-year, 100,000 Lives Campaign with a goal of reducing unnecessary hospital deaths by 100,000 by June 2006. In 2005, AMH joined the campaign with individual nurse champions leading each of the six teams supported by a physician champion to implement the best practices. We worked diligently to change our care practices and have seen significant improvements after implementing these practices (see Table 5).

Table 5. IHI 100,000 Lives Campaign

Rapid Response Team (MET Team)
Preventing adverse drug events
Delivering evidence based care for acute MI (heart attack)
Preventing ventilator associated pneumonia
Preventing central line infections
Preventing surgical site infections.

One of the most important factors in our adoption of these six best practices was widespread education for and commitment from the medical, nursing, and clinical ancillary staffs. Our Chairman of the Board in 2005 was and remains a strong proponent of patient safety. He is also a very generous philanthropist, a retired CEO of his family's very successful business. He challenged the administrative, medical, and nursing leadership to create a safer environment, and he offered to fund a small team of leaders, trustees and clinical staff to attend the IHI annual conference and to bring back and share information with their colleagues.

When the second two-year IHI campaign, 5 Million Lives, was introduced in 2006 our Board Chair again provided funding but this time 30 people were able to attend the annual IHI conference. One of those attendees was the prior Chair of the Board who had also served as Vice Chair of the Board. She had served in many leadership capacities at the hospital and was an early patient safety and quality champion chairing or serving on every safety and quality committee in the hospital. She and the Board Chair provided exemplary leadership in our patient safety efforts. They truly exemplified the values of the 5 Million Lives initiative of getting the Board on Board. Our strong presence at the IHI annual meeting has created many more patient safety advocates for these very important behavioral process changes. Every year since, this same generous and very committed patient safety advocate has funded 30-35 AMH staff and trustees to attend the IHI annual conference. He moved patient safety to the front of his Board agenda devoting 30 minutes to address a specific patient safety issue at the beginning of every Board meeting. The collective experience so many of us at AMH have had

at the IHI conference has truly embedded a culture of safety and the need for appropriate attention and resource allocation to accomplish the daunting tasks before us.

In 2006, our Board Chair spoke to one of his colleagues who was on the Board of Miriam Hospital in Connecticut. Miriam Hospital had advanced the aviation concept of Crew Resource Management, and so our Chair arranged for a team of doctors to visit Miriam Hospital with him. We subsequently adopted a similar model from the Agency for Healthcare Research and Quality (AHRQ) called Team Stepps. For the past three years, we have assiduously trained our nursing staff, our residents, and our physicians. This two-day training teaches the principles of clear and complete communication among the healthcare team. Staff are empowered to ask questions when they have any concerns about the care provided to patients. It has been a significant investment of time, energy, and funding for the 3,200 individuals who have attended.

