

Comparison of Electronic Pharmacy Prescription Records With Manually Collected Medication Histories in an Emergency Department

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Study objective: Medication history is an essential part of patient assessment in emergency care. Patient-reported medication history can be incomplete. We study whether an electronic pharmacy-sourced prescription record can supplement the patient-reported history.

Methods: In a community hospital, we compared the patient-reported history obtained by triage nurses to a proprietary electronic pharmacy record in all emergency department (ED) patients during 3 months.

Results: Of 9,426 triaged patients, 5,001 (53%) had at least 1 (mean 7.7) prescription medication in the full-year electronic pharmacy record. Counting only recent prescription medications (supply lasting to at least 7 days before the ED visit), 3,688 patients (39%) had at least 1 (mean 4.0) recent medication. After adjustment for possible false-positive results, recent electronic prescription medication record enriched the patient-reported history by 28% (adding 1.1 drugs per patient). However, only 60% of patients with any active prescription medications from either source had any recent prescription medications in their electronic pharmacy record.

Conclusion: The electronic pharmacy prescription record augments the manually collected history. [Ann Emerg Med. 2013;62:205-211.]

Please see page 206 for the Editor's Capsule Summary of this article.

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INTRODUCTION

Background

The patient's medication history cues physicians about patient problems and provides information needed for removing, adjusting, or adding therapies, and it is valued highly by physicians.¹ The Joint Commission² and Meaningful Use regulation³ ask hospitals to obtain and reconcile a medication history at each emergency department (ED) visit or hospital admission. Direct inquiries to pharmacies uncover medications not reported by the patient in up to 53% of hospitalized patients.^{4,5} The systematic review by Tam et al⁶ found omissions in 10% to 61% of the patient medication histories across 22 studies, and these failures caused 25% of the reported prescribing errors.

Importance

In the United States today, almost every prescription and refill is processed through a computer and records of their dispensing (or a close equivalent) are carried in large umbrella computer systems of pharmacy benefits managers, payers, and other organizations. Records for prescriptions not covered by commercial insurance, eg, those filled by fee-for-service Medicaid and the Veterans

Administration, are usually not sent to a pharmacy benefit manager, but they are saved to some central computer system, eg, the Veterans Administration Medication Database.⁷

Today, providers can access many of these central systems for some of their patients through a collaboration of 40 pharmacy benefit managers, payers, and pharmacies. SureScripts (Minneapolis, MN, and Arlington, VA) is a proprietary system that provides access to these collaborating sources as a commercial real-time service.⁸ Currently, this electronic product processes 2.5 billion US prescriptions per year, representing 60% to 70% of the US prescriptions covered by commercial insurance.

Goals of This Investigation

We sought to describe the change in medication knowledge gained by using this proprietary system in 1 ED.

MATERIALS AND METHODS

Study Design and Setting

We collected data in the Suburban Hospital ED, a 225-bed community hospital and regional trauma center in Bethesda, MD, with 45,000 visits per year. We studied all patients within

Editor’s Capsule Summary

What is already known on this topic

Patient medication lists created in the emergency department (ED) may be incomplete.

What question this study addressed

Does a query of a single, proprietary, national, electronic pharmacy prescription database identify additional medications for the medication list during the ED care interval?

What this study adds to our knowledge

In 1 ED during 3 months, 39% of ED patients had at least 1 current prescription medication identified, with a mean 1.1 medications added in affected patients. The query required seconds to complete.

How this is relevant to clinical practice

Electronic tools that work contemporaneously can help better identify current medications and could affect care.

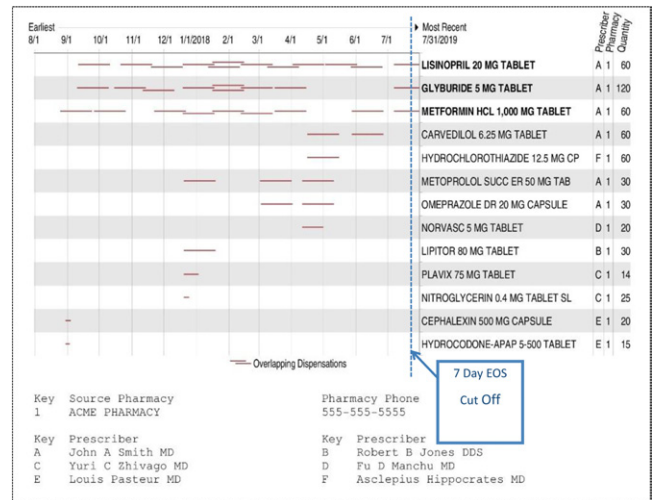


Figure 1. Dispensing of each medication over time. Each red, horizontal line represents a single new prescription or refill, and its length represents the calculated duration of the supply dispensed. We considered any medication with a duration line that crossed the blue dashed vertical line (end of supply is within 7 days of ED visit) to be a recent medication. The document lists the prescribers for each medication. This example patient had 6 different prescribers (fictitious names shown), 13 medications of which the first 3 were considered recent. This report is produced by the NLM/Health Level Seven server and is not the native report delivered by Surescripts.

the 3-month study period, and the Office of Human Subjects Research at the National Institutes of Health and the institutional review board of Suburban Hospital deemed the study exempt from consent requirements.

ED nurses routinely collected a medication history from their patients and entered it into the hospital information system as part of their intake process. At this study, medication names were entered as free text, which was flexible, eg, it allowed entry of “blood pressure drug” when the exact medication was not known, but prone to misspelling of drug names. During the trial period, pharmacists reviewed the triage medication history with the patients, within 0.5 to 4 hours during the day shift.

To retrieve a patient’s prescription records, we sent the first and last name, birth date, zip code, and sex for matching in the proprietary database, which then reported whether the patient was in its registry and delivered to the ED records the name, code, dispensing date, amount dispensed and prescriber’s name for each prescription, and refill record it carried for that patient. All communication occurred automatically and electronically according to the Health Level Seven V.2 messaging standard⁹ as described by Frisse et al.¹⁰ Building on the open-source health care data integration product, Mirth,¹¹ a contractor (software engineer) who was not part of the research team, developed software that routed and saved the messages, gathered additional patient characteristics from the hospital information system, linked the electronic prescription record to their corresponding ED history, and deidentified them per the Health Insurance Portability and Accountability Act of 1996 rules.¹² Researchers on this project had access only to deidentified data. After the

trial period ended, a printed and easy-to-read graphic, timeline summary of each patient’s full-year prescription records was delivered to the ED staff (Figure 1)

To standardize the raw medication names from both history sources, we converted their drug names into RxNorm¹³ generic ingredient names by lexical matching supplemented with manual review and added important distinctions about route (eg, topical versus systemic) when needed. We ignored dosage forms (eg, tablets versus liquid) and strength in our primary analysis, but we tallied the ED medication entries that did not include that information. When a medication contained multiple ingredients, we used all of its ingredient names in alphabetic order as its standardized generic name. To simplify the comparison, we ignored strengths and all item names that were not drugs (eg, insulin needles), could not be resolved to a specific drug (eg, “blood pressure drug”), or were unrecognizable.

To compare the 2 sources for each patient, we first created a list of unique ED medications by removing any duplicate medication names that appeared when we standardized the names in the raw ED medication history. We call this the ED raw medication list. The patient’s electronic prescription report included a full year of dated prescription and refill records. For each patient, we produced a list of unique electronic medications prescribed anytime in the previous year. We call this the raw full electronic list. We also defined a raw recent

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