

THE
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How to Improve Electronic Health Record Usability and Patient Safety

October 5, 2016



The Pew Charitable Trusts

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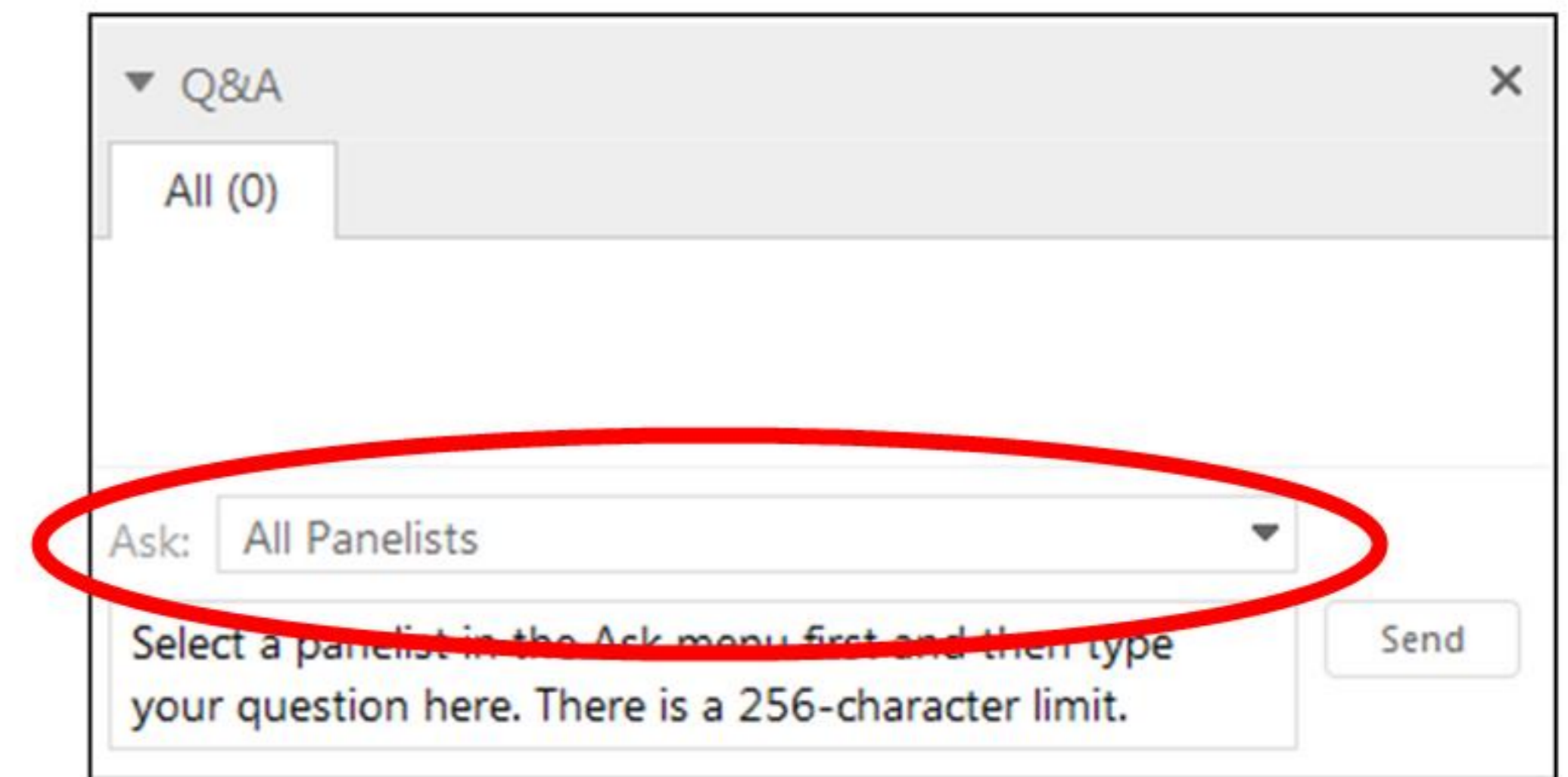
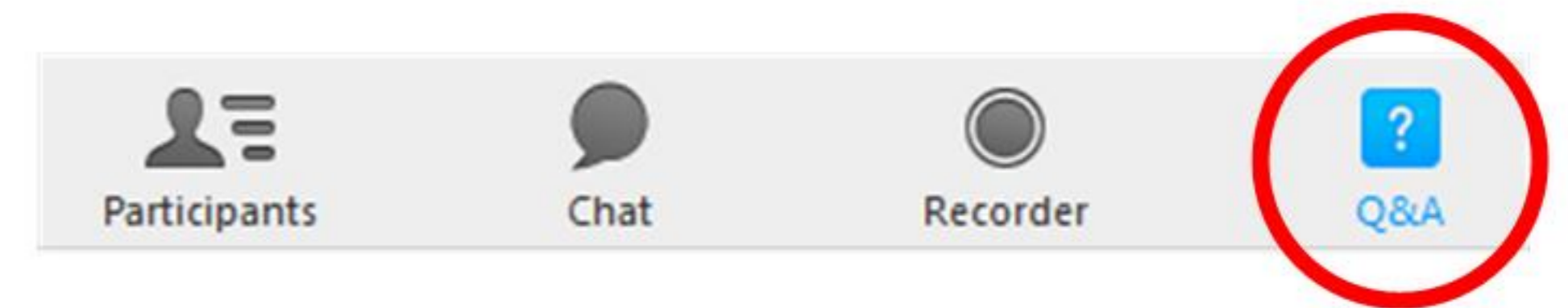
Pew's Health Information Technology Project seeks to improve patient safety and quality of care through advances in electronic health record interoperability and usability

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

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.¹ 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.²

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:

<http://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2016/09/how-to-improve-electronic-health-record-usability-and-patient-safety>

