The Root Causes of Preventable Patient Harm

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Abstract:

"… all of us will likely experience a meaningful diagnostic error in our lifetimes…". (IOM 2015). Medical Errors are a common cause of death in the United States,(1) but there is evidence that healthcare-related harm can be prevented. This article addresses the "root causes" of the Patient Harm epidemic.

This article considers the "why" and the "how" of medical errors. Despite having well-trained, intelligent, compassionate caregivers that have modern equipment like surgical robots and telemedicine, we still get it wrong so often. Why tolerate a system that does not prioritize patient safety?

A Root Cause Analysis (RCA) is often performed after a patient is harmed in order to determine not just *what* happened, but more critically, *why*. Why did the surgeon and the entire operating room team miss the fact that the operation was being done on the wrong side? Why did the highly experienced nurse give the medication to the wrong patient? Only by understanding factors associated with an error can steps be taken to prevent a recurrence. If we performed an RCA on the entire healthcare system, we would find a number of "root causes" including complicated systems, competing values, distracted caregivers, confusing and disconnected information technology (IT) systems, unsafe cultures, "drift" behaviors, and a lack of board-level oversight of patient safety.

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The Patient Harm epidemic will continue until caregivers and the public insist on a system that prioritizes safety. Progress will only come with acknowledging the problem and refusing to accept the current level of preventable harm.

I Introduction:

"… all of us will likely experience a meaningful diagnostic error in our lifetimes…" (2) So begins the most recent report from the Institute of Medicine (IOM). Fifteen years ago, it was revealed that the number of people killed by medical mistakes in this country would fill up four jumbo jets every single week. That jarring statistic emerged from the IOM report, "To Err is Human: Building a Safer Health Care System." (3) The report focused national attention on the issue of patient safety, and subsequent data has confirmed the magnitude of the problem. In 2010, a combined statement was published by The Joint Commission (TJC) and The Office of the Inspector General (OIG), describing a random chart audit completed by physicians. TJC and OIG reported that 27% of Medicare beneficiaries had been harmed by the healthcare system. Not all of the harm is preventable, and not all of the preventable harm is due to negligence. However, it is critical to consider the "root causes" of the Patient Harm epidemic. Many practitioners are vaguely aware of the statistics. While the data are controversial, medical errors may be between the 3rd and 6th leading cause of death.(3) The IOM estimated 98,000 deaths per year is likely a dramatic underestimate, and improvements are coming far too slowly. (4) Still, there is evidence that with appropriate measures healthcare related harm can be prevented.

This article focuses on the "why" and the "how" of medical errors. In the United States and the entire developed world, we generally have well-trained, intelligent, compassionate caregivers that want to help others. The individuals have modern equipment like surgical robots and telemedicine. How do we get it wrong so often with such tragic results? Why do we continue to tolerate a system that does not prioritize patient safety?

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II How Did We Get Here -- The Root Causes of Patient Harm:

A Root Cause Analysis (RCA) (5) is often performed after a patient is harmed in order to determine not just *what* happened, but more critically, *why*. Why did the surgeon and the entire operating room team miss the fact that the operation was being done on the wrong side? Why did the highly experienced nurse give the medication to the wrong patient? Why did the respiratory therapist leave the breathing tube in the esophagus? Only

by understanding factors associated with an error can steps be taken to prevent a recurrence. What if we performed an RCA not on a single patient event, but the entire healthcare system? Such an RCA might find a number of "root causes," including complicated systems, competing values, distracted caregivers, confusing and disconnected information technology (IT) systems, unsafe cultures, "drift" behaviors, and a lack of board-level oversight of patient safety.

1- Complicated Systems

[N]o industry in the world has to deliver on so many different service lines. We have some 6,000 different drugs and more than 4,000 different kinds of procedures, and providing them currently entails 35 million hospital admissions, 120 million ER visits, 400 million imaging procedures, almost 1 billion office visits, and 3.5 billion prescriptions each year. What science has given us is extreme complexity. And, our system cannot handle it.

> *-Atul Gawande, Testimony Before the House Committee on Energy and Commerce Subcommittee on Health, March 10, 2009*

Medicine used to be safe but largely ineffective. Healthcare was often limited to hand-holding and reassurance. Now, it is highly effective and highly dangerous.(6)

For anyone that works at the bedside, this is not new information. We are constantly facing new "Quality measures", human factors, extraordinarily complex IT systems, sicker patients that live longer with more chronic illnesses, and an ever-changing doctor-patient relationship. Peter Drucker, the highly respected expert in international management, has noted that healthcare is "…the most difficult, chaotic, and complex industry to manage today." (7)

Additionally, it is no longer enough for a physician to understand their respective medical specialty, how to diagnose, and how to treat. Physicians are expected to be well-versed in ethics, law, business, computers, and interpersonal psychology.

2- Competing Values

It is comforting, yet highly inaccurate, to think that safety is the highest value in the United States (U.S.) healthcare system. Charles Vincent has described the comparison between the healthcare system and executives that run an energy company.

