HIT Usability and Data Breaches

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Digital Vulnerabilities

Private medical data for 20,000 emergency room patients at Stanford Hospital exposed to the public for nearly a year (Oct. 2011)

Do you know where your health information is?
A Problem of Some Magnitude

Health care identity theft dominated all other crimes in the sector in 2010: 100 billion a year

As the infusion of health IT accelerates, so do the associated vulnerabilities
Breaches By The Numbers

In 2010, across the 207 breaches that affected 500 or more individuals:

- 99 incidents involved theft of paper records or electronic media, together affecting approximately 3M individuals.
- Loss of electronic media or paper records affected 1.1M individuals.
- Unauthorized access to, or uses or disclosures of PHI information affected approximately 1M individuals.
- Human or technological errors affected almost 80K individuals.
- Improper disposal of paper affected approximately 70K individuals.

Source: Annual Report to Congress on Breaches of Unsecured Protected Health Information; 2012 HIMSS Analytics Report: Security of Patient Data
Why Data Are At Risk

Source: 2012 HIMSS Analytics Report: Security of Patient Data
The “Usability” of Health IT

- The SHARP-C project (ONC): Usability based on the TURF (Task, User, Representation, and Function) framework

  **Useful**
  - Supports work domain
  - Contains essential functions

  **Usable**
  - Easy to learn and use
  - Error tolerant

  **Satisfying**
  - Perceptions of system usefulness
  - Likeability of a system
EHR Usability Breakdowns

Potential for Data Breaches

- Poor organization and display of information
- Increases in cognitive burden
- Interference with practice workflow
- Poor design of system functions

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Usability and EHRs

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<th>EHR Capability</th>
<th>Usability Issue Illustrations</th>
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| Across all functionalities               | • Excessive layers of screens and click-through increase burden and disrupt the workflow.  
• Practice workflows that are not aligned to support efficient and effective use of the technology. |
| Health Information and Data Management  | • Lack of options for structured data entry may increase workload and affect data quality.  
• Excessive use of defaults, templates, and copying may affect data quality and increase potential for fraud and abuse. |
| Order Entry Management                   | • Prescribing systems that are not integrated with other parts of the EHR system, for example, with preferred formulary lists, pharmacy database, and clinical decision support systems. |
| Results Management                       | • Failure to present results information to match the physician’s cognitive pattern; for example, the system only lists test results alphabetically, whereas physicians may prefer chronological or clustered by clinical relevance or by severity.  
• Failure to warn if a patient has missed a test.  
• Use of lists that require scrolling. |
# Usability and EHRs

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| **Clinical Decision Support** | • Decision support systems that do not allow the filtering of certain alerts that the clinician may find inconvenient or not clinically useful based on their practice setting (e.g., certain drug-drug interactions, or excluding certain drug-allergy cross-sensitivity rules).  
• Alerts that are not accompanied with appropriate visual cues, such as based on severity.  
• The lack of integration between dual systems in order to complete a recommended action; for example, the decision support system recommends an alternate drug dose, but does not integrate with the e-prescription system to provide for easy selection and ordering of the recommended drug. |
| **Patient Support**     | • Lack of ability to provide patient education materials in plain English.                                                                                                                                                     |
| **Administrative Processes** | • Lack of integration with administrative systems, such as billing and scheduling.                                                                                                                                              |
## Securing Healthcare Data

### Technology
- Firewalls
- Proxy servers
- Biometrics
- VPNs
- **USABILITY**
- .....  

### Process
- Restrict and monitor use
- Password rules
- Predictive models of threat
- **ADAPTIVE ROUTINIZATION**
- .....  

### People
- Security training
- Awareness
- Recruitment
- **SYMBOLIC EXPRESSIONS**
- .....  

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Usable technology that is congruent with workflow, aligns with work processes, and is supported by training and education