

## HOW SAFE IS HEALTH TECHNOLOGY ?

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#### Learning Objectives

- 1. Identify health technology added value for patient safety
- 2. Recognise the failures that might occur with technology
- 3. Anticipate safety issues and technology risks and mitigate those

#### Death By 1,000 Clicks: Where Electronic Health Records Went Wrong

**BOTCHED OPERATION** 

The U.S. government claimed that turning American medical charts into electronic records would make health care better, safer and cheaper. Ten years and \$36 billion later, the system is an unholy mess. Inside a digital revolution that took a bad turn.

By Fred Schulte and Erika Fry, Fortune • MARCH 18, 2019 (The Voorhes for Fortune)

## A true story



## HEALTH IT

#### Administrative

- Automated dispensing systems
- Computerized medical devices (pumps, monitors)
- Electronic health records
- Human interface device
- Laboratory Information System (Microbiology, pathology)
- Radiology/ Diagnostic imaging system
- Implants: prosthesis and pacemakers
- > Advanced surgical applications: Robotics

## Components

Hardware & Software

Create

Maintain

Analyse

Store

Receive information

to help in the diagnosis and treatment of diseases.



#### Characteristics of Safe Health technology

Optimally designed by developer

Thoughtfully implemented by the organization

Appropriately used by the organization's staff



#### A socio-technical model to evaluate Health IT

- The technology operates in a very complex environment.
- The socio technical model was developed to evaluate health IT within the context of 8 dimensions
- Examine health IT reported events
- Understand human system interactions when gaps are identified in the IT system in order to improve



# HEALTH IT BENEFITS

## Health IT Benefits

- Accessibility
- Support for many HC providers
- Standardization
- Improve communication between HC providers
- Communicate with patients
- Minimize manual input
- Tracking
- Statistics & Data aggregation

- Integrate artificial intelligence & access to knowledge
- Integration to CDSS
- Reduce adverse events
- Forcing functions
- Sending Reminders (manual/ automatic)
- Don't rely on human memory

## IT enhances Patient Engagement

Access to their health records

- Self managing chronic diseases
- Direct communication with their providers
- Coordinate their care across of many caregivers
- Interact with other patients with similar conditions

#### **Promising technology**

- Personal Health records
- Mobile health devices
- Patient portals
- Internet based resources
- Social media networking

## IT Enhances patient safety

New technology reduces adverse events through:

- Good design
- Facilitation of a response to an adverse event
- Providing feedback after an event
- At TWO levels:
- Individual user
- System level

The CADTH & AHRQ provides information about the effectiveness and efficiency of health technologies

#### IT Enhances patient safety : CPOE

- Eliminate transcription errors
- ✓ Provide clinical decision support
- ✓ Alert physicians to possible dangerous orders

## HEALTH IT RISKS



ECRI Ir	stitute's Top 10 Patient Safety Concerns for 20	15
1	Alarm hazards: inadequate alarm configuration policies and practices*	
2	Data integrity: incorrect or missing data in EHRs and other health IT systems	
3	Managing patient violence	
4	Mix-up of IV lines leading to misadministration of drugs and solutions*	
5	Care coordination events related to medication reconciliation	
6	Failure to conduct independent double checks independently*	
7	Opioid-related events	
8	Inadequate reprocessing of endoscopes and surgical instruments	
9	Inadequate patient handoffs related to patient transport*	
10	Medication errors related to pounds and kilograms*	MS15138
*New to the	2015 list.	

