

Impact of Office-Based E-Prescribing on Prescribing Processes and Outcomes

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Summary: Suboptimal prescribing practices in outpatient settings can result in errors and excessive costs. Electronic prescribing (e-prescribing), which allows prescribers to write prescriptions electronically, is thought to be an important tool for meeting this challenge. The Medicare Modernization Act of 2003 set goals for the adoption of e-prescribing across the country, and private coalitions have used financial incentives to encourage its adoption. Effective e-prescribing systems must have utility for prescribers and must be integrated into routine medical practice workflow. If e-prescribing is to improve quality and safety, it must have valid and usable decision support capabilities and be available at the point of care.

The primary aim of this study was to evaluate the implementation of an e-prescribing system in ambulatory settings. The vendor ZixCorp's PocketScript system is currently used in a large number of practices in Massachusetts, New Jersey, Pennsylvania, New York, North Carolina, California, and Louisiana, providing a large study population with diverse practice types (e.g., pediatric, adult primary care, family practice, and specialty offices), locations (urban, suburban, and rural), and sizes (from single-physician practices to groups of more than 20 providers). This study evaluated the use of alerts and drug history, and the impact of e-prescribing on workflow, patient safety, and patient adherence. The project staff partnered with the developers of the office-based e-prescribing system, and with multiple insurance companies and public programs that provided claims data.

The project was conducted in three phases. The first phase used data from the e-prescribing system to evaluate physician responses to decision-support interventions and alerts. In the second phase, the project team brought information technology experts and experienced survey researchers together to develop a qualitative study demonstrating the impact of e-prescribing on prescribing processes and outpatient workflow. The study included a large-scale survey to develop a detailed understanding of how e-prescribing can be integrated into medical practice. The third phase of the project drew on decades of project team experience in studying large medical databases to evaluate prescribing decisions and clinical outcomes when e-prescribing is initiated. The project linked patients' e-prescriptions with pharmacy claims and generated a comprehensive dataset to evaluate the true clinical impact of e-prescribing.

Specific Aims:

- Measure physician use of two safety-related e-prescribing functions: safety alerts and dispensed drug history. **(Achieved)**
- Measure the effect of e-prescribing on processes of prescribing for physicians to assess characteristics

of successful and productive adoption. **(Achieved)**

- Extend and expand ongoing research to assess whether the adoption of e-prescribing is associated with improved clinical outcomes for patients. **(Achieved)**

2011 Activities: The project collaborated with ZixCorps, an e-prescribing vendor, and two large insurance providers: Tufts Health Plan and Blue Cross Blue Shield of Massachusetts. Their data provided insights to the research questions. The data were prepared, and the analytic files and linkages across data sets were cleaned. A 1-year no-cost extension was used to complete all of the analyses for the project. The study team identified medications that generate alerts more frequently and the rates at which different medications are cancelled versus prescribed despite safety warnings. They characterized the rates at which physicians use e-prescribing and defined other metrics of how sophisticated is their use of the system. The team identified physician characteristics that may predict use of the system and developed models to evaluate these associations.

As last self-reported in the AHRQ Research Reporting System, project progress and activities were on track, and project budget spending was on target. Difficulties obtaining data from the collaborating organizations necessitated the 1-year no-cost extension. The project activities were completed when the project ended in August 2011.

Impact and Findings: Qualitative analyses identified seven themes, ranging from positive to negative, that affect how physicians adopt new technologies. Survey results indicated that physicians using e-prescribing systems that were part of an integrated electronic health record were more likely to use advanced e-prescribing features than were physicians using stand-alone e-prescribing systems. Quantitative analyses showed that physicians used e-prescribing systems more frequently, and they used more of the features over time. Of the 1,947 eligible respondents, 1,011 completed the survey, a response rate of 52 percent. Response rates by survey strata were almost equivalent: 51 percent for physicians in the regular-use stratum and 53 percent in the low-use stratum. Sixty percent of respondents reported having an integrated e-prescribing system; the rest had a stand-alone system. Those with integrated systems were more likely than those with stand-alone systems to be primary care physicians, to practice in larger groups and in a hospital or medical center, and to have practiced for fewer years. They were also more likely to be regular users of e-prescribing.

Ninety-seven percent of respondents reported that they were able to send prescriptions electronically. Eighty-seven percent had e-prescribing systems that included drug warnings or contraindications and the ability to manage refill authorizations.

Physicians with integrated systems were significantly more likely than those with stand-alone systems to report writing prescriptions electronically most or all of the time. At least half of physicians said that their use of e-prescribing made it easier for them to take care of prescription refills themselves, have staff take care of refills, batch process refills, write an initial prescription for a new patient, and prescribe within a patient's formulary. The majority (88 percent) of physicians were satisfied with their e-prescribing system. Overall, physicians reported that their use of e-prescribing had a positive effect on the safety of their prescribing practices. Sixty-eight percent of physicians reported that their system made it easier to reconcile a patient's medication list, and 57 percent reported a reduction in the number of calls the practice received from pharmacies about prescribing errors.

Use of the e-prescribing system increased with duration of experience with the system. While physicians

who had been using the system for less than one year averaged less than five e-prescriptions per week, those using e-prescribing for more than one year averaged 17 e-prescriptions per week, and those using e-prescribing for more than three years averaged 33 e-prescriptions per week.

Target Population: General

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve the quality and safety of medication management via the integration and utilization of medication management systems and technologies.

Business Goal: Synthesis and Dissemination
