



E-Prescribing: Barriers and Opportunities

August 2011

Electronic prescribing (also known as e-prescribing) is a system that enables providers in health care settings—e.g. doctors' offices, hospitals, and long-term care facilities—to electronically write and store prescription information and send it directly to pharmacies.

There are two main types of e-prescribing systems:

- Systems integrated with electronic health records, which include comprehensive patient information.
- Stand-alone systems, which are less costly and easier to implement.

Some e-prescribing systems also include advanced features that allow health care providers to access generic medication alternatives, drug formularies (insurance benefit information), and patients' medication lists and histories (to check for drug allergies and interactions). These advanced features have the potential to enhance physicians' decision-making capabilities and increase their use of e-prescribing.

Advocates of e-prescribing tout its potential for improving patient safety and lowering health care costs.¹ Research indicates that e-prescribing is indeed a useful intervention for reducing the risk of medication errors and adverse drug events in hospital settings² and increasing the selection of effective, less costly medications for hospitalized patients,³ but there is less evidence of its effectiveness in reducing medication errors in ambulatory settings.⁴

In the changing health information technology environment, various public-private collaboratives and state and federal initiatives are underway to encourage the adoption and use of e-prescribing among providers. In 2010, 25 percent of eligible prescriptions were sent electronically in the United States.⁵ Michigan ranks second in the U.S. for e-prescribing: In 2010, 25 percent of eligible prescriptions were sent electronically in the United States. Michigan ranks second in the U.S. for e-prescribing based on the following three factors in the e-prescribing process: (1) the percent of patient visits involving a prescription benefit request; (2) the percent of patient visits involving a medication history response; and (3) the percent of eligible prescriptions routed electronically. In Michigan, 20 percent of eligible prescriptions were ordered electronically in 2009, up from only 4 percent in 2007.⁶

Although the use of e-prescribing is increasing, providers continue to encounter significant barriers to the implementation and effective use of e-prescribing systems. It is important to understand these challenges in order to ensure the widespread adoption and effective use of e-prescribing.

The Center for Healthcare Research & Transformation (CHRT) sponsors research and public information to promote evidence-based care delivery, improve population health, and expand access to care. Housed at the University of Michigan, CHRT is a nonprofit partnership between U-M and Blue Cross Blue Shield of Michigan to test the best ideas for improving the effectiveness and efficiency of the health care system.

www.chrt.org

Barriers to Widespread Adoption of E-Prescribing

In the last several years, e-prescribing has been the focus of both statewide legislation and regional public/private collaboratives. More recently, federal initiatives have been designed to incentivize providers to adopt e-prescribing systems. In 2008, Medicare began providing bonus payments to physicians who e-prescribed medications. Between 2008 and 2009, the electronic routing of prescriptions through Surescripts⁷ more than doubled nationally from 12.1 percent to 25 percent.⁸

Although e-prescribing is increasing in the United States, the vast majority of prescriptions are still not sent electronically. The use of e-prescribing among providers still lags behind policy goals, suggesting that policy and financial incentives alone are not enough to accelerate widespread adoption of e-prescribing.

A recent qualitative study by the Center for Studying Health System Change found that only 40 percent of physicians in office-based ambulatory settings had access to e-prescribing in 2008.⁹ Beyond lack of access to the technology, research shows that the lack of e-prescribing uptake in outpatient settings results from a number of key factors. Technological complexity, incomplete patient data, and physician attitudes toward e-prescribing all greatly affect the implementation and successful use of e-prescribing.

Complex Technology and Data Availability

Many e-prescribing systems have advanced features that provide electronic access to important patient information, such as patient medication histories, formulary information, and generic alternatives. These features enhance the basic ability to write and store prescriptions electronically, but are not available in all e-prescribing systems. For example, in 2009 only 62 percent of the physicians who routed prescriptions electronically via Surescripts had access to medication histories, and just 60 percent had access to patient formularies. Even when physicians had access to these features, they did not always use them: 56 percent used the interface with patient medication histories most or all of the time and 34 percent used the interface with drug formularies most or all of the time.

