Embedding Health IT Into Your Safety Program

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The presenters have nothing to disclose

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#IHIFORUM
Disclosure:

- Robert Giannini and Patricia Giuffrida today have no relevant financial or nonfinancial relationship(s) within the services described, reviewed, evaluated, or compared in this presentation
Session Objectives

- Recognize that health IT can contribute to patient safety/risk management issues
- Discuss the safe practice recommendations and tools for developing, implementing, and integrating a health IT safety program
- Describe and apply the strategies to develop, implement, and integrate health IT into a patient safety/risk management program
Introduce Yourself: Organization, Role, Profession
Embedding Health IT Into Your Safety Program

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What is...
Established in 2013
Multistakeholder collaborative
Convened and operated by ECRI Institute
Goal is to make healthcare safer
Provide evidence-based recommendations for safer health IT utilization
Working Together:
Partnership Expert Advisory Panel

- David W. Bates, MD, MSc, Brigham and Women’s Hospital
- Kathleen Blake, MD, MPH, American Medical Association
- Pascale Carayon, PhD, University of Wisconsin-Madison College of Engineering
- Tejal Gandhi, MD, MPH, National Patient Safety Foundation/IHI
- Christoph Lehmann, MD, Vanderbilt University Medical Center
- Peter J. Pronovost, MD, PhD
- Daniel J. Ross, MD, DDS, Department of Defense, Defense Health Agency
- Jeanie Scott, MS, VHA Office of Informatics and Analytics/Health Informatics
- Patricia P. Sengstack, DNP, RN-BC, CPHIMS, Vanderbilt University Medical Center
- Hardeep Singh, MD, MPH, Michael E. DeBakey VA Medical Center and Baylor College of Medicine
- Dean Sittig, PhD, The University of Texas Health Science Center at Houston, School of Biomedical Informatics
- Paul Tang, MD, MS, IBM Watson Health
Focus on Health IT Safety

organization incorporate vendor risk identify

safety health HIT training

reporting program technology

assess culture change events

mitigate make decisions

existing agreements

opportunities guidance

patients harm

addressed

engage

daily

partnership huddles opportunity

activity

issue participants

meetings

providers

great

assessments hazards

making

consequences
The Partnership for Health IT Patient Safety
What Do We Do?
Workgroup Process for Developing Safe Practice Recommendations

Process

Evidence/Safety Data Review
De-identification Sense making
Expert review
HIT Safe Practices
Overview
Key Components of a Health IT Safety Culture

- Committing to health IT safety
- Understanding a just culture
- Adequately identifying the involved stakeholders
- Evaluating and using general risk principles
- Employing initial and continuous learning opportunities
- Reporting (including reporting to vendors and by vendors)
- Understanding technology’s function within the sociotechnical environment
- Providing feedback on interventions to strengthen safety efforts and strengthen organizational learning
Framework for Integrating a Health IT Safety System

1. Leadership and staff commitment to health IT safety
2. Define a culture of safety
3. Incorporate organizational patient safety strategy and commit resources
4. Apply improvement methods, considering human factors and reliability science
Definition: Health IT Safety Event

- A health IT–related patient safety event is any event
  - triggered by,
  - or related to, the technology that has
    - caused patient harm
    - has the potential to cause patient harm
    - or that causes a delay in treatment
    - or misdiagnosis.

- These errors would not occur but for the use of technology.
Health IT-related Issue or Not?
Case 1: System Availability

- The surgeon tried to access a patient’s radiology study from the PACS system in the OR
- The display would only show a blue screen
- The patient’s time under anesthesia was extended while staff tried to get the computer display to work

HIT issue? Should this be reported?
Case 2. Patient Identification

- Nurse noticed patient’s DOB was incorrect on wristband
- Investigation revealed that patient’s admission was tied to her deceased husband’s account
- Care summary showed history of past medical admissions that were not hers, but her deceased husband’s
- Labs had been drawn, sent, and transfusion administered under the husband’s account

HIT issue? Should this be reported?
Case 3: Default Values for Opioids

0.25 mg/mL
0.5 mg/mL
0.75 mg/mL
1.0 mg/mL
1.25 mg/mL
1.5 mg/mL
1.75 mg/mL

HIT issue? Should this be reported?
Case 4. Prescribing EpiPen

- A key word search was conducted to order an EpiPen for an adult patient
- The key word search brought up only the pediatric dose, not the adult dose as was intended

HIT issue?
Should this be reported?
Case 5. DNR Status

- An incorrect status (do not resuscitate) appeared in the record for this patient after multiple charts for the same patient were merged
- The patient was not resuscitated and subsequently died

HIT issue? Should this be reported?
Health IT-related Patient Safety Events

**Looking at an Issue**

- Is there direct evidence that this is EHR-related?

  - Yes, can we identify the EHR-related mechanism for the error?
  - Other sources of error

  - Can the error be prevented with technology?
  - What are the non-EHR-related factors explaining this error?
  - Can technology help with these sources of error?

