Patient Safety
20 years after To Err is Human
Reflections on the journey and what’s next

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The publication of the Institute of Medicine’s 1999 report *To Err is Human: Building a Safer Health System* was a watershed moment for healthcare. The report, which catalogued and classed harmful errors by healthcare providers, highlighted the rate of casualties that could have been prevented by electronic safety checks. This catalyzed the digitization of healthcare throughout the following decades.

*To Err is Human* pre-dated the mid-2000s HITECH mandate, but many early adopters of electronic health records (EHR) saw great potential in technologies that could reduce risk and harm. They recognized the value of capabilities, such as computerized physician order entry (CPOE) and knowledge-based medication administration, in delivering patient-centered care. The years that followed brought phenomenal advancements, from consumer platforms and machine learning, to analytics and big data, to genomics and precision medicine. Key safety measures, such as data’s transfer to the cloud for security and digital systems designed to catch human error, were developed and executed. In 2009, the American Recovery Act provided $30 billion of funding toward this execution. Since then, the industry has collectively and relentlessly focused on patient safety and quality, and EHR companies like Allscripts have led the change.

A common purpose fuels all these innovations: the idea that we can digitize “do no harm” and deliver safer care. It is a mission many of us have been working on for a long time. Due in part to *To Err is Human*, patient safety is the top priority across all stakeholders – clinicians, solution builders, advocates – and we must work together to continue to make progress.

Much has been accomplished since the report was released, but much remains to be done. Today, as patients expect to actively engage with their own care, the focus is on enabling them to do so fully. Recent rulings from the Centers for Medicare & Medicaid Services (CMS) on granting patients access to their records have aligned with tech companies’ focus on connecting patients as consumers and building apps that let them personalize their care. As we continue in this direction, patients and their loved ones will be increasingly empowered to recognize their own needs and advocate for their own safety and well-being.

In recognition of the past 20 years of patient-safety achievements, and looking ahead to the next 20 years, this publication features insights from thought leaders and trail blazers from across the industry. I’m inspired by their efforts to create the safest environments for patients, and I hope you are, too.

All Possible,
Paul Black, CEO
Optimizing health IT for patient safety

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As a patient safety organization and an Agency for Healthcare Research & Quality (AHRQ) evidence-based practice center, ECRI Institute began focusing on health information technology (IT) safety in 2014 by establishing the multistakeholder collaborative Partnership for Health IT Patient Safety. The Partnership analyzes data and information focusing on how health IT could be involved in safety.

Building on To Err is Human

This work builds on a movement begun twenty years ago, when the seminal report, To Err is Human: Building a Safer Health System1 called for quality and safety improvements in healthcare. The report emphasized the need for increased knowledge about patient safety, voluntary efforts for learning, new standards and expectations, and the creation and expansion of safety systems. At that time, leaders could not have anticipated how deeply embedded technology would become into the delivery of healthcare and that it, too, would be part of systems integral to driving quality and safety. Safety practices have been put in place valuable for identifying, evaluating and addressing concerns. In a field rich with investigators, the Partnership and others have found evidence that technology has positively affected patient safety, but new concerns have been identified, including interoperability, functionality, usability and burden.

Identifying Health IT Safety Issues

Events such as falls are easy to recognize. However, it is not always easy to recognize when health IT may be involved and even more difficult for providers to see the potential opportunities for technology to drive safety improvements. Yet, health IT risks are no less important to address than patient falls, hospital-acquired infections or medication errors.

Strategies can help incorporate health IT safety into safety and quality efforts. However, the specific issues must be clearly identified first. Consider this de-identified narrative from a PSO-reported safety event:

A postpartum patient with a fever post-cesarean was readmitted to the hospital to receive intravenous antibiotics for infection. The obstetrician hospitalist caring for the patient ordered an epidural for pain relief but cancelled it upon realizing the order had been entered under the wrong patient. The anesthesia team that received the original order began preparing for the procedure in the incorrect patient’s room without discovering that the order had been canceled.

Here, issues under evaluation involve patient identification, effective communication and system interfaces. Although learnings can occur by evaluating this single event, greater opportunities for learning may occur when similar events that contain similar issues are examined together as part of safety programing.

Incorporating Health IT into Safety Solutions

The Partnership seeks not only to identify and mitigate issues related to health IT, but to identify opportunities to incorporate health IT into safety solutions. To further this goal, the Partnership brought together an extraordinary group of stakeholders: electronic health record (EHR) developers/vendors, providers, PSOs, subject matter experts, patient advocates, professional organizations and others.

Working collaboratively, the Partnership incorporates learnings from voluntary reports, closed liability claims data and other sources of information. Analysis is then combined with current evidence and organizational successes to drive safety. Identified recommendations must be considered within the complex sociotechnical environment where external rules and regulations, policies and procedures, system measurements and interfaces, hardware and software and clinical content meet people, workflows, communication and the numerous interfaces available.2

The Partnership encourages an organizational focus on health IT safety by developing recommendations for implementing and embedding a health IT safety program (see www.ecri.org/safepractices). The multistakeholder workgroups have issued recommendations related to (1) closing the communication loop in medication and testing, (2) creating a health IT safety program, (3) ensuring accurate patient identification and (4) safe use of copy and paste.

Some safety issues, such as copied-and-pasted "note bloat" and alert fatigue, are consequences of adding technology to...
the already complex care environment. To recognize and understand these complex issues, the group of participants in safety programming needs to expand to include new stakeholders such as IT developers, IT staff, frontline users, human factor experts and subject matter experts. Their involvement will enable more robust collaboration and expand opportunities for learnings.

Commitment to Continuous Improvement and Collaboration

Reflecting on To Err is Human twenty years later helps us to see how far we have come but also highlights how far we still need to go. Systems, processes and conditions within healthcare must be continually designed to minimize the likelihood of human error. Organizations must continue to promote a culture of safety and gather meaningful data for continual learning. It is only through collaboration that stakeholders prioritizing a shared culture of safety will be able to facilitate safer care. With all we have accomplished in the past twenty years, the most important learning is that safety is and continues to be a shared responsibility.

Health IT Safety is a Shared Responsibility

Geoff Caplea, M.D., MBA, Medical Director for Patient Safety, Allscripts

In the fall of 2018, the Pew Charitable Trusts, MedStar and the American Medical Association released Ways to Improve Electronic Health Record Safety. The report recommends rigorous testing and establishing voluntary criteria across the software life cycle to enhance the usability, safety and safe use of health information technology (IT). A quote from page one first acknowledges some of the benefits of electronic health records (EHRs):

“Electronic health records have transformed modern medicine, giving doctors and nurses better data to guide care, supporting enhanced patient safety through new automated tools, and creating more efficient processes by connecting different health systems.”

There are several studies and numerous examples of the benefits of health IT, and our clients successfully demonstrate the following benefits:

- Safer prescribing and medication administration
- Rapid identification and treatment of sepsis
- Improved patient engagement
- Precision care with delivery of genomic information at point of care
- Health information exchange improves safety, reduces cost

But the use of health IT has led to some unintended consequences. Regulatory, organizational, financial and quality requirements have increased health IT administrative tasks, specifically documentation. These tasks can disrupt the clinician-patient relationship and add to growing clinician burdens.

Taking a Systems Approach

The report acknowledges the importance of the key attributes of a social-technical model for health IT, introduced by Dean Siting, Ph.D., and Hardeep Singh, M.D., MPH. It contends that healthcare is a highly complex and adaptive system with multiple dimensions.

For example, there is the technology itself—the hardware, software, content and user interface. Then we add people who design, develop, implement, customize and ultimately use the technology. There are workflows and communication processes that are unique to each function and team. There are internal organizational policies, procedures and culture, as well as external rules, regulations and other pressures.

These dimensions are not sequential or hierarchical, but rather interdependent. To achieve safety, usability and high reliability, a systems approach must address these interrelated factors that affect system safety.

Health IT safety is a shared responsibility of all stakeholders across the health IT lifecycle. It must be a top consideration throughout the software lifecycle—product design and development, implementation, customization and configuration, and user training, as well as ongoing maintenance and upgrades.

Our Commitment to Usability and Safety at Allscripts

Allscripts recognizes the role of health IT in improving usability and safety, and we commit to continue doing our part to minimize risks and unintended consequences.

The report authors advocate for the expanded use of existing best-practices for usability, beyond the minimum required by certification, including more robust clinical test cases. Allscripts agrees that usability criteria from The Office of the National Coordinator for Health Information Technology (ONC) sets a low bar, and we far exceed those expectations. Allscripts current usability and safety practices include deep user engagement, robust user-centered design (UCD) processes (e.g., formative testing) and rigorous clinical test cases.