"Safety is not our top priority. Getting oil out of the ground is our priority. However, when safety and productivity conflict, then safety takes precedence." (8)

For most at the bedside, patient safety is the most important consideration. This is clearly not the case for the healthcare system as a whole. If we subscribe to the idea that every system is perfectly designed to get the results that it gets,(9) then we have designed (or tolerated) a system that may be one of the leading causes of death in the U.S.

Historically, physicians and nurses have been the loudest voice to advocate for patient safety. Increasingly, however, physicians are "employed" by large entities, so the concept of an "independent medical staff" is rapidly dissipating. A physician who questions unsafe practices risks being labeled as "disruptive," "negative," or "not a team player." Similarly, nursing staffing ratios are an extremely volatile topic. Nurse labor costs are the largest expense in most hospital budgets. If cost-containment is the major focus, then there is a major incentive to decrease staffing. At the same time, there is clear evidence that understaffing increases the risk of patient death. A retrospective study at the Mayo Clinic found that mortality risk increased two percent per shift when a unit is understaffed and four percent for a high turn-over shift.(10) The same study found that more than one-third of patients were exposed to three or more understaffed shifts.

A hospital Emergency Department can be a telling example of "competing values." ED's are often under tremendous pressure to meet "throughput" or "efficiency" metrics. While "door to doc" time can be an important safety consideration, moving too quickly is also dangerous. Getting patients properly triaged and admitted to the proper service is vital; however, many hospital systems measure the speed of their ED team year to year. Therefore, an extremely efficient and fast-moving ED will be asked to "go faster" the next year. When a team is moving as fast as they possibly can and then are asked to move even faster the next year, there is a potential for tragic errors. Twelve-year-old Rory Staunton, for example, was treated in a hospital's Emergency Department for dehydration. Rory was discharged home hours before the complete blood count (CBC) result showed a massive left shift, strongly suggesting sepsis rather than dehydration. Unfortunately, the lab was never checked, and Rory subsequently died of septic shock. The New York State Department of Health found a "systemic failure related to the reporting and follow up of abnormal laboratory results." (11)

3- Electronic Distraction

Look around in any restaurant, hardware store, or hospital committee meeting. How many people are staring at their phones, tablets, and computers partially or completely disengaged from their physical environment? Hospital team members text on their way to work and, worse, text at the bedside in the midst of patient care, with serious safety consequences. At one academic medical center, a resident in the midst of discontinuing a warfarin order on her smartphone received a text about an upcoming party. The resident confirmed she was attending the party but never completed the order, and three days later, the over anticoagulated patient developed a cardiac tamponade and required emergency open-heart surgery. (12)

Electronic distraction is also a problem in the operating room (OR). A recent article in Perfusion noted that the majority of cardiopulmonary bypass technicians admit to having updated social media and web browsed while they had a patient on the pump. (13) The behavior was not just texting and responding to e-mails (which would be concerning enough). The technicians admitted to being engaged in social media, and the majority of technicians admitted that they knew what they were doing was wrong. Anesthesiologist Peter Papadakos, who has written on this topic, cites disturbing examples of electronic distractions in the OR, including a neurosurgeon making more than ten personal calls during a single operation and a nurse checking airfares during surgery. Dr. Papadakos states, "My gut feeling is lives are in danger." (14)

4- The Unfulfilled Promise of Health IT systems-

EMR's were touted as making everything safer and more efficient, and in many cases, they have had the exact opposite effect. A recent article in the American Journal of Emergency Medicine noted that the average ED physician clicks their mouse 4000 times during a 12 hours shift.(15) While there are data that certain types of medication errors are less frequent with CPOE, most agree that Health IT is still an undelivered promise.(16)

It is possible that 15 years in the future, caregivers will look back on this period as the "dark ages" of health IT. It is not that caregivers have not embraced technology. Most carry

their smartphones, tablets, and use home entertainment centers that rival the complexity of the previous generations' supercomputers. Rather, Health IT systems have profoundly altered workflow and process. The introduction of Health IT systems has been linked to increased mortality in children in PICU's. (17) There are also data on how this increased mortality can be avoided.(18, 19) Yet, there is widespread unfamiliarity with this impactful and timely literature. Those that are currently practicing medicine are well-aware of the distractions related to Health IT systems., and the media is becoming increasingly aware as well. In a New York Times article titled "Patients vs. Paperwork," a nurse laments: "Computer documentation in health care is notoriously inefficient and unwieldy, but an even more serious problem is that it has morphed into more than an account of our work; it has replaced the work itself."(20)

5- Not appreciating the importance of culture-

Many older physicians likely recall their early days of medical school and residency. Many young doctors were told, "you can call me, but it will be seen as a sign of weakness." Where did Patient Safety fit into that paradigm? The answer….it did not.