The Urgent Need to Enhance Usability of the EHR

Peter Pronovost, MD, PhD, FCCM

Johns Hopkins Medicine Armstrong Institute's Patient Safety

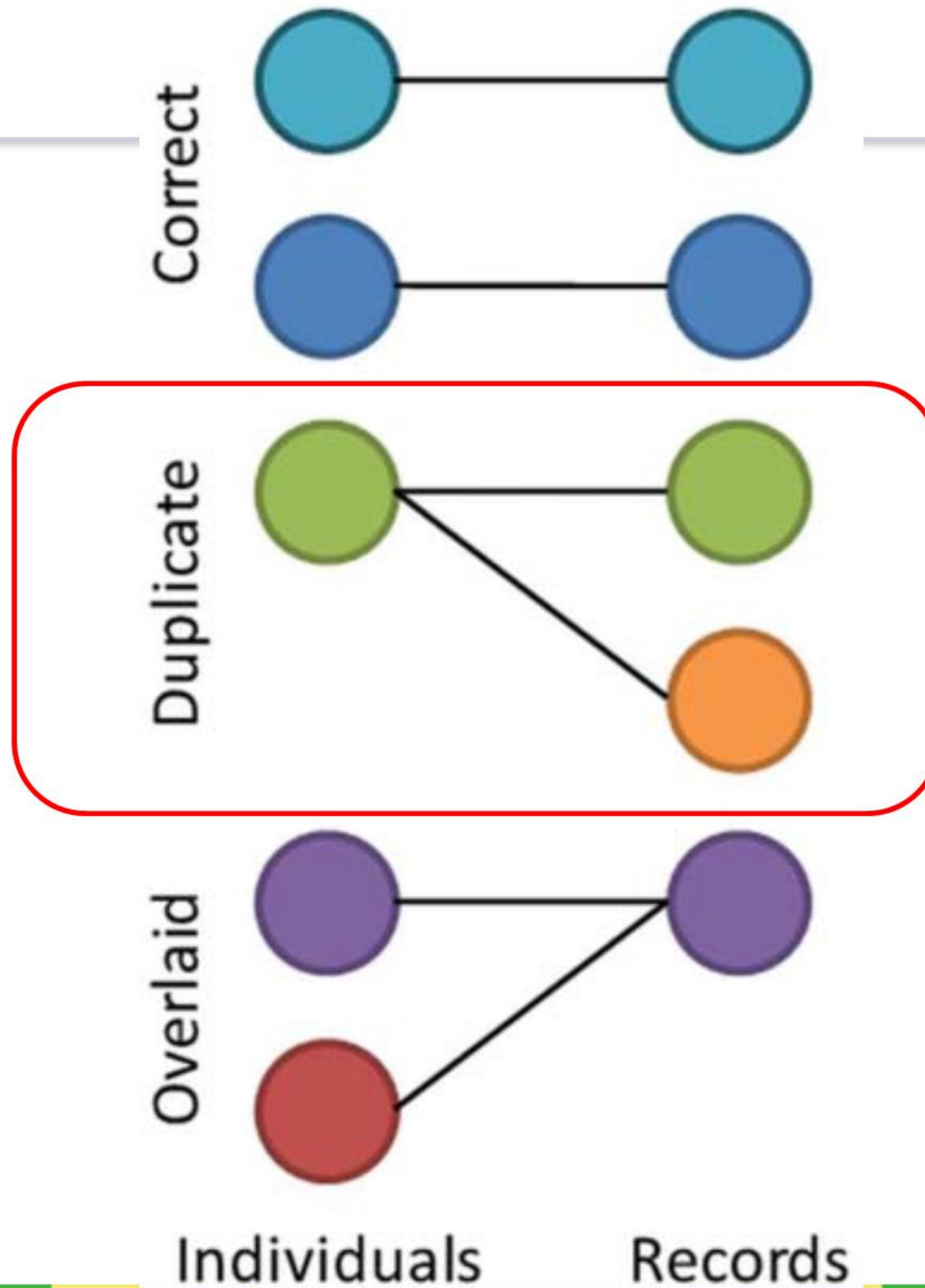
Harm from Poor Usability

- 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

<http://www.wsj.com/articles/medical-record-mix-ups-a-common-problem-study-finds-1474844404>

Patient Identification- Duplicate MRN



McCoy et al 2013.

Usability Testing and Redesign with User Centered Approach

Patient Lookup

Select Patient Recent Patients

Name/MRN: EPI ID:

SSN: Sex:

Birth date:

Use sounds-like

Name/MRN: EPI ID:

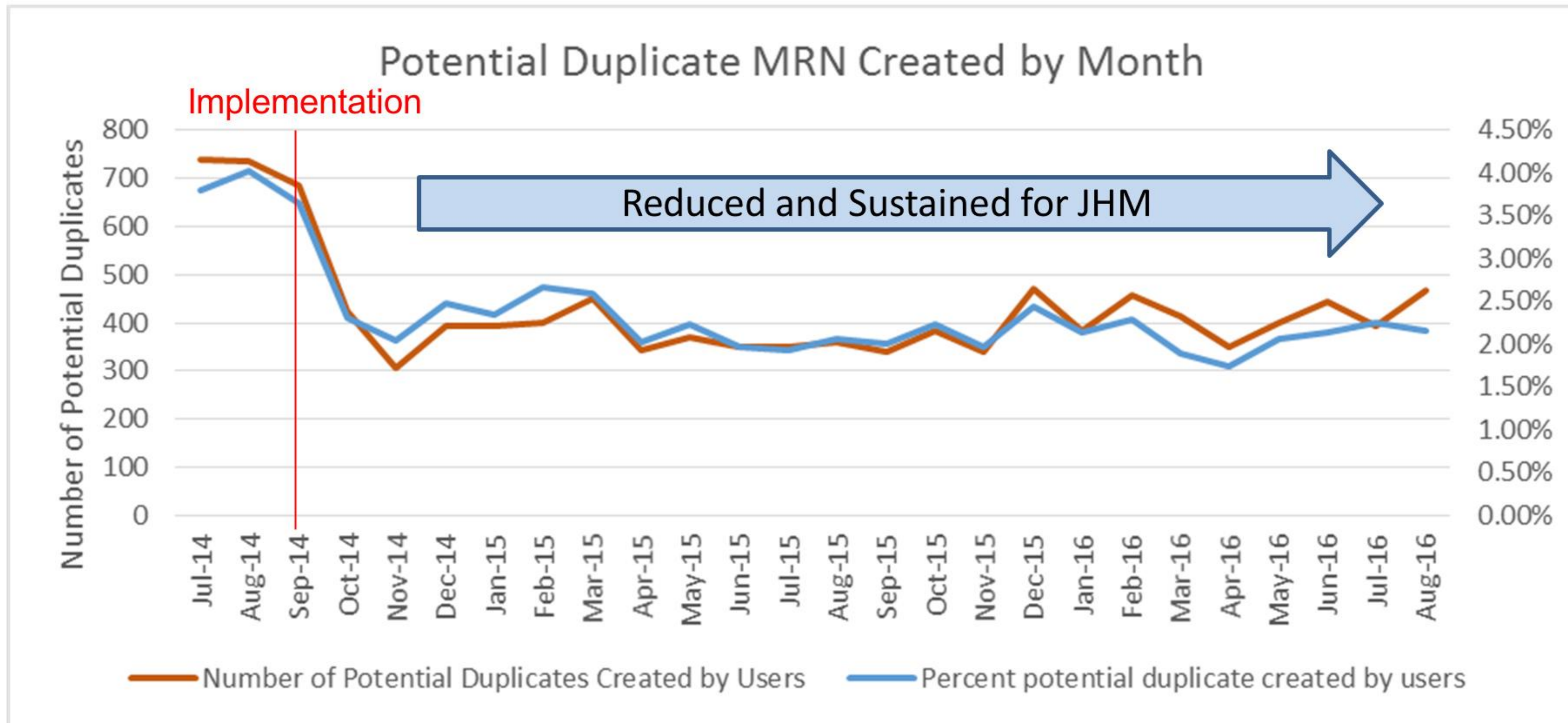
Birth Date:

SSN: Sex:

Phone Number: Zip Code:

Use sounds-like

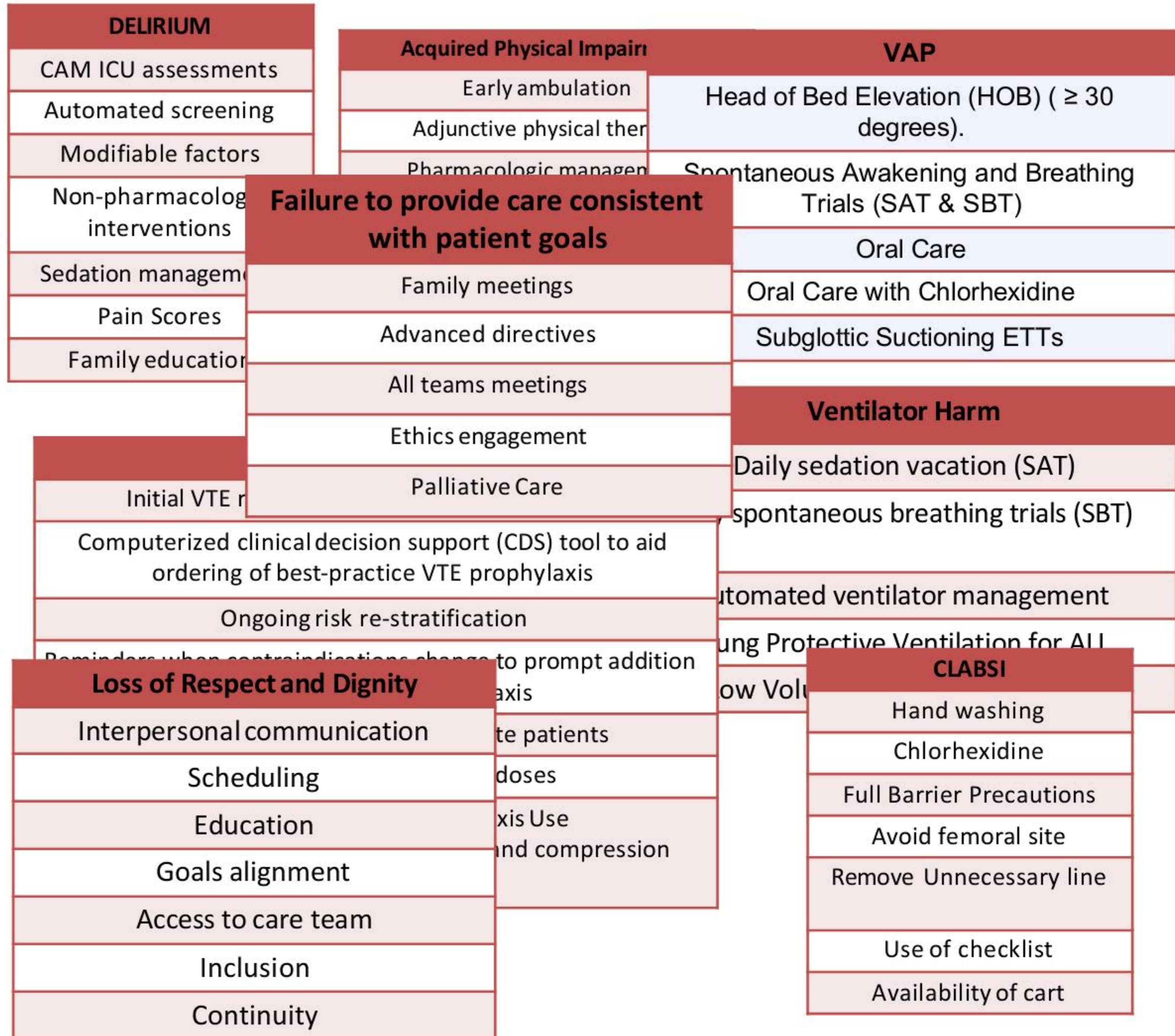
Implementation of a Sustainable Solution for JHM



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

<u>Harms</u>
Delirium
Acquired Physical Impairment
Ventilator associated infections and harms
DVT-PE
CLABSI
Loss of Respect and Dignity
Failure to provide care consistent with patient goals



Islands, SevenP... MRN: HC0004... Room and Bed: TRN HCGH... Admit Dx: ACL tear Code: CPR - Full Code Research: None First Call: None Patient Class: Hospital Outpatien... Female, 18 y.o., 02/25/1997 CSN: 470084 Attending: TREE, S Admit Dt: 02/27/15 Allergies: Penicillins Pref Language: En... Primary Ins.: None

- Patient Summary
- Chart Review
- Results Review
- Work List
- MAR
- Doc Flowsheets
- Intake/Output
- Notes
- Patient Education
- Care Plan
- Manage Orders
- Respiratory
- More Activities

Doc Flowsheets

File Add Rows Add LDA Cascade Add Col Insert Col Show Device Data Hide Comp'd Last Filed Reg Doc Graph Go to Date Values By Refresh Legend Link Lines

RT Assessment Vent Doc ABG Pulse oximetry NPPV Vital Signs Oxygen RT CPT RT Medication Treatment RT Capnography ABCDE Protoc Vent Doc

Jump to where I left off Mode: Accordion Expanded View All 1m 5m 10m 15m 30m 1h 2h 4h 8h 24h Based On: 0700 Reset Now

Admission (Current)...	
2/27/15	
1500	1600

Adjunct Airways Other (Comment)

Non-surgical Airway Properties	Placement Date/Time: 02/27/15 1215	Airway Device: Other (Comment)
Secured at (cm)		
Measured From	Lips	
Secured Location	Right	
Secured by	Cloth tape	
Tube care	Low inte...	
Site Assessment	No pres...	