In addition to comprehensive usability and safety practices during design and development, the authors also advocate for advanced testing with the customization, configuration and ongoing maintenance of health IT. This is important because while configuration can bring benefits that are tailored to organizations, it can also inadvertently introduce usability or safety concerns. Because of the potential for unintended consequences, it is critical for healthcare organizations to perform appropriate clinical risk assessment, as well as failure modes and effects analysis (FMEA) to ensure the safety of customizations.

EHR vendors should do more to explain and deliver to healthcare organizations
the workflows that we know are safe and efficient, and we should make organizations aware of the impact of changes on safety and usability. EHR vendors should continue to make more of an effort to ensure solutions consider safety modes when enabling configuration, or “guardrails” that can help to restrict known safety concerns. As part of our commitment to achieving safety across the health IT lifecycle, Allscripts continues to collaborate with healthcare organizations, patient advocates, safety experts, researchers, patient safety organizations (PSOs) and other vendors to help ensure system safety.

EHR usability is just one piece of the healthcare socio-technical system. More user input and expanded testing will not be sufficient to make health IT products better. However, EHRs must continue to improve and we, as vendors, must help minimize potential risks to patient safety. It will take continued effort from multiple stakeholders to achieve this goal.

**Electronic patient record (EPR) systems are not infallible, as much as we wish they were. Hospitals must maintain live clinical systems 24/7 whilst also instituting planned upgrades and configuration changes. This means that every single organisation has a unique software environment with specific workflows and hardware permutations. It is unfeasible to predict every potential scenario. Most organisations recognise that a backup plan and proactive patient safety reviews are crucial. In the UK, the NHS requires rigorous review and documentation of these activities.**

However, when trusts envisage and prepare for a major incident, they often see things in black and white; they anticipate the technology either works in its entirety or it doesn’t. Many of them create contingency plans based on the worst-case scenario of a complete outage.

In reality, EPR malfunctions are not always all or nothing, and trusts encounter a mixed variety of situations. One time, it may be that a group of users cannot access the system, and another time might involve lost data. Unfortunately, if organisations have only prepared for a full outage, they are not equipped to quickly manage and resolve events they did not anticipate. If the full resolution of the EPR issue is likely to be hours (or longer) away, plans need to be expedited to ensure an acute hospital can continue to operate 24/7.

Mitigating Patient Safety Risk When Technology Malfunctions

Anna Bayes, Allscripts Medical Director, United Kingdom

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4 Steps for Patient Safety Review When an EPR Malfunctions

It’s impossible to predict every combination of possible patient safety hazard, which is why it’s important to categorise and quantify risk based on industry standards. Best-practice approaches include the following steps:

**Step 1: Identify patient safety concerns as a subset of all the issues reported**

When technology malfunctions, organisations must first focus on patient safety, which is defined as harm to the patient. That seems like an obvious distinction, but it’s an important one. If billing or reporting functions are down, for example, it is unlikely that will cause harm to a patient. Ensure any issues identified are assessed and systematically scored for potential patient harm.

**Step 2: Distinguish risks from issues**

A patient safety issue is something that is happening; a risk is something that might happen. It’s important to view the situation through both lenses. Be consistent and record everything that needs to be detected and monitored. In particular, identify issues that have led to out-of-sync data that will need to be checked and entered later to restore data integrity.

**Step 3: Prioritise hazards**

No one can address everything all at once. Use an industry framework to determine the severity and likelihood of each safety hazard on the list. Deal with the most worrying items on the list first, and don’t lose track of the others.

**Step 4: Make the situation as safe as possible whilst waiting for a long-term fix**

Once the list is prioritised, organisations must ask: How quickly can these items be fixed? How long will it take to do it right? How can we ensure the safety of patients in the meantime? Put in place work-around processes until a long-term resolution can be implemented.

We prepare for situation A through situation Z, but we never dreamed of situation 48

EPRs contribute to patient safety in countless ways, and we must constantly monitor for potential risk. A lot of proactive clinical safety work is theoretical; we prepare for situation A through situation Z, but we never dreamed of situation 48. By taking a step back and addressing incidents with the core principles above, we can consistently manage risk and patient safety effectively in a crisis.
Creating and sustaining a safety culture

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How to Change Patient Safety from a Priority to a Purpose

Patricia McGaffigan, RN, MS, CPPS, Vice President, Safety Programs
Institute for Healthcare Improvement (IHI), and President, Certification Board for Professionals in Patient Safety

Editor’s note: This article is an excerpt of an original piece that appeared on IHI’s blog. In this installment of IHI’s Profiles in Improvement series, McGaffigan describes her healthcare journey and why the safety movement needs a “reboot.” To read the full article, visit IHI’s blog.

How far have we come in the two decades-plus of collective work in patient safety—as a nation, and as an industry? In 2015 the National Patient Safety Foundation (NPSF) convened a panel of experts from around the world to ask this very question: Are we any safer today? The panel published a report, Free from Harm: Accelerating Patient Safety Improvement Fifteen Years after To Err Is Human (the 1999 Institute of Medicine report that put a spotlight on medical errors). The panel’s report found that, when we focus on very circumscribed problems like catheter-related urinary tract infections or ventilator-associated pneumonia, and when we invest in focused, well-defined initiatives, we are making a difference. Such results have helped put safety in the consciousness of our healthcare system in a meaningful way.

At the same time, the panel concluded that preventable healthcare errors remained unacceptably high. While we have, understandably, focused on specific, targeted initiatives, we have not made wholesale and sustainable progress. We have a long way to go in ensuring that safety is at the core of why every healthcare organization exists, and what every all healthcare leaders believe is their purpose. I describe this as moving safety from a priority to a purpose. A priority is something that we can rate... higher or lower. A purpose is timeless and nonnegotiable.

Tell me about the patient safety “reboot” at IHI.

It’s around taking a firm position that we cannot continue to make progress unless we are committed to a total systems approach to safety. The best of humans under the best of circumstances make errors. We must accept this reality, as nearly every other industry does, and shore up the systems in which we work to mitigate risk and error.

This reboot involves ensuring that healthcare leaders and boards commit to zero harm as a core value. It also involves being able to understand, create and sustain cultures of safety within an organization. The culture is set by and dependent upon leaders who recognize that safety is their purpose. It requires looking at safety not just from a departmental or a unit perspective but spanning the total trajectory of the patient and family through the healthcare system. Every point a patient touches in their journey requires this leadership commitment and know-how, and we’ve developed resources such as our leadership blueprint to ensure that leaders have diagnostic tools and practical recommendations for creating cultures of safety.

What’s an example of something that keeps you up at night—the toughest challenges you see?

Workforce safety keeps me up at night. We know that the physical and emotional safety of our staff are essential to a safe and productive culture. Healthcare is a dangerous environment. Acts of violence and incivility continue to grow, and in response, we are seeing substantial impact on our workforce with respect to burnout, fatigue, injury, absenteeism, presenteeism, attrition, moral distress, depression and even suicide. We can’t simply put a Band-Aid on these problems; we need to understand and address their root causes, which often tie back to unacceptable leadership and cultural behaviors that have accepted this harm as a collateral part of doing business.

We are working to change this by raising awareness—many boards never see workforce safety dashboards, for example—and by creating zero-tolerance policies for accountability. We’re also working to raise awareness of emotional harm for patients, families and our workforce.

What are some bright spots you see in patient safety?

A big bright spot is the recognition that patients and families have become an integral part of the care team, and that partnering with them as co-designers of their care will only help improve their care and safety. While there’s still a long way to go, we are also seeing an era in which expectations for transparency with patients, within and across organizations, and with the public, is expected.

Another bright spot is the reformation of academic professional programs, with a growing focus on interprofessional learning environments, where safety is embedded into the DNA at the most formative stages of students’ careers. Teaching safety from an individual perspective can merely “check the box”; however, the critical role of culture and learning systems is best taught in teams and is essential for highly reliable care. I’m excited by signs that patient safety is becoming its own profession. We have all kinds of pathways to
build skills and capabilities in safety, including credentialing via the Certified Professional in Patient Safety (CPPS) exam. We now have more than 2,200 credentialed professionals who have unique and proven skills to lead organizations in safety. And we have a range of offerings for individuals at all levels, from beginners taking our Open School classes to clinicians and senior managers ready for patient safety executive programs.

What are you most excited about?

We just announced the formation of a National Steering Committee to develop a national action plan for patient safety, convening representatives from about 25 organizations from the healthcare, policy, regulatory and advocacy communities. This new effort stems from a 2017 NPSF Call to Action that identified preventable harm as a public health crisis.

