

Medication Reconciliation by a Pharmacist in the Emergency Department: A Pilot Project

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INTRODUCTION

The Institute for Healthcare Improvement has defined medication reconciliation as “a formal process of obtaining a complete and accurate list of each patient’s current home medications—including name, dosage, frequency and route—and comparing the physician’s admission, transfer, and/or discharge orders to that list. Discrepancies are brought to the attention of the prescriber and, if appropriate, changes are made to the orders.”¹ The impetus behind this concept is to prevent adverse drug events.

The Canadian Adverse Events Study reported an adverse event rate of 7.5% in Canadian hospitals, and 36% of the adverse events were deemed preventable.² Drug- and fluid-related events together constituted the second most common type of adverse event.² Medication discrepancies can occur at any point in the medication use process, but the largest percentage of these discrepancies occur during the prescribing phase.³⁻⁷ The presence of a pharmacist during patient care rounds and when prescriptions are written has been associated with a reduction in medication discrepancies at the ordering stage.⁸⁻¹⁰

In a sample of 98 emergency department visits, the accuracy of medication lists completed by the triage nurse was 42.6%.¹¹ Most physicians rely on patients’ drug lists when making a diagnosis and ordering tests and medications in the emergency department. However, without appropriate verification of the patient’s medication regimen, drug-related problems may not be detected, a diagnosis may be missed, or discrepancies in patient admission orders may occur.^{3,12-14}

A few studies regarding medication reconciliation conducted in larger teaching centres have been published^{3,15}; however, there are no similar published studies from small community hospitals. Colchester Regional Hospital is a 120-bed community hospital offering medical, surgical, psychiatric, pediatric, and obstetric services. The hospital has about 3000

admissions per year with a maximum capacity of 11 beds in the Emergency Department. Before the study, the hospital’s pharmacists were involved in direct patient care in the acute care units and provided seamless care at discharge to about 60% of patients treated in these units. Many of the interventions at discharge were performed to correct discrepancies in the admission orders prepared in the Emergency Department. Given that about 80% of the hospital’s admissions originate in the Emergency Department, the authors theorized that involving a pharmacist earlier in the process would lead to more timely interventions and would help to prevent medication discrepancies.

The purposes of this study were to determine if involving a pharmacist in the documentation and reconciliation of medications in the Emergency Department would result in fewer medication discrepancies and to evaluate a multidisciplinary form for medication reconciliation in the Emergency Department.

METHODS

This study was approved by the Colchester East Hants Health Authority Ethics Committee in June 2006.

To determine the baseline incidence of medication discrepancies, a retrospective analysis of medical records was undertaken on a convenience sample of 100 patients, taken from a randomly generated list from the admissions database, who were admitted to the hospital through the Emergency Department during the period January 1 to February 28, 2006. Patients who were discharged or who passed away within 24 h of admission were excluded. Each medical record was reviewed for discrepancies between the patient’s home medications at the time of admission and the admission orders in the Emergency Department that had not been resolved within 24 h of admission. Nursing worksheets, Emergency Department triage sheets, nursing home record sheets, ambulance transfer

documents, and physician histories were used to determine the patient's home medications. Each home medication that was not ordered or commented on was deemed to represent a discrepancy. Clinical judgment was applied if there was an obvious reason for not ordering a drug (e.g., if the patient had been taking warfarin at home but was admitted for bleeding associated with anticoagulation and warfarin was not ordered on admission). The medications were classified according to the criteria of the Safer Healthcare Now! campaign: 0 = no discrepancy, 1 = documented intentional discrepancy, 2 = undocumented intentional discrepancy, 3 = unintentional discrepancy.¹⁶ Each medical record was reviewed independently by 3 reviewers (2 pharmacists [A.J.K. and L.H.] and 1 nurse), and results were determined by consensus. If the reviewers were unable to determine whether a medication had been intentionally omitted or changed, it was deemed not to have been reconciled and was counted as a discrepancy.