#### **ECRI**Institute

#### 2019 Top 10 Patient Safety Concerns

ecri.org/patientsafetytop10



## **ECRI TOP 10 Patient Safety Concerns**

**DIAGNOSTIC STEWARDSHIP AND TEST RESULT MANAGEMENT USING EHR** 

## IT Risks

- > Development
- Installation
- Training
- Unavailability of the system
- Malfunction during Implementation
- Misuse : human machine interaction
- New Upgrade of system
- >New interfaces causing loss of data or inaccurate data entry



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## IT-Related Common Problems At the interface



Entering data on a misidentified patient



Failure to alert the user of a concern



User ignore and override an alert



Not enough equipment cause delays in data entry



Delay in revision of lab results



No evidence of a written order



Tests results sent to the wrong provider



Gaps in trainings

#### IT-Related Common Problems

#### Functional

Unclear data display

Malfunction of the hardware

S Loss of Data

Unapproved data entry devices

Interface issues with lab systems lead to delays in retrieving data

" Software not up to date

Internet or server connectivity prevented real-time data entry

**E** Breach in the security of the system

#### TOP 5 SAFETY ISSUES

ECRI Institute PSO Deep Dive Study

Data entry in wrong patients files

Gaps in reporting critical tests

211 PS issues grouped into 22 categories

Top Five Safety Issues from Health IT Events



## ECRI Institute PSO's analysis

- System Interface
- System/Software configuration
- Software function

- Wrong Data Input
- Wrong record retrieved

#### Computer Related Issues



## Human-Computer issues



### Smart Pumps

- Pump-Programming errorsUser Bypassing the drug database
- ✓ User Overriding alarms

#### Automated Dispensing Cabinets



- Storage & Automatic Dispensing Cabinets
- ✓ At the point of use
- Medication and supplies
- ✓ Controlled
- ✓ Tracking the use (usernames and passwords)
- Error in filling similar unit-based cabinet lead to the death of patients (2006)
- Don't forget the importance of double checkers (nurses & pharmacists) during the restocking and administration processes



## Bar Coding Technology

Assist in medication administration, blood samples labeling and identification

- Barcodes scanners in patients rooms
- Cross-linkage to other HIS as Patient index files. eMAR, OES..
- National concensus on the use of barcodes (ISMP & CPSI)
- Some Professionals have problems with this technology causing delays in patient care

## Software systems

Physician support at the point of care

Gathering, storing and reporting of health information

> Examples : Computerized care documentation, CDSS, CPOE

This technology needs to fit into hospital workflows

➢ Risks: Delays

Disruptions

**Duplication of work** 

Legal: exchange of sensitive health data



#### **Health Information Exchange**



## EMR-HER-EPR

- Reduces errors due to poor handwriting
- Reduces lost patient information
- Better and Accurate information
- Risk of copy-paste
- Risk of accessing the wrong patient file
- Risk of error in interface with diagnostic testing

DENED combination creatures. Abylity is pulsed. Conditions of organism are in total out. Pulse is law read ble to recognise. Genesi of evolutialisation are qualified and reat.

## HEALTH IT RISK MANAGEMENT

## Shared Responsibility

#### Healthcare Organizations

Internal reporting of incidents, near misses, unsafe conditions

#### Patient Safety Organizations

Analysis of aggregated data, feedback, education

#### Health IT Safety

**EHR** Developers

Safety alerts, software updates

#### **Federal and State Authorities**

Guidance from agencies of the Department of Health and Human Services, as well as state licensing authorities

## Regulation of IT in healthcare

Presence of a body to assess the safety and effectiveness of medical devices before authorizing sales

> Development of standards to support systems' interoperability (ISO, IEC)

> Some IT systems as EHR and eMAR are still not subject to these regulations

#### ORGANIZATIONS RESPONSIBILITIES

- Risk Identification
- Risk Analysis
- Risk Mitigation
- Implement strategy
- Monitor Effectiveness



#### AAMÌ

#### Health IT Risk Management

A Practical Tool to Help Hospitals and Medical Devices Stay Secure in a Complex World.