These organizations, which share similar goals, now have the opportunity to work together to become more united in our efforts, with more wholesale collaboration across key parties. This was a key recommendation from To Err Is Human... and while we’ve seen more shared learning and partnership in recent years, this represents a critical milestone—an opportunity for everyone in healthcare to create a world in which patients, and those caring for them, are free from harm.

New Models for Building Better, Safer Healthcare

Jay Bhatt, D.O., Senior Vice President and Chief Medical Officer, American Hospital Association

The pressure to offer cutting-edge technology and services while keeping healthcare safe, accessible and affordable has increased. Twenty years after To Err Is Human: Building a Safer Health System was published, the healthcare field abounds with disruptors, innovators and transformers. And issues such as ensuring affordability and value in healthcare, addressing the social determinants of health, caring for a larger number of older adults in the patient population, and improving maternal care and end-of-life care are at the forefront.

To Err Is Human described healthcare delivery at the time as “decentralized and fragmented” and lacking transparency. Today, hospitals and health systems are redesigning healthcare by better engaging patients and families, reaching out into their communities and leading collaborative partnerships focused on improving care coordination and transitions and eliminating healthcare disparities, training healthcare teams and sustaining clinical partnerships, and improving access and value. And patients and consumers are becoming better informed about quality and costs as they make healthcare decisions.

Leadership, Teamwork and Clinical Partnerships

Delivering safe, high-quality care starts with interactive leadership. Leaders—and that includes board members—must be committed to zero patient harm, make safety and quality the organization’s highest priority, and set goals and empower employees at every level to accomplish those goals. Leading healthcare organizations integrate patients and their families in their care plans from the start—whether it’s discussing the patient experience (what matters) or value—identify and address social determinants of health, and care for their own employees. They also drive continuous improvement by tracking and sharing data at all levels, including with patients.

Team training courses and programs provide healthcare professionals with valuable resources and hands-on practice to gain the knowledge and skills that improve communication and teamwork. Teamwork skills are teachable and learnable, and they optimize team performance—and patient outcomes—across the healthcare delivery system. TeamSTEPPS—Team Strategies and Tools to Enhance Performance and Patient Safety—is the evidence-based framework developed by the Agency for Healthcare Research and Quality and U.S. Department of Defense that the AHA Team Training program features. Studies have found that teamwork training can lead to a stronger culture of safety.

Many effective leadership models have a clinical partnership, or dyad, in place. Successful clinical dyads are grounded in a shared commitment to finding better outcomes for patients, families and hospitals. Sustaining an effective dyad requires communication, mutual respect and a belief that each member is “not alone” and “has the other’s back.” The AHA Physician Alliance worked closely with the American Organization of Nurse Executives, American Association for Physician Leadership, chief medical officers and chief nursing officers across the U.S. to discuss effective clinical partnering and leadership collaboration. We determined that successful clinical dyads use three key questions when making a decision: 1) Does it help the patients? 2) Does it help our team? 3) Does it move our organization forward? Leaders point to clinical partnerships as a key contributor to achieving excellence in patient care and staff engagement.
New Models of Care

Healthcare teams are addressing the physical, behavioral and social needs of patients and families as they redesign healthcare. New models for building better, safer healthcare include:

Age-friendly health systems. Among the 46 million Americans ages 65 and older—a number projected to double to more than 98 million by 2060—80% have one chronic disease and 77% have at least two, putting significant demands on the health system now and in the future. A pilot of a new “4M” model—focused on what matters, medications, mentation and mobility—shows promising results in improving the quality and safety of care for older adults while using evidence-based practices. Age-Friendly Health Systems is an initiative of the John A. Hartford Foundation and the Institute for Healthcare Improvement in partnership with the AHA and the Catholic Health Association of the United States.

Better health for mothers and babies. Reducing maternal mortality, better understanding and addressing complications, and ensuring mother and babies receive quality care are top priorities for providers. To prevent and treat the leading causes of maternal harm, hospitals and health systems—working with community partners—should discuss internal data with the entire care team, review care practices and communications at discharge or transition, recommit to evidence-based practices, and prioritize and implement targeted strategies to address known risk factors, including inadequate prenatal care and any known care disparities.

High-reliability healthcare. Healthcare associated infections, a leading cause of preventable errors, have decreased significantly in the last 20 years and now are publicly reported, beginning with central line-associated blood stream infections in 2011. Initiatives such as the Hospital Engagement Network and Hospital Improvement Innovation Network, funded by the Centers for Medicare & Medicaid Services, have prevented hundreds of thousands of adverse events and saved billions of dollars in healthcare costs. Key to preventing infections and errors is creating a high-reliability organization. The AHA/HRET HIIN offers change packages on creating and sustaining a culture of safety as well as on more than a dozen other patient safety topics.

Value-based care. The definition of “value” in healthcare is highly connected to an individual’s personal experiences and perspectives. Life circumstances, including age, health status, cultural influences or simply people’s proximity to healthcare services in their community, can have a significant impact on an individual’s definition of value. Healthcare organizations must consider patients’ needs and wants to enhance the value of care. The AHA’s work on The Value Initiative has found that value must be viewed as more than an opportunity to offer new payment models and implement operational solutions that make care more affordable. It also is an opportunity to redesign the delivery system and improve quality, safety and outcomes.
In nearly a decade since the Affordable Care Act, the role of the healthcare leader continues to evolve. Today, with an established focus on ensuring patient safety, there is a recognition and shift in bringing clinicians into key leadership and decision-making roles across the industry. People become clinicians to help, serve, keep people safe. By nature, clinicians are innovative and curious, constantly seeking a better way.

We are rapidly observing a need to have clinical leaders on the executive team, not just as stakeholders that are invited for certain workgroups, but as consistent decision makers. One of the newer titles we hear about is the Chief Clinical Informatics Officer (CCIO). Don’t let the “informatics” in the title scare you off; informatics certifications available are not necessary to lead an organization through the endless decisions necessary for smart planning, investments and prioritization.

The growing number of C-level clinical informaticist roles—such as Chief Medical Information Officer, Chief Pharmacy Information Officer and Chief Clinical Information Officer—shows that healthcare is recognizing the value of clinical leadership in technology transformation. Having clinicians in C-suite and key leadership positions helps organizations make better decisions about the use of clinicians’ time and better investments that will affect the patient’s experience. Clinical leaders apply the same thought and concern about the wellness of the organization as they do the wellness and safety of their patients.

In the earliest days of health IT rollouts, IT efforts were often IT-led, and many resulted in workflows and solutions that did not work for clinicians and ultimately contribute to the burden issues confronting us today. But we are seeing increasing numbers of physicians and nurses involved with health IT initiatives, and they bring several advantages.

What Clinicians Bring to the Table
Clinicians are on the front lines of patient care, and their focus on patient safety doesn’t change when they become administrators and executives. They bring a deep understanding of how patient care happens, and how technology and financial decisions can affect patient safety—for better or worse.

Physicians are trained to be decisive and evidence-based, important qualities for any leader. Combining this skill set with leader personalities and business acumen becomes a driving force in any healthcare organization (whether it’s for a provider, payer or vendor).

Despite nurses representing the largest segment of the healthcare workforce, they have not traditionally been part of health IT decision-making processes. But we’ve seen signs of change over the last two decades, with more efforts to improve nurses’ satisfaction with EHRs, and the CNIO voice is getting stronger.

CCIOs rely on first-hand experiences to anticipate how technology will influence the enterprise delivery of patient care. Patient safety is always the top priority, and the CCIO is focused on several areas that increase risk, including the following:

• **Clinician burnout.** It is well documented that overwhelmed, overburdened clinicians are more likely to make mistakes that can cause potential harm. Clinician wellness must be a priority. CCIOs make sure tools are efficient and reduce burden for their users.

• **Clinician shortage.** An aging population, combined with higher rates of chronic disease, have placed increasing demands on providers. Also, increasing cases of clinician burden are becoming a deterrent to new clinicians entering the field.

• **Gaps in care.** Patient care doesn’t only happen within the four walls of the hospital. CCIOs provide technology solutions that enable effective care management across the continuum of care.

• **Patient engagement.** It’s not new to the clinician that patients are part of the care team. (The only thing that is new is that provider reimbursement is tied to patients’ behavior.) CCIOs will make decisions advocating for both clinicians and patients.

• **Value-based care.** Demonstrating quality with data is fundamental to success with value-based models of care. CCIOs facilitate that process with effective technologies to keep pace with a rapidly changing financial environment.

[Clinicians] focus on patient safety doesn’t change when they become administrators and executives.