Mode and Initial Settings

Vent Mode	SIMV/P...
-----------	-----------

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)	
SIMV/PRVC Set I:E ratio	
SIMV/PRVC Insp Rise Time (%)	
SIMV/PRVC Waveform	Square
SIMV/PRVC Trigger Sensitivity	Flow
SIMV/PRVC Tube Compensation	
SIMV/PRVC Humidification	

Check All Uncheck All

Emerge Care Team Portal – Census



CARE TEAM PORTAL

03May2015 18:06

Howard Carolan



3



Geoff Cameron
SICU-042-A



1



Lori Chalupny
SICU-043-A



0



Edgar Castillo
SICU-044-A



0



Alyssa Naehar
SICU-045-A



0



Ali Krieger
SICU-046-A



1



Julie Johnston
SICU-047-A



4



Amy Rodriguez
SICU-050-A



2



Julie Johnston
SICU-051-A



0



Tim Howard
SICU-052-A



2



Chris Wondolowski
SICU-053-A



0



Hope Solo
SICU-055-A

Emerge Care Team Portal – Harms Monitor



CARE TEAM PORTAL

23Jan2015 13:34

Howard Carolan



John Doe

Zayed 9E, Room # SICU-049-A



GENDER

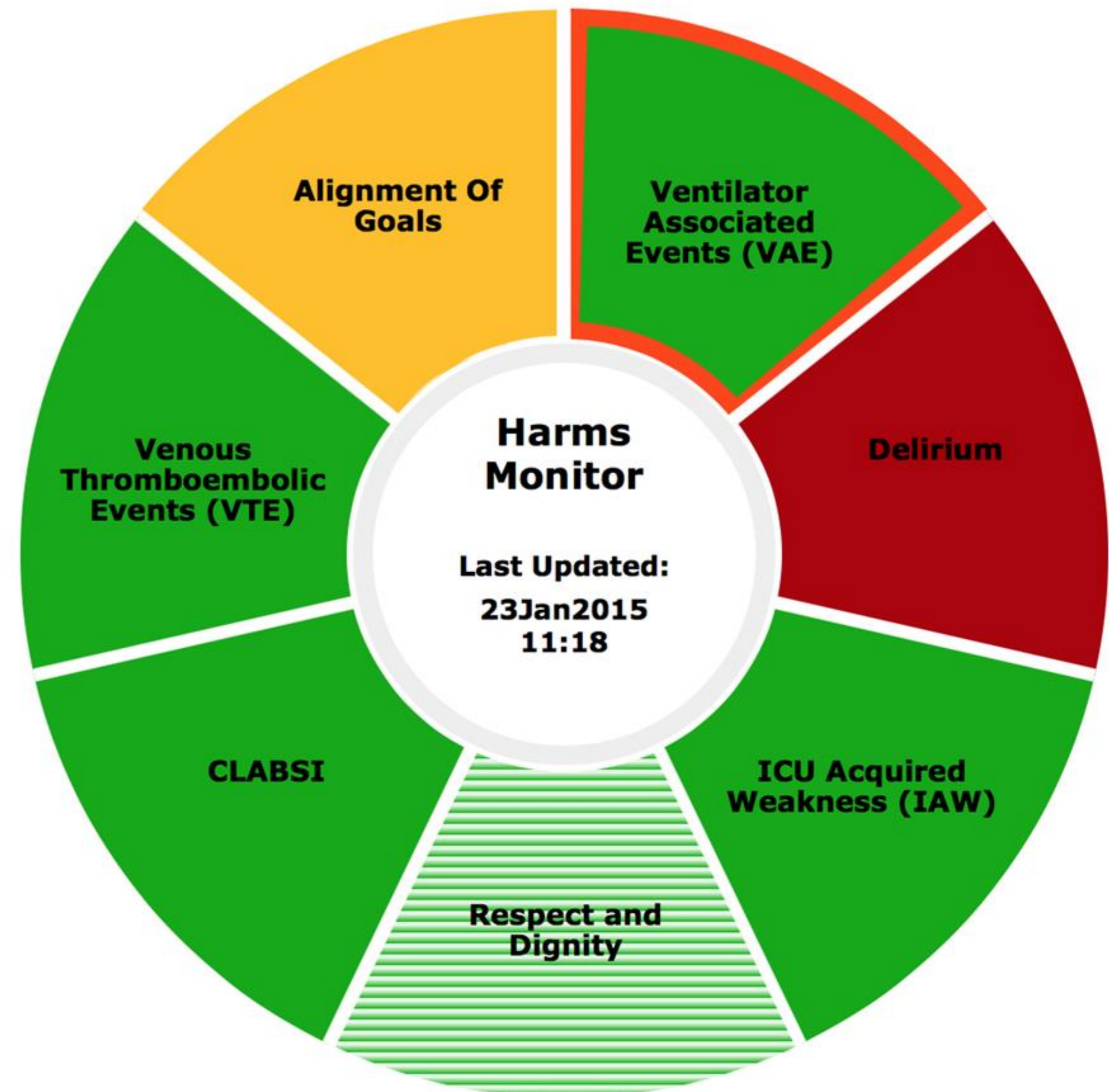
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AGE

52

FAMILY SPOKESPERSON

Mrs. Gomez



Patient Schedule

Set Family Activities

Patient Profile

Notify Care Team

Conclusion

- 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



The Office of the National Coordinator for
Health Information Technology

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)

One Hundred Eleventh Congress of the United States of America

AT THE FIRST SESSION

*Begun and held at the City of Washington on Tuesday,
the sixth day of January, two thousand and nine*

