

# Evaluation of electronic inpatient medication implementation at an acute care hospital

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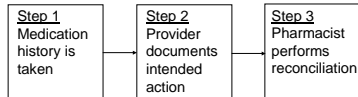
## Introduction

Medication reconciliation is a process that involves compiling an accurate list of medications a patient is taking and comparing that list to a provider's admission orders. This process has been extensively promoted in the inpatient hospital setting as a means to decrease medication errors and adverse drug events.

The objective of this study was to evaluate discrepancies found between a patient's medication history and admission orders based on data collected during initial implementation of an electronic inpatient medication reconciliation process at Kings County Hospital Center (KCHC), a 630-bed, academic, tertiary care hospital.

## Materials and methods

An electronic medication reconciliation module for all inpatient services was implemented in May 2006 as part of the existing facility-wide electronic medical record (EMR). The medication reconciliation module involves a three-step process.



Step 1: A comprehensive medication history is obtained for a patient by either a nurse or provider. During this step, medications are distinctly labeled as "KCHC meds" (i.e. medications pre-existing in the patient's electronic profile) and "Non-KCHC meds" (i.e. prescription and over-the-counter medications from outside sources).

Step 2: The provider documents the intended action for each medication by selecting "continue", "discontinue", "substitute", or "unable to verify". The provider-performed documentation is automatically routed to an electronic work queue for pharmacy.

Step 3: A pharmacist performs reconciliation by reviewing provider documentation and comparing it against the admission orders in the EMR. The pharmacist records any discrepancies found between and categorizes them into one or more of the following: "Continued" medication(s) not ordered, "Discontinued" medication(s) ordered, dose discrepancy, frequency discrepancy, therapeutic duplication, and other. In addition, the pharmacist also communicates with the provider to resolve any discrepancies found.

For data collection, an automated query was performed in the EMR to retrieve medication reconciliation data from June 3 to June 16 2006. The data was analyzed for patient and provider demographics, the number of "Non-KCHC meds" per reconciliation event, and the number and types of discrepancies

## Results

Total Med Recon events examined= 120  
Mean patient age= 44.5 years  
Male patients= 52%  
Female patients= 48%

Of the Med Recons performed:  
By physicians 83% (attendings 17%, residents 66%)  
By NPs 15%  
By PAs 2%

An evaluation of the discrepancies detected by pharmacists during the reconciliation process is shown in Figure 1.

Figure 1.

Percentage of reconciliations with discrepancies	20.8% (n=25)
Types of discrepancies*	
"Continued" medication not ordered	n=10
"Discontinued" medication ordered	n=0
Dose discrepancy	n=5
Frequency discrepancy	n=1
Therapeutic duplication	n=0
Other	n=15

\*Each reconciliation event may have >1 type of discrepancy

The breakdown of discrepancies by specialty is shown in Figure 2.

Figure 2.

Medicine	n=12
Pediatrics	n=9
Other (Psychiatry, Rehab, Neurosurgery)	n=4

A description of the "Non-KCHC meds" documented in patients during the study period is shown in Figure 3.

Figure 3.

Percentage of reconciliations with "Non-KCHC meds"	44.2% (n=53)
Mean number of "Non-KCHC meds"	1.8 ± 2.8
Range of "Non-KCHC meds"	0 - 10

## Conclusions

- Significant discrepancies were found between admission orders and the providers' intended actions documented on the Med Recon form in EMR.

- There was a high percentage of patients with medications prescribed outside of the institution ("Non-KCHC meds").
  - Prior to the implementation of this module, there was no standardized method of documenting and sharing information about outside medications among various providers across of the continuum of care.

- A thorough multidisciplinary electronic medication reconciliation process can detect and intercept adverse drug events before they reach patients and cause harm.

- Further study is necessary to determine the factors associated with discrepancies in electronic medication reconciliation given the relatively high number of discrepancies found during this study.

## References

Institute for Healthcare Improvement. Reconcile Medications at All Transition Points. Available at: <http://www.ihl.org/IHI/Topics/PatientSafety/MedicationSystems/Changes/Reconcile+Medications+at+All+Transition+Points.htm>. Accessed June 23, 2006.

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## For further information

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