MD:Notes designing an information service for public hospitals

Team: Katherine Ahern Zach Gillen Jill Blue Lin
Advisor: Bob Glushko
Purpose of Project

- Understand how public hospitals are making the transition from paper records to electronic medical records

- Design an information system that meets their needs

- Specific focus on how 2 Bay Area hospitals work with progress notes
Public Hospital Waiting Room

Photo from Flickr user Andy and Elayne
Our Methods

- Contextual inquiry - interviewed 14 people from 2 public hospitals
- Sequence diagrams
- Affinity notes
- Paper prototype with usability test
- Functional prototype
About Progress Notes

Notes written by a physician to describe a patient’s condition during a visit, assessment and plan for treatment.

Progress notes, nursing assessment, operative report, encounter form ...

Patient’s medical record
Handwritten vs Electronic Progress Notes

Handwritten

Electronic note - dictation, typing, speech recognition

MD:Notes
Paper Chart vs. Electronic Record

- Handwritten, printed progress notes
- Orders
- Photos …

- Electronic progress notes
- Lab results, reports
- X-Ray reports …
Missing Charts

• 10% to 80% charts are missing - “This is really devastating”

• Physicians and nurses try to locate chart

• Physician questions patient to reconstruct history

• Physician orders new tests

Photo from Flickr user kris247
### Handwriting vs Dictating Notes

<table>
<thead>
<tr>
<th>Write note by hand</th>
<th>Dictate note</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intent:</strong> Create note</td>
<td><strong>Intent:</strong> Create note</td>
</tr>
<tr>
<td><strong>Trigger:</strong> Patient visit concluded</td>
<td><strong>Trigger:</strong> Patient visit concluded</td>
</tr>
<tr>
<td>1. In exam room, get progress note form in notebook</td>
<td>1. Go to dictation station</td>
</tr>
<tr>
<td>2. Look in paperwork for patient MRN</td>
<td>2. Look at schedule</td>
</tr>
<tr>
<td>3. Fill out form with physician ID, patient MRN, note category</td>
<td>3. Find patient MRN</td>
</tr>
<tr>
<td>4. Write summary of visit</td>
<td>4. Refer to directions on using system</td>
</tr>
<tr>
<td>5. Put note in chart and give to nurse</td>
<td>5. Call system on landline, listen to instructions</td>
</tr>
<tr>
<td>6. Enter required info using touchtone phone - physician ID, patient MRN, note category ID, etc.</td>
<td>6. Enter required info using touchtone phone - physician ID, patient MRN, note category ID, etc.</td>
</tr>
<tr>
<td>7. Repeat note category via speech</td>
<td>7. Repeat note category via speech</td>
</tr>
<tr>
<td>8. Speak summary of visit</td>
<td>8. Speak summary of visit</td>
</tr>
<tr>
<td>9. Repeat physician ID, patient MRN via speech</td>
<td>9. Repeat physician ID, patient MRN via speech</td>
</tr>
<tr>
<td>10. Hang up, wait for transcription</td>
<td>10. Hang up, wait for transcription</td>
</tr>
</tbody>
</table>
Pain Points in Existing Tools

• Writing by hand - hard to retrieve
• Dictation (landline)
  o In-patient settings
  o Some physicians dislike dictating
  o Touch-tone phones
  o Time lag for transcription
• Typing
  o Some physicians can’t type
  o In-patient settings
Key Takeaways for Design

• One application
  o Create & find notes
  o Multiple methods - speaking, typing
  o Multiple devices

• Based on physician’s schedule

• Speech recognition replaces dictation

• Compatible with existing systems, ROI
Prototype Design and Usability Test

Results:

• Some users had no major problems
• Novice user did not understand the prototype
Complex system environment
Technical Architecture

Request/response

MD: Notes (PHP)

MySQL database (emulates EMR)

Patient (modeled in XML)

Schema

Mapforce HL7 Mapping Transform

Note in HL7 format - EMR compatible

MD:Notes
Prototype demo

MD:Notes

Create and find progress notes by schedule or patient

Setting: Out-patient

Note status: All

Date: 3/17/08

Clinic: [Clinic name]

<table>
<thead>
<tr>
<th>Time</th>
<th>Name</th>
<th>Note Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 am</td>
<td>John Smith</td>
<td>Draft</td>
</tr>
<tr>
<td>9:10 am</td>
<td>John Smith</td>
<td>Signature required</td>
</tr>
<tr>
<td>9:20 am</td>
<td>John Smith</td>
<td>Complete</td>
</tr>
<tr>
<td>9:30 am</td>
<td>John Smith</td>
<td>-</td>
</tr>
<tr>
<td>9:30 am</td>
<td>John Smith</td>
<td>-</td>
</tr>
<tr>
<td>9:30 am</td>
<td>John Smith</td>
<td>-</td>
</tr>
</tbody>
</table>
Preventing a new information silo
Preventing a new information silo
Converting to the HL7 Standard

- A healthcare messaging standard for system interoperability.
- Must be able to send progress notes to the EMR!
Future Work

• Integration
• Templates
• Security
• Extending the patient model
• Supporting multiple devices
Future Work, cont.

- Exploiting network effects
- Taking advantage of standards
Summary

- Many hospitals have problems managing patient information

- Our product makes it easier to enter and retrieve notes
Questions

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