Once the baseline frequency had been established, a multidisciplinary team consisting of an emergency physician, emergency nurses, and pharmacists developed and refined a medication list and admission order form to be used for medication histories and the reconciliation process (Figure 1). Emergency nurses and physicians received training on use of the new form and on the concept and process of medication reconciliation. For an 8-week period, from September 25 to November 17, 2006, one pharmacist (L.H.) chosen to conduct the pilot project worked in the Emergency Department from Monday to Friday, from 0800 to 1600 each day, interviewing patients and family members or caregivers regarding current home medications to compile the best possible medication history for each patient. If necessary, the pharmacist contacted the patient's community pharmacy or physician's office. The list of current medications was recorded on the new medication list and admission order form, which could be used as admitting orders if the physician so chose. All patients admitted to the facility through the Emergency Department were eligible for inclusion in the study, except those who were unable to communicate and who did not have a caregiver available. The completed medication list was reconciled with the admitting orders from the Emergency Department within 24 h of admission, except for patients admitted on weekends, for whom medication lists were reconciled on the following Monday. The pharmacist maintained a log of all interventions performed in the Emergency Department during the 2-month period.

A random sample of 100 medical records generated from the admission database for the study population (patients admitted to the hospital through the Emergency Department during the study period) was reviewed using the same criteria as were employed in the baseline review of medical records.

A post-trial survey was developed and distributed to all physicians and nurses throughout the facility. The survey

included questions regarding the medication list and admission order form, as well as questions about the medication reconciliation process. In addition, the Emergency Department staff were polled for their opinions of the role of the pharmacist in the department.

Medication discrepancies were analyzed to determine the number of unreconciled medications per 100 admissions, as described in the 100,000 Lives Campaign (the predecessor to the 5 Million Lives Campaign) of the Institute for Healthcare Improvement.¹ The number of unreconciled medications per 100 admissions was calculated as follows: (number of unreconciled medications/total number of patients) × 100, where the number of unreconciled medications was determined by reviewing medical records and refers to the number of medications, not the number of doses.

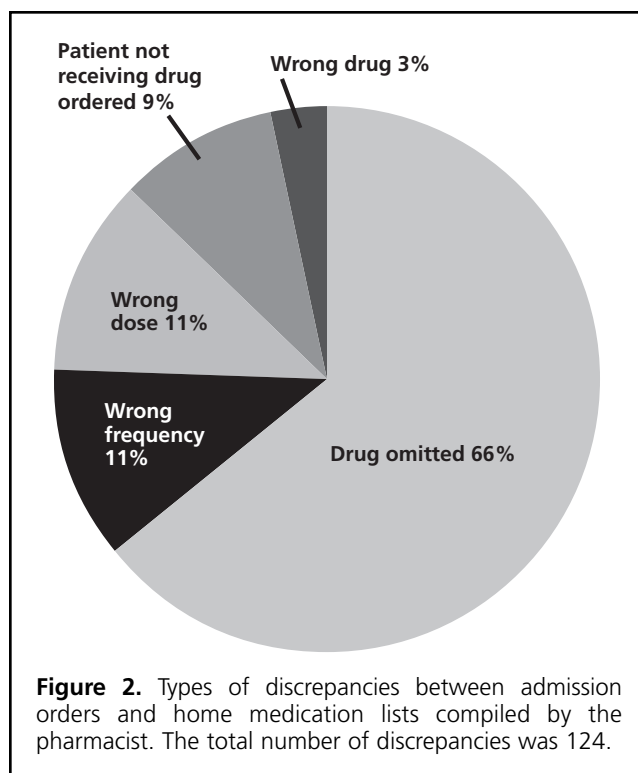
Post hoc analysis included calculation of the number of medication discrepancies per medical record reviewed, both before and after the study period. In addition, the number of medical records with at least one discrepancy was compared before and after the intervention.

Interventions performed by the pharmacist were documented, and the categories of the most common interventions were recorded (omissions, dose errors, frequency errors, orders on admission for a drug that the patient was not receiving at home and for which there was no clear indication). The percentage of patients who required an intervention by the pharmacist and the average times required to review the medication history and to perform the reconciliation were calculated.

RESULTS

During the 8-week pilot project, the pharmacist completed medication histories and reconciled orders for 98 patients, which represented 35% of the 280 patients admitted through the Emergency Department during that period. The average number of medications per patient was 7 (range 1 to 15), and the average age of patients was 71 years (range 17 to 98). The pharmacist found a total of 124 medication discrepancies, which were brought to the attention of the attending physician. The majority of the errors involved home medications that were omitted on admission; other discrepancies included wrong dose, wrong drug, and wrong frequency (Figure 2). Of the patients whose medications were reconciled, 40% had discrepancies that required an intervention by the pharmacist. The average time to take the medication history and reconcile orders was 23 min (range 6 to 97 min).

