EHR USER EXPERIENCE SURVEY

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Baylor Health Care System
Dallas, Texas
Presentation Outline

I. Motivations
II. Background
III. Methods
IV. Results
V. Discussion
VI. Future Plans
Baylor Health Care System located in Dallas/Ft Worth

- 3,532 licensed beds
  - 10 acute care hospitals; 4 specialty hospitals
  - 22,000+ births
  - 130,000+ admissions
  - 400,000+ Emergency visits
  - ~3,250 active physicians
- 22,000+ employees

Implementation of vendor EHR started 2006

- 6 hospitals live with several key functionalities (e.g. clinical documentation)
- Pending first site for CPOE & associated workflow modules
Motivation 2: User experience of deployed EHR

- Prioritization of efforts of the EHR Team in the health care system
  - Builders and designers
  - Informaticians, educators, and support personnel

- The “long tail” of implementation efforts
  - Optimization
  - Bolt-on modules

- Transformation of the socio-technical system
  - Policies and procedures
  - “Hardware”: Built environment, devices
  - Integration

*Part of SHARP-C Project on patient-centered cognitive support*
Motivation 3: Key elements of user experience

- Dimensions to reflect the impact of the socio-technical system on EHR user experience (training, support, hardware access)

- Providing assessment of usability of deployed EHR as an evolving property (due to continuous updating, integrating new devices, organizational changes)

- Providing information to multiple stakeholders to drive decisions impacting on EHR end user experience
Background – EHR user surveys

Nursing information: users’ experiences of a system in Taiwan one year after its implementation. (2007)

Ting-Ting Lee PhD RN, Journal of Clinical Nursing

Design: Semi-structured interviews during focus group (n=23 nurses); One year after EHR implementation

Results: Six major issues identified:

- Insufficient computer/printer resources
- Issues during department changeover
- Decrease in charting quality
- Slow performance
- Dissatisfaction with content design
- Impact on nurse professional relationships


Ting-Ting Lee PhD RN, Computers, Informatics, Nursing

Design: Three stage:

- 30 Item Questionnaire using 4-point Likert scale taken by volunteer nurses over 2 month period
  - Domains: Patient care, nursing efficiency, education/training, usability, usage benefit
- Focus Group interviews of volunteers
- Work Sampling Observation

Results:

- Positive responses to ability to correct errors within EHR
- Negative responses included: availability of computer, downtime, paperwork purpose, time available to spend with patients, legal implications and data confidentiality
Background – EHR user surveys


Ochieng George Otieno, Hinako Toyama, Motohiro Asonuma, Masako Kanai-Pak, Keiko Naitoh, Research Methodology

Design: 45 Item Survey using 5-point frequency scale created based detailed literature review; Pilot survey to panel of nursing informatics staff

Results:

- Final survey instrument: 34 items with high initial validity; n=1,666

- Need: incorporation of training/competency component
Background – EHR user surveys


Patricia C. Dykes, Ann Hurley, Margaret Cashen, Suzanne Bakken, Mary E. Duffy, Journal of American Medical Informatics Association

Design: 43-Item Survey tool developed through literature review, Coiera conceptual model, and input from nurse informaticists

Results:

- Item analysis, exploratory principle component analysis, and internal reliability testing of 1,760 participants indicated high reliability measures.

- Need: Training, Access, Support information
Methods

- Pooled items from existing tools in published literature to a large bank of questions (Feb. 2011)
- Identified overlapping questions to streamline survey items (Feb. 2011)
- Reviewed & adapted by a team of experts in a series of meetings (Feb.- Mar. 2011). Team:
  - Patient safety researcher/safety culture survey expert
  - Human Factors specialist
  - Survey design expert/statistician
  - Nursing informaticists
  - EHR implementation/user support specialist
- Alpha testing of practicing nurses with informatics responsibilities (Apr. 2011)
- Reviewed and incorporated comments (May 2011)
- Content experts identified the domains of the EHR user experience in the survey instrument
- Items were mapped using a panel of content experts to one of 5 domains: Training & Competency, Usability, Access, Usefulness and End User Support. (Aug. 2011)
- Pilot test of survey instrument at 6 facilities (~4500 users) (Sept. 2011)
Methods

Synthesizing items from existing survey tools

- Otiento (41)
- HIT (29)
- Lee (30)

73

36

32
## Methods

### Conceptual Domain Definitions

<table>
<thead>
<tr>
<th>Domain</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Training/Competency</strong></td>
<td>The degree to which the end user has received information in a variety of formats (including “help” within the program) that prepared them to be able to use the EHR in their work both as a novice user, and with time, additional information that allowed them to more effectively use EHR more completely or effectively. The degree to which participants feel as though they are &quot;competent&quot; in their day-to-day use of EHR.</td>
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<tr>
<td><strong>Usability</strong></td>
<td>The degree to which the end user can find where to both enter information that needs to be documented and the degree to which the end user can also retrieve data that is relevant for clinical assessment of the status of the patient. It includes the degree to which these activities can be accomplished and the degree to which they can be done with ease (vs. with difficulty). The degree to which the end user is able to easily navigate, view, edit, and enter medical information into the EHR system.</td>
</tr>
<tr>
<td><strong>Access</strong></td>
<td>The degree to which an end user enjoys access to the software as a result of the existence of sufficient locations where the software/hardware is available and is not “down” (either as a result of being dropped or as a result of an ongoing “downtime.” Additionally, the degree to which the user is free from delays in transitioning from one screen to another as a result of normal navigation through the software.</td>
</tr>
<tr>
<td><strong>Usefulness</strong></td>
<td>The degree to which an end user finds that EHR enables (vs. interferes with) professional practice that was possible compared either to a non-electronic environment or the electronic tools that existed prior to deployment of the EHR. The degree to which the end user feels as though use of EHR has affected their working experience.</td>
</tr>
<tr>
<td><strong>End User Support</strong></td>
<td>The degree to which an end user can be provided solutions to problems that are encountered when the software is not functioning as it was intended as a result of problems of slowness, freezing, printing problems, local hardware malfunctions, etc. This is distinct from gaps in training that might seek to enhance the end user’s capability to use the software more effectively.</td>
</tr>
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Results (N=606, response rate 35.9%)

