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Accuracy of medication documentation in hospital discharge summaries: A retrospective analysis of medication transcription errors in manual and electronic discharge summaries

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ABSTRACT

Background: Medication errors in hospital discharge summaries have the potential to cause serious harm to patients. These errors are generally associated with manual transcription of medications between medication charts and discharge summaries. Studies also show junior doctors are more likely to contribute to discharge medication error rates. Electronic discharge summaries have the potential to reduce discharge medication errors to ensure the safe handover of care to the primary care provider.

Objectives: (1) Quantify and compare the medication transcription error rate from handwritten medications on manual discharge summaries to typed medications on electronic discharge summaries, and (2) examine the quality of medication documentation according to the level of medical training of the doctors who created the discharge summaries.

Methods: A retrospective examination of 966 handwritten and 842 electronically generated discharge summaries was conducted in an Australian metropolitan hospital. The electronic discharge summaries at the study site were not integrated with an electronic medication management system and hence discharge medications were typed into the electronic discharge summary by the doctor. The discharge medication documentation in both types of summaries was transcribed, either handwritten or typed, from inpatient medication charts in paper-based medical records. Documentation differences between medications in discharge summaries and inpatient medication charts constituted medication errors.

Results: 12.1% of handwritten and 13.3% of electronic summaries contained medication errors. The highest number of errors occurred with cardiovascular drugs. Medication omission was the commonest error. The confidence intervals of all odds ratios indicate handwritten and electronic summaries were similar for all areas of medication error. Error rates regarding all 13,566 individual medications for the 1808 summaries were similar by doctor medical training level (intern, resident, and registrar).

Conclusion: Similar medication error rates in handwritten and electronic summaries may be due to the common factor of transcription, either handwritten or typed, known to be

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associated with medication errors. Clinical information systems evolve and often in the early stages of implementation electronic discharge summaries are integrated with existing paper-based patient record systems. Automatic transfer of medications from an electronic medication management system to the electronic discharge summary holds the potential to reduce medication errors through the elimination of the transcription process.

1. Introduction

Discharge medication errors are well-recognised problem in hospitals and many have the potential to cause serious adverse events for patients [1–3]. Methods commonly cited to reduce discharge medication errors include information technology for prevention [4,5] and hospital pharmacist intervention for correction [6,7]. Electronic discharge summaries are used in some Australian hospitals, but mostly in conjunction with paper-based inpatient records which contain manual documentation of medications on medication charts filed in the medical record. Therefore, discharge medication data in electronic discharge summaries is usually manually typed by the physician into the electronic discharge summary by transcription from the patients' paper-based medical record. Implementation of clinical information systems is an iterative and dynamic process which can go through multiple stages. Growing information systems [8,9] rather than viewing them as a static piece of technology acknowledges that clinical information systems will continue to evolve and be refined. This is particularly the case for electronic discharge summaries. In the early stages of implementation electronic discharge summaries include some information which is automatically drawn from other electronic systems, for example test results from diagnostic test management systems, whilst some information is typed into the electronic discharge summary from existing paper-based medical records.

Commonly junior doctors [1,7,10–13] produce discharge summaries and some studies have shown that errors are associated with this junior status [1,7,12]. Medication error rates have also been shown to vary according to the hospital doctors' level of medical training [14]. Studies of varying sample sizes and settings have reported a range of discharge medication error rates, from 6% [15] to 66% [16,17]. There are no studies which show the extent of the problem of medication transcription, the type of transcription errors and the medications involved using a large sample comparing discharge medications which have been handwritten in manual discharge summaries and typed into electronic discharge summaries. This study attempts to fill that gap by undertaking a retrospective audit of manual and electronic discharge summaries to:

1. assess the quality of transcribing discharge medications, both manual and typed, from paper-based hospital medical records both to handwritten and electronically created discharge summaries, and
2. examine the quality of medication documentation according to the level of medical training of the doctors who created the discharge summaries.

Handwritten discharge summaries in the sample were created during a 12-month period 7 months prior to the implementation of the electronic discharge summary system whilst the sample of electronic discharge summaries was created over a 12-month period 1 year following the implementation of the electronic system. Doctors responsible for creating the discharge summaries were unaware that their work was to be examined in this retrospective study. Discharge medication documentation in both types of summaries was transcribed, either handwritten or typed, from inpatient medication charts in paper-based medical records.

2. Methods

The study was conducted in a 78-bed hospital located in metropolitan Sydney, Australia specialising in acute general geriatric and rehabilitation services. The study hospital was chosen given the large percentage of elderly patients with multiple medications prescribed on discharge. The study sample spanned two 12-month time periods: March 2003 to February 2004 and March 2006 to February 2007. All discharge summaries were handwritten during the 2003/4 period, and all were created electronically during the 2006/7 period. An electronic discharge summary system was implemented at this hospital in October 2004.

Handwritten discharge summaries consisted of a paper form carbon-copied in triplicate, with a discharge prescription section and a detachable pharmacy script. Discharge medications were manually transcribed into the paper discharge summary from the inpatient medication chart. The inpatient medication chart may contain multiple sheets due to the limited spaces on individual sheets for recording medication orders and administrative items.

The electronic discharge summary system was accessed by the house doctor (intern, resident or registrar), through the hospital clinical information system with a password protected login. Some elements such as patient demographics and General Practitioner (GP) details automatically populated the discharge summary from the hospital patient administration system whilst results of investigations could be copied and pasted into the electronic discharge summary from the electronic test management information system. Discharge medications were automatically transferred into the electronic discharge summary after being manually typed by the physician into the electronic discharge prescription system. Other discharge information was typed in free text format into relevant fields in the electronic discharge summary by the discharging doctor. At the time of the study the hospital did not have in place an electronic medication management system linked to the electronic discharge summary system.