

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

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Target Population: General

Summary: Suboptimal prescribing practices in current systems of care delivery in outpatient settings can result in errors and excessive costs. Electronic prescribing (e-prescribing) is a technology that allows prescribers to write prescriptions electronically. The Medicare Modernization Act set goals for the adoption of e-prescribing across the country, and private coalitions have stepped forward to encourage the adoption of e-prescribing through the use of financial incentives. Effective e-prescribing systems must have utility for prescribers and must be integrated into the workflow of routine medical practice; for e-prescribing 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 is to evaluate the implementation of an e-prescribing system in ambulatory settings. 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 will evaluate the full spectrum of e-prescribing. The project has an active partnership with the developers of the office-based e-prescribing system, and with multiple insurance companies and public programs that will provide claims data.

The project is being conducted in three phases. The first phase uses data from the e-prescribing system to evaluate physician responses to decision support interventions and alerts. In the second phase, the project brings together experts on information technology and experienced survey researchers to develop a qualitative study demonstrating the impact of e-prescribing on prescribing processes and outpatient workflow, including 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 will draw on decades of experience by the project team studying large medical databases to evaluate prescribing decisions and clinical outcomes when e-prescribing is initiated. The project will link patients' e-prescriptions with pharmacy claims and will generate 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. **(Ongoing)**
- Measure the effect of e-prescribing on processes of prescribing for physicians to assess characteristics of successful and productive adoption. **(Ongoing)**
- Extend and expand ongoing research to assess whether the adoption of e-prescribing is associated with improved clinical outcomes for patients. **(Ongoing)**

2010 Activities: Data use agreements were executed between the e-prescribing company and the research institution. The dataset was received, uploaded, cleaned, and verified. The study team has begun to define the variables and cohorts for the analyses, and project programmers have begun integrating the datasets. The key challenge in preparing the datasets has been linking events and individuals from the e-prescription files to the insurance claims files. Linkage of providers went smoothly for one health plan's data (Tufts) and has been more challenging for another (Blue Cross Blue Shield of Massachusetts) due to a need to reconcile identifiers of providers who practice in a variety of locations. The final step will be linking e-prescriptions to filled claims.

Four focus groups were conducted during this period, two each with doctors and nurses and office managers, which explored a variety of topics that were used in developing the large sample survey. The resulting manuscript was published in the *Journal of the American Medical Informatics Association*. The large sample survey was closed to enrollment in fall of 2009. Over 1,000 survey responses were included in the final sample. During this period the data were prepared for analysis and initial analyses have focused on the comparison of stand-alone e-prescribing to integrated systems. The resulting manuscript was accepted by *Health Affairs* and published in December 2010.

Grantee's Most Recent Self-Reported Quarterly Status (As of December 2010): The project progress is mostly on track with the team reporting that they are meeting 80 to 99 percent of their milestones. Project spending is roughly on target.

Preliminary Impact and Findings: Focus group participants identified a range of issues associated with the current use of e-prescribing in their practices, including benefits derived and perceived, challenges in using the technology, and workflow issues caused by the technology. Positive responses toward e-prescribing focused on efficiency, a reduction in medical errors, patient satisfaction, and ease of use. Negative responses focused on technological problems, medical errors, trust of technology, the learning curve for using the software, and surveillance and liability issues. There were different reactions and changes to the e-prescribing workflow based on which functions were completed by physicians versus office staff. Physicians entered prescriptions while seeing patients or immediately thereafter, whereas the office staff usually handled refills. By splitting the tasks, significant workflow efficiency was gained.

In regard to e-prescription adoption, the focus groups found that the attitude of the doctors played a major role in the perceived usefulness of the technology. Some practices that adopted the technology have found that it has been completely integrated into their daily workflow and used frequently. On the other hand, several users do not yet have complete knowledge of the functionality of the application (e.g., what the colors on the screen represent).

Survey results showed that physicians have generally positive attitudes regarding e-prescribing and the

impact of e-prescribing on the efficiency and safety of prescribing. Physicians using e-prescribing systems that are integrated into comprehensive electronic health records use more e-prescribing functionalities on a more regular basis than physicians who use stand-alone e-prescribing systems. However, the cost of stand-alone e-prescribing systems is considerably lower, which is attractive for many physicians and practices.

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