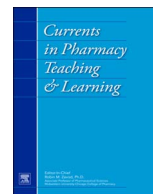




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## Currents in Pharmacy Teaching and Learning

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Experiences in Teaching and Learning

## Pharmacy student engagement in the evaluation of medication documentation within an ambulatory care electronic medical record

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## ABSTRACT

*Background and purpose:* An abundance of literature supports the benefits of electronic medical records (EMR) for improving overall healthcare quality. Identifying preventative care opportunities, reducing medical and medication related errors and incorporating clinical practice guidelines are just a few attributes of EMR implementation. The goals of this study were to engage experiential pharmacy students in the assessment of medication related documentation discrepancies in a newly implemented EMR system and to provide exposure to various aspects of conducting research.

*Educational Activity and Setting:* Pharmacy students screened patient charts over a three-month period to identify documentation discrepancies, including omissions of medications and medical problems and duplication of medications. Students conducted medication reconciliation for a total of one-hundred thirty-four patients.

*Findings:* Medication omissions were identified for 46% of patients, medical problem omissions were identified for 38% of patients, and thirty-two duplicate medications were identified.

*Summary:* Engaging pharmacy students in the quality improvement project afforded an interactive learning experience, highlighting firsthand the challenges associated with electronic documentation and the associated potential negative implications to patient care. Additionally, students gained exposure to various components of research including data collection, assessment, entry, analysis and future implications.

**Background and purpose**

Introductory and advanced pharmacy practice experiences introduce students to a wide variety of practice settings, patient populations, and charting systems. Implementation of electronic medical records (EMR) is occurring across the country in a variety of healthcare settings. According to the Centers for Disease Control and Prevention's National Center for Health Statistics, by 2011 approximately fifty-four percent of physicians had adopted an EMR system.<sup>1</sup> Electronic medical records aid in tracking data over time, identifying preventative care opportunities and screenings, reducing medication errors, improving adherence to clinical practice guidelines, and improving the overall quality of care.<sup>2–4</sup>

Medication reconciliation is a crucial process for ensuring the accuracy of medication records and the safety of medication prescribing and use. A study by Andrus and colleagues<sup>5</sup> retrospectively described and quantified electronic medication

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reconciliation efforts by pharmacy students in an outpatient setting. The twelve pharmacy students in that study identified over one-thousand seven-hundred medication discrepancies within the electronic record.<sup>5</sup> Several studies have been conducted over the last decade investigating implementation of EMRs, the perceived usefulness by users, and the impact of EMRs on drug-related errors.<sup>6–22</sup> Satisfaction and perceived usefulness among physicians and residents utilizing EMRs has varied. Some physicians have reported that EMRs improve the quality of care<sup>7</sup> while others report frustration with the unexpected problems associated with using them.<sup>8</sup> The medication-related problems found in many of the studies assessing utilization of an EMR, regardless of the setting, were related to duplicate orders, wrong dosages of drugs being prescribed, and omissions of drugs on the medication list that the patient was no longer taking.<sup>13–14,17–20,22</sup> Medication-related problems are more likely to occur when discrepancies exist in the medication record documented within the EMR. Data suggest that as many as one in every four medications used regularly by outpatients is associated with discrepant information in the medication record.<sup>17</sup>

Recognizing the importance of proper documentation and the multitude of factors that evoke errors precipitated, a quality improvement project was undertaken. The primary goals of the project were to engage experiential pharmacy students in the assessment of medication related documentation discrepancies in a newly implemented EMR system and to provide exposure to various aspects of conducting research. Two university faculty pharmacists, thirteen introductory pharmacy practice experience (IPPE) students, and three advanced pharmacy practice experience (APPE) students conducted medication reconciliation for patients seen at a patient centered medical home (PCMH) ambulatory care clinic located within a family medicine residency program. The intent of engaging pharmacy students in the project was to provide hands on experience that would highlight the importance of accurate documentation. Students were provided opportunity to interview patients to collect data, enter information from the data collection form into an electronic spreadsheet, conduct a descriptive analysis of the results to determine frequency and type of documentation discrepancies, and engage in conversations to develop solutions for reducing errors in the future. This quality improvement initiative was granted exemption status by the Institutional Review Board (IRB).

### Educational activity and setting

All pharmacy students that participated in the quality improvement project were required to complete the university web-based Collaborative Institutional Training Initiative (CITI) Program in human research subject protection. This educational opportunity enhanced student understanding of the ethical conduct of human research subject protection and compliance with regulations, state and local laws, and university policies. Additionally, faculty pharmacists trained all pharmacy students to proficiently navigate the EMR and interpret the information from the EMR to accurately record the indicated items on the data collection form. Faculty also provided an overview of the Lexi-Comp® drug database. The nurse manager provided the nursing staff with education pertaining to the project and the process for collaborating with the pharmacists and pharmacy students to resolve discrepancies.

A simplistic data collection form was created with the aim to provide rotation students, regardless of level of education, a structured and consistent process to quickly and accurately collect data (Fig. 1). All pharmacy students have access to and are familiar with the Lexi-Comp® database through required didactic coursework. Utilizing one reliable drug database for students to reference in clinical practice reduced over abundance of information for student comprehension and facilitated opportunity for pharmacists to reiterate teaching points, engage students in clinical discussions with the interprofessional team, and encourage IPPE/APPE student collaboration. The interprofessional team consisted of family medicine faculty physicians, medical residents, medical students, and nursing staff. Pharmacy students on experiential rotations at the PCMH ambulatory clinic collaborated with the team to conduct medication reconciliations for patients seen between January and March 2012 on the days faculty pharmacists were present.

In order to be included in the study, patients had to meet the following criteria: 18 years of age or older, have at least one medication documented in the EMR, and show up to the scheduled clinic appointment. Prior to interviewing the patient at a scheduled clinic appointment, pharmacy students reviewed the medical problems and current medication sections of the EMR to ensure that all medications had a corresponding medical indication, all medical problems had a corresponding drug or non-drug treatment plan, and that medications were not duplicated. Non-drug treatment plans included diet and lifestyle modifications to manage medical problems. Duplicate medication documentation was defined by any one of the following criteria: 1) the brand name of a drug was documented twice, 2) the generic name of a drug was documented twice, or 3) both brand and generic name of a medication was documented. If a medication was intentionally duplicated for achievement of a particular dose, it was not included in the data. If any one of these three criteria were not met it was considered to be a documentation discrepancy.

Students clarified each pre-identified documentation discrepancy with the patient at the scheduled clinic appointment. Additionally, students verified the patient's primary pharmacy was documented correctly within the EMR. Students called pharmacies to clarify discrepancies when patients did not bring medications to the appointment or could not recall information. Upon completion of the medication reconciliation process, pharmacy students, pharmacists, and nurses collaborated to correct medication documentation discrepancies within the EMR. Documentation discrepancies related to medical problems were communicated to the physicians for correction. Faculty pharmacists evaluated student ability to identify and record pertinent discrepant information on the data collection form and verbalize findings to the interprofessional team.

### Findings

A total of one-hundred 43 patient charts were reviewed by students for documentation discrepancies. Nine patients (6%) were excluded as a result of not showing up for the scheduled clinic appointment. Students conducted medication reconciliation for the

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