A total of 86 medical records were reviewed in each of the baseline and post-intervention groups; 14 patients were excluded from each group because the duration of their stays was less than 24 h. The total number of home medications was 519 for the baseline group and 543 for the post-intervention



group. The average number of home medications per medical record was 6 for both reviews (range 0 to 19). The baseline review revealed a rate of 170 medication discrepancies per 100 admissions. After the intervention, the discrepancy rate was reduced to 80 per 100 patients, a 53% percent reduction. The number of medication discrepancies per medical record reviewed declined from 1.7 in the baseline review group to 0.8 in the intervention review group (number needed to treat = 1.1). The number of medical records with at least one discrepancy was 59 in the baseline review group and 39 (34% reduction) in the post-intervention review group.

A total of 52 surveys were completed, for a response rate of about 25% of all staff; the response rate among emergency department staff was 50%. Forty-four (85%) of the respondents had seen the medication list and admission order form on the medical record, and 37 (84%) of these respondents had referred to the form for information. Respondents rated various aspects of the form on a scale of 1 to 5, with 5 representing the best score; scores of at least 4 were recorded by 37 (71%) of respondents for accuracy, by 41 (79%) for clarity, by 36 (69%) for usefulness, by 35 (67%) for comprehensiveness, and by 39 (75%) for time-saving capability.

DISCUSSION

The results of this study are consistent with other published studies of the medication reconciliation process.^{3,15,17,18} These

previous studies involved patients who were admitted directly to an inpatient medical unit or to a surgical preadmission clinic. To the authors' knowledge, this is the first study that has evaluated admissions through an emergency department. The Emergency Department of the Colchester Regional Hospital was chosen for this pilot study because 80% of the hospital's admissions come through that department. Although conducting the study in the Emergency Department posed more challenges than would have been the case for patients with planned admissions, it was hypothesized that the most benefit would be achieved by intervening in this area. Clinical pharmacists have been working on other units in the hospital, but the Emergency Department had been overlooked until this project was undertaken. Previously, some medication discrepancies were found and corrected by pharmacists on nursing units during the patients' stay, but the presence of a pharmacist in the Emergency Department, when the admission orders were written, allowed for more timely intervention and a reduction in medication discrepancies. A recent study investigated the effect of a pharmacist in the emergency department on medication errors in general. In that study, a retrospective comparison of medical records for a control group (no pharmacist present in the emergency department) and an intervention group (pharmacist present in the emergency department to review orders) showed a 66% reduction in medication errors when the pharmacist was present.¹⁹ In the current study, the main purpose of having the pharmacist in the Emergency Department was to complete medication histories and perform reconciliation; however, the pharmacist was also able to answer drug information questions, clarify poorly written orders, suggest alternatives to nonformulary medications, and identify unknown medications brought in by patients. As a result of this pilot project, a permanent pharmacist position has been created for the Emergency Department.

The results of the survey suggested that the medication list and admission order form was well accepted by staff in the Emergency Department and throughout the hospital. At the time of the pilot project, the pharmacist was the only person filling out the medication list and admission order form. Since then, use of the form has been extended to other areas in the hospital, and the form is now being completed by pharmacists, pharmacy technicians, and nurses. It is hoped that eventually this form will be used by all staff members whenever medication histories are taken.

Initially, physicians were slow to adopt the form for admission orders, because it tended to get lost among all the papers in the medical record generated in the Emergency Department. A purple border was added to the form to allow it to be quickly identified in the medical record. This created a noticeable difference in physicians' use of the form for admitting orders. The colour purple was chosen because it did not have any other meaning in the triage system employed by this Emergency Department.

This study had a few limitations. First, the evaluators were not blinded; however, blinding was considered impractical because of the date identifier in the medical record. Consensus among 3 reviewers was thought to be sufficient to ensure objectivity and reduce bias. Second, with the medical record as the only source for compiling the patients' home medication list, some inaccuracies may be present. Given the time lapse between the date of admission and the review of the medical record, it was not possible to consult other sources for the medication histories. A retrospective analysis of medical records is not as accurate as concurrent observation; however, medication reconciliation was already being performed informally by many of the pharmacists on other units before the pilot study started, and it was therefore deemed necessary to obtain baseline data before implementation of a formal medication reconciliation process.

CONCLUSIONS

Medication discrepancies occur frequently in admission orders in the Emergency Department at the authors' institution, and these discrepancies have the potential to lead to adverse drug events. A pharmacist working in the Emergency Department identified discrepancies between home and admission orders in a timely manner and intervened to reduce the incidence of medication discrepancies.

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