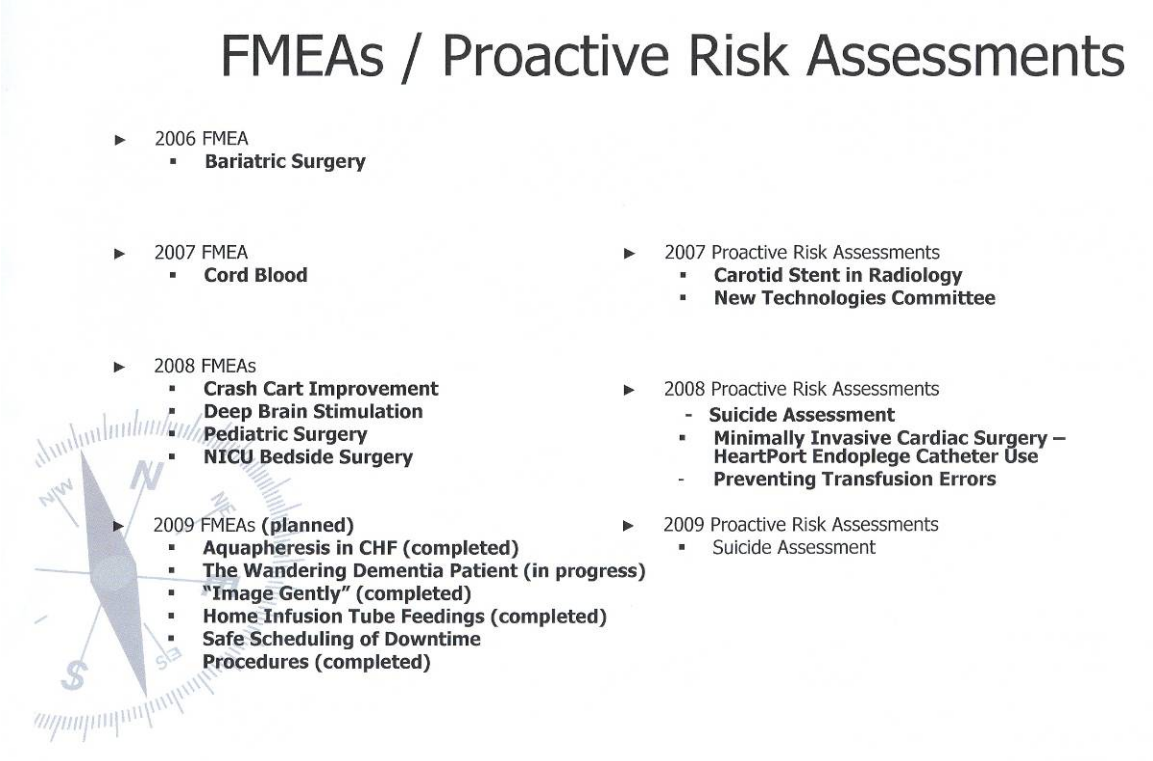
By 2006, we had accomplished significant training and education. We communicated to all trustees, leaders, physicians, nurses, and staff that patient safety was our number one priority. We now needed an organized structure for implementation. We needed patient safety champions who could catalyze efforts everywhere in our inpatient and outpatient hospital services and in our physician practices. Safety needed to be ubiquitous and the challenge was so great that it could not be handled in a centralized fashion. Everyone needed to be a patient safety champion or at least knowledgeable about the best practices and accountable for delivering safe care. What we needed was an organizing entity

to structure our implementation agenda and enable effective execution of our ambitious and overwhelming patient safety agenda.

We established the “Center for Patient Safety and Healthcare Quality” (CSQ). We appointed two of our best and brightest clinicians who were also educators and members of our faculty. Our Administrative Director was a clinical nurse practitioner and our Medical Director was the Associate Director of our Internal Medicine Residency Program and a practicing internist. One was highly organized, gifted communicator and tactically capable of delivering a clinical work product; the other was exceptionally creative and skilled at design of systems, particularly information systems. Together, they synthesized energy, intellect and creativity. We integrated processes and procedures related to quality and safety and added new staff in an effort to coalesce our clinical safety and quality resources in one department with a renewed commitment to accelerate our work in creating a culture of safety. They have successfully gathered data, analyzed our performance, introduced best practices, educated our physicians and staff and held people accountable to our goals. They collaborate with staff and collate data to keep everyone focused. With their help and guidance, we have created a “no excuses” environment – patient safety is a core value and our number one priority. Everyone is expected to be a positive force in our culture of safety. The center has staffed and been the driving force behind root cause analyses of serious safety events as we strive to retrospectively understand the system story (what happened), the co-producing or interacting forces, and the resolution (how can we prevent this from happening again). Even more impressive, however, is

the work the CSQ has done with Failure Mode Effects Analysis (FMEA) and proactive risk assessments. This is the prospective review, mapping and analysis of what could happen, rather than the root cause analysis of what did happen. FMEA is about preventing errors before a service is started or a new procedure or device is introduced. It is painstaking work, but it is so important for the prospective design of safe systems. The CSQ has over the last four years, 2006 – 2009, performed the activities presented in Figure 4.

Figure 4
Abington Memorial Hospital
Center for Healthcare Safety and Quality



AMH has engaged in an impressive array of very important work that requires extreme effort but yields extraordinary results. To a person, every clinician involved thought they knew what they wanted to do as they introduced a new service or procedure, and to a person, they complemented the process indicating

they learned so much in the process that better prepared them to care for their patients safely.

