Assessing EHR Implementation Decisions to Improve Usability and Reduce Burden for Clinicians
PRESENTERS

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• Aaron (Zach) Hettinger, MD, MedStar Health National Center for Human Factors in Healthcare

• Raj Ratwani, PhD Director of the MedStar Health National Center for Human Factors in Healthcare

• Justin Cross, MD ONC Medical Director for Systems Safety, US Department of Health & Human Services

• Moderator: LaVerne Perlie MSN, RN ONC Health Scientist, US Department of Health & Human Services
Project background

• Jonathan Wald, MD, MPH
  Director of Digital Health,
  RTI International
EHR Users are facing critical usability problems

• Go-live is just the beginning!
  » Many usability problems surface after an EHR is in regular use
  » Making changes, and testing the changes to improve usability, are essential activities
  » Medium-to-low-resource practices have limited time and know-how to address usability challenges
What is Usability?

- **Usability**: the extent to which a system supports a user to efficiently and effectively achieve desired goals.

  » Part of the scientific discipline of human factors.

  » Can be measured *quantitatively* by examining error rates and time-on-task, and can be assessed *qualitatively* by talking with users.

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EHR Users are facing critical usability problems

- Ratwani et al (2016) findings from interviews and a literature review on usability and EHR implementation:
  - Products implemented differed considerably from products demo’d
  - Few practical tools to identify usability-related safety issues
  - EHR customization not informed by human factors principles can add to risk
  - Workflow decisions are often uninformed by best practices
  - Limited improvements or ongoing training after go-live are typical

- Smaller healthcare practices and institutions need to:
  - Select products with high marks for UCD
  - Implement with appropriate expertise and support
  - Identify EHR aspects that should be customized
  - Identify and ameliorate usability-related issues in implemented systems

To promote usability...

• **A Change Package is being developed**
  » To collect and present resources that enable and accelerate usability improvements
  » Targeted toward users who are EHR implementers and QI project leaders
  » Serving practices having medium-to-low resources
Project approach

**Resources**

- Identify and collect an initial set of resources
  - Publicly available
  - Helpful to non-experts
- Test those resources in-the-field
- Produce a Final Change Package and guide for its use, including case examples
Project activities

• Project team
  » RTI International | Medstar | Clinovations Government+Health

- Draft CP:
  • TEP input
  - Sep ‘16

- Test CP:
  • TEP input
  • 4 sites
  - Mar ‘18

- Finalize CP:
  • TEP input
Usability IRL (in real life)

- Raj Ratwani, PhD
  Director of the MedStar Health National Center for Human Factors in Healthcare
What does Usability look like in the clinical environment?

**User Interface Design**
- Context Independent
  - Font Sizes
  - Icons
  - Colors & Contrast
  - Layout

**Cognitive Task Support**
- Context Dependent
  - “Workflow Design”
  - Visualization
  - Memory Aids
  - Error Anticipation

Photo Credit: Bob Wears, MD
Resource Gaps

- General lack of applicable tools and resources
- Lack of detailed, step-by-step “how to” guidance
- Variability of user need

<table>
<thead>
<tr>
<th>Roles</th>
<th>Administrative Expertise</th>
<th>Clinical Expertise</th>
<th>Informatics Expertise</th>
<th>Usability Expertise</th>
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<tbody>
<tr>
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<td>Informatics RN</td>
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Optimization through the Change Package

- Step-by-step vignettes to demonstrate tool usage
- Design around variable user needs

<table>
<thead>
<tr>
<th></th>
<th>Learn about Usability</th>
<th>Identify Problems and Approaches</th>
<th>Identify Tools and Implement</th>
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<tbody>
<tr>
<td>Practice Manager</td>
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The Usability Change Package (UCP)

- Laura Marcial, PhD Health Research Scientist, RTI International
Usability Change Package: Introduction and Navigation
Aaron (Zach) Hettinger, MD, MedStar Health National Center for Human Factors in Healthcare
## Test Sites Overview

<table>
<thead>
<tr>
<th>Care Setting</th>
<th>Population Served</th>
<th>Resource Availability</th>
<th>End User(s)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Ambulatory</td>
<td>Suburban</td>
<td>Lower</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Practice Manager</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Physician</td>
</tr>
<tr>
<td>2</td>
<td>~100 Bed Hospital</td>
<td>Suburban/Rural</td>
<td>Higher</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Director of IT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Clinical Informatics Specialist</td>
</tr>
<tr>
<td>3</td>
<td>Ambulatory</td>
<td>Rural</td>
<td>Lower/Moderate</td>
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<td></td>
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<td></td>
<td>• Regional Medical Director</td>
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<tr>
<td>4</td>
<td>~700 Bed Hospital</td>
<td>Urban</td>
<td>Higher</td>
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<td>• CMIO</td>
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<td></td>
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<td></td>
<td>• Nursing Informaticist</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Clinical Performance Specialist</td>
</tr>
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</table>
Site Familiarity with EHR Usability

Survey Responses
(N = 9)

<table>
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<tr>
<th>How long have you been at your current position?</th>
<th>How long have you been involved with implementing or optimizing electronic health records?</th>
<th>Do you have any formal training in implementing/optimizing electronic health records?</th>
<th>How familiar are you with the term &quot;usability&quot; as it relates to electronic health records?</th>
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<tbody>
<tr>
<td>&lt; 1 year</td>
<td>2-5 years</td>
<td>&lt; 1 year</td>
<td>Not at all</td>
</tr>
<tr>
<td>2-5 years</td>
<td>6-10 years</td>
<td>2-5 years</td>
<td>I have heard of it</td>
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<tr>
<td>6-10 years</td>
<td>&gt; 10 years</td>
<td>6-10 years</td>
<td>Unsure</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td></td>
<td>&gt; 10 years</td>
<td>Somewhat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very Familiar</td>
</tr>
</tbody>
</table>

Total Number of Responses

Survey Responses
(N = 9)
Site 1: Project: Optimizing the workflow of communication around surgical orders and scheduling

- Outcome: Changed internal workflow, Vendor Collaboration

Site 2 Project: Implementing EHR radiology Clinical Decision Support (CDS)

- Outcome: EHR Upgrade Challenges, Regulatory Coordination

Site 3 Project: Effect of EHR Upgrades on Colon Cancer Screening

- Outcome: Impact of EHR upgrades on quality metrics, Increased awareness for near-future EHR conversion

Site 4 Project: Integration of a patient transportation communication system integrated into the EHR to prevent delays and patient safety events.

- Outcome: Assessment of EHR Usability, *Pending data analysis
Lesson Learned from Sites

- Workflow analysis and data collect assists assisting with optimization
- Role of EHR with quality metrics
- Coordination with EHR improvements and regulatory requirements
- Communication between the healthcare organization and the EHR vendor is critical to success
- Unintended consequences of EHR software upgrades on usability improvements
ONC Comments

- Justin Cross, MD
  ONC Medical Director for Systems Safety, US Department of Health & Human Services
THANK YOU FOR YOUR PARTICIPATION

FOR MORE INFORMATION:

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