



A Human Factors Approach to Electronic Medication Reconciliation

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Background

Implementation of effective medication reconciliation processes has proven difficult due to incomplete admission medication information, lack of standardized processes, and paper-based systems which limit the ability to access, manage, and compare medication information. Some electronic health records (EHRs) provide electronic medication reconciliation functionality, but often suffer from poor design and lack of integration with the inpatient computerized physician order entry (CPOE)

BIDMC is a 631 bed academic medical center with a mature, homegrown EHR and CPOE system built using the Cache programming language with a web based interface for clinical use. We sought to design an electronic medication reconciliation (eMR) application using our existing EHR/CPOE architecture.

Methods

To facilitate the design and programming of the eMR application, we assembled a multidisciplinary team of doctors, nurses, pharmacists, and programmers. The design principles were that the application allow the user to import, assemble, reconcile, order, and document the PAML using a single, intuitive interface.

Description of Innovation

1. On admission, the eMR application assembles the patient's medications from electronic sources (ambulatory EHR, prior discharge medication list), and by manual entry, to create an electronic preadmission medication list (PAML).
2. The user then records planned actions (continue, discontinue, continue at different dose/frequency/route), and documents the accuracy of the PAML.
3. The user can then edit and bring preadmission medications into the active inpatient CPOE system without manually re-entering the order.

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4. The completed PAML can be imported into all clinical documentation.

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5. At the time of discharge, the PAML and the existing active CPOE orders are assembled in a matrix sorted by medication. This allows for direct comparison of each medication without referring to an external data source (e.g. admission note, other applications).

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6. The user builds a discharge medication list by choosing from the PAML or the active POE medications, editing and adding medication as needed.

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7. As each medication is reconciled, the computer identifies any that are new or discontinued, as well as any changes in the dose, route, or frequency of medications that are being continued. Each decision is automatically recorded, and the provider can edit and add additional text to these computer generated descriptions as needed. Because every medication must be reconciled, the system assures that there are no errors of omission or commission, and that every decision is clear to the patient and the next provider

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8. On discharge, the patient receives a reconciled medication list; the list is stored electronically in the EHR, and sent via a Health Information Exchange to the next provider.

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Conclusions

The implementation of eMR is a complex process which often fails due to poor design. We have developed an easy to use eMR application which seamlessly integrates into existing workflow, and provides robust discharge reconciliation functionality which merges disparate data sources.