A very important component of our safety journey has been to support caregivers at the point of care with resources. The CSQ conducts patient safety rounds where trustees, leadership and CSQ staff visit various units or departments on all three shifts to meet with caregivers and discuss how they care for patients and what unmet needs they may have. Purposeful patient safety rounding includes asking the following questions of clinical staff:

- What worries you about care on your unit?
- What is the next accident that could happen on your unit?
- Tell me what is working well.
- If you could change something, what would it be, how would you do it and why?
- Do you have the tools and equipment to do your job?
- Are there any individuals who should be recognized for their commitment to safety?

The caregivers often tell stories about patients as they communicate new processes or needs for change. This process fosters collaboration and understanding between the blunt end of care (leadership/governance) and the sharp end of care (clinical caregivers). It is management's responsibility to operationalize system changes to properly resource and organize safe patient care services. Careful follow-up occurs after the rounds to insure reasonable changes are implemented based on the caregivers' input.

In 2005, we had a very serious event where we mortally injured one of our patients. We disclosed the tragic error to the patient's wife and we offered mediation as a formal way to bring closure for this family. The family decided to donate their compensation to establish a patient safety lectureship at AMH. This was an incredibly generous and proactive, positive gesture on the part of this family in the face of their devastating loss. To this day, I believe they understood the deep regret we had in failing to rescue their loved one. Our Chief of Staff was the principal spokesperson for our hospital, and he has the ability to truly communicate empathy and remorse and to frame the picture of well-meaning, well-trained professionals working in a system that fails the patient. He knows how to sincerely apologize. I suspect he aged a few years in those several months of mediation. Reliving the death of a loved one or your patient can be draining but it can also be a way to heal and hopefully allow people to move forward after such a loss.

The patient safety lectureship provided a very public venue for AMH to remember this patient and the family's loss while educating our staff about how to prevent errors through systems improvement. Our first speaker in 2005 was Jeffrey Cooper, Ph.D. Each year we invite noted experts to educate us in a day-long series of lectures and rounds. We have been so fortunate to have hosted several patient safety champions (see Table 6).

Table 6. AMH Patient Safety Lecturers

Jeffrey Cooper, Ph.D.	2005
David Marx, J.D.	2006
Sorrel King	2007
Michael Leonard, MD	2008
Craig Clapper, P.E.	2009

Each speaker shared new dimensions of safety with us, whether through the eyes of an anesthesiologist, biomedical engineer, systems engineer, lawyer, or mother. Their depth of knowledge, commitment, diverse perspective, and heartfelt drive creates a better system for providers to care for patients.

In 2006 David Marx described a “Just Culture” in his Primer for Healthcare Executives. As we evolved as an organization seven years into our journey, we recognized that we needed to instill a sense of individual accountability for our actions while understanding systems theory and the impact system flaws can have on a well meaning, attentive, informed practitioner in a complex, coupled environment. We no longer used the term “blame-free.” There were times when individuals would demonstrate reckless behavior. This required discipline and we needed everyone to understand what our performance expectations were at AMH.

David Marx helped us to bridge the links between the four evils. First is human error which refers to what we should have done other than what did. The second is negligence, the failure to exercise expected care which refers to what we should have been aware of substantial and unjustifiable risk. The third is recklessness, the conscious disregard of substantial and unjustifiable risk. The fourth is intentional rule violation or knowingly violating a rule or procedure (Marx 2001, pg. 12).

Mr. Marx also differentiated between the three disciplinary decision-making strategies. Outcome-Based Disciplinary Decision-Making concerns much of our disciplinary decision making. If a nurse makes an error and causes no harm, we consider her to be lucky. If another nurse commits the same error resulting in injury, she is blameworthy (Marx, 2001, pg. 13). This system is fundamentally flawed. We can only control our intended behaviors but not always the outcome.

