Patient Safety and Technology

Frank A. Federico, RPh
Executive Director
Institute for Healthcare Improvement

September 2012

This presenter has nothing to disclose

Julie Thao Case

- Is there a method in your place of work to know when technology is not functioning as designed and individuals have developed workarounds?
- How do you fix the ‘problem’?
“Darrell suspected someone had once again slipped him a trick spoon with the concave side reversed.”

-Gary Larson, The Far Side

Objectives

- Discuss how to incorporate technology review into the structure and strategy.
Technology

Boston after the Civil War is blossoming into an industrial powerhouse, and the science and engineering breakthroughs fueling its advances are known by a fancy label: technology.

The Technologists by Matthew Pearl

Americans and Their Medical Machines
By Richard L. Reece, MD

"The real problem is not whether machines think, but whether men do." -- B. F. Skinner

"If you are designing a machine, you had better think of everything, because a machine cannot think for itself."

Edgeware: Insights from Complexity Science for Health Care Leaders, 1998
http://www.thehealthcareblog.com/the_health_care_blog/2010/05/americans-and-their-medical-machines.html
Space Program

Computers in Everyday Life
Computers in Everyday Life
Increasing Use of Technology
Increasing Use of Technology

Global Problems with Technology

- Magical thinking – It starts something like this: Let’s have technology do that.
- What does this type of thinking miss?
- Can you think of examples of magical thinking?
Human Factors vs. Human Factors Engineering

As defined by FDA:

Human Factors – “the study of how people use technology. It involves the interaction of human abilities, expectations, and limitations, with work environments and system design.”

Human Factors Engineering – “the application of Human Factors principles to the design of devices and systems”

“New technologies will succeed or fail based on our ability to minimize the incompatibilities between the characteristics of people and the characteristics of the things we create and use.”

Steven M. Casey, 1993/1998
“Set Phasers on Stun” and Other True Tales of Design, Technology, and Human Error
Examples of HF Problems with Medical Devices

- From 1995-2000, 39 patients overdosed and 373 patients were injured by infusion pump free-flow; pumps were turned off but small roller clamp on the IV line was not engaged.

- A typing error, software bug, and uninformative error message lead to a radiation dose 125 times the normal dose causing radiation burns and complications resulting in patient’s death.

The Monk and the Help Desk
Response to Introduction of Technology

Different views:

• Excitement and anticipation of gaining a new skill or as an opportunity to grow.
• Disruption or threat to their practice
• Intrusion into routine of providing patient care

(Bozak, 2003)

Health Information Technology and Patient Safety

• Health IT is not a single product; it encompasses a technical system of computers and software that operates in the context of a larger sociotechnical system—a collection of hardware and software working in concert within an organization that includes people, processes, and technology.

Health IT and Patient Safety: Building Safer Systems for Better Care
Institute of Medicine
Health Information Technology and Patient Safety

- The challenges facing safer health care and safer use of health IT involves the people and clinical implementation as much as the technology.
• **Healthcare IT News** (1/23) reported, “The Agency for Healthcare Research and Quality's (AHRQ) National Resource Center for Health Information Technology has released a report that shows how barcode medication administration (BCMA) can improve the quality, safety, efficiency, and effectiveness of healthcare.” The agency says, however, that “providers aren’t adopting the technology because of the complex issues associated with it, including getting buy-in from staff, selecting vendors, preparing for changes in workflow, training nurses and pharmacists, finding technical support and evaluating the impact on quality of care.” Healthcare IT News added that, “according to AHRQ grantees used for the study, after an initial learning period, nurses and nurse managers were satisfied with the new [electronic medication administration record technologies] and BCMA systems, believing that the systems make them better clinicians.”
Role of Computerized Physician Order Entry Systems in Facilitating Medication Errors

Koppel et al, JAMA, March 9, 2005—Vol 293, No. 10 1197

The Extent and Importance of Unintended Consequences Related to Computerized Provider Order Entry

Conclusions: The unintended consequences of CPOE are widespread and important to those knowledgeable about CPOE in hospitals. They can be positive, negative, or both, depending on one’s perspective, and they continue to exist over the duration of use. Aggressive detection and management of adverse unintended consequences is vital for CPOE success.

CPOE and Warnings

Study indicates most physicians ignore warnings issued by electronic drug-prescribing systems

- Researchers at Dana-Farber Cancer Institute and Beth Israel Deaconess Medical Center found that "out of almost a quarter-million medication safety alerts produced during the study period, the doctors involved accepted only 9.2 percent of the interaction warnings and 23 percent of the allergy warnings. In other words, they ignored more than 90 percent of the drug interaction alerts and more than 75 percent of the allergy alerts."

Isaac, T et al, Overrides of Medication Alerts in Ambulatory Care Arch Intern Med. 2009;169(3):305-311
Copied and Pasted and Misdiagnosed (or Cloned Notes and Blind Alleys)


"[t]he capacity to manipulate the EHR makes it far too easy for trainees to avoid taking their own histories and coming to their own conclusions about what might be wrong." The copying of someone else’s notes without attribution is especially dangerous and unprofessional. In fact, it is a form of plagiarism.

The World Wide Web

- Patients seek out knowledge
- Up to 58% of all Americans use the internet to determine how and when to access other health care resources
- Many websites with dubious information
- "The trouble with quotes on the Internet is you never know if they are genuine." - Abraham Lincoln
Key findings

- Health IT can improve patient safety in some areas such as medication safety; however, there are significant gaps in the literature regarding how health IT impacts patient safety overall.
- Safer implementation and use begins with viewing health IT as part of a larger sociotechnical system.

All stakeholders need to work together to improve patient safety.

Health IT safety is contingent on how the technology is designed, implemented, used, and fits into clinical workflow, requiring the cooperation of both vendors and users.

Institute of Medicine
The Future

CollaboRhythm
Redefining healthcare delivery
CollaboRhythm is a technology platform that enables a new paradigm of healthcare delivery; one where patients are empowered to become active participants and where doctors and other health professionals are transformed into real-time coaches. We believe that this radical shift in thinking is necessary to dramatically reduce healthcare costs, increase quality, and improve health outcomes.

http://newmed.media.mit.edu/collaborhythm

Avatars

NewMedia Medicine - MIT Media Lab
Cardiac Rehab Game
The Future
The Future is Here

Smartphone Apps
The Medical Product Safety Network (MedSun) improves FDA's understanding of problems with the use of medical devices so that the FDA, healthcare facilities, clinicians, and manufacturers can better address safety concerns.

http://www.fda.gov/medicaldevices/safety/medsunmedicalproductsafetynetwork/default.htm

Table Top Exercise
Recommendation

- The Patient Safety Executive can play an integral role in ensuring that the organization has a plan to evaluate where to dedicate resources
  - Done by including technology as part of strategy
  - Important because technology is part of structure
  - Technology can introduce a whole new set of problems

Take a moment to reflect on your own work. What will you incorporate from this session into your plans?