An Act

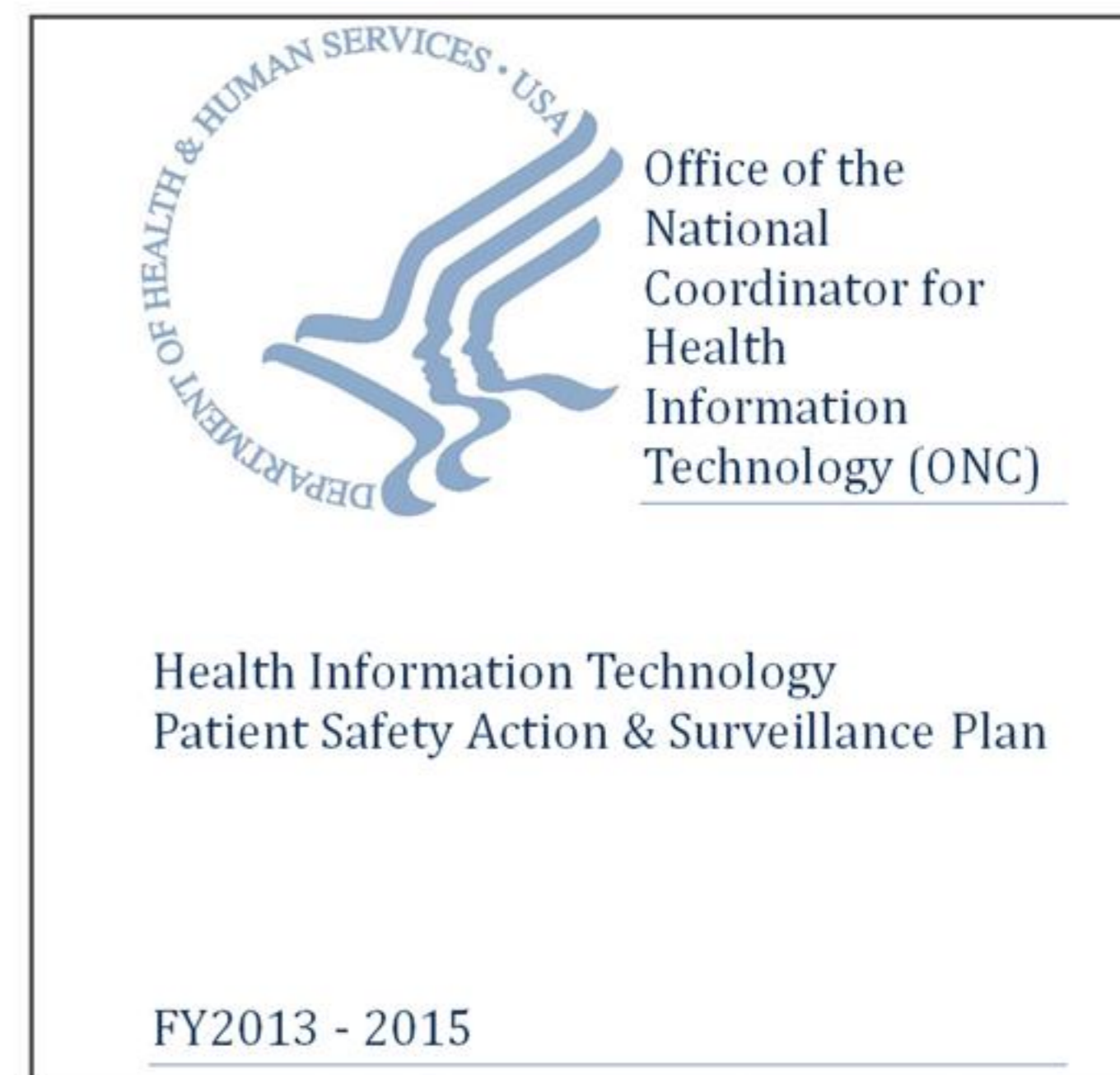
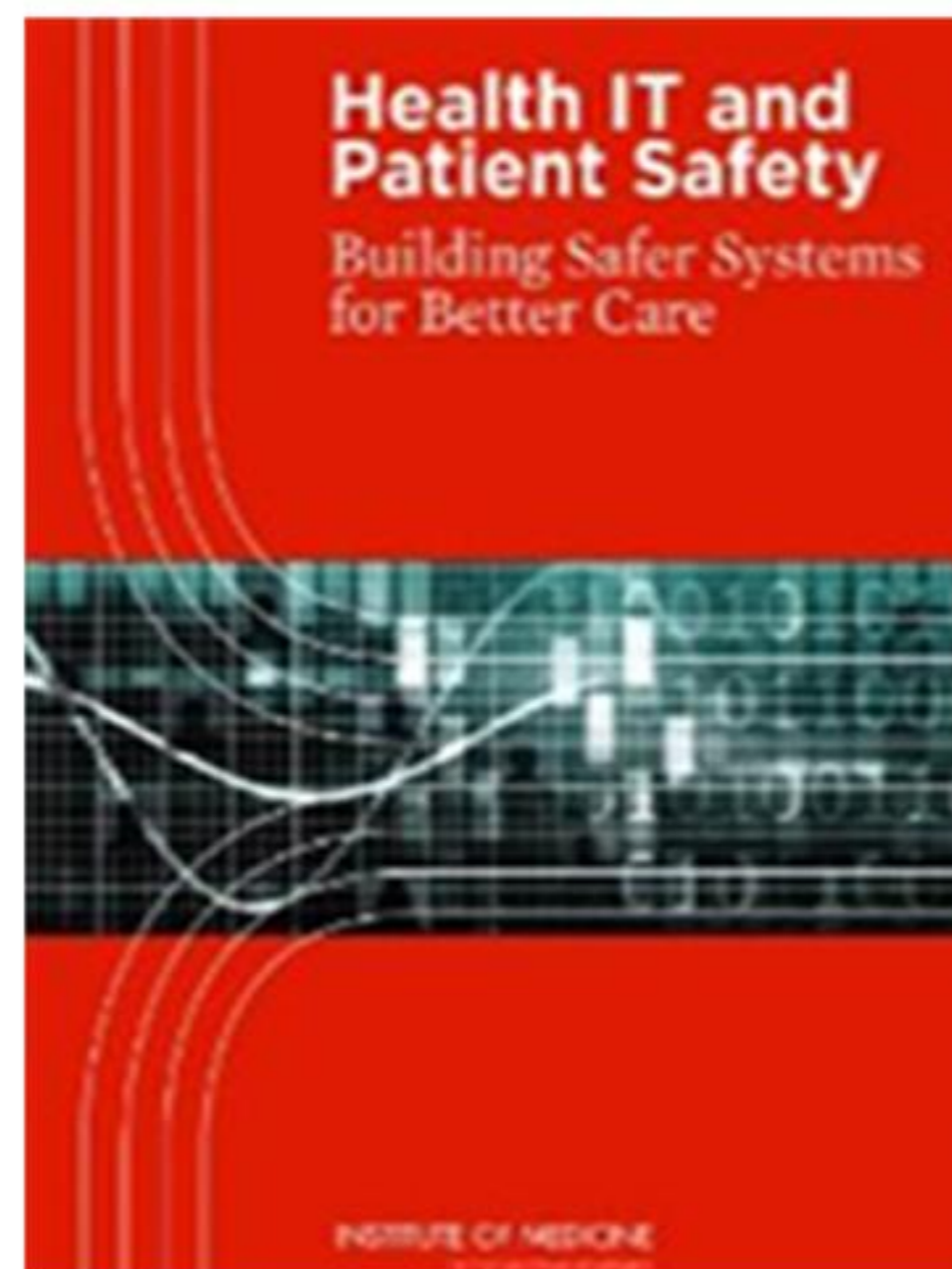
TITLE XIII—HEALTH INFORMATION TECHNOLOGY

Health
Information
Technology for
Economic and
Clinical Health
Act.

