How to Improve Electronic Health Record Usability and Patient Safety

October 5, 2016
The Pew Charitable Trusts

The Pew Charitable Trusts is an independent, non-profit research and public policy organization

Pew’s Health Information Technology Project seeks to improve patient safety and quality of care through advances in electronic health record interoperability and usability
Housekeeping

1. To ask the panelists a question, please use the Q&A function

2. Type your question into the box. Make sure the “Ask” drop down menu is set to “All Panelists”

3. This webinar is being recorded and will be posted on the Pew website in the coming weeks along with slides
Agenda

- Overview of Pew white paper—Josh Rising, Pew
- Patient safety perspective—Peter Pronovost, JHU
- Federal perspective—Andrew Gettinger, ONC
- Moderated Q&A
Speakers

Peter Pronovost is the director of the Armstrong Institute for Patient Safety and Quality at Johns Hopkins and Johns Hopkins Medicine’s senior vice president for patient safety and quality. Dr. Pronovost is one of the world’s leading experts on patient safety with over 800 published works and he serves as an advisor to the World Health Organization’s World Alliance for Patient Safety.

Andrew Gettinger is the Chief Medical Information Officer and Executive Director of the Office of Clinical Quality and Safety at the Office of the National Coordinator for Health IT. Dr. Gettinger’s work focuses on the intersection of information technology and health care and he was previously Associate Dean for clinical informatics at the Geisel School of Medicine at Dartmouth College.
Josh Rising
Director, Health Care Programs
The Pew Charitable Trusts

THREE WAYS TO IMPROVE EHR USABILITY
What is usability?

- EHRs designs can inadvertently harm patient safety
  - Clinician workflow may not be sufficiently addressed in EHR design
  - EHRs can be cumbersome to use with long drop down menus requiring continuous scrolling, disruptive pop-up alerts, and poorly designed interfaces
  - These challenges can lead to patient safety problems like incorrect medication dosages, or procedures ordered for the wrong patient
Patient safety effects of poor usability (Ex. 1)

- A pediatric patient received 38 times the appropriate amount of an antibiotic and suffered a massive seizure
  - The attending physician entered an order for an antibiotic, not realizing that the EHR default setting was mg/kg doses for pediatrics. Instead of ordering a 160 mg pill, she accidentally ordered a 160 mg/kg dose
  - While several alerts were in place to warn the physician, pharmacist and nurse, they were dismissed, due in part to the high frequency of irrelevant alerts

Source: https://backchannel.com/the-overdose-harm-in-a-wired-hospital-8e5ac74fe73c#j2k7eznok
Patient safety effects of poor usability (Ex. 2)

- A patient died from a massive stroke a week after he received an ultrasound of his carotid artery that showed he had a 90% chance of blockage
  - No one reviewed his test results and he was discharged because the EHR system that his hospital used did not flag any radiology or cardiac diagnostic findings as critical values

Source: Maryland Hospital Patient Safety Program Annual Report FY 2013
Problem: Inadequate safety testing requirements

- Testing of EHR usability and safety is inadequate
  - Usability and safety testing is needed during three stages:
    - during development (formative);
    - after development (summative); and
    - post-implementation
  - ONC only requires summative functionality testing as part of EHR certification criteria

Solution

- ONC should require formative, summative and post-implementation usability and safety testing
Problem: Lack of quality measures to evaluate safety and usability

- Clinicians and EHR vendors lack sufficient data to know if certain design changes positively affect patient safety and usability
- There are few endorsed measures to track patient safety associated with EHR design and none used in federal programs

Solution
- Quality measures organizations, EHR vendors, hospitals, clinicians and patient safety advocates should develop measures to track and benchmark progress
Problem: Little data to evaluate safety problems

- Hospitals and clinicians do not have data on the types and the frequency of EHR-related patient safety problems
  - Many EHR contracts have nondisclosure agreements and intellectual property clauses that restrict the ability to share screenshots or detailed information
  - There is no organization responsible for studying EHR safety problems and disseminating best practices