Rule-Based Disciplinary Decision Making involves high-risk industries where individuals are expected to follow rules, policies and procedures. Discipline can occur if one violates a rule. The FAA's Aviation Safety Reporting System incents pilots to report all errors. If reported, a pilot will not be disciplined for inadvertent violations. The problem with rule-based disciplinary action is that there will always be times where the rule does not fit circumstances the professional is facing. Over time, people push the normative boundary of safe practice. Violations of policy can be learning opportunities. In a disciplinary model that takes action against intentional rule violation there will be little

learning about why people violated the rule. Employees will, as a defensive measure, report they thought they were following the rule (Marx 2001, pg. 15). Rule-based discipline is also flawed if we truly want to create safe systems for the future.

Risk-Based Disciplinary Decision-Making includes recklessness, a high-crime demonstrating greater intent than mere negligent conduct. Unjustifiable risk should result in disciplinary action. Even in a learning, reporting culture, reckless conduct is grounds for discipline as a deterrent to knowingly performing unsafe acts. To develop an effective and robust reporting system employees and physicians need to understand how the information will be handled: human error should not be disciplined, intentional rule violation should not be disciplined, reckless behavior should be disciplined, and for negligent behavior discipline depends on the circumstances.

Was the person aware or unaware of risk they were creating – the former may be cause for discipline and the latter should not be. The balance between discipline to create deterrence and communication and enhanced reporting and learning needs to be carefully weighed (Marx, 2001, pg. 16). The greater the reporting, the greater the opportunity for learning. We at AMH have moved to learning vs. discipline for negligent behavior.

In all of these disciplinary decision-making models, only reckless behavior is cause for discipline at AMH. Repeat reckless behavior is cause for termination.

In 2007, we invited Sorrel King to be our patient safety lecturer. Ms. King lost her daughter, Josie, when she was 18 months old. Josie was being treated at Johns Hopkins Hospital for burns she received after accidentally stepping into a scalding tub at home. Josie was responding well to treatment in the intensive care unit. She was moved to an intermediate care unit and began to exhibit unusual symptoms: sucking her washcloth, crying for every drink she saw. Despite her mother's expressions of concern, caregivers overlooked or misinterpreted the child's signs of dehydration. She was given a narcotic despite the verbal order that she should receive no additional medications. Josie died in 2001, two days before she was expected to go home. Sorrel and her husband were devastated by this seemingly senseless death of their daughter. Consumed with grief and anger they decided to channel their energy into the healthcare system. When Johns Hopkins Hospital offered a financial settlement she asked them to take some of the money back to start a Children's Safety program, and she created the Josie King Foundation to fund safety initiatives in other hospitals. To hear Ms. King retell the story of her daughter's death and to challenge hospital leadership about their role in patient safety was very powerful for all of us at AMH. This was another call to action like the two watershed IOM reports. This time it was not a think tank and years of research framing the importance of safety in hospitals, it was a mother who knew her daughter was struggling, no one listened to her and she lost her child.

Sorrel King believes it all comes back to communication. People did not listen to her and they did not listen to each other. Sorrel King joined our patient

safety rounds when she visited us in 2007. She later posted a piece on her website. She was connecting the dots, reinforcing her message to us – It All Comes Back to Communication (See Appendix B).

In 2008, we hosted Michael Leonard, MD at our patient safety lectureship. Dr. Leonard is an anesthesiologist who is the Physician Director of Patient Safety for Kaiser Permanente in Oakland, California. Dr. Leonard is an expert in understanding the factors affecting clinicians in the care environment and a strong advocate for communication and team work. Practicing medicine or nursing is complex, stressful work. Team members support each other, help each other and effective teams produce better outcomes. Multi-tasking, stress, fatigue degrade professionals' performance. Hospitals need to design safeguards to these conditions that increase the risk of error.

Dr. Leonard advocates for briefings before an operating room procedure and a debriefing after the procedure to communicate issues or concerns prospectively in the briefing and ways to improve in the debriefing: what went well, what was difficult, what we could have done differently, and what we learned. This kind of level playing field creates an environment where everyone in the operating room feels empowered to ask a question, contribute an idea, or voice a concern. The results are impressive: more communication equals less error, but the communication needs to be succinct and pertinent. SBAR (Situation, Background, Assessment and Recommendation) is a way of organizing the briefings or communiqués. Dr. Leonard offers this methodology as an effective communication tool (Groff, 2003).