As these challenges keep expanding, so does the role of CCIO. But the core purpose remains the same: a CCIO advocates for advancing technology, while maintaining the humanity and dignity of healthcare. The premise of “doing something for the clinician, not to the clinician” being the key. Successful CCIOs will be able to keep this balance and sustain patient safety while furthering their organizations’ missions.
Patient Safety Officer: Keeping a Vigilant Focus on Patient Safety

A full-service community hospital, Methodist Hospital of Southern California (Arcadia, California) has earned numerous awards and certifications for high-quality patient care. Chief Medical Officer and Patient Safety Officer Dr. Bala Chandrasekhar attributes the hospital’s success to its vigilant focus on patient safety. He shares insights about how his team sustains a steadfast commitment to patient safety.

Q. How do you prioritize patient safety at Methodist Hospital?

Dr. Chandrasekhar: If you don’t keep patients safe, it’s not quality. Patients essentially want three things from their hospitals: don’t hurt me, heal me and be nice to me. And they want them in that order.

Q. What are some of the tactics you use to keep patient safety in the forefront every day?

Dr. C: If we don’t know what the problems are, we can’t fix them. I hold a daily safety huddle that is open to the entire hospital. People can talk about any safety issues, and we ask three questions: First, what safety issues did you see in last 24 hours? Second, what nagging patient safety concerns do you have for the next 24 hours? Lastly, what might prevent you from delivering the best patient care today? In these non-punitive discussions, employees can raise concerns, share instances of “near-misses” and discuss how to fix processes and reduce errors. These are all opportunities for improvement. As an executive, I am there every day to make sure safety remains in the forefront. The staff knows the executive team and medical leadership are focused on continuous improvement; it’s not a flavor of the month here.

Q. What initiatives have been successful with medication safety?

Dr. C: A good example is medication reconciliation. To reduce readmissions, hospitals have to get the discharge medications right. Because if patients don’t take the right medications when they leave the hospital, they’ll come right back. We use technology to combine home medications and hospital medications into one list. It’s the physicians’ responsibility to make sure that list is accurate within 48 hours. If physicians don’t do the medication reconciliation, they can’t submit orders. The EHR is one way we can remind physicians to do the right thing.

Q. How did Methodist Hospital become a mentor hospital in California for antimicrobial stewardship?

Dr. C: Methodist Hospital’s hospital-acquired C. diff (Clostridium difficile) rate was at twice the national average rate in 2013. Part of this can be attributed to widespread use of antibiotics, so to better monitor and manage usage, we developed an antimicrobial stewardship program. A new automated approach replaced a paper-based system and met multiple federal, state, payer and accreditation requirements. Clinicians and IT teams worked together to build a system for custom health issues, including advanced patient lists and a search function for specific criteria of antibiotic use. Pharmacists can complete the mandatory 48-hour antibiotic timeout in fewer than four hours, when previously it had taken more than eight hours. Intelligent order sets require physicians to undergo an active process to continue certain medication, avoiding unnecessary automatic renewals.

As a mentor hospital in California for microbial stewardship, we’ve been able to showcase how we’ve drastically decreased infections and saved about a half-million dollars in our first year.

Q. What’s next for Methodist Hospital in patient safety?

Dr. C: We can never rest on our laurels. We must never fall back. Every program supports our much larger goal to be the safest hospital. I want processes that help make us the benchmark. We have the resources, ability, dedication and results… we should be the best we can be.
Driving meaningful outcomes

How Health IT is Turning the Tide Against Sepsis
Salman Naqvi, M.D., MPH, Allscripts CMIO

A Pharmacist’s Perspective on Medication Safety
Tom Pasquariello, PharmD

“Precise” Healthcare Drives Safer Healthcare
Joel Diamond, M.D., Co-Founder and Chief Medical Officer, 2bPrecise™

Advancing Safety and Efficacy with Genomic Medicine
David M. Margulies, M.D., Co-Founder and Chairman of Q-State Biosciences
Sepsis contributes to one out of every three hospital deaths. It is also the most expensive condition that U.S. hospitals treat. But the incidence of sepsis and related mortality has remained stable over the past several years, in part because health IT systems are doing more to help prevent and address it.

The signs of sepsis, the immune system’s extreme response to infection, are highly variable. Studies show that each hour of delay in detecting abnormal signs in patients with sepsis increases mortality rates.

An electronic health record (EHR) system that is constantly monitoring and evaluating patient data can help clinicians more quickly identify sepsis and intervene earlier with treatment. There are multiple opportunities within hospital workflows to assess and manage care for patients with sepsis.

One of our clients delivers several tools to its clinicians within the EHR, such as an early warning system, a sepsis screen nurses can use at triage or the bedside, clinical decision support and evidence-based job aids to standardize treatment, emergency department order sets, and surveillance and auditing tools that track adherence to sepsis protocols and enable quality improvement.

Working with a data sciences team, this client confirmed several statistically significant results, including:

- Drop in length of stay over time
- Inverse relationship between order set use and length of stay, inferring more standardization of care
- Inverse relationship between mortality and documented time-zero events (when sepsis is first captured in the EHR), inferring sepsis being detected earlier

Executives also noted that the organization saw a favorable reduction in cost for sepsis patients.

There is clear evidence that EHRs can help clinicians recognize sepsis and start treatment sooner. Many organizations we work with have implemented sepsis protocols that have saved lives, for example:

- **Methodist Hospital of Southern California**, in the city of Arcadia, alerts physicians when patient symptoms meet evidence-based criteria for sepsis and triggers order sets in the emergency department triage area. As a result, the organization has reduced its sepsis mortality rate to below 20%.

- **University Hospitals** health system based in Cleveland, Ohio, implemented a toolkit and early warning system alert that has reduced overall sepsis mortality by 30%, which saved 205 lives in its first two years. These organizations are showing real progress in the fight against sepsis. They’re saving lives.

**What We Do in Health IT Matters**

Now the industry needs to put these lessons into practice. Whether it is refinements to early warning systems, triggers for nurses and doctors to screen at-risk patients, or specific audit tools that help elucidate a better understanding of events over time, health IT companies must incorporate and share these learnings through their solutions and services.

People use health IT systems every day to make clinical decisions. It’s up to us to continuously improve the solutions that clinicians use to identify, prevent, treat and manage diseases. Only then can we achieve better outcomes, improve patient experience and lower the cost of care.
A Pharmacist’s Perspective on Medication Safety

Tom Pasquariello, PharmD, BCPS, BCMAS, Clinical Pharmacist, Veradigm™

Despite healthcare’s best efforts, medication-related errors still occur and are the third leading cause of deaths in America behind heart disease and cancer, accounting for between 250,000 and 440,000 deaths annually.1 Dr. Tom Pasquariello shares some of his thoughts about the industry’s work to continuously improve medication safety.

Q. What counts as a medication error?

Dr. Pasquariello: Medication error is defined as any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient or consumer. Such events may be related to professional practice, healthcare products, procedures and systems, including prescribing; order communication, product labeling, packaging and nomenclature; dispensing, administration, education, monitoring and use.2 Medication errors and adverse events are among the most common errors in both inpatient and outpatient settings.3

Q. What are your biggest concerns about medication safety today?

Dr. P: As a pharmacist, patient safety is always my number one concern. We must carefully review and analyze each prescription to determine the five rights of medication administration: right patient, right drug, right dose, right route and right time.

I am concerned that today’s workload makes it difficult for clinicians to apply their critical thinking skills to each prescription. Physicians and pharmacists receive so many warnings, the majority of which are mild, that there is a risk of overlooking a serious one. As clinicians, we need to continue to think critically and use our formal education, training, medical intuition and prior experiences. Clinicians should verify the output from technology instead of the other way around.

Q. What are some examples of areas in which technology needs to improve?

Dr. P: Transitions of care remains a major concern. Electronic health records (EHR) are now able to replicate inpatient orders and continue them as outpatient therapies. Unfortunately, specific inpatient directions do not always align with outpatient medications and can create confusion. For example, a patient who receives instructions to take an opioid might be given pain scores as a reference (e.g., mild pain 1–3, moderate pain 4–6, or severe pain 7–10) and misunderstand it to mean the number of tablets he or she is supposed to take.

Another example of a sub-optimal technology application would be the use of ancillary equipment, such as smart pumps that deliver the correct dose and rate of an intravenous medication. The pumps are programed with instructions that align with the information in the EHR, but they still need to be manually set. This can lead to serious errors, especially with Heparin and other high-alert medications that often involve dual sign off.