Safe Practice Recommendations for Developing, Implementing, and Integrating a Health IT Safety Program

Health IT Safety = ICE

Integrate
Identify ways to integrate health information technology (IT) safety into existing safety programs.

Rationale for Practice: Integrating health IT into a safety program assumes that the entity has a robust safety program in place. The elements of a good risk program include risk identification, risk prevention, risk mitigation, risk control, and risk assumption. These identified risks are analyzed, solutions are developed and implemented, and results are monitored and adjusted as needed. Creating awareness of the health IT risks and concerns and identifying new ways that health IT promotes safety is a primary reason for integrating health IT into a safety program. It is important to secure leadership support by leveraging these existing structures whenever possible and to evaluate issues that can arise across the lifecycle of the technology or software.

Stakeholders impacted: Providers, vendor developers, leadership, and suppliers.

Collaborate
Gather the necessary stakeholders, including users, vendors, organizations, and patients to actively collaborate on safety.

Rationale for Practice: A safety program that addresses health IT safety needs to include a broader group of stakeholders than that which is incorporated into a general safety program. This may vary by entity (vendor/developer, provider, healthcare organization). Included in this group are the vendors/providers, information technology experts and staff, and those providers not using the technology, but expert in how to address risks and the potential benefits of using technology for safety. Such collaboration supports a continuing learning environment.

Stakeholders impacted: Providers, vendor developers, leadership, patients.

Embed
Embed safety into the culture and daily workflow to achieve a unified vision of health IT safety.

Rationale for Practice: Health IT is ubiquitous and facilitates safety, but may also have unintended consequences. When health IT safety is embedded into an organization’s culture, it is possible to prioritize care and recognize the benefits of health IT in nonpunitive transparent learning environments.

Stakeholders impacted: Providers, vendor developers, patients, leadership.
Health IT Safety = ICE

Integrate
Identify ways to integrate health IT safety into existing programs.

Collaborate
Convene the necessary stakeholders, including users, vendors, organizations and patients to actively collaborate on safety.

Embed
Embed safety into the culture and daily workflow in order to achieve a unified vision of health IT safety.

Multiple Stakeholders
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Stakeholders impacted: Providers, vendors/developers, leadership, healthcare and supplier organizations
Integrate - Using General Safety Program* Principles for Health IT Safety

- Risk Identification
- Risk Analysis/Assessment
- Risk Mitigation
- Risk Control
- Risk Assumption
Integrate - Risk Identification

- Use both proactive (e.g., failure modes, safety assessments, awareness studies) and reactive strategies (e.g., investigations, root-cause analyses [RCAs], common cause analysis) for advancing safety and safety issues.
- Integrate identifying and reporting health IT-related risk into risk assessments and activities.
Integrate - Risk Analysis/Assessment

- Assess for safety before introducing new technology and/or upgrades (e.g., test scripts, use-case testing, information flow evaluations, simulation)
- Encourage reporting (e.g., patient safety organizations [PSOs], IT, vendor)
- Ensure active participation by health IT subject matter experts (SMEs) in organizational safety meetings, investigations, analysis, resolutions, and uses of technology for safety
Integrate - Risk Mitigation

- Incorporate health IT safety into enterprise risk strategies
- Encourage reporting (PSOs, IT, vendor, other)
- Implement vendor recommendations to avoid internal workarounds
- Create a health IT-related reporting system with a common reporting language
- Use WalkRounds, huddles, and summaries to report issues for action
Integrate - Risk Control

- Test and monitor implementations, upgrades, and modifications, as appropriate across the life cycle
- Report health IT–related patient safety events to vendor/developer
- Identify safety standards for implementation
- Evaluate reporting, tracking, and transparency in issue resolution
Integrate - Risk Assumption

- Develop a health IT–related event analysis process
- Develop metrics for health IT processes and outcomes
Health IT Safety = ICE

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**Stakeholders impacted:** Providers, vendor/developers, leadership, patients
Collaborate

- Continuous learning
- Checklists/check-ups
Collaborate - Continuous Learning

- Provide training and periodic updates for competency-based learning and sharing of information about health IT–related safety issues
- Strengthen relationships (e.g., provider/vendor) so that issues are appropriately escalated and resolved
- Identify and work to resolve safety issues (involve appropriate parties, consult vendor, participate in multistakeholder analysis and development activities)
- Conduct health IT simulations
- Include patient and family participation, as appropriate, encouraging their input into safety systems and checks
- Provide learning and sharing of health IT–related issues, hazards, and successes
Collaborate - Checklists/Check-ups

- Conduct information gathering/awareness via regularly scheduled activities (e.g., leadership WalkRounds)
- Incorporate health IT safety (e.g., initiatives, events, guidance) into work assessments
- Use portals and information exchanges
- Provide training and periodic updates for competency-based learning and sharing of information about health IT-related safety issues
- Become involved in safety initiatives
Health IT Safety = ICE

Integrate

Identify ways to integrate health IT safety into existing programs.

Collaborate

Convene the necessary stakeholders, including users, vendors, organizations and patients to actively collaborate on safety.