Dr. Leonard impressed upon us the importance of these communication techniques. Although we had instituted SBAR and briefings, we had not hardwired it across our organization. It was not institutionalized. Our Center for Safety and Quality began a rigorous educational program that included the use of succinct educational briefings using the SBAR framework, which are routinely emailed to our entire organization.

Nursing handoffs are conducted in the SBAR format. Unit briefings (huddles) are required to be held twice a day on each unit. We have set a goal in FY 10 of increasing our briefing compliance from our current rate of 67% to 85%.

Dr. Leonard is a very smart, practical, and succinct patient safety advocate. He understands how things work and he has a very practical approach to achieving breakthrough results. As an educator, he always circles back to learnings and what can be retained by clinicians caring for patients. One of the techniques being used in Kaiser's primary care clinics is the Five Red Flags, which are the fundamental sources of risk. They are different for each setting or each team, but some examples would be:

- What are the five medications our patients are on that increase the risk of having a problem?
- What are the five conditions that we cannot afford to miss in our clinic?
- What are the five tests we cannot afford to lose?
- What are the five ways that the ball gets dropped?

The Five Red Flags draw attention to what creates problems, causes risk, and creates a common mental model and safety net across the care continuum (Groff, 2003).

Our most recent patient safety lecturer was Craig Clapper who visited in 2009. Mr. Clapper is an expert on engineering systems design. Coming from the nuclear power industry, he has applied his knowledge of high reliability organizations (HROs) to transforming the safety culture in hospitals towards the journey to zero events of harm. In 2008, the Healthcare Improvement Foundation, which we have been involved with since 2003, and the Regional Medication Safety Program for hospitals in the Delaware Valley invited Mr. Clapper's organization, Healthcare Performance Improvement (HPI) to guide participating hospitals on their journey to zero events of harm. AMH immediately agreed to participate and in fact pursued with Mr. Clapper the possibility of being one of the pilot hospitals. In 2009, we began our work with HPI as one of the initial pilot hospitals. Mr. Clapper was able to reinforce with all of our staff in his day of lectures and rounding at AMH the possibility of actually chasing zero errors with careful study and deliberate design of safe systems in a culture of caring and learning. The collaborative is focused on creating and fostering a culture of safety where zero serious events are possible through the creation of a high reliability organization (HRO). The HPI initiative capitalizes on all of the current, progressive thinking about creating a culture of safety. There are many synergies with the IHI and their 100,000 Lives and 5 Million Lives Campaign

initiatives of 2004 and 2006, as well as with the recommendations of the two watershed IOM reports of 1999 and 2001.

AMH is at a very critical juncture in our journey to create a culture of safety with zero harm events. For the past 10 years we have worked assiduously in a very deliberate fashion to embrace patient safety as a core value of our organization. We aspire to be one of the safest hospitals in our country. We have been inspired by gifted patient safety advocates and learned from patient safety experts some of whom are within our organization. We have set very aggressive and extensive patient safety goals for our organization. We have studied the literature, participated in appropriate collaboratives, traveled and visited other organizations in search of best practices. Through our Innovator's Circle Grants we have fostered creativity and innovation and have been recognized for our unique contributions nationally. We have demonstrated significant commitment from the Board, leadership, medical staff, employees, and volunteers to patient safety as our number one priority and a core value for our organization. We have built an infrastructure to support the execution of our comprehensive patient safety agenda. We have educated and trained our staff. We have invested extensively in technology and information systems in support of patient safety initiatives. We have raised funds from philanthropic individuals and granting organizations to improve patient safety at AMH. And finally, we have never lost our focus on patient safety over the past 10 years despite the many other pressing issues in healthcare.