Q. Where are pharmacists and physicians collaborating most effectively to improve patient safety?

Dr. P: The order sets or order panel collaboration between pharmacists and physicians is improving. These are pre-written orders that can be selected based on a diagnosis, such as prescribing the appropriate medications for an allergic reaction that might include multiple antihistamines, a steroid and an adrenergic agonist. If an error is identified with one of these panels, it is critical to make the necessary changes as soon as possible to minimize toxicity and risk to any other patient within the organization. More efficient communication enables urgent changes to these sets or re-evaluating on a regular basis for any guideline changes.

Q. What patient safety priorities should be the focus for pharmacists over the next 2-3 years?

Dr. P: There a many important initiatives coming up over the next few years. For example, USP800 will help promote the safety of patients and healthcare personnel who are exposed daily to hazard drugs (HDs) with new quality-of-practice standards.

The opioid crisis remains a hot topic. Pharmacists will help balance the need for treatment but not overexposure, incorporate Prescription Drug Monitoring Programs (PDMP) into workflow, educate prescribers about opioid reversal agents and develop new approaches to methadone dispensing.

Barcode scanning of patient medication has significantly evolved over the past decade, but there is still a gap to be addressed. Having a barcode scan to incorporate the medication’s lot number for commercially made products will be mandatory. This new technology will enable organizations to easily identify patients who may have been exposed to recalled products.

Medication errors are inevitable, even with proper policies, procedures and technologies in place. Medical organizations and professionals must continue to use root cause analysis to decrease medication errors, identify opportunities for improvement and undertake initiatives to help keep patients safer.
“Precise” Healthcare Drives Safer Healthcare

Joel Diamond, M.D., Co-Founder and Chief Medical Officer, 2bPrecise™

Threats to patient safety are dramatically reduced when providers:

- Identify patients at risk for disease before a condition manifests itself
- Arrive at a definitive diagnosis sooner
- Understand how well—or poorly—a patient may react to specific therapies in advance
- Recognize the impact and interactions a specific course of treatment might have on concurrent conditions and care plans

Advances in genomics—and the ability to integrate this data with other clinical information within the patient context—equip providers with the knowledge to achieve therapeutic benefit faster and avoid delays or errors that harm patients.

Consider these three scenarios:

Sarah and cancer risk. During an initial visit with her primary care provider, Sarah shares a family history that includes high incidence of breast and colon cancers. The primary care provider (PCP) orders a genomic test, which reveals an elevated risk for breast cancer, but none of the variants associated with colon cancer. As a result, the PCP has Sarah undergo diagnostic screening for breast cancer earlier and more frequently than other patients. This dramatically increases the chance for timely diagnosis, so the disease can be treated at an earlier stage—which in turn means the course of therapy may be less harsh and/or invasive, resulting in fewer side effects and complications (not to mention better outcomes).

At the same time, Sarah avoids aggressive screening for colon cancer since she is not at high risk. Fewer tests mean fewer opportunities for problems to arise.

Carlos and clopidogrel. Carlos suffers a cardiac event and Dr. Young treats him with the commonly prescribed antiplatelet drug clopidogrel (Plavix) to prevent clotting. However, Carlos is among the 20 to 30% of patients who are rapid metabolizers of clopidogrel and for whom the drug delivers virtually no therapeutic effect. This leaves Carlos as vulnerable to a second heart attack as if he were on no medication at all. Pharmacogenomics (PGx) testing would have alerted Dr. Young to this fact, equipping him with critical information necessary to selecting a therapy that would deliver the desired result.

PGx testing has far-reaching impact not only on individual patients, but the healthcare system as a whole. Studies have shown that:

- 98% of patients have genetic variants that affect how well they do (or don’t) metabolize specific medications—or if the drug might have toxic effects
- 34% of all adverse drug reactions are caused by genetics, not drug-drug interactions

In addition, consider how often physicians use a trial-and-error approach to medications (What drug and what dose of antidepressant will relieve a patient’s distress? Will statins be the most effective treatment for a patient's hyperlipidemia?)

Ethan and a seizure disorder. Ethan was born with a seizure disorder and immediately admitted to neonatal intensive care unit (NICU). A genomics test helps the neonatologist determine the cause of the disorder and, consequently, what therapies would relieve the seizures—in other words, she can prescribe what would have been the sixth or seventh line of therapy first. This information prevents problems arising from ongoing seizure activity, failure-to-

This level of insight can help caregivers arrive at the best answers faster, accelerating treatment, preventing misdirected therapies and achieving advantageous outcomes.

In addition, these genomic results also reveal other genetic markers that physicians throughout Ethan’s life can review to make better care decisions about a myriad of conditions.

Scientific advances are accelerating rapidly and solutions such as the 2bPrecise platform bring this information directly to the point of care, where providers can leverage it in clinical decision-making. This level of insight can help caregivers arrive at the best answers faster, accelerating treatment, preventing misdirected therapies and achieving advantageous outcomes.

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Advancing Safety and Efficacy with Genomic Medicine

David M. Margulies, M.D., Co-Founder and Chairman of Q-State Biosciences

When considering the 20 years since To Err is Human, David M. Margulies, M.D., Co-Founder and Chairman of Q-State Biosciences, sees progress in healthcare’s quest to combine safety and efficacy for better outcomes, particularly with genomic insights. And he envisions an even more promising future.

Q: How has genomic information affected the relationship between safety and efficacy?

Dr. Margulies: Ultimately, the goal of medicine is to match the right patient with the right therapy. Historically, physicians were taught to recognize clinical symptoms of broad syndromes and to match these disease patterns with therapies. Over time, these broad syndromes are being subdivided into more precise disease subtypes, often using genetic information as a more powerful way of classifying disorders. The successful sequencing of the human genome and discovery of the genetic causes of many disorders has advanced our ability to match individuals to effective therapies.

For instance, epilepsy had been historically viewed as one disease. Now, we know it to be a group of more than 100 genetically specified disorders. Unsurprisingly, individuals in each subgroup don’t respond the same way to the same therapies. The response to a therapy ranges from effective to ineffective to toxic to lethal. To ensure patient safety and create the best outcome for patients, extensive sequencing with proper interpretation is, often, an important first step. Sequence information can provide a proper diagnosis, and, more recently, patient-specific ‘functional models’ have begun to provide clinicians with still better predictors of how a patient will respond to therapy. One example of a patient-specific disease model is to create a cell culture derived from a patient’s own tissue. The cultured cells can then be used to test potential therapies that may then be administered to the patient. Having methods to predict a patient’s response to drug therapy is the ultimate goal.
Q. How common will genomic medicine be 10 years from now?

**Dr. Margulies:** I envision that by the spring of 2029, most people – both children and adults – will have had a comprehensive genome measured during some interaction with the healthcare system. Every newborn will be genome sequenced. In part because it will cost less than today’s electrocardiogram, genome sequencing will become as routine as a chest x-ray. This genomic data will belong to the patient, but it will live securely inside a data center that consumers, clinicians and researchers can draw from as needed.

*In part because it will cost less than today’s electrocardiogram, genome sequencing will become as routine as a chest x-ray.*

Importantly, in this new environment, genomics will help inform treatment for any acute medical episode, whether it’s diabetic shock, an asthma attack or complications from pregnancy. Evolving clinical symptoms will be combined with underlying DNA-sequence data to see if the symptoms manifesting are likely to have a genetic cause or contribution. Genomically-enabled clinical information systems will use this data to alert the clinician to a more precise diagnosis, more rapidly. We’ll only have to sequence an individual’s genome once in a lifetime, then interpret it multiple times as the information is needed.

Q. What are the possibilities for predictive medicine?

**Dr. Margulies:** In this future state, your sequence will be checked at birth, anytime you start a new medication or have a new acute episode of care. It will be used to match you with the appropriate therapy, specialist, clinical trial or support group. It will also help identify potential health risks. For example, if your father and uncle had cardiac events prior to the age of 50, there’s an increased likelihood of the inheritable disease hypercholesterolemia. Familial hypercholesterolemia is characterized by a defect in the LDL receptor gene. If your family history and genomic information reveal that you carry a disease-causing mutation, you will be prescribed a statin at an early age. This intervention may offer substantial protection and several extra decades of healthy living. Genomic information will offer a broad range of opportunities for surveillance of risk and modification of lifestyle.