Embed

Embed safety into the culture and daily workflow in order to achieve a unified vision of health IT safety.

Multiple Stakeholders
Embed

Embed safety into the culture and daily workflow to achieve a unified vision of health IT safety

**Rationale for practice:** Health IT is ubiquitous and facilitates safety, but may also have unintended consequences. When health IT is embedded into an organization’s culture, it is possible to prioritize risks and recognize the benefits of health IT in a nonpunitive transparent learning environment.

**Stakeholders impacted:** Providers, vendor/developers, patients, leadership
Embed

- Continually evaluate safety
- Daily safety
- Developing a just culture
Embed - Continually Evaluate Safety

► Identify current safety awareness through self-assessments

► Create a nonpunitive culture that encourages reporting and open discussion of safety issues (PSO reporting, Safe Tables, vendor dialogue, and user groups)

► Periodically assess the organization’s safety culture (self-assessment questionnaires, other surveys)

► Implement survey-specific improvement strategies, and monitor results
Embed - Daily Safety

- Encourage increased transparency (dashboards, follow-up information, and safety updates to staff)
- Share survey results and conduct periodic updates to monitor status
- Implement safety huddles/briefings
**Embed - Developing a Just Culture**

- Create a nonpunitive culture that encourages reporting and open discussion of safety issues (PSO reporting, safe tables, vendor dialog, and user groups)
- Identify transparent safety systems with accountability, consequences, and acknowledgements
- Integrate safety into the culture rather than counting on one particular leader or individual alone
- Assess health IT as part of the patient safety culture
Investigating an HIT-related Event
Identify

Patient Safety Event

Immediate/interim action for patient safety

IDENTIFY Health IT-related?

Yes

ASSESS Health IT Contributing factors

Other sources for the error have been identified

Can technology help?

Yes

Other solutions

No

REVIEW & COLLABORATE

Conduct investigation

Safety analyst

Internal IT

Vendor

DEVELOP

No

DEPLOY

TRACK action plan effective?

Yes

COMMUNICATE

User

Provider organization

Vendor

REMITATE

No
How does your organization find out about HIT-related events?
How Do Front-line Staff See Events?
Reporting: When to Use AHRQ Common Formats for Health IT and When to Use the Health IT Hazard for Reporting

- **AHRQ Common Formats**
  - Events
  - Incidents
  - Near Misses
  - Unsafe Conditions

- **HIT Hazard**
  - Precursors to events
  - Unsafe conditions

[Diagram showing cycle with categories like Downtime, Upgrades, Interoperability]
Reporting Tools

- AHRQ Common Formats v1.2
- HIT Hazard
- Vendor reporting tools
What Should Be Completed?

- AHRQ Common Formats
  - Identifiers
  - Device types
  - Contributing factors

- HIT Hazard
  - Discovery
  - Causation
  - Impact
  - Hazard control plan
  - Plan approval
AHRQ Common Formats: Contributing Factors

- Incompatibility between devices
- Equipment/device function
- Equipment/device maintenance
- Hardware failure or problem
- Failure of, or problem with, wired or wireless network
- Ergonomics, including human/device interface issue
- Security, virus, or other malware issue
- Unexpected software design issue
AHRQ Common Formats: Health IT Type of Device

21. Which of the following best characterizes the type of HIT device related to the event or unsafe condition? CHECK ONE:
   a. ☐ Administrative/billing or practice management system
   b. ☐ Automated dispensing system
   c. ☐ Electronic health record (EHR) or component of EHR
   d. ☐ Human interface device (e.g., keyboard, mouse, touchscreen, speech recognition system, monitor/display, printer)
   e. ☐ Laboratory information system (LIS), including microbiology and pathology systems
   f. ☐ Radiology/diagnostic imaging system, including picture archiving and communications system (PACS)
   g. ☐ Other: PLEASE SPECIFY

22. Which component of the administrative/billing system? CHECK ONE:
   a. ☐ Master patient index
   b. ☐ Registration/appointment scheduling system
   c. ☐ Coding/billing system
   d. ☐ Unknown
   e. ☐ Other: PLEASE SPECIFY

23. Which type or component of the EHR? CHECK ONE:
   a. ☐ Computerized provider order entry (CPOE) system
   b. ☐ Pharmacy system
   c. ☐ Electronic medication administration record (e-MAR)
   d. ☐ Clinical documentation system (e.g., progress notes)
   e. ☐ Clinical decision support (CDS) system
   f. ☐ Unknown
   g. ☐ Other: PLEASE SPECIFY
AHRQ Common Formats

24. Which of the following describes the circumstances involving the HIT device in the event of an unsafe condition? Check all that apply:
   a. Incompatibility between devices
   b. Equipment/device function
   c. Equipment/device maintenance
   d. Hardware failure or problem
   e. Network failure or problem
   f. Ergonomics, including human/device interface issue
   g. Security, virus, or other malware issue
   h. Unexpected software design issue
   i. Unknown
   j. Other: PLEASE SPECIFY