All of this is very positive, but have we made a difference to our patients? Have we achieved measurable improvements? Have we saved lives? Have we reduced harm events? All of our metrics have improved. We rank in the top quartile of comparative databases for the Joint Commission Core Measures and National Patient Safety Goals. We have successfully instituted all 12 IHI Campaign Measures. We have reduced our mortality (not including hospice patients) significantly. Our hospital acquired infections (HAIs) continue to decrease and our hand hygiene rates are above 80% compliance from a starting point 2 years ago of 30%. More important than these results, we have created a small army of internal patient safety champions, some are even zealots, and we have created a Board that is focused and compulsive about its role in overseeing and supporting our patient safety agenda. They care, they question, and they look for results.

AMH has always talked about its positive, can do culture as one of its strengths as a community teaching hospital. Blending a culture of safety with the existing culture is our current focus. What we want to create is an environment where everyone is comfortable challenging authority (leadership, medical staff and trustees) when it comes to our patients' safety. Safety culture needs to trump everything we do. Our Chief of Staff and CNO have been very supportive of staff who question colleagues regarding safety or quality measures. In fact, employees who ask questions or stop a procedure are thanked for their attention to detail regardless of whether they were correct or incorrect in their challenge. The gratitude is for their courage in speaking up. For every 10 questions there

could be one near miss or error that is prevented. Physicians who dismiss employees' appropriate questions are counseled by our Chief of Staff about the need to respect everyone's opinions and concerns when it comes to the safety of our patients.

I am very proud to be part of Abington Memorial Hospital's journey to a culture of safety and our pursuit of zero preventable harm events. The agenda is enormous, at times overwhelming and the journey continuous. The agenda is also working, results are improving, patients are being treated in a safer environment, and the rewards are tremendous for patients and staff who are spared the personal trauma of being involved in a harm event. I am grateful to all who have made our journey to date such a success. We collectively recognize how much work still lies ahead of us but we are focused and energized about the opportunity to create a safer environment for our patients, their families, our medical staff and our employees.

REFERENCES

Bates, David W. "Preventing Medication Errors: A Summary". American Journal of Health Systems Pharmacy Vol. 64, Supplement 9, (July 2007): 3-9.

Berwick, Donald M. "Error Today and Errors Tomorrow." New England Journal of Medicine 348;25 (2003): 2570-2572.

Blendon, Robert J., DesRoches, Catherine M., Brodie, Mollyann. "Views of Practicing Physicians and the Public on Medical Errors." New England Journal of Medicine 347;24 (2002): 1933-1940.

Bosk, Charles L. Forgive and Remember – Managing Medical Failure. Chicago, Illinois: University of Chicago Press, 1979.

Chassin, Mark R., Becher, Elise C. "The Wrong Patient." Annals of Internal Medicine 136;11 (2002): 826-832.

Cohen, Michael, Senders, John, Davis, Neil. "Failure Mode and Effects Analysis: A Novel Approach to Avoiding Dangerous Medication Errors and Accidents." Hospital Pharmacy 29,4 (1994): 319-324,326-328,330.

Cook, R., Rasmussen, J. "Going Solid: A Model of System Dynamics and Consequences for Patient Safety." Quality Safe Health Care 14 (2005): 130-134.

Cook, Richard I., Woods, David, D. "Operating at the Sharp End: The Complexity of Human Error", Ohio State University, 1994, p. 255-310.

Gawande, Atul. Better. New York, New York: Metropolitan Books, 2007.

Gerlin, Andrea. "Healthcare's Deadly Secret: Accidents Routinely Happen." Philadelphia Inquirer, September 13, 1999.

Groff, Heidi, Augello, Thomas. "From Theory to Practice: An Interview with Dr. Michael Leonard." Forum (July 2003): 10-13.

Grooperman, Jerome. How Doctors Think. Boston, Massachusetts: Houghton Mifflin Company, 2008.

Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, DC: National Academy Press, 2001.

Institute of Medicine. To Err is Human – Building a Safer Health System. Washington, DC: National Academy Press, 1999.

King, Sorrel. "Patient Safety Advocate Turns Anger Into Action. "Hospital and Health Networks, (April 2007): 20-22.

Leape, Lucian L., Berwick, Donald M., Bates, David W. "What Practices Will Most Improve Safety?" JAMA 288;4 (2002): 01-507.