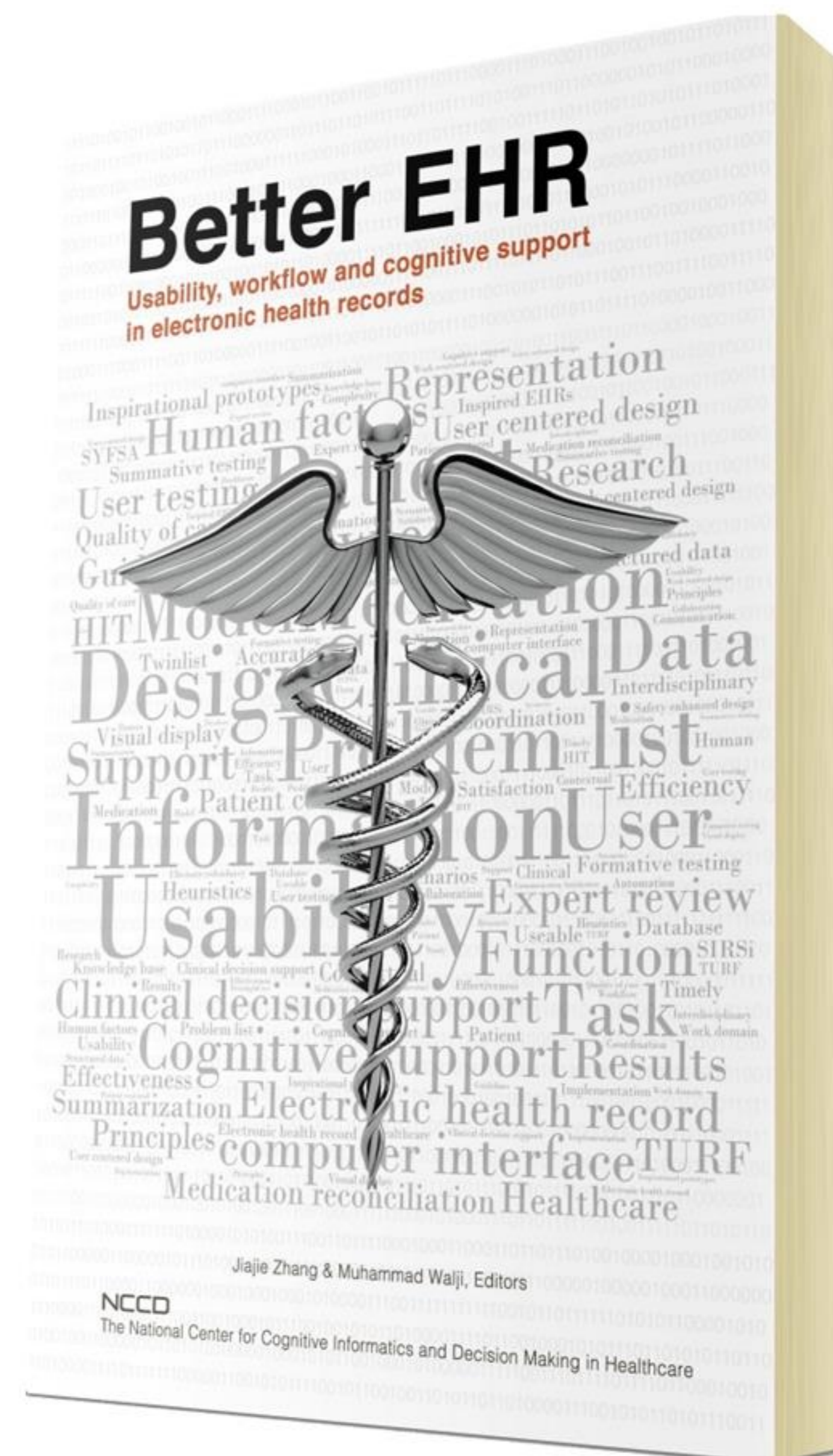
42 USC 201 note.

SEC. 13001. SHORT TITLE; TABLE OF CONTENTS OF TITLE.

(a) SHORT TITLE.—This title (and title IV of division B) may be cited as the “Health Information Technology for Economic and Clinical Health Act” or the “HITECH Act”.