25. Which problem(s) resulted from the equipment/device function problem? Check all that apply:
   a. Loss or delay of data
   b. System returns or stores data that does not match patient
   c. Image measurement/corruption issue
   d. Image orientation incorrect
   e. Incorrect test results
   f. Incorrect software programming calculation
   g. Incorrect or inappropriate alert
   h. Other: PLEASE SPECIFY

26. Which ergonomic or human/device interface issue(s)? Check all that apply:
   a. Hardware location (e.g., awkward placement for use)
   b. Data entry or selection (e.g., entry or selection of wrong patient, wrong provider, wrong drug, wrong dose)
   c. Information display or interpretation (e.g., font size, color of font, location of information in display screen)
   d. Alert fatigue/alarm fatigue
   e. Other: PLEASE SPECIFY
HIT Hazard: Discovery

**HIT Hazard**

**Discovery**

**How was the hazard discovered?**
- Local IT Implementation and Testing (DBV)
- Value-Added Reseller
- End-User Report (any clinician)
- Automated Error Log
- Patient or Lay-Caregiver Report
- Vendor Reported (any vendor)
- Chart Review
- Retrospective Analysis
- Other: Please specify

**Stage of Discovery**
- Software Specification
- Vendor Programming
- Customer Configuration
- Customer Programming
- Testing

**How long was this hazard present in the system when it was discovered?**
- Hours (Up to 23)
- Days (Up to 30)
- Weeks (Up to 51)
- Months
- Unknown

**How was the hazard communicated?**
- Communicated internally
- Reported to software vendor
- Published report (including electronic publication)
- Informal communication with vendor user group
HIT Hazard: Causation

### Usability
- [ ] Information not where expected
- [ ] Difficult data display
- [ ] Excessive data
- [ ] Sub-optimal awareness
- [ ] Confusing

### Data Quality
- [ ] IT design, wrong patient
- [ ] Organizational data in the wrong place
- [ ] Patient information recipient
- [ ] Discrepancies printed, or
- [ ] Faulty reference

### Decision Support
- [ ] Excessive non-specific recommendations/alerts
- [ ] Faulty recommendation
- [ ] Missing recommendation or safeguard
- [ ] Inadequate clinical content
- [ ] Inappropriate level of automation
- [ ] Other: Please specify

### Vendor Factors
- [ ] Sub-optimal interfaces between applications (and devices)
- [ ] Inadequate vendor software change control

### Other Factors
- [ ] Inadequate training
- [ ] Excessive workload (including cognitive)
- [ ] Interactions with other (non-HIT) care systems
- [ ] Physical environment (e.g., hardware location, lighting, engineering)
- [ ] Hardware failure
- [ ] Inadequately secured data
- [ ] Use error in the absence of other factors
- [ ] Other: Please specify

### Local Implementation
- [ ] Faulty
- [ ] Inadequate
- [ ] Inadequate
- [ ] Inadequate organizational change management
- [ ] Inadequate management of system downtime or slowdown
- [ ] Unclear policies
- [ ] Compromised communication among clinicians (i.e., during hand-offs)
HIT Hazard: Impact and Hazard Control Plan

**Impact**

Has this hazard affected a care process?

- Yes
- No
- Unknown

**Hazard Control Plan**

How quickly must this hazard be controlled?

- Already controlled – no action needed
- Do not control – the risks exceed the benefits. No further hazard control plan information is required.
- If hazard is in production: URGENT - fix software or remove it from use within 24 hours
- If hazard is in production: control hazard within 1 month
- If hazard is in production: control hazard within 6 months
- If hazard is not yet in production: delay implementation until software is fixed
- Other: Please specify
Other Methods

- Help-desk tickets
- Clinical Informaticists
- IT super-users
- Vendor reports
- Leadership WalkRounds
- Daily huddles
- Triggers
- Systems data
# Health IT Issues Log

<table>
<thead>
<tr>
<th>ID</th>
<th>Issue Description</th>
<th>Date</th>
<th>Initials</th>
<th>Impact</th>
<th>Unmitigated Impact</th>
<th>Mitigated Impact</th>
<th>Priority</th>
<th>Risk Score</th>
<th>Risk Area</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Example Issue 1</td>
<td>1/1/2023</td>
<td>John Doe</td>
<td>Low</td>
<td>Major</td>
<td>Minor</td>
<td>Medium</td>
<td>7</td>
<td>50</td>
<td>Complete removal of software.</td>
</tr>
<tr>
<td>2</td>
<td>Example Issue 2</td>
<td>1/2/2023</td>
<td>Jane Smith</td>
<td>High</td>
<td>Major</td>
<td>Minor</td>
<td>High</td>
<td>9</td>
<td>70</td>
<td>Integration with external systems.</td>
</tr>
</tbody>
</table>

**Note:** This is a sample table to illustrate the Health IT Issues Log format. Actual content and data would vary based on the specific issues and their impacts.
# Health IT Issues Log