Leape, L.L., Brennan, T.A., Laird, et al., The nature of adverse events in hospitalized patients: Results from the Harvard Medical Practice Study II. New England Journal of Medicine 1991, 324:377-384.

Leape, L.L., Error in Medicine. JAMA, (1994), 272:1851-1857.
Leape, L.L., Woods, D., Hatlie, M., et al., Promoting patient safety by preventing medical error. JAMA, 1998, 280:1444-1447.

Leape, L.L. and Berwick, D.M., Safe health care: Are we up to it? BMJ 2000;320:725-726.

Marx, David. Patient Safety and The Just Culture: A Primer for Health Care Executives. Transfusion Medicine (MERS-TM), 2001.

Paget, Marianne A. The Unity of Mistakes: A Phenomenological Interpretation of Medical Work. Philadelphia: Temple University Press, 1988.

Perrow, Charles. Normal Accidents – Living with High Risk Technologies. Princeton, NJ: Princeton University Press, 1999.

Raskin, Jef. The Human Interface. Boston, Massachusetts: Addison – Wesley, 2000.

Reason, James Human Error. New York, New York: Cambridge University Press, 2008.

Reason, James, Hobbs, Alan. Managing Maintenance Error. Hampshire, England: Ashgate Publishing Company, 2008.

Roberts, Karlene. "Some Characteristics of One Type of High Reliability Organizations". Organizational Science 1;2 (1990): 160-176.

Rochlin, Gene I., LaPorte, Todd R., Roberts, Karlene H. "The Self Designing High-Reliability Organization: Aircraft Carrier Flight Operations at Sea." Naval War College Review 40;4 (1987): 76-90.

Taylor, Frederick W., The Principles of Scientific Management. New York and London: Harper and Brothers Publishers, 1911.

Vaughan, Diane. The Challenger Launch and Decision. Chicago, Illinois: University of Chicago Press, 1996.

Appendix A

Abington Memorial Hospital
Daily "CARE" Plan

Your Personal guide for Communication, Access to Information, Resources & Education

Admit Date:

Health Issues: Admitting Dx Chest Pain
Health Issues: Secondary Dx Cough
Allergies: penicillin
Durable Power of Attorney: **Does Patient have DPOA? Yes, on chart
Durable Power of Attorney: **Does Patient Have Living Will? Yes, patient to bring living will/DPOA.

Code Status

Code Orders No Code/DNR Per Patient

Medications

Acetaminophen Tablet 1000 mg (every 6 hours) (as needed)
Maalox Plus Extra Strength Suspension 30 mL (at bedtime) (as needed)
Docusate Sodium Capsule 100 mg (twice a day)
Heparin (10,000 Units/mL) Injection 5000 unit(s) (every 12 hours)
Digoxin Tablet 125 mcg (once a day)
Amiodarone Tablet 200 mg (once a day)
Furosemide Tablet 20 mg (once a day)
Aspirin Tablet 325 mg (once a day)
Nitroglycerin SL Tab 0.4 mg (every 5 minutes) (as needed)
Hydrochlorothiazide Tablet 12.5 mg (once a day)
Isosorbide Dinitrate Tablet 10 mg (twice a day)

Respiratory Care

O2 Therapy Cannula 2.0 LPM (continuous) A way to deliver needed oxygen to help you breathe better.
Oximetry (Resp) Routine (one time) A test to check the percent of oxygen in your blood.

Nutrition

Diet - Common Cardiac Diet Lunch

Laboratory

CK w/Reflexive MB 1100 Lab Rounds A blood test that measures the amount of muscle enzyme in your blood.
Cardiac Troponin 1100 Lab Rounds A blood test that measures the amount of cardiac protein in your blood.
Comprehensive Metabolic Pnl AM Lab Rnds A blood test that measures your blood sugar level, electrolyte and fluid balance, kidney function and liver function.
CBC/Platelets (CBC ONLY) AM Lab Rnds A complete blood count (CBC) provides important information about the kinds and numbers of cells in the blood, especially red blood cells, white blood cells and platelets.
Protime AM Lab Rnds A blood test that measures how long it takes blood to clot.
Digoxin Level AM Lab Rnds A blood test to measure the amount of the medication Digoxin in your blood.
Lipid Profile AM Lab Rnds A blood test that measures blood levels of total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides.
Lipase AM Lab Rnds A blood test to measure the amount of this enzyme in your blood.