Q. How will we achieve this future state?

**Dr. Margulies:** Everyone must work together to achieve this vision, including the information system suppliers, pharmaceutical companies, insurers, legislators, clinicians and patients. This future state is both desirable and attainable; let’s all work to get there together.
Supporting the healthcare workforce

Human Error and Human Factors as the Gateway to Patient Safety
Jessica L. Howe, MA, Senior Human Factors Research Specialist & System Safety Specialist, and Raj Ratwani, Ph.D., Director, National Center for Human Factors in Healthcare, MedStar Institute for Innovation, MedStar Health Research Institute

Where Usability and Patient Safety Intersect
Ross Teague, Ph.D., Allscripts Director of User Experience

5 Things That Can Improve Nurses’ Satisfaction with EHRs
Carin Mann, RN, Allscripts User Experience Clinician

Integrating Evidence-Based Medicine into Everyday Workflows: Learnings from Northwell Health’s Usability Lab
Thomas G. McGinn, M.D., MPH, Senior Vice President and Deputy Physician-in-Chief, Northwell Health
Human Error and Human Factors as the Gateway to Patient Safety

Jessica L. Howe, MA, Senior Human Factors Research Specialist & System Safety Specialist
Raj Ratwani, Ph.D., Director, National Center for Human Factors in Healthcare, MedStar Institute for Innovation, MedStar Health Research Institute

Errors can happen regularly in healthcare. In fact, medical errors are the third leading cause of death in the United States. Mistakes occur in healthcare rarely because of incompetent or careless clinicians but rather healthcare is a complex and messy system that may actually promote errors.

The science of human factors focuses on understanding human capabilities and using this knowledge to design systems, devices, software and tools to meet those capabilities. Constantly keeping the user in mind promotes safety, effectiveness and efficiency. Most high-risk industries have embraced the human factors approach, including aviation, defense and nuclear energy, but only recently have human factors become more widely adopted in healthcare.

There are many clear examples of how leaving human factors out of healthcare can promote inefficient, ineffective and error-prone technologies and processes. A prime example is the design, development and implementation of electronic health records. In 2009, the HITECH Act was passed, promoting (and monetarily incentivizing) the use of electronic health records. The technology came to market quickly, and not all vendors invested in the human factors approach to enhance usability and safety. Federal certification programs intended to promote health IT usability were not robust. Research has shown that some vendors that were deemed certified did not adhere to certification requirements and testing standards. Electronic health record usability testing sometimes did not include clinicians (the intended user of the technology) completing realistic tasks with the version of the electronic health record they would actually be using in the clinical environment.

As a result, serious usability issues exist such as cluttered visual displays, difficult data entry and confusing workflows. A decade since the passing of the HITECH Act, usability challenges persist. Suboptimal usability of electronic health records leads to clinician frustration and burnout, and contributes to medical errors that have direct patient safety consequences. Studies have been published on both adult and pediatric populations showing a clear association between poor usability of electronic health records and patient harm. Healthcare needs to focus less on eliminating human error, as that is an impossible aspiration. Instead, it should focus on reducing patient harm by embracing human factors principles as the path to patient safety through designing systems and processes that are error tolerant. It is often stated in the science of human factors that the best course of action is to always, “make it easy for individuals to do the right thing and hard to do the wrong thing.” Telling clinicians to try harder or blaming and shaming individuals when mistakes occur is not an effective strategy to improve safety. Moving forward, an opportunity exists to think differently about medical errors and view healthcare through the lens of human factors.

Where Usability and Patient Safety Intersect

Ross Teague, Ph.D., Director of User Experience, Allscripts

Electronic health records (EHRs) help improve patient safety in several ways. For example, clinical decision support (CDS) and computerized provider order entry (CPOE) can reduce prescribing mistakes.1,2 However, bad design and poor usability of EHRs can introduce new risks. For instance, The Joint Commission found that human-computer interaction problems caused one-third of patient safety events,3 and EHRs can increase the risk of error while ordering tests or medications.4

Poor usability can also lead to unnecessary cognitive effort, creating a hidden “cognitive tax,” which can affect provider efficiency and focus. One simple and powerful illustration of the “cognitive tax” is how something as basic as date formatting can create confusion or unnecessary work for the user.

In the U.S., most people would understand that 10/5/1998 is October 5, 1998. But this format requires translating a number (10) into a month (October) and takes cognitive effort away from the patient visit, etc. It is also prone to translation errors (e.g., a European might read 10/5/1998 as May 10, 1998).

While these “switch costs” may only be a few tenths of a second per item, they add up when users must switch repeatedly back and forth between tasks.5 This activity limits cognitive resources, which can increase risk of error.6 Designing EHRs to be more intuitive can help eliminate switch costs with simple changes, such as a date format with no ambiguity: 05-Nov-2015.

Usability is One Aspect of Many Related to Safety

There are many industry conversations, studies and efforts addressing the systemic problem of clinician burnout and its effects on patient safety. Unfortunately, sometimes EHR usability is oversimplified as the “silver bullet,” when in fact there are multiple complex factors at work.

Healthcare is a complex, adaptive system, which means we must address several factors to improve the clinician experience. The National Academy of Medicine offers six interrelated causes that contribute to clinician well-being and resilience.

These factors also affect the effectiveness of EHRs. Now more than ever, rules and regulations require EHRs to facilitate more documentation, while organizational policies continue determining how EHRs are deployed and supported.

The risk of oversimplifying EHR usability is that more user input and expanded testing will not be sufficient to make health IT products better. EHRs must continue to improve and we, as vendors, must help to alleviate clinician burden. It will take continued effort from multiple stakeholders to fully address this systemic problem.

EHR companies should improve usability and safety by following design standards, involving clinical users early and often, and using rigorous user-centered design processes and scenarios. Allscripts understands it will take true provider-vendor partnerships based on clear communication between vendors and decision makers to combat issues leading to burnout, but as those issues are addressed, we as a vendor won’t ease up on doing all we can from a technology perspective. We must be vigilant when it comes to usability, because patient safety is at stake.

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3 http://www.jointcommission.org/assets/1/6/Safe_Health_IT_infographic_1-26.pdf
5 Things That Can Improve Nurses’ Satisfaction with EHRs

Carin Mann, RN, Allscripts User Experience Clinician

Nurses, by nature, are good at adapting. We work in a state of near constant interruption and shifting tasks. We strive for patient safety in all situations, even when they are less than ideal. We often work around problems in our electronic health records (EHRs) to advocate for patients.

But, much like doctors, nurses are also not immune to burnout, which can affect patient safety. Because delivering safe, quality patient care is the goal for all nurses, it’s important to focus on nursing wellness. Recent studies give insights that can help improve nurses’ experiences with EHRs, which can in turn reduce burnout and potential patient safety risks. Here are just a few:

1) Offer a more mature EHR
Many EHR implementations do not use all available features. One study found that nurses were more than twice as likely to be satisfied when the EHR is advanced, including features like optimized clinical decision support and electronic medication reconciliation, compared with nurses who indicated these functionalities were not present.

2) Improve usability
Another study found that one in three nurses report poor usability as a top concern. Unnecessary key strokes and screens interrupt clinical thinking and increase cognitive load. We argue that it’s time to move beyond usability and focus more on features that will be helpful when responding to clinicians’ feedback about the EHR.

3) Design views with nursing in mind
Related to usability, research suggests that nurses don’t feel they can accurately capture the patient story within the EHR. Options for narrative and structured formats, as well as more effective views that tell the patient’s story for nurses, appeared as suggestions for improvement. Understanding the nursing-specific workflows (instead of designing generically for clinicians) can optimize how information is captured and reviewed by the nurses.

4) Break down “silos” of information
One in four survey respondents are frustrated that data in their EHR system is not integrated with data from other systems. Nurses realize that integrated information will reduce the amount of re-entry they have to do and create a more accurate, complete picture of patients. Comprehensive information can also improve patient satisfaction, as patients don’t have to repeat themselves.

5) Include nurses in EHR selection decisions
Nurses are the primary users of EHR systems and should have a seat at the table when early, critical decisions are being made. A HIMSS Analytics survey about EHR adoption found that only about one out of four nurses have participated in an EHR buying decision, even though nurses comprise the largest segment of the healthcare workforce by far.

Nurses are key stakeholders and should be involved throughout when designing, selecting, implementing, configuring and optimizing EHR systems. The EHR becomes a stronger tool with their input and participation are taken into consideration. To continuously improve patient care, we must be committed to giving nurses tools and features that are—not just useful or usable—but helpful.
Integrating Evidence-Based Medicine into Everyday Workflows: Learnings from Northwell Health’s Usability Lab

Thomas G. McGinn, M.D., MPH, Senior Vice President and Deputy Physician-in-Chief, Northwell Health

Healthcare organizations develop many tools and protocols to help clinicians deliver the safest care possible. Applying the latest findings in evidence-based medicine—and translating it into clinical decision support (CDS) tools that are helpful at the point of care—is a complex task. This is the focus of Northwell Health’s Usability Lab, and Senior Vice President and Deputy Physician-in-Chief Thomas G. McGinn, M.D., MPH, offers advice on how to effectively increase clinician use of the best evidence-based CDS.