<table>
<thead>
<tr>
<th>IDENTIFY</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed Description</td>
<td>Date Time</td>
<td>EHR Component</td>
<td>Where was user?</td>
</tr>
<tr>
<td>Provider notes are excessively long and redundant. Notes from previous days have been copied and pasted</td>
<td>1/7/2018 13:45</td>
<td>CPOE</td>
<td>ED</td>
</tr>
</tbody>
</table>

**This set of items:** Information about: who, what, why, where, when. Identify areas of concern. Localize issue in time in order to relate to other actions (upgrades, new installments). Trace components involved.
After the Break

- Break into groups
- Review case studies
- Conduct exercises using review process for health IT-related issues
BREAK
Group Breakout and Case Studies
Assess
Health IT Case Studies for Evaluation

- Entering a patient’s weight into the computer
- Reviewing lab results
- Entering allergy information into the computer
Health IT Safety Measurement Framework

Expected Measurement Impact
- Integration of HIT safety with existing clinical risk management & patient safety program
- Organisational learning
- Shared responsibility
- 360° assessment
- Refinement of measurement tool/strategies

Sociotechnical Work System

Health IT Safety Domains

Safe HIT
- Integrity
- Availability
- Confidentiality

Safe use of HIT
- Usability
- Complete use
- Correct use

Using HIT to improve safety
- Surveillances & Optimisation

Italicized text denotes domain principles

Changes in standards, regulations, policy and practice

Safer HIT-enabled healthcare

Improved value of health care

Improved patient outcomes

Feedback to EHR developers and healthcare organisations

* Includes eight technological and non-technical dimensions.
† Includes external factors affecting measurement such as payment systems, legal factors, national quality measurement initiatives, accreditation and other policy and regulatory requirements. EHR, electronic health record.


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Building on a Core to Inform Health IT Safety

Pairing the Sociotechnical and Enterprise Risk Models
Building on a Core to Inform Health IT Safety
# Health IT Issues Log

<table>
<thead>
<tr>
<th>ASSESS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What was user doing?</strong></td>
<td><strong>Stage of Discovery</strong></td>
</tr>
<tr>
<td>Order entry</td>
<td>Production Use</td>
</tr>
</tbody>
</table>

**This set of items:** Information about the stage/life cycle, workflow, origin of identified issue and how reports originate.
Review
Preliminary Timeline

- From initial findings start a preliminary timeline
- Focus on evidence as encountered and perceived
- Additional information from interviews and evaluations will help to further define the timeline
Timeline Template
Identify the Problem

► Determine if there is a change or deviation from a requirement, standard, norm or expectation

► Identify existing requirements, norms, standards or expectations
Develop The Problem Statement

► Determine if there is a change or deviation from a requirement, standard, norm or expectation
  ■ What is wrong, not why it is wrong?
  ■ When and where the problem occurred?
  ■ Who was involved?
  ■ Measurability – how often, how much, how many?
# Health IT Issues Log

<table>
<thead>
<tr>
<th>REVIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risks of care-process compromise</strong></td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Ease of copy and paste and insufficient training</td>
</tr>
</tbody>
</table>

**This set of items:** Includes preliminary reasons for issue, and identified patient safety risks or known harms.
Collaborate
Who Are the Process Stakeholders?
Definition: Task Analysis

The study of what a person is required to do to complete the task.
Timeline with Task Identification

Start → Sub-process #1 → Sub-process #2 → Sub-process #3 → End

Tasks [SP1]
1.1
1.2
1.3

Tasks [SP2]
2.1
2.2

Tasks [SP3]
3.1
3.2
3.3
3.4
Task Analysis

- What are the individual tasks that needed to be done?
- What are the subtasks?
- What are the time requirements?
- What equipment is used?
Definition: Safeguards

- Something that has been put into place to protect from harm, damage, or loss
Safeguard Examples

- Clinical decision support upon medication order entry
- Clinical decision support upon medication order review
- Alert notification upon medication administration
Timeline with Task Analysis

- 7:30am – Physician orders meds
- 7:31am – Physician receives alert
- 7:50am – Medication order appears in Pharmacist queue
- 7:52am – Pharmacist reviews order and receives an alert
- 7:55am – Pharmacist reviews order and receives an alert
- 8:10am – RN administers medication
- 8:20am – RN signs-off on new order
- 8:20am – RN scans medication package
- 8:20am – Patient suffers anaphylaxis reaction to the medication

- ▪ Physician enters order
- ▪ Physician receives alert
- ▪ Pharmacist reviews and approves order
- ▪ Pharmacist receives alert
- ▪ RN signs-off on new order
- ▪ RN retrieves medication from ADC
- ▪ RN administers medication to patient
- ▪ RN scans medication package
- ▪ RN receives alert

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Definition: Gap Analysis

To identify the gap between how a person or system actually performed and the desired performance
Gap Analysis

- How were the tasks performed in the scenario?
- How should the tasks be performed?
- How did the gap occur? No procedure? No training?
- Inadequate procedure? Is the procedure best practice?
- Lack of a safeguard? Safeguard failure?
Timeline with Task (☐) & Gap Analysis(■)