Radiology

22-Sep-2006 10:05

Abington Memorial Hospital

Continued

Radiology

Radiation passes through a patient's body and is recorded on film, video or computer producing anatomical images.

Chest - 2 Views (PA-LAT) Routine

NM Stress Test Routine

Cardiology

EKG (Routine/12 Lead) Routine (on admission) A non-invasive test that records the electrical activity of the heart by using ultrasound.

Cardiolite Exercise Stress Test Routine (one time) A stress test that is similar to the standard treadmill test, but provides the doctor with more information.

Consults

Primary Resident Coverage RES IM-D7 #7607(B069) Routine

Consult Smoking Cessation Comm Hlth

Case Mngmt Consult (Misc.)

Physician Consult Group AMS-CARDIOLOGY(0648)

Rehab Medicine

PT Cardiac Precautions

PT Evaluation Routine (one time)

PLEASE NOTE THAT YOUR PHYSICIAN MAY HAVE ORDERED ADDITIONAL TESTS OR MEDICATIONS WHICH MAY NOT BE INCLUDED IN YOUR "CARE" PLAN

Appendix B

JOSIE KING FOUNDATION at BCF
creating a culture of patient safety, together

THURSDAY, JUNE 7, 2007

It All Comes Back to Communication

In the nearly five years that I have been participating in this patient safety movement, I have met thousands of wonderful healthcare providers. I have visited hospitals all over the country. I have sat and listened to dozens of patient safety conferences and grand rounds. I have learned big words like nosocomial infections.

Through it all I have told Josie's story and every step of the way I have tried my best to inspire caregivers to incorporate patient safety best practices into their everyday experience on the job. I have looked and listened, and have been amazed at all of the good I see, while also being confused as to why things can't happen faster and why 98,000 people still continue to die from medical errors every year.

The thing that really continues to amaze me is the communication issue. Josie died because people didn't listen. They didn't listen to me, and they didn't listen to each other. I can't tell you how many stories I have on my computer from families who have been affected by medical errors, and there always seems to be a common thread, "They didn't listen."

Correct me if I'm wrong. Doesn't the Joint Commission report that over 60% of all sentinel events are due to a breakdown in communication? I am not a doctor or a nurse. I am not at the bedside, and I am not an expert in the field of patient safety; however it seems to me that if people communicated better we'd all be safer. I believe in high tech solutions. It is where we are

heading, but wouldn't we get more bang for our buck if we communicated better?

I was in Pennsylvania a few months ago at a wonderful hospital by the name Abington Memorial. I was presenting at their Grand Rounds. After the presentation, I was lucky enough to join them on their Patient Safety rounds. The team consisted of two nurses, a doctor, and a board member. I was struck by two things:

The first was the presence of the board member. There is a lot of talk these days about getting board members involved, especially when it comes to safety and quality. It was so great to see first hand a hospital that was doing just that.

The second thing that struck me- Every unit we went to, the patient safety officer would ask the nursing team on the floor a question:

"If you could have anything you wanted on your floor to keep patients safe what would it be?"

Each floor had variations on the same response:

"I wish we could get into the doctors' heads."
"I wish we were more like a team."
"I wish we communicated better."

That is what they wanted. They did not ask for fancy equipment or the latest in technology. They wanted to understand what the doctors were thinking. They wanted better communication between the nurses and the doctors. The thing that amazes me even more is that I hear this everywhere I go. Communication- and it is not just between the doctors and the nurses. It is between the patients, their families and those who are caring for them.

It seems so simple, but I am learning that changing behavior is not an easy thing to do. I don't know what it takes, maybe time, maybe another generation, hopefully not more deaths.

I will tell you one thing. The board member that day heard that message loud and clear and I bet she shared what she learned with her fellow board members, at least I hope she did.