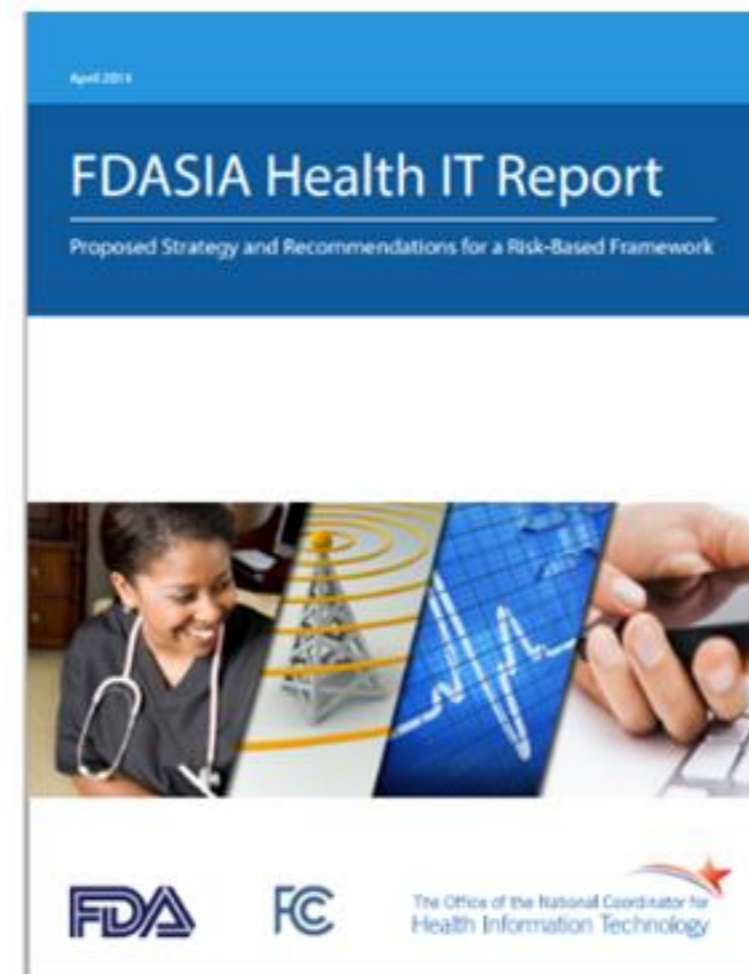
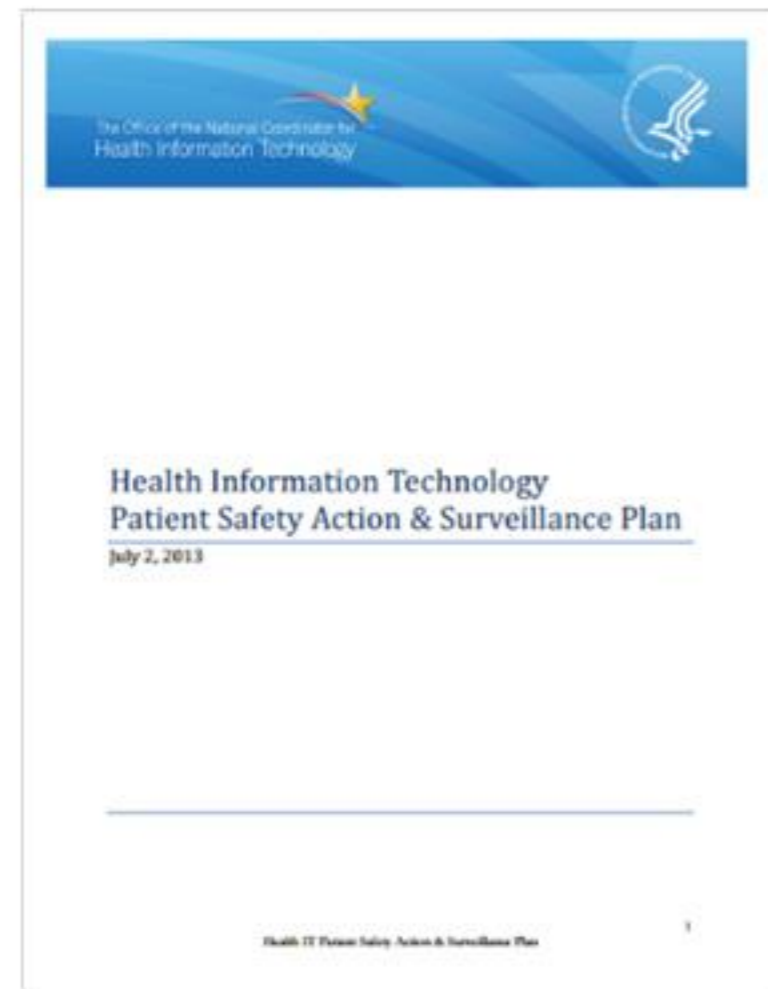


- Focus on patient-centered cognitive support for clinicians
- Short-term research that addresses usability and workflow
- Long-term research that can remove key cognitive barriers to HIT adoption and meaningful use