Analysis of Survey Instrument

- Cronbach Alpha value of Survey Domains

<table>
<thead>
<tr>
<th>Domain</th>
<th>Correlation with Overall Rating</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training &amp; Competency</td>
<td>0.675</td>
<td>0.718</td>
</tr>
<tr>
<td>Usability</td>
<td>0.753</td>
<td>0.769</td>
</tr>
<tr>
<td>Access</td>
<td>0.267</td>
<td>0.610</td>
</tr>
<tr>
<td>Usefulness</td>
<td>0.827</td>
<td>0.894</td>
</tr>
<tr>
<td>End User Support</td>
<td>0.584</td>
<td>0.789</td>
</tr>
</tbody>
</table>

Overall Rating – “Overall I am satisfied with the EHR”
Results

Item-specific correlation with assigned domain (A=agreement, F=Frequency)

<table>
<thead>
<tr>
<th>Training/Competency</th>
<th>Correlation with Overall Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The training I received related to the EHR was effective. (A)</td>
<td>0.600</td>
</tr>
<tr>
<td>I am confident using the EHR. (A)</td>
<td>0.590</td>
</tr>
<tr>
<td>In general, I am not concerned about making errors in documentation in the EHR. (A)</td>
<td>0.567</td>
</tr>
<tr>
<td>I am aware when changes/improvements are made to the EHR. (F)</td>
<td>0.473</td>
</tr>
<tr>
<td><strong>Usability</strong></td>
<td></td>
</tr>
<tr>
<td>I am able to find where I need to document patient care. (A)</td>
<td>0.571</td>
</tr>
<tr>
<td>In general, it is easy to correct errors in charting in the EHR. (A)</td>
<td>0.513</td>
</tr>
<tr>
<td>In general, the screen display is easy to read. (A)</td>
<td>0.612</td>
</tr>
<tr>
<td>The content is laid out in an understandable way. (A)</td>
<td>0.726</td>
</tr>
<tr>
<td>I am able to complete documentation without having to stay after my shift. (F)</td>
<td>0.403</td>
</tr>
<tr>
<td>I document directly into the computer without writing on paper first. (F)</td>
<td>0.379</td>
</tr>
<tr>
<td>Duplicating entries. (F)</td>
<td>0.315</td>
</tr>
<tr>
<td><strong>Access</strong></td>
<td></td>
</tr>
<tr>
<td>Slowness of computers or programs. (F)</td>
<td>0.223</td>
</tr>
<tr>
<td>Having to reboot computers. (F)</td>
<td>0.126</td>
</tr>
<tr>
<td>Finding a computer to use. (F)</td>
<td>0.166</td>
</tr>
<tr>
<td>Login or passwords. (F)</td>
<td>0.163</td>
</tr>
<tr>
<td><strong>Usefulness</strong></td>
<td></td>
</tr>
<tr>
<td>Documentation through the EHR has improved patient safety. (A)</td>
<td>0.722</td>
</tr>
<tr>
<td>Access to information within the EHR has increased patient safety. (A)</td>
<td>0.651</td>
</tr>
<tr>
<td>The EHR provides useful alerts/reminders. (A)</td>
<td>0.587</td>
</tr>
<tr>
<td>The EHR allows me to spend more time with my patients. (A)</td>
<td>0.706</td>
</tr>
<tr>
<td>The EHR supports efficient interdisciplinary communication. (A)</td>
<td>0.657</td>
</tr>
<tr>
<td>The EHR makes it easier for me to assume care for patients transferred to my unit. (A)</td>
<td>0.678</td>
</tr>
<tr>
<td><strong>End User Support</strong></td>
<td></td>
</tr>
<tr>
<td>Effective help is readily available when I experience problems with the EHR. (F)</td>
<td>0.448</td>
</tr>
<tr>
<td>I get feedback when I report errors or problems with the EHR. (F)</td>
<td>0.536</td>
</tr>
<tr>
<td>It is easy to report problems with the EHR. (A)</td>
<td>0.536</td>
</tr>
<tr>
<td><strong>Overall Rating</strong></td>
<td></td>
</tr>
<tr>
<td>Overall, I am satisfied with the EHR. (A)</td>
<td>1.000</td>
</tr>
</tbody>
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Discussion

- Value of survey to ongoing EHR implementation at Baylor Health Care System

- Dissemination of results within the organization
Future Plans

- Rework “Access” Domain
- Pharmacy and Physician Surveys
- Resurvey Nursing Staff (September 2012)
Questions?

Contact: Sunni.Barnes@BaylorHealth.Edu
(PDF version of the current survey available)