Solution

- Congress should authorize the creation of a collaborative with EHR vendors, clinicians, and ONC focused on collecting and analyzing safety data, and issuing best practices to address safety problems
How to Improve Electronic Health Record Usability and Patient Safety

Stakeholders identify 3 problems, and their solutions, at a meeting convened by Pew

Overview

Although the United States has invested tens of billions of dollars to encourage providers to adopt electronic health records (EHRs), many clinicians have found that these systems have poor “usability.” EHRs can put patients at risk of medical error, do little to enhance clinical care, and increase the time clinicians spend documenting patient care. Indeed, one study found that 15 percent of physicians reported that their EHR had caused a potential medication error within the past month. For example, in a well-publicized case, a child received a near-fatal dose of a routine antibiotic due to the poor design of the EHR’s medication ordering system and the repetitive alerts that were ignored by clinicians.

To identify the root causes of—and potential solutions to—usability problems, The Pew Charitable Trusts, in collaboration with the Johns Hopkins Armstrong Institute for Patient Safety and Quality, convened 70 experts representing makers of EHR systems, hospitals, clinicians, patient safety advocates, and the federal government at a July 28, 2015 workshop. Following a day of robust discussion, a set of core problems that inhibit EHR usability emerged along with a number of promising solutions. Since then, several reports have also looked at ways to address EHR usability and patient safety.

Report available at:
The Urgent Need to Enhance Usability of the EHR

Peter Pronovost, MD, PhD, FCCM
Johns Hopkins Medicine Armstrong Institute’s Patient Safety
Harm from Poor Usability

- Harm from commission
  - Patient Identification errors results
    - Patient not being resuscitated after cardiac arrest
    - Patient with heart disease dies after surgery
    - Patient receives wrong chemo, medicines

- Harm from omission

- Harm from wasted productivity

- Harm from burnout

ECRI PSO Deep Dive Pt ID exec. Summary
Patient Identification - Duplicate MRN

Correct

Duplicate

Overlaid

Individuals

Records

McCoy et al 2013.
Usability Testing and Redesign with User Centered Approach
Based on the assumption that each duplicate pair costs $1000 (1). Based on our data, assuming that 250 Duplicates were prevented each month: **$3M saved annually** for cleaning records since the implementation.
Use case 2:
Increased use of recommended therapies

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### Delirium
- CAM ICU assessments
- Automated screening
- Modifiable factors
- Non-pharmacological interventions
- Sedation management
- Pain scores
- Family education

### Acquired Physical Impairment
- Early ambulation
- Adjunctive physical therapy
- Pharmacologic management
- Family meetings
- Advanced directives
- All teams meetings
- Ethics engagement
- Palliative Care

### Failure to provide care consistent with patient goals

### VAP
- Head of Bed Elevation (HOB) (≥ 30 degrees)
- Spontaneous Awakening and Breathing Trials (SAT & SBT)
- Oral Care
- Oral Care with Chlorhexidine
- Subglottic Suctioning ETTs

### Ventilator Harm
- Daily sedation vacation (SAT)
- Spontaneous breathing trials (SBT)
- Automated ventilator management
- Lung Protective Ventilation for ARDS
- Flow Volume

### Loss of Respect and Dignity
- Interpersonal communication
- Scheduling
- Education
- Goals alignment
- Access to care team
- Inclusion
- Continuity

### CLABSI
- Hand washing
- Chlorhexidine
- Full Barrier Precautions
- Avoid femoral site
- Remove Unnecessary line
- Use of checklist
- Availability of cart
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<td>SIMV/VC Settings</td>
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**Adjunct Airways Other (Comment)**

- **Non-surgical Airway Properties**
  - Secured at (cm): 
  - Measured From: 
  - Secured Location: 
  - Secured by: Cloth tape
  - Tube care: 
  - Site Assessment: No pres...

