Medication Reconciliation Hack-A-Thon

Clinical / Administrative Workshop

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Clinical / Admin Workshop

- Goals –
    - Learn about Rapid Prototype Development
    - Review basics of good user-centered design
    - Review some resources available to help
    - Break into groups
    - Identify Current State
    - Develop Features list
    - Begin to draw user-interface options

Task Identification Current State

Identify problems you are trying to solve
- Cognitive task
- Data required to achieve this
- Actions you wish user to take
- Actions Software should accomplish
- Think of how it is done well / poorly or not at all now in the tools available
- Ok to identify differences between software tool

Table 1. Medication history review tasks for care of chronic disease

Task	EHR current state
Identifying current prescription on a medication history	Easy
Identifying past prescriptions on a medication history	Can be done with 1 or more steps currently
Identifying the length of time a medication has been prescribed	Difficult in list view; can be searched in some EHRs
Identifying new prescriptions in a given time interval	Cumbersome
Identifying a dosage change in a given time interval	Cumbersome
Making intercategorical comparisons of medication changes with other data categories (blood pressure, weight, lab results)	Available in only 1 EHR in mobile (tablet) product

Develop Features List

Prioritize what you
- Need to happen
- Want to happen
- Wish would happen

Table 2. Features of interactive medication timeline and their associated human factors and design principles

Number	Feature	Principles and Rationale
1	Display overview of all medications for selected time on a single screen without scrolling.	• Achieve spatial contiguity and reduce demands on working memory.[28] • Allow quick visual queries.[29] • High information density for complex patients.
2	Default interval is 2 years.	During ambulatory care visits for chronic disease, providers need >12-month history.
3	Medication names display on both left and right sides of the view area, making it easier to identify the name for an associated row.	Gestalt principles of proximity and alignment.[30]
4	Right-hand drug name panel also serves as the time scrubber, dynamically updating drug and dose as the user moves the scrubber.	System shows state dynamically.[29]
5	Use monochrome grayscale bar graph, where black represents maximum daily dose for a given clinical indication (diagnosis). Gray is less, lighter is lower.	Intensity corresponds to dosage strength.
6	Longitudinal bar graphs display start-stop-change	Pre-attentive attributes (color, shape, length) allow

- Focus on Target Audience
- Avoid Scope Creep
- Focus on outcomes
  - Avoid drug duplication, adverse events, time to task completion

Draw Out Options

Quickly identify
- Good ideas
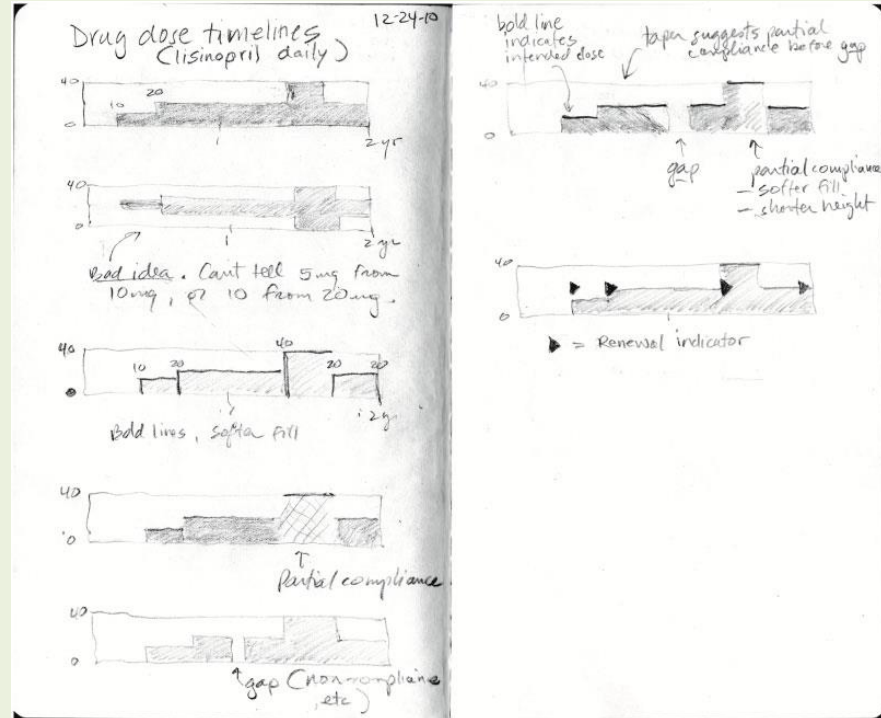- Visualization pros/cons
- Multiple people can work on alternatives

Figure 2. Failing rapidly with pencil sketches. See "Bad idea" in left panel.

EHR Safety Concepts

Video examples of Medication Ordering Challenges and Safe Design Principles

https://ehrseewhatwemean.org/

Usability Principles

- Consistency and Standards
- Visibility of System State
- Match System & World
- Minimalistic Design
- Minimize memory load
- Informative Feedback
- Flexibility and efficiency

- Good error messages
- Prevent errors
- Clear closures
- Reversible actions (undo)
- Use users language
- Users in control
- Help and Documentation

National Center for Cognitive Informatics & Decision Making in Healthcare

Consider Wireframe Software

- Allows Rapid Prototyping
  - Screen layout
  - Some functions
  - Colors
  - Might be able to demo functionality prior to build

- Downsides
  - Time to learn software
  - Can take more time than worth it

What now?