- **7:30am** – Physician orders meds
- **7:31am** – Physician receives alert
- **7:30am** – Medication order appears in Pharmacist queue,
  - Physician tabs through alert
  - Pharmacist reviews and approves order
  - Pharmacist receives alert
- **7:50am** – Medication order appears in Pharmacist queue,
  - RN receives new medication order notification
  - Pharmacist reviews order and receives an alert
- **7:55am** – RN receives new medication order notification
  - RN signs-off on new order
  - RN retrieves medication from ADC
  - RN administers medication
  - Pharmacist reviews order and receives an alert
- **8:10am** – RN administers medication
- **8:20am** – RN Documents medication administration and receives an alert
- **8:20am** – Patient suffers anaphylaxis reaction to the medication
- **8:20am** – RN scans medication after medication administration
  - RN signs-off on new order
  - RN receives alert
  - RN scans medication package
  - RN receives alert
  - RN administers medication to patient

**Physician**
- Enters order
- Receives alert

**Pharmacist**
- Reviews and approves order
- Receives alert
- Reviews order and receives alert

**RN**
- Retrieves medication from ADC
- Administers medication
- Signs-off on new order
- Receives alert
- Scans medication package
- Scans medication after medication administration
## Health IT Issues Log

This set of items: Calculates risk score after rating harm and likelihood and helps assign prioritization.

<table>
<thead>
<tr>
<th>Risk Score</th>
<th>Priority (High, Medium, Low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Harm (1 to 10)</td>
<td>Likelihood (1 to 10)</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

**COLLABORATE**
# Health IT Issues Log

<table>
<thead>
<tr>
<th>DEVELOP, DEPLOY &amp; REMEDIATE</th>
<th>TRACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrective actions</td>
<td>Steps taken to date (timeline)</td>
</tr>
<tr>
<td>Evaluate measures to reduce distractions while using the EHR. Removing 3 of 5 CPOE training sessions conducted</td>
<td>CMIO</td>
</tr>
</tbody>
</table>

**This set of items:** Sets forth corrective action and timeline as well as accountability.
Deploy
Systems Thinking
Root Causes Identify Systemic Problems

- These causes go deep enough to reveal the system issues underneath

- Once root causes are known, they point to fixes at a systems level

- Fixes at a systems level can prevent recurrences
Corrective Actions

- Are an important goal in a Systems Analysis
- Include effective improvement strategies in a thorough Systems Analysis
- Should achieve the desired patient safety improvement
- Should prevent a reoccurrence of similar events
Key Features of Corrective Actions

► Address the risk associated with the findings identified in the analysis

► Utilize the most effective solutions that are reasonable or possible given the circumstances

► Offer a long term solution to the problem

► Target the actions at the right level of the system

► Assign responsibility at the appropriate level in the organization

Key Features of Effective Corrective Actions
Be SMARTER

- Specific--tackle a clearly defined issue with a clear scope
- Measurable--shows an impact on processes and outcomes
- Attainable--achieved with available resources
- Realistic--will be accepted and implemented
- Timely--set a timeframe for implementation and completion
- Evaluate--determine if the actions taken are achieving the desired result
- Re-do--if you are not achieving the desired effect
Developing Corrective Actions

► When looking to redesign your process to correct “causes” and mitigate hazards look to “best practices” and “established science” from sources such as...
  
  ▪ Other facilities and colleagues
  ▪ Professional and human factors literature

► Develop corrective actions that not only meet the mission of your system, but are also flexible enough to be effective over the spectrum of scenarios encountered – think resilience!
Successful Corrective Actions

► Address options for reducing frequency (prevention) and/or reducing the consequences (mitigation) of one or more sharp end or blunt end causes

► Clearly state the intended action

► Are practical, feasible and achievable

► Do not pose other unacceptable risks

► Are based on conclusions from data collected during the investigation

► Eliminate all of the casual factor(s) and the underlying root causes that caused the event
Task Triangle-Depth of Analysis

Sharp End

- Equipment and Frontline Performance Gaps
- Task Control Issues
- Process Control Issues
- Management Systems Issues

Blunt End

Organizational Culture Issues

Increasing scope of corrective action
Root Causes Need To Be Directly Tied To Causal Factors And Their Underlying Causes
Corrective Actions

Develop at least one corrective action for each causal factor.

When developing corrective actions use a basic three-step process.

Track corrective actions, who, what, when, where, how.

Follow up to make sure corrective actions have been implemented in a timely manner.
Health IT Safety Measurement Framework

Health IT Safety Domains
- Safe HIT
  - Integrity
  - Availability
  - Confidentiality
- Safe use of HIT
  - Usability
  - Complete use
  - Correct use
- Using HIT to improve safety
  - Surveillances & Optimisation

Italicized text denotes domain principles

Expected Measurement Impact
- Integration of HIT safety with existing clinical risk management & patient safety program
- Organisational learning
- Shared responsibility
- 360° assessment
- Refinement of measurement tool/strategies

Changes in standards, regulations, policy and practice

Safer HIT-enabled healthcare

Improved value of health care

Improved patient outcomes

Feedback to EHR developers and healthcare organisations

* Includes eight technological and non-technical dimensions.
† Includes external factors affecting measurement such as payment systems, legal factors, national quality measurement initiatives, accreditation, and other policy and regulatory requirements. EHR: electronic health record.

