Acknowledgements

- AMIA Usability Task Force
- HIMSS Usability Task Force
- Janey Barnes, Jiajie Zhang
  - original learning module creators
Purpose

Observations describe behavior, communication patterns, workflows and tasks of clinicians in specific work environments.

UCD process relies on systematic understanding of clinician behavior and environment constraints.
Informaticist Designer

**expertise**
Usability, HCI, methods
Interface design

**Clinician**
Characteristics
- Medical expertise
- Clinical role
- Experience
- Preferences

**Informaticist Designer**

**Methods**
- Observation
- Ethnography
- Interviews
- Log analysis
- Cognitive analyses
- Task analysis
- Expert walkthrough

**Methods**
- Surveys
- Questionnaires
- Focus groups
- Pilot studies
- Guidelines
- Regulations

**emergent characteristics**
- Interaction strategy
- Collaborative relationships
- Contextual knowledge
- Workflow routines
- Unintended consequences

**characteristics**
- Clinical objectives
- Constraints
- Collaboration
- Workflow
- Environment

**attributes**

**Methods**
Goals

Determine workflows
- Help to ensure that IT fits with or improves existing workflows

Identify inefficiencies
- Where are the breaks, gaps, disconnects, and opportunities for error?

Identify opportunities
- What can be done better?
Goals

Describe clinicians
- Hospitalists, specialists, surgeons, nurses, EMS personnel, support.

Describe clinical environments
- Ambulatory, hospital floor (service), surgical, critical care, emergency care

Describe opportunities for error
- Interruptions, handoffs, missing info
- Workarounds, safety concerns
Goals

Describes interactions

- Among clinicians and with patients
  - Face-to-face, phone (real-time)
- Clinicians with information systems
  - Search and retrieval of data
  - Documentation
- Clinicians and physical environment
  - Rooms, clean environment, transfers, location of workstations, nursing stations
Preparing for Observations

- Identify key stakeholders
- Gain access
- Set primary focus
  - Workflow model (present and future), communication pattern, deviation from protocol, situational awareness, tracking flow of care and time to treatment
- Identify participants and conditions
  - Physicians, nurses, coordinators
  - High/low patient volume, handoff
Preparing for Observations

- Develop an approach
  - Observations of work? Interviews?

- Develop supporting materials
  - Observation sheet

- Use de-familiarization
  - Don’t assume you know how work is conducted

- Triangulate
  - Compare data from different methods
Observation Techniques

- **Shadowing**
  - Follow one clinician over the course of a shift (or less, 2–3 hrs) and create field notes.
  - Record activities, interactions, events, their duration, time and location.
  - Do not ask questions or interrupt, clinicians may volunteer explanations.
Observation Techniques

- Observe group behavior
  - Take notes on activities at specific locations – description, goal, frequency, duration, clinical role.

- Observe from patient perspective
  - Follow one patient through an episode of care – describe interactions, kind and source of information, waiting.
Ethnographic Descriptions

Observation and shadowing
- Evaluating authentic behavior
- Time consuming, may not understand reasons for actions
- Interpretation may be difficult

Interviews (open, semi-structured)
- Excellent to fill observation gaps
Structured Observations

Define activities, tasks, artifacts

- Prepare from literature, prior studies, informants, experts, interviews.

Develop field notes collection tool

- Timestamp, pre-defined categories, descriptive notes
- Paper or electronic format
<table>
<thead>
<tr>
<th>Patient Code</th>
<th>View</th>
<th>Activity</th>
<th>System</th>
<th>Human</th>
<th>Location</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>Note</td>
<td>ED Track</td>
<td>Patient</td>
<td></td>
<td>Alpha</td>
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<tr>
<td></td>
<td>Order</td>
<td>ED Border</td>
<td>Attending</td>
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<td>Bravo</td>
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<td>Labs</td>
<td>BICS</td>
<td>Resident</td>
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<td>Obs</td>
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<td>Vitals</td>
<td>LMR</td>
<td>PA</td>
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<td>Ecn</td>
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<td>Centricity</td>
<td>Consult</td>
<td></td>
<td>Waiting</td>
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<td>Allergies</td>
<td>CAS</td>
<td>Nurse</td>
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<td>Paper</td>
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<td>PCP</td>
<td></td>
<td>Other</td>
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<tr>
<td></td>
<td></td>
<td>Dictation</td>
<td>Other</td>
<td></td>
<td>Other</td>
</tr>
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</table>

Narrative comments:
R click in EDT to review and take off orders. R click in EDT to look at BICs-info he was looking for not entered their yet. "that's frustrating"
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>9:47:40</td>
<td>Orders come up on EDT, prints them.</td>
</tr>
<tr>
<td>9:49:46</td>
<td>Opens BICS to look up container types for lab tests– not all the info is there. Writes down on orders page the info he can get.</td>
</tr>
<tr>
<td>9:51:41</td>
<td>Calls lab control to get the info missing from BICS, about what tubes to use for different blood draws.</td>
</tr>
<tr>
<td>9:54:45</td>
<td>Calls tissue typing (got number from lab control) to ask about how to draw sample for test – gets the info he needed.</td>
</tr>
<tr>
<td>9:59:24</td>
<td>Enters pt room to give discharge instructions on paper and verbally, prescriptions, etc.</td>
</tr>
<tr>
<td>10:01:24</td>
<td>Looks through pt binder, writes in ED progress note. Then stacks papers in order, paperclips them and puts them back in binder</td>
</tr>
<tr>
<td>10:05:01</td>
<td>Enters pt room to give discharge instructions</td>
</tr>
<tr>
<td>10:13:21</td>
<td>Logs back into computer, r-click to BICS to view pt registration info to make sure of proper billing.</td>
</tr>
<tr>
<td>10:23:48</td>
<td>EDT right click to view pt disposition order then rclick to assign nurse to pts</td>
</tr>
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Data Analysis

- Summarize your collected data according to primary focus
  - Workflow – Chronology, task structure
  - Performance – Duration, duplication
  - Interactions – Information flow model
  - Patient Safety – Workarounds, errors

- Identify best available electronic interventions to observed behavior
Data Analysis

- Identifying work and information flows
Data Analysis

Identifying work and information flows
Data Analysis

- Identify best available electronic interventions to observed behavior
- Develop low-fidelity prototypes
  - Paper sketches, Power Point
- Use prototypes to validate findings and conclusions
Development Lifecycle

Observe early in the process long before any screens are built and likely before features and functions are identified.

During implementation focus on workarounds, workflow fit, errors
Design and Test Process

- Discover
- Define
- Design
- Develop
- Beta
- Launch
- Post-Launch

- Observational Research
- • Rapid Usability Assessment
- • Formative Usability Test

- Summative Usability Test
Cost Distribution

Cost

Production Cycle

Design

Testing

UI Lock

Production

Release
Exercise

Identify an issue to address in an ambulatory visit

- Patient, Nurse, Physician, EHR

Watch video of a simulated visit

Take notes on observations.

Discuss problems, improvement

- Documentation, organization