## Identify Hazards

- 1. Know well your system
- 2. Identify 5 most common IT problems that might lead to potential patient harm
- 3. Examine your reporting system on IT hazards
- 4. Review the role of EHR and IT department

## HRO commitment to Safety Culture :

#### Report the Risk

- Educate Staff on IT safety
- Everyone's responsibility
- Open Communication
- Empower staff to report IT risks
- Empower staff to improve
- Blame free culture

me Admin * Hazards * Reports * My Account *				
Not al When enter	l categories may be ap ing a Hazard, use the t	plicable. If something is not ap tabs to navigate back and forth	pplicable, leave it . Do not use the	blank. back button.
1. Description 2. Systems Involved 3. Discovery 4. Cause	ation 5. Impact	6. Hazard Control Plan 7	. Plan Approval	8. Notes & References
Usability: (Check all that apply.)	Decision Support: (C	heck all that apply.)	L	ocal Implementation: (Check all that apply.)
<ul> <li>Information hard to find</li> <li>Difficult data entry</li> <li>Excessive demand on human memory</li> <li>O Sub-optimal support of teamwork (situation awareness)</li> <li>Confusing information display</li> <li>Inadequate feedback to the user</li> <li>O Mismatch between real workflows and HIT</li> <li>O Mismatch between user expectations (mental models) and HIT</li> <li>Other (specify)</li> </ul> Data Quality: (Check all that apply.) If design contributed to entry of data in the wrong patient's record Organizational policy contributed to the wrong recipient Discrepancy between database and displayed, printed, or exported data Faulty reference information Unpredictable elements of the patient's record available only o paper/scanned documents Lost data Inaccurate natural language processing Virus or other malware Other (specify)	O Excessive non     Faulty recommer     Missing recommer     Inadequate clinic     O Inappropriate     Other (specify) Vendor Factors: (Chee     Sub-optimal inte     Non-configurabl     Faulty vendor co     O Unusable soft     Inadequate vend     Inadequate vend     Inadequate contre     Faulty software d     Other (specify)	-specific recommendations/ale ndation endation or safeguard al content level of automation eck all that apply.) effaces between applications (an le software infiguration recommendation ware implementation tools for testing for software change control rol of user access lesign (specification)	nd devices)	<ul> <li>Faulty local configuration or programming</li> <li>Inadequate local testing</li> <li>Inadequate project management</li> <li>Inadequate software change control</li> <li>Inadequate control of user access</li> <li>Sub-optimal interface management</li> <li>Other (specify)</li> </ul> Other Factors: (Check all that apply.) Inadequate training Excessive workload (including cognitive) <ul> <li>Inadequate organizational change management</li> <li>Inadequate management of system downtime or slowdown</li> <li>Unclear policies</li> <li>O Compromised communication among clinicians (i.e., dur hand-offs)</li> <li>Intractions with other (non-HIT) care systems</li> <li>Physical environment (e.g., hardware location, lighting, engineering)</li> <li>Hardware failure</li> <li>Inadequately secured data</li> <li>O Use error in the absence of other factors</li> <li>Other (specify)</li> </ul>

#### **Risk Analysis**

- 1. Structured, step by step
- 2. Determine underlying causes
- 3. FMEA
- **4.** RCA
- 5. Conduct in depth examination of the 8 socio-technical dimensions

#### Action, Feedback & Monitoring

- 1. Provide Staff with the feedback
- 2. Inform everyone about the improvement strategy
- 3. Monitor the effectiveness of new strategies and solutions
- 4. Monitor effectiveness of use of reporting structure



Measuring and improving patient safety through health information technology: The Health IT Safety Framework

Hardeep Singh,<sup>1</sup> Dean F Sittig<sup>2</sup>

Singh H, Sittig DF. BMJ Qual Saf 2016;25:226–232. doi:10.1136/bmjqs-2015

#### CONCLUSION

#### **PITFALLS**

Relying on technology to reduce risk and ensure safety

- Not having enough resources for implementation
- Technology leads to Clinical improvements

#### PEARLS

Health IT shall be developed Optimally and encouraged

- The healthcare organization shall implement the system in a high reliable way : be aware of risks
- Safety Culture: All errors and bugs need to be reported promptly and accurately
- Have the will to learn about unsafe conditions with IT
- >Improves the system before harm occurs
- Train Staff on the system use
- Careful: What is current might change

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