Small groups for design

- Ambulatory PCP

- Inpatient hospitalist / nurse / PharmD

- Skilled Nursing Facility / Home Health Agency
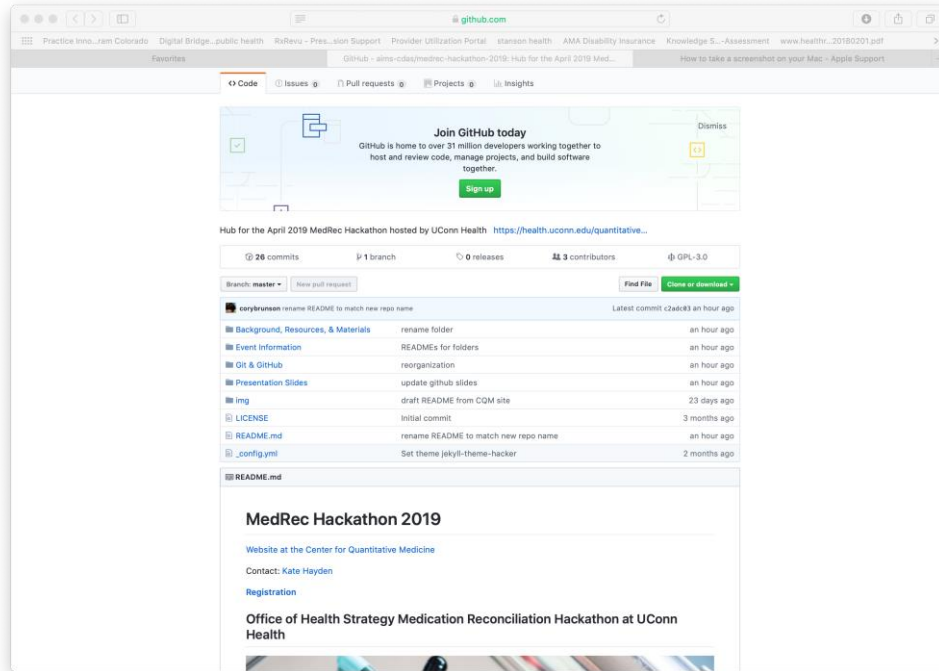
- Patient / Caregiver

Identify what exists now

- Sources of Med information
- Challenges with data
- Task identification / prioritization
- Begin Features List
- Meet up with Programmers
- Explain tasks / features
- Draw out options
- Perhaps Wireframe
- Iterate

Timeline

Resources

https://github.com/aims-cdas/medrec-hackathon-2019
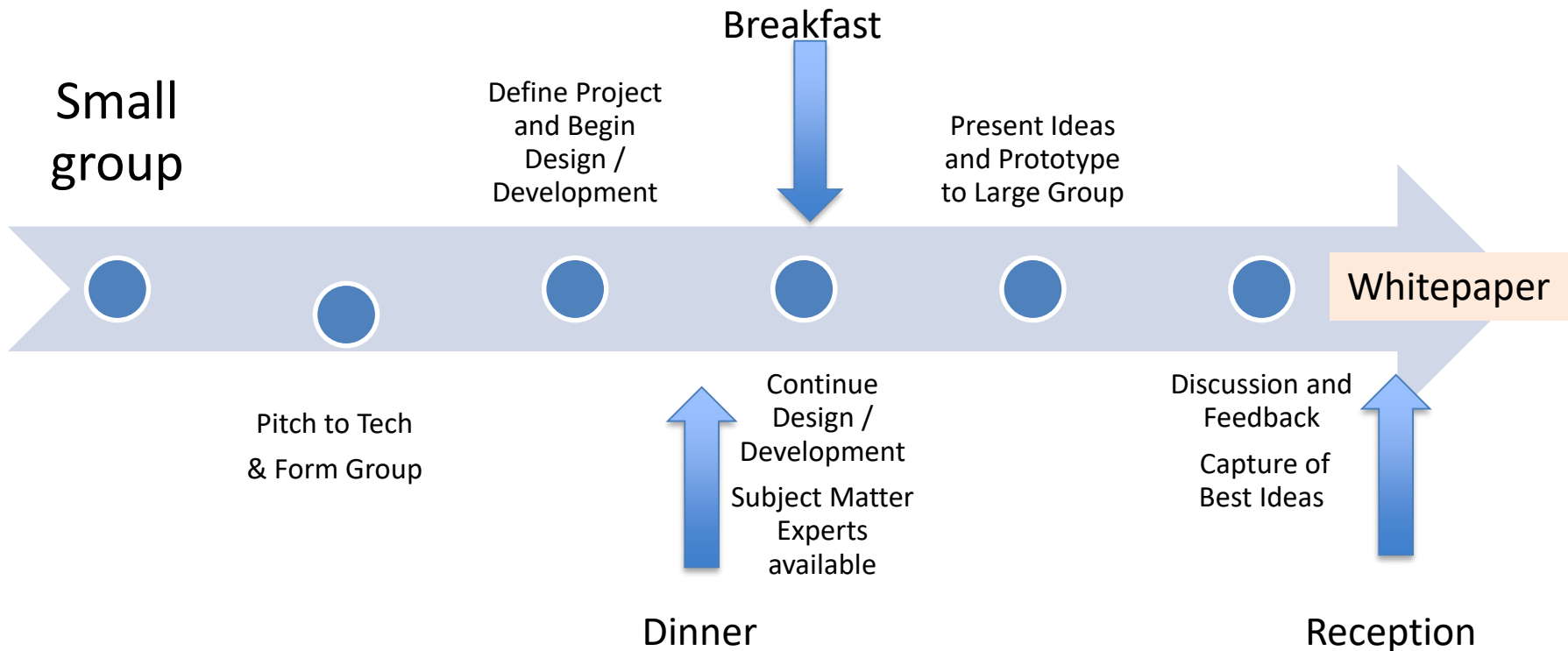
Example

Twinlist

Prototype Med Rec

ONC SHARP Grant

University of Maryland

http://www.cs.umd.edu/hcil/sharp/twinlist/