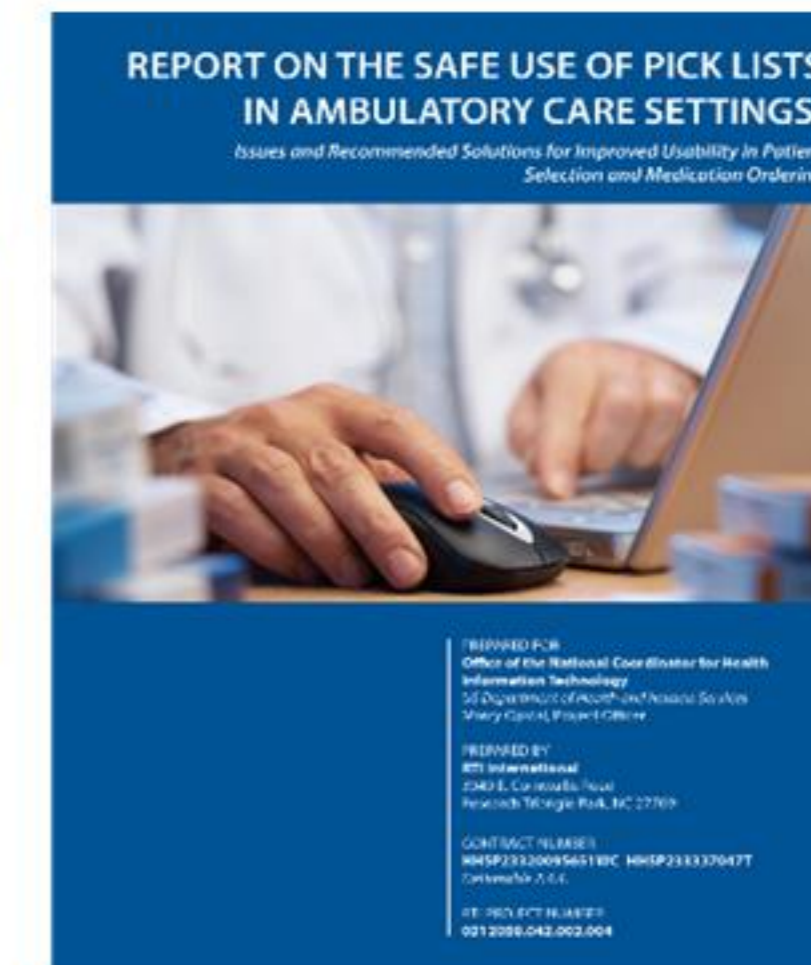


<http://inspiredehrs.org>

Background



Coming Soon



2011

2013

2014

2015

2016

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***

- 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

HEALTH IT SAFETY CENTER ROADMAP

Collaborate on solutions, Informed by evidence



The Office of the National Coordinator for
Health Information Technology



Thank You

Andrew.Gettinger@hhs.gov

WWW.HEALTHIT.GOV



@ONC_HealthIT



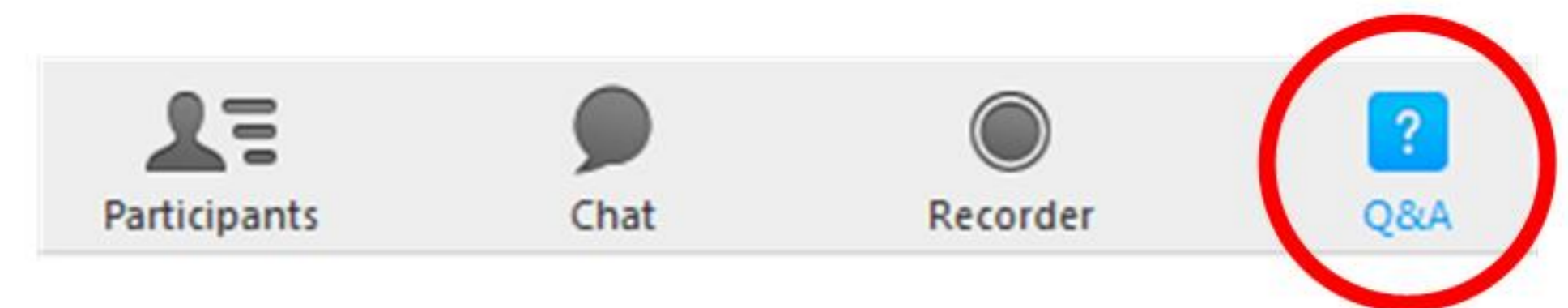
@HHSOnc

HealthIT.gov 

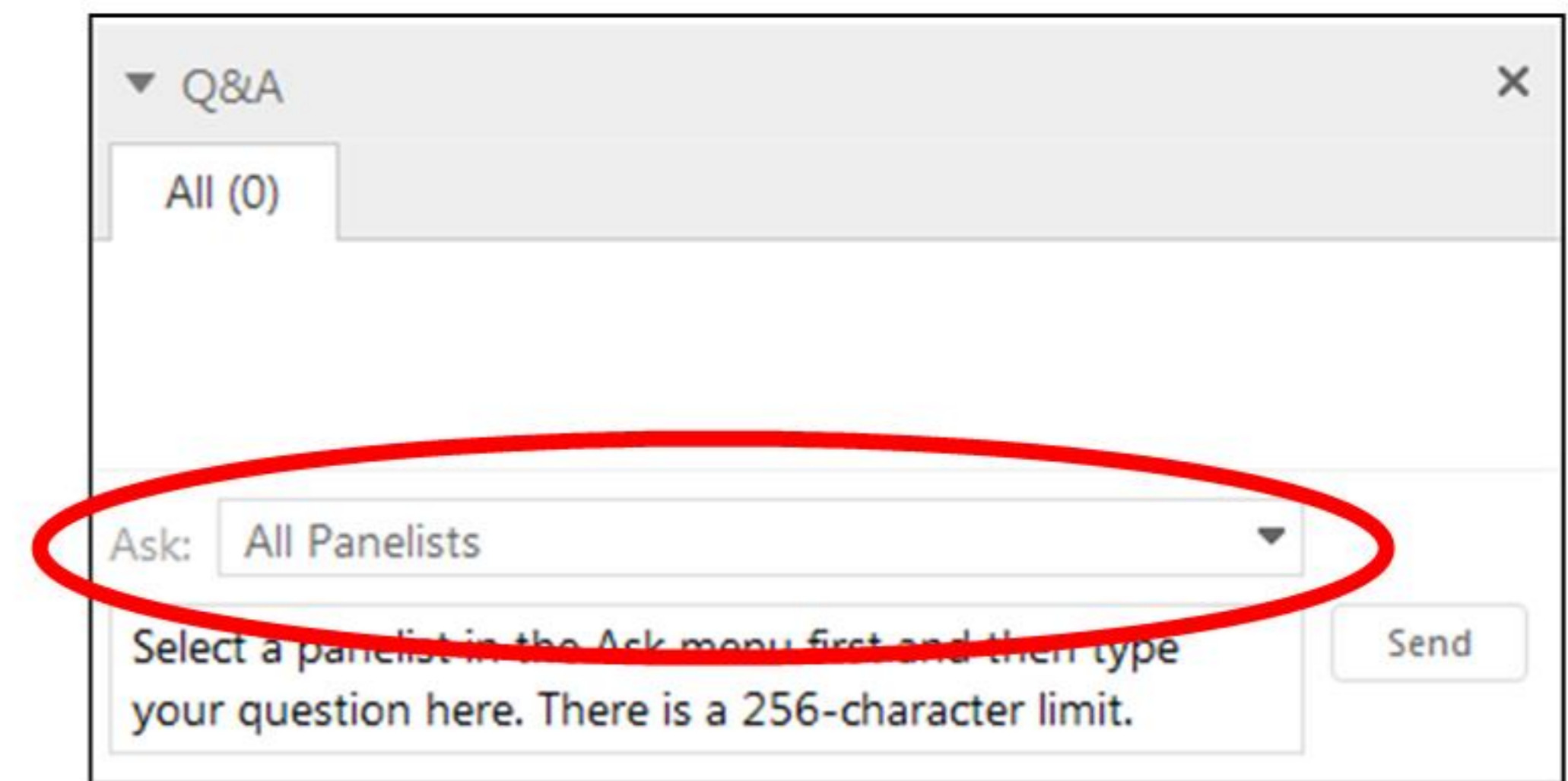
Q&A

We encourage your active participation by asking questions

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

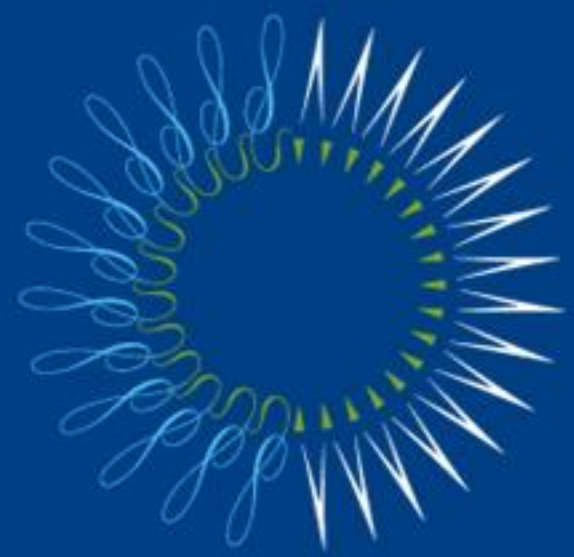


2. Type your question into the box
Make sure the Ask drop down menu is set to “All Panelists”



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>
- 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>



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