**Mode and Initial Settings**

- **Vent Mode**: SIMV/PRVC

**SIMV/PRVC Settings**

- SIMV/PRVC Target Tidal Volume (mL): 400
- SIMV/PRVC Ventilator Set Rate: 20
- SIMV/PRVC FiO2 (%): 40
- SIMV/PRVC PEEP (cm H2O): 5
- SIMV/PRVC Pressure Support (cm): 5
- SIMV/PRVC InSp Time (sec): Square
- SIMV/PRVC Set I:E ratio: Flow
- SIMV/PRVC Trigger Sensitivity: 
- SIMV/PRVC Tube Compensation: 
- SIMV/PRVC Humidification: 

**Adjunct Airways Other (Comment)**

- Placement Date/Time: 02/27/15 1215
- Airway Device: Other (Comment)
Emerge Care Team Portal – Census
• Current usability of EHRs causes significant harm to patients and providers
• Use of systems-based HFE framework to improve usability and work flow can improve safety and productivity
• Regulators could ensure vendors demonstrate compliance with best practices
• Providers can set up “learning labs” to integrate HFE, vendors, and clinicians to test and improve usability in the wild and share
Usability Challenges, Opportunities, and Lessons Learned: Federal Perspective

Andrew Gettinger, MD | CMIO and Executive Director, OCQS | Office of the National Coordinator for Health IT

The views expressed herein do not necessarily represent the views of the Department of Health & Human Services or the United States Government (5 CFR §2635.807)
• Focus on patient-centered cognitive support for clinicians
• Short-term research that addresses usability and workflow
• Long-term research that can remove key cognitive barriers to HIT adoption and meaningful use

http://inspireddehrehs.org
Background

2011

2013

2014

2015

2016

Coming Soon
Development of a Roadmap for a Health IT Safety Collaborative

Convening
- Assemble stakeholders to identify critical health IT safety issues and identify needed solutions

Researching
- Collect and assess existing analysis of health IT safety event data
- Identify existing solutions (best practices, tools, initiatives, etc.)

Disseminating
- Promote and distribute Collaborative work products
Testing Proposed Health IT Safety Collaborative Methods

- **Objective:** develop (or identify) a solution to a critical issue related to usability and medication management in ambulatory settings
- **Process:** assemble a work group of private/public stakeholders to test methods the proposed Collaborative would use to deliver solutions
- **Focus Area:** work group identified *pick list errors* as the targeted issue for recommendations and achievable solutions
• **Work Group Membership:** Individuals with relevant expertise and with private and public sector perspectives:
  » Advocacy groups
  » Patient safety organizations (PSOs)
  » Safety researchers
  » Provider organizations
  » Human factors and usability experts
  » Medication safety organizations
  » Health IT vendors
  » Government agencies
What We Tested

• This test validated Roadmap assumptions about convening volunteer expert workgroups to develop a solution to a specific health IT safety concern
• The test focused on the process to develop the solution
• Coming this Fall:

  » *Report on the Safe Use of Pick Lists in Ambulatory Care Settings: Issues and Recommended Solutions for Improved Usability in Patient Selection and Medication Ordering*
Roadmap

- Nothing has been approved at HHS or Congress
- Seed money from HHS
- Public private partnership
- Protected space for work protected from litigation

Safety Center is NOT

- A bricks and mortar physical entity
- Federal entity collecting data
Thank You

Andrew.Gettinger@hhs.gov

WWW.HEALTHIT.GOV
Q&A

We encourage your active participation by asking questions

1. To ask the panelists a question, please use the Q&A function

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Next Steps

- Pew released an RFP for new research projects on the cost and safety ramifications of poor EHR usability and patient matching
  - Deadline for proposals is **October 28, 2016**
  - More details can be found here: [http://www.pewtrusts.org/~media/assets/2016/09/health-information-technology-rfp.pdf](http://www.pewtrusts.org/~media/assets/2016/09/health-information-technology-rfp.pdf)

- Pew is hiring for two new positions within the HIT project
  - Position descriptions and more information can be found on Pew’s career center: [https://jobs-pct.icims.com/jobs/intro](https://jobs-pct.icims.com/jobs/intro)