Q. What are some of the barriers to integrating CDS tools into electronic health records (EHRs) today?

Dr. McGinn: There are two broad categories of CDS: simple versus complex. Complex CDS tools are defined by the fact that they pull data from various sources such as labs, x-rays and patient history, for example, and give patient-specific, real-time recommendations via decision support tools built into the EHR. While these forms of CDS are most effective at improving patient care due to their richness (complexity), they are harder to integrate and to demonstrate true adoption and clinical change. The most common, simple CDS tools—such as a flu-shot reminder or colon-cancer screening—are easier to integrate but tend not to have a great effect on patient care because they are one-dimensional and are not perceived as useful by either the patient or physician. CDS tools that deliver patient-specific, real-time information at the point of care have a much greater impact on patient outcomes. We just have to address commonly cited challenges, such as information content, user interface and alert fatigue.

Q. When introducing a new technology or workflow, what are the steps organizations should take to guard against potential risks to patient safety?

Dr. McGinn: There are many opportunities to incorporate new CDS tools, but it’s important to first evaluate what your team needs and have a plan to integrate them in your workplace. The Usability Lab promotes five key steps that help lead to successful adoption. First, conduct small focus group sessions to understand current usage and perspectives regarding CDS. Second, interview key stakeholders for a deeper understanding of specific challenges and opportunities in your organization. Third, we recommend a “Think Aloud” approach, where users verbalize their thoughts while interacting with the technology. Fourth, “Near Live” usability testing involves clinicians in...
real-world scenarios prior to launch, and it enables changes before implementation. Finally, monitor usage such as trigger rates and adoption and keep testing usability after the system is live to remedy any obstacles. While each of these methods is targeted at a specific type of evaluation, all of them are common in that they are focused on end-user needs, perspectives and real-world experiences. Getting these factors right is typically what can make or break successful adoption of CDS—and evidence—at the point of care.

Q. What would you say to clinicians who would rather rely on intuition and experience than technology and CDS?

Dr. McGinn: This is a common question and what I call false dichotomy or false choice. Technology does not exclude clinicians from using their instincts and using your instinct doesn’t preclude clinicians from using technology.Clinicians must use a combination of science and instinct; you can’t do it with just one or the other. Based on my experience in both clinical practice and research, I’ve learned that you need both. Use the technologies and tools available, but trust your instinct to investigate further. Predictive models and CDS tools are valuable, but the doctor-patient relationship and time during the exam are more important than any technology.

Northwell Health’s Usability Lab

The Usability Lab’s mission is to help healthcare organizations “close the gap” between the wealth of evidence that exists in the form of research and patient data, and clinicians’ ability to comprehensively utilize that evidence in practice. Effectively integrating complex forms of CDS tools at the point of care is a proven method to achieve this, but doing so requires extensive focus on usability testing and user-centered design. By sharing protocols and best practices for developing and integrating CDS tools, the Usability Lab hopes to increase clinicians’ use of the best evidence-based CDS, thereby 1) increasing quality and 2) decreasing unnecessary treatment and testing.

Examples of how the Usability Lab’s work improves patient safety include:

**“Improving Provider Adoption with Adaptive Clinical Decision Support Surveillance: An Observational Study**

The impact of CDS tools has been limited by low provider adoption due to over-triggering, leading to alert fatigue. A tracking mechanism for monitoring triggers (percent of total visits for which the tool triggers) and adoption (percent of completed tools) rates of a complex CDS tool based on the Wells criteria for pulmonary embolism (PE) was developed.

**A Computerized Method for Measuring Computed Tomography Pulmonary Angiography (CTPA) Yield in the Emergency Department: Validation Study**

Use of CTPA to assess pulmonary embolisms improves the accuracy of testing but carries increased risk for nephropathy and malignancy. A computerized method can help health systems monitor appropriate use of CTPA.

**“Think aloud” and “Near live” usability testing of two complex clinical decision support tools**

Complementary types of usability testing generated unique and generalizable insights, which are helpful for understanding key barriers to adoption and realizing the potential of CDS.

**Integration of physical abuse clinical decision support into the electronic health record at a Tertiary Care Children’s Hospital**

A CDS system for evaluation of child physical abuse was developed. The tool was composed of a trigger system, alerts and a physical abuse order set. The overall objective was to evaluate the effect of this CDS system on physician compliance with clinical guidelines.
Partnering with patients for the safest care

**Patients as Partners in Ensuring Safety**
Jan Oldenburg, Principal, Participatory Health Consulting

**How Patient Engagement Leads to Safer Care**
Raj Toleti, Senior Vice President and General Manager, Allscripts

**A Mother’s Story: What Patient-Centered Care Means to Patients**
Lisa Danielpour, Patient/Family Advocate, Speaker; Vice President, University Hospitals Rainbow Babies and Children’s Hospital
Patient and Family Partnership Council
Patients as Partners in Ensuring Safety

Jan Oldenburg, Principal, Participatory Health Consulting

There are clear reasons for health systems to focus on collaborating with patients and their caregivers: it results in better outcomes, lower costs and more satisfied patients. One of the least appreciated reasons, however, is that when people are involved in their own care as partners, they also contribute to their care’s safety. In an era where the Institute of Medicine estimates that 44,000 to 98,000 people die in US hospitals every year because of medical errors and WHO estimates 15% of total health spending is wasted on the aftermath of mistakes,¹ this outcome truly matters.

In this environment, there is broad agreement that empowered patients and caregivers can play a role in reducing medical errors. In effect, giving patients access to their own medical records means they can be employed as “millions of fact checkers.”² There is less concrete research, however, on the impacts that involved patients actually have on improving safety. But we can identify some key areas where empowered and involved patients are already having an impact.

¹ https://www.who.int/features/factfiles/patient_safety/en/
² http://blogs.hcpro.com/hipaa/2012/01/qa-farzad-mostashari-on-meaningful-use-privacy/

General Health Literacy

The more patients are engaged as active partners in their own health and healthcare, the more their health literacy increases. This, in turn, means they are more likely to ask questions about their care, catch errors in their records, and avoid adverse events triggered by incorrect data or poor communication. One thing that’s had the greatest impact on health literacy in the last 15 years has been providing patients with online access to their own medical records. Especially when this access is paired with contextual education about the impact and meaning of the information, this simple act can increase patient’s meaningful understanding of and participation in their own care. Educated and informed patients are less likely to experience medical errors and have better health outcomes overall.³

Hand Washing

At any given time, 1 in 25 hospitalized patients acquires an infection related to their care.⁴ The CDC’s “Clean Hands Count” campaign notes that clinicians wash their hands fewer than

⁴ https://health.gov/hcq/prevent-hai.asp
half the times they should. They are trying to change this by enlisting patients to ask their providers to wash their hands in front of them. Various studies show that patients are willing to be involved in this effort. A full 80-90% of people said they would ask their clinicians about handwashing. Although the percentage of patients who actually asked was a bit lower, at 60-70%, the rate goes up when patients are given explicit permission to ask about hand hygiene from a doctor or nurse. When patients do ask, handwashing rates go up in turn—one study found that the handwashing rates increased by 34% after a campaign was instituted encouraging patients to ask their clinicians if they had washed their hands.

Medication Errors

Medications are one of the key areas vulnerable to medical mistakes. Many things can go wrong, whether medication is administered in a hospital setting or prescribed for use at home. For example, the wrong medication or dose may be administered, the wrong patient may get the medication, a medication may be prescribed despite allergies or contraindications or the medication may be taken on the wrong schedule. It’s clear that alert and involved patients can make a difference in the outcomes in these areas. The AHRQ’s 20-point fact sheet for patients on preventing treatment errors devotes nine of them to medications.

But what happens when patients and organizations actually take this advice to heart? One study found a collaborative effort to improve medication list accuracy increased the accuracy from 55% to 72%. A CDC report from 2013-2014 showed that 10% of people who accessed their online health record requested changes in the record. One study found that 89% of changes requested after patients viewed their online record were to the medication list. Studies of collaborative medication reconciliation processes show that unless medication reconciliation actively involves patients and their caregivers, the results will be incomplete and inaccurate.

Lab Results

Over 7% of abnormal lab results are never communicated to patients. Providing patients with access to their lab results gives them context and tools to ask about follow up and, as a result, reduce the potential for associated errors. In 2013, Kaiser Permanente studied patient reactions to viewing their lab results online. It found not only that most patients appreciated the access, but also that their reactions focused on things that improved health literacy, specifically by looking up information about the lab test, graphing the results to see changes over time and talking to friends and family about the results.

