Gaps in Functionality: Work-centered Design of Medication List in Ambulatory EHRs

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Introduction

- As the importance of the continuum of care on clinical outcomes has been widely recognized [1], longitudinal information which spans across episodes of care (e.g. medication list) is required to be documented in addition to traditional encounter-focused clinical notes.
- An accurate list of medications in current use with timely updates is necessary to prevent medical errors. [2]
  - Inaccurate medication lists found in ambulatory Electronic Health Records (EHRs) [3] may be partially due to lack of support for the workflow of medication management in the outpatient setting
- In this poster, we will compare medication list functionalities with medication-related work in the outpatient setting and propose solutions following work-centered design approach.

Methods

I. Identify gaps in functionalities in existing ambulatory EHRs

I.(a) Interviewed four primary care providers regarding medication-related work in the outpatient setting, independent from the work carried out using specific EHRs, with published clinical guidelines on medication review incorporated.

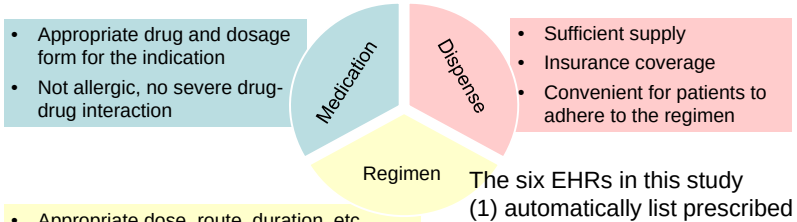
I.(b) Evaluated six ambulatory EHRs in terms of functionalities supporting providers' medication-related work by a usability researcher

II. Propose expanded data model and user interface mockups using TURF framework

- Function analysis in TURF (i.e. task, user, representation and function): the process that the abstract structure of a work domain is identified. [4]

Results

I. Outpatient medication management and gaps in EHR functionalities



The six EHRs in this study
(1) automatically list prescribed medications as current medications with **no functionality to indicate patient adherence**;
(2) only provide "allergy list" to document adverse consequences, with data entry and display separated from "medication list";
(3) provide no linkage between medications and test results that are processed by clinicians to monitor toxicity and effectiveness of those medications.

II. Proposed data model and user interface mockups

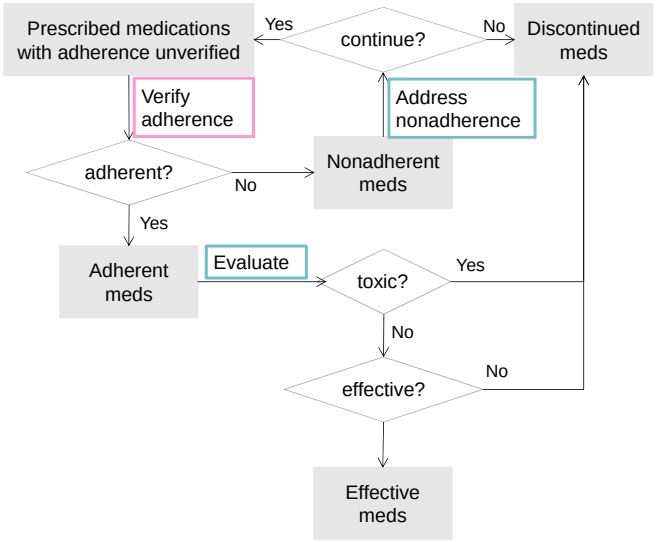
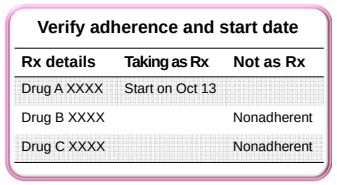
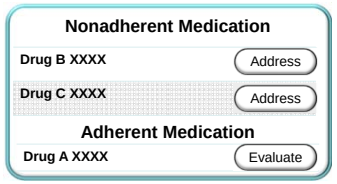
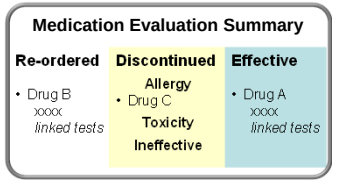


Fig 1. Data model for medication management







Summary of Conclusions

- Work-centered design is essential for EHRs to support patient care.
- Medication-related work activities in the outpatient setting should be adequately captured for the design of medication list in ambulatory EHRs.
- Clinicians' feedback on the proposed user interface mockups will be analyzed for further improvement.

References

1. Lamb GS. Outcomes across the care continuum. Medical Care. 1997;35(11): NS106-14.
2. Barnsteiner JH. (2008) Medication Reconciliation. In: Hughes RG, editor. Patient Safety and Quality: An Evidence-Based Handbook for Nurses. Rockville (MD): AHRQ (US). Chapter 38.
3. Staroselsky M, Volk LA, et al. An effort to improve electronic health record medication list accuracy between visits: patients' and physicians' response. Int J Med Inform. 2008; 73(3):153-60.
4. Zhang J, Walji MF. TURF: Toward a unified framework of EHR usability. J Biomed Inform. 2011;44(6):1056-67.
5. Nunes V, Neilson J, et al. (2009) Clinical Guidelines and Evidence Review for Medicines Adherence: involving patients in decisions about prescribed medicines and supporting adherence. London: NCCPC & RCGP.

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