Strength of Risk Reduction Strategy

High
- Automate
- Incorporate forcing functions
- Incorporate fail-safe mechanisms

Moderate
- Simplify the process
- Standardize to reduce process variability
- Minimize choices
- Increase detectability
- Optimize redundancy

Low
- Document
- Educate or train
- Implement policies

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Exercise:
Implementing Policy/Procedure
Instructions

1. Fold the paper in half
2. Fold it in half again
3. Tear off the right hand corner
4. Fold the paper in half again
5. Tear off the bottom, left corner
6. Tear a semi-circle off the top, left corner
7. Open the paper to full size
Let’s Debrief

- How many of you ended up with paper projects exactly the same?
- Why were you unable to end with exactly the same cut-outs?
- What instructions were the least helpful and why?
- How could these instructions have been made clearer?
- What clarifying questions would you have asked if permitted to clarify the instructions?
- What additional tools or devices would help the reliability of the instructions and fullness of understanding?
Instructions

1. Hold the paper in portrait style and fold it in half by taking the top down to the bottom
2. Turn the paper so that the folded edge is in your left hand
3. Tear off the left hand upper corner
4. Fold the paper in half again by taking the top down to the bottom
5. Once again hold the folded edge in your left hand
6. Tear off the bottom, left corner
7. Tear a semi-circle off the top, left corner
8. Open the paper to full size
Remediate
Evaluating the Cycle
Track
Tracking and Feedback Tools

- Dashboard

<table>
<thead>
<tr>
<th>Health IT-related Patient Safety Events</th>
<th>1/2017</th>
<th>2/2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Laboratory</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Radiology</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Procedure</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Pathology</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Health IT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total # Events</strong></td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>Harm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hazard</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Event, No Harm</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Event, Harm</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Event, Death</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>HIT Category</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. HIT fails during use/not working as designed</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2. HIT is working as designed, but does not meet the user's needs or expectations</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3. HIT is well-designed and working correctly, but was not configured, implemented, or used in a way anticipated or planned for by system designers and developers</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4. HIT is working as designed, and was configured and used correctly, but interacts with external systems so that data is lost or incorrectly transmitted or displayed</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5. Safety features or functions were not implemented or not available</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Patient Severity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Critical</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>In Progress</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Under Consideration</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Health IT-related Patient Safety Dashboard

- Event Type
- Harm
- Patient Severity
- Status
Measures of Effectiveness

- Measurement sometimes seems like “just more work”
- Good measures help to ensure improvement
- Identify, track, and assess selected parameters—should change if the recommendation is working
- Should be reasonable to implement
National Quality Forum
Key Measurement Areas for HIT Safety

1. Clinical Decision Support
2. System Interoperability
3. Patient Identification
4. User-Centered Design and Use of Testing, Evaluation, and Simulation to Promote Safety across the HIT Lifecycle
5. System Downtime (Data Availability)
6. Feedback and Information-Sharing
7. Use of HIT to Facilitate Timely and High-Quality Documentation
8. Patient Engagement
9. HIT-Focused Risk-Management Infrastructure

Source:
Measures of Effectiveness Should Contain:

- Numerators and denominators
- Realistic performance goals, e.g., 95% of intravenous medications should be using dose error reduction software when on a smart pump
- Specific parameters--and make these maybe sub bullets
  - Define data collection methods,
  - Identify who will collect the data
  - Set a timeframe for data collections
- Instructions on how measures are communicated and the time needed to complete the measures
Measures of Effectiveness

▶ **Structural Measure**: related to changes in the physical aspects of the environment or equipment

▶ **Process Measure**: the extent to which the process is in place for quality of care

▶ **Outcomes Measure**: net change in health status of designated population resulting from quality of care
Measures of Effectiveness
Health IT example

► Structural Measure
  ■ Availability of computer and barcode reader at medication administration

► Process Measure
  ■ Percent of medications administered with the use of bar code medication administration

► Outcome Measures
  ■ Number of medication administration errors
## How and When to Use A Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>When used</th>
<th>Companion measures</th>
<th>Example</th>
</tr>
</thead>
</table>
| Structural measure | The corrective action plan calls for the removal or replacement of equipment or physical change to the environment | Outcome measure            | Structural measure  
Clamp with detachable parts to be removed from stock  
Outcome measure  
Number of retained objects |
| Process measure  | The corrective action plan calls for a system/process change               | Outcome measure            | Process measure  
Hourly rounding will occur as expected  
Outcome measure  
Fall rate |
| Outcome measure  | Extremely rare process where occurrence is difficult to predict; a way to monitor if a process or structural change has had the desired impact | Structural or process measure | Process measure  
Skin inspection is conducted consistently under/around a specific brace that is very rarely used  
Outcome measure  
Pressure ulcer rate for patients with this type of brace |

Reference: Minnesota Adverse Health Events Measurement Guide  
Communicate
Who Are You Communicating With?