A more recent study focused on reactions to receiving abnormal test results electronically. It showed that patients felt strongly that getting test results online enabled them to take a more active role in their own health. It also suggests that patient access to their test results—including abnormal results—can reduce medical errors associated with overlooked abnormal results. It is critical to provide contextual education about lab results delivered online for them to have their intended beneficial impact.

Open Notes

One of the anecdotal evidences of the benefits of open notes is that patients are able to follow up on recommendations or issues that may not have been caught before. Similar to delivery of test results, patients find and question recommendations that haven’t been acted on. A 2018 study looked the results of open notes access with 10,000 patients. It found about 75% of patients and parents reported that reading notes helped them better understand tests and referrals. About 50% said it helped them complete the tests and referrals—and that number was largest among underserved populations. Another study of open notes found that 23% of patients noted potential documentation errors in their medical record. On clinician review, 63% of those reports were confirmed to be safety concerns. There’s also evidence that people who read their physicians’ notes had an increase in their sense of self-efficacy.

Patient Safety and Process Design Committees

Truly inviting patients in to the process of designing hospital procedures and policies makes it much more likely that the outcomes will be friendly to patients. Involving patient in patient safety committees, especially in a leading role, can uncover risks that were invisible to those on the inside. The Institute for Patient- and Family-Centered Care highlights the importance of involving patients and families in safety committees in its article on best practices for partnering with patients and families to increase safety. When patients are asked to identify adverse events that happened during a hospital stay, they identify errors and near-misses that are often not reported in their record. This opens a promising avenue for increasing vigilance and avoiding future errors.

Summary

In summary, engaged patients and caregivers can impact the safety of care in a wide variety of ways. Going beyond “the right thing to do,” it is clear that involving patients is good for business and for safety.
How Patient Engagement Leads to Safer Care

New strategies and technologies are making it easier for providers to reach patients wherever they are and empower them to continually improve their health outcomes. An interview with Allscripts Senior Vice President and General Manager Raj Toleti highlights the connection between patient engagement and safer care.

Q. How are technologies successfully engaging today’s patients?

Raj Toleti: New technologies can transform and automate patient-facing processes and drive engagement. Solutions and strategies can empower patients to make the right choices and ensure compliance with medications, treatment regimens, referrals and follow-ups.

These solutions can put vital information in the hands of patients and their families via the consumer technology they use every day—cellphones, mobile apps and text messaging. Patients and their caregivers can receive timely, relevant information regarding progress, daily schedule, prescriptions, at-home care, discharge and more.

Q. How can technology help ensure safer care at every step of a patient’s healthcare journey?

RT: Femwell Group Health does a good job of communicating with the patient before, during and after each visit using Allscripts FollowMyHealth® patient engagement platform.

Before: Pre-care engagement starts prior to the office visit, such as enabling real-time appointment scheduling, confirmations and mobile check-in. Pre-visit texts can educate patients about what they can expect and remind patients what to bring to the appointment.

During: Point-of-care engagement helps optimize time during the patient’s visit. Tools like tablets can help simplify patient participation. A strong engagement strategy helps patients to pose the right questions and interact with the doctor in a way that encourages decision-making.

After: Post-care engagement ensures patients adhere to their care and treatment plans. I recommend mobile discharge instructions to reach patients on their phones. Clinically guided outreach, education and follow-up messages help create new opportunities to engage patients.

Q. Why is recognizing consumer needs important when it comes to patient engagement?

RT: To reach patients, we need to meet their needs and understand their preferences to effectively engage them.

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Q. What is the significance of simplifying platforms?

RT: Many organizations use—in addition to portals—multiple, standalone solutions to handle segments of patient outreach, such as those for reminders or scheduling. However, a unified enterprise platform integrating all outreach technologies is more efficient, effective and engaging.

Q. How can we measure patient engagement success?

RT: I suggest measuring success through key benchmarks including no-show rates, appointment confirmations, payments collected, appointment volume, portal enrollments and patient satisfaction. Ultimately, patient engagement platforms can motivate patients to become more active partners in their care, resulting in better health and improved outcomes.
Lisa Danielpour is a mother of two and Vice President of the University Hospitals Rainbow Babies & Children’s Hospital Patient and Family Partnership Council (Cleveland, Ohio, U.S.A.). She is also a member of the University Hospitals Patient Facing IT Governance Committee, the Rainbow Hospital Quality Council and the National Health IT Patient and Family Advisory Council sponsored by OpenNotes and PFCCpartners. Here, Lisa shares her perspective about the value of patient-centered care.

Tell us about Josh’s healthcare journey with complex, rare conditions.

My son, Josh, had a very active, happy, normal childhood until the age of 13, when he developed symptoms that led to the August 2014 discovery that he has inflammatory bowel disease (IBD). Josh got sicker and sicker until he was in the hospital more than he was out. No matter what his wonderful medical team at Rainbow did, his disease would not respond to standard treatments.

On President’s Day weekend 2015, Josh was in agony, curled up in bed. He finally said, “Mom, I need to go to the hospital.” The inflammation that had started in his colon had spread to his entire digestive tract. We stayed in hospital from February through September. When his amazing Rainbow GI specialist called other top academic centers around the country to consult, no one had seen a case like Josh’s. That is not the kind of unique and special you want to hear that your child is.

We took a medical flight to Children’s Hospital of Philadelphia (CHOP) to seek treatment from its pediatric IBD center. CHOP involved a brilliant National Institutes of Health (NIH) GI/Immunologist who understood the likely rare path of Josh’s disease and recommended a medication. Josh slowly responded, but it was a very long recovery. Unfortunately, we found out that he has other complicating conditions. A type of liver disease associated with Crohn’s disease was diagnosed in November 2015. Thankfully, at least, it’s early stage, and his liver counts have normalized. In addition, he has avascular necrosis in his right hip. It was overwhelming in the beginning.

How do you manage his care across multiple providers and organizations?

Josh’s medical conditions are so complex, and, unfortunately, very unusual. What has been important as he’s gone through each diagnosis is that his specialists have coached my husband and me about the conditions. What lab results are they looking at and what do they mean? What are the warning signs we should watch for? The personal health record has been invaluable, because we obsess a bit about lab results, which we can monitor closely for ourselves.

What role does a personal health record play in patient-centered care?

Whether for yourself or for a family member, the personal health record is so important because it empowers you by providing easy access to information. It enhances the patient experience, safety and quality. It gives people with chronic illnesses or medical complexities a great tool to learn what to track and monitor, which has been extremely important for our family.

I love that I can scroll down the personal health record and see, “normal, normal, normal, normal. Uh oh. Red flag.” I love that I can click on the chart icon and see the trend over time of various counts and test results. We can see the detailed results of Josh’s various specialized MRIs and I can message back and forth with a physician. Because NIH and University Hospitals both use FollowMyHealth®, I have access to information from both organizations in the same portal.

It is also incredibly helpful using the app on the fly, so we have access to information when we’re at an ER visit or when we go to other health systems. It was especially helpful when we first went to NIH, and we were meeting with so many different doctors with meticulous questions about Josh’s journey. I have a lengthy biography of Josh’s medical history, but I can’t anticipate every little thing that they’re going to ask. So, I can open up the app and show them on my phone…that’s been extraordinary.

How important is a patient-centered care experience?

University Hospitals has an extraordinarily patient-centered culture that I am so grateful for. I was astounded at the degree to which University Hospitals’ staff, throughout the organization at the highest levels, really value patient input. They don’t just put a mouthpiece to getting feedback. They seek it out with new initiatives that they’re trying to achieve or improvements in the organization’s day-to-day processes, and I truly appreciate it. It’s also just a great place to get excellent medical care that is very patient- and family-centered.

How does patient-centered care and the personal health record enhance patient safety?

Providing a collaborative, patient- and family-centered culture that listens to and respects the patient and family voice helps ensure everyone is on the same page and that the care plan is clear. The personal health record supports patient safety by giving patients an easy way to see their own lab and test results and enabling an easy way to message their providers with any questions.

Many health systems are moving to Open Notes, in which patients can access their full medical chart notes through their secure patient portal. Open chart notes ensure patients and families can see their provider’s full description of the office visit and care plan. Being able to see that full information in their own time and reflect on the care plan prevents potential misunderstandings and enables clear communication. That collaborative partnership approach to healthcare, along with coaching and engaging patients and families through the personal health record, is key to better health and outcomes.

Thanks to Lisa for sharing her perspective. You can read more from her at lisadanielpour.com
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