Since 2010, there has been a small but growing body of literature that safe culture translates directly into safer patient care. Based on the work of Peter Pronovost's team, a variety of safety initiatives (including care bundles) were instituted in Michigan. The Keystone Project fundamentally transformed ICU care in the United States and around the world. One of the more remarkable findings from the Keystone Project was that the ICU's with the safest culture scores also had the lowest incidence of bloodstream infections (BSI's)(21) and ventilator acquired pneumonia (VAP's).(22)

The link between "culture" and improved outcomes was also noted in the surgery literature. In a study involving 22 hospitals, it was observed that operating rooms with the safest culture scores had significantly lower serious post-operative complications following bariatric surgery.(23) Similarly, ineffective communication and lack of psychological safety have been associated with the highest postoperative mortality.(24)

The Emergency Department literature also supports the link between culture and safety. In a 2012 article from Annals of Emergency Medicine, it was reported that the ED's with the safest culture were more likely to catch a medication error (intercepted "near misses").(25)

There are still those in medicine that think safety culture means "group hug." On the contrary, there is now data from multiple medical specialties that having a safe culture is correlated with fewer patient injuries and death. In fact, safety attitude has been linked to decreased BSI's, VAP's, hospital-acquired ulcers, patient falls, CHF readmission and the list goes on.

6- Drift Behavior-

"Drift" has been described as the normalization of deviant behavior. A telling example is compliance with speed limits while driving. No one sped on their driver's test. As drivers become more comfortable with the operation of a vehicle, they often will exceed the posted speed limit. 5 mile per hour over the speed limit, becomes 10, becomes 15, and soon we arrive at the current state of our highways. Likewise, as we become more comfortable, the "danger" of our behavior becomes more remote.

Baby Boy Martinez is scheduled to have his right kidney removed. When he awakens, the parents note a bandage on the left side of his body. How could this happen?

A recent article in the journal Surgery reported 60% non-compliance with the surgical checklist at a Children's Hospital.(26) One of the conclusions drawn by the authors was that their OR's had an unsafe culture. Not following checklists is an example of "drift behavior" The team does not "perceive" the danger in their collective drift behavior.

Of course, drift behavior is not limited to the operating rooms. The same behavior is seen when nurses "workaround" bar-coded medication systems using methods such as affixing patient labels to their computer workstations.(27) Poor system design is a major contributor to this and many other "drift" behaviors and workarounds.

7- Slow Adaptation of Evidence-Based Practice-

In the 1840s, the world's largest maternity clinic had a major problem. The maternal mortality rate in the medical student ward was 29%, compared to 3% in the midwifery ward.(28) Obstetrician Ignaz Semmelweis suspected infection as the culprit and required hand washing using chlorinated water prior to deliveries. Despite the fact that mortality rates immediately decreased, Dr.Semmelweis faced ridicule and criticism when he presented his findings to fellow physicians. Other physicians of the day, such as Charles Meigs, essentially stated that gentlemen do not need to wash their hands, and it was over a century before a concerted effort was made to improve hand hygiene. (29, 30)

Hand hygiene is not the only evidence-based practice that the medical profession has been slow to adapt. Indeed, while millions of dollars are spent on clinical research, it is very difficult for research findings to be incorporated, "given how slowly important new treatments are disseminated into practice and how resistant practitioners are to withdrawing established treatments from practice even once their utility has been disproved."(31)

8- Safety Begins in the Boardroom

Physicians generally receive very little training about the business side of medicine, let alone corporate structure. The board of trustees has ultimate responsibility for overseeing the quality of care provided at hospitals in this country, sitting above even the Chief Executive Officer. Boards used to focus mainly on the financial side of hospital operations. After two serious medical errors at the prestigious Dana-Farber Cancer Institute, however, including the death of *Boston Globe* reporter Betsy Lehman from a chemotherapy overdose, it became clear that safety must be a priority at all levels, not just a staff subcommittee. After the errors at Dana-Farber "sweeping" changes were made following a "critical examination of how the organization delivered care and conceived its mission."(32) This included strengthening the trustee-level quality committee.

III- Conclusions:

This article has attempted to outline a RCA of patient harm, but ultimately the goal of an RCA is not to discuss what has hap-

pened in the past but to figure out how to improve systems in the future. After a number of high profile aviation accidents in 1996, the airline industry began a concerted effort to improve safety and achieved a 65% drop in fatal airplane crashes in 10 years.(33) Similar to aviation, the nuclear industry, fire-fighting, law enforcement, military, and healthcare sectors attempt to achieve "high reliability."(34-35)

Health care aims to be highly reliable, and every year additional resources are devoted to the substantial issue of Patient Harm. Unfortunately, resources alone are not enough. After all, billions of dollars have been poured into electronic medical records without a clear benefit to quality or safety. The healthcare industry has made some progress, but there is much more to be done to change the culture and improve the process of care. As distinguished leader Colin Powell has noted, "There are no secrets to success. It is the result of preparation, hard work, and learning from failure."(36)

The Patient Harm epidemic will continue until caregivers and the public insist on a system that prioritizes safety. Safety is a board-level priority, and progress will only come with acknowledging the problem and refusing to accept the current level of preventable harm.

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The authors have no conflicts of interests to disclose.

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