COMMUNICATE

User

Provider organization

Vendor
### Health IT Issues Log

<table>
<thead>
<tr>
<th>COMMUNICATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>End-User</td>
</tr>
</tbody>
</table>

**This set of items:** Identifies who must communicate actions taken.
Evaluating the Cycle: What is Happening Now?

DEVELOP

No

DEPLOY

REMEDiate

TRACK
Action plan effective?

Yes

COMMUNICATE

User

Provider organization

Vendor
TOOLKIT: Safe Practice Recommendations for Developing, Implementing and Integrating a Health IT Safety Program
Self-assessments

- Did You Know — Did You Ask
  - Leadership Tool for an Organization
  - Tool for Providers
  - User Tool for a Vendor/Developer Organization

- Health IT Safety Program Evaluation Tool

- Safety Culture
  - Leadership
  - Health IT Users
Learning Modules

► Presentations
  ■ Leadership/Organizations
  ■ Health IT users

► Handouts
  ■ Health IT-related events
  ■ Safe Practice Recommendations
A system-wide downtime of the EHR occurred that lasted longer than 10 hours, caused by the failure of a critical piece of hardware. Some users were unable to access downtime reports on the computers identified for use during downtime to access historical records.

Device data, from the monitoring system, is not flowing into patient EHR.

A patient with a pending swallow evaluation received an incorrect diet. There is no safeguard in place in the EHR to warn clinicians to change the diet order when a swallow evaluation is ordered.

When multiple patient charts are open, alerts and alert responses might not file to the correct patient.

Due to undefined naming conventions used with patient name, laboratory results were filed in the error queue.

Case Examples
Algorithms for Early Analysis

Algorithm and Steps—Review Process for Health IT-Related Issues

The Algorithm and Steps—Review Process for Health IT-Related Issues provides instructions, including a step-by-step process and algorithm, to guide an organizational review process.

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Communication and Transparency Tools

- Sample Safety Memo
- Sample Safety Report Feedback Log
Other Tools, Information, and Resources
Thanking the Workgroup Members for Developing, Integrating, and Maintaining a Health IT Safety Program

Patricia P. Sengstack, Workgroup Chair, DNP, RN-BC, FAAN, Vanderbilt University

► Don Asmonga, Officer, Health Information Technology, The Pew Charitable Trusts
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► Gerry Castro, PhD, MPH, Project Director, Patient Safety Initiatives, Joint Commission
► Allen Chen, MD, PhD, MHS, Associate Professor Oncology, Associate Professor Pediatrics, Armstrong Institute for Patient Safety and Quality, The Johns Hopkins Hospital
► Andrea Cobb, Texas Medical Association
► Brian Crawford, Epic
► Mike Favreau, PMP, MSPM, Allscripts
► Trisha Flanagan, RN, MSN, Senior Manager, Patient Safety, athenahealth
► Roy Gill, MD, Physician Director of Clinical Content, NextGen
► Richard Hornaday, Senior Solutions Manager – Public Health & Certification, Allscripts
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► Wendi Melgoz, Sutter Health System
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► P. Divya Parikh, Vice President of Research & Risk Management, PIAA
► Jim Russell, RPH, Epic
► Donna Summers, CNIO, Henry Ford Health System
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► Amy Tsou, MD, MS, Senior Research Analyst, Health Technology Assessment, ECRI-Penn AHRQ Evidence Based Practice Center (EPC)
Other Toolkits Available

Health IT Safe Practices: Toolkit for the Safe Use of Copy and Paste

Health IT Safe Practices: Toolkit for the Safe Use of Health IT for Patient Identification

Health IT Safe Practices for Closing the Loop

www.ECRI.org/safepractices
Tools To Aid Implementation

- SAFER Guides (ONC)
- Sentinel Event Alert 54: Safe use of health information technology (Joint Commission)
- Risk Assessment Tools (AHRQ)
- Algorithm – Health IT Issue Analysis
- Reporting tools
- Health IT Issues log
- Patient Safety Leadership WalkRounds™ (IHI)
- Safety briefings tool (IHI)
- Daily safety briefings (Joint Commission)
- AHRQ TeamSTEPPS® – Safety Huddles
- Conducting a morning briefing (AHRQ)
Tools To Aid Implementation (Cont’d)

- Health Information technology through the lens of patient safety (IHI/NPSF)
- Take 5: safe use of health information technology (Joint Commission [audio file])
- The digital transformation: how technology is helping (and hurting) healthcare IHI
- Infographic–Health IT Awareness, case examples
- AHRQ Common Formats
- Health information technology hazard manager (Pennsylvania; AHRQ)
- Health IT Issues Log/Dashboard
- Educational PowerPoint
- Checklists
References


Questions? Contact hit@ecri.org

Thank You