E-prescribing system design varies by software vendor, and the technology is often complex and time consuming to use. Some systems display medication history prominently on the screen at the start of the prescribing session, and others require the prescriber to go through several steps to bring up that information. Not surprisingly, physicians are more likely to use the medication history feature in systems where it is readily available.

The same is true for formulary information, which allows the physician to view a list of medications covered by the patient's health plan. Prescribers are much more likely to use e-prescribing systems to review a patient's formulary details if the feature is automated and integrated into the workflow. Better systems let the prescriber know if an entered medication is on formulary, and if not, suggests alternative medications. More cumbersome systems do not offer these alternatives and require the prescriber to manually check each medication by trial and error.

The successful use of these features also depends on the availability and accuracy of patient information. Not all insurers share patient data with vendors for use in e-prescribing features, inhibiting consistent access for all patient medication histories and formularies. Physicians are much less likely to use these features if the data are not consistently available for all insured patients. And even when patient information is available, information can be out-of-date or incomplete. For example, medication history data is either entered manually by clinical staff¹⁰ or pulled from each participating health plans' claims system reports. Medications which are paid for completely out-of-pocket are not included in the patient's history, and in the era of retail pharmacies and four dollar generic drugs, incomplete medication histories are common.¹¹

Physician Attitudes^{12,13,14}

Another factor that can become a barrier to successful implementation and use of e-prescribing systems is provider expectations. For example, some physicians expect the technology to increase the speed of clinical care, and give up on using the system when they encounter difficulties and lack technical support.

Studies suggest that primary care physicians and practices that are more familiar with health information technology are more successful in fully implementing e-prescribing systems and managing expectations of the benefits. In fact, research also suggests ambulatory care practices that have successfully and fully implemented e-prescribing share common traits:

- Physicians have positive attitudes and are committed to learning more about e-prescribing and other health information technology.
- Physicians and support staff have realistic expectations about the overall benefits of e-prescribing and expect some technical difficulties and disruption of office workflow during implementation.

Like successful practices, those that have been unsuccessful in implementation share commonalities. In addition to a lack of familiarity with e-prescribing or other health information technology, these following contribute to their lack of e-prescribing use:

- Physicians often have high expectations about the ease of implementation, yet are concerned with how e-prescribing may affect their clinical independence and authority.
- Physician focus is primarily on the use of e-prescribing to increase the speed of prescribing.
- Staff has very little advance knowledge of the potential effect on prescription workflow or understanding that the existing work processes may need to change in order to accommodate new technology.
- In response to problems with the program during implementation, physicians perceive that the e-prescribing company is not very responsive to their concerns.

Other commonly identified barriers include increased costs, insufficient time for clinicians and staff to learn the new systems, and the additional effort needed to adapt office systems and manage technical difficulties. All of these factors would need to be addressed to realize the potential benefits of e-prescribing.

Conclusion

While many advocates of e-prescribing promote its use in improving health care safety, quality and efficiency, there are sizable gaps between the use of e-prescribing and policymakers' vision for its widespread adoption. Governors, state agencies, and legislators have used various approaches to advance the adoption of e-prescribing by creating incentives, addressing policy barriers to implementation, and using regulatory authority to support e-prescribing goals. Given the relatively recent availability of federal funding established to encourage the use of e-prescribing, the number and diversity of these actions and initiatives continue to proliferate. (See **Appendix** for more information.) As states and the federal government work to advance e-prescribing use, it is important to understand what factors support or hinder its adoption and use among physicians.

Given the barriers to implementation and use, policymakers should consider multiple strategies to encourage widespread adoption. Beyond the financial support that many current e-prescribing initiatives provide, initiatives should address the availability of advanced features and patient data provided through these features, the complexity of the technology, and provider and staff understanding of implementation and use. Specifically, stakeholders and policymakers should consider the following in designing e-prescribing initiatives and incentives:

1. Data availability is a key aspect in determining the usefulness of e-prescribing functions. Increased participation in e-prescribing systems by health insurers and state Medicaid programs is important so that providers have consistent access to complete medication histories and formulary information for their patients while using the e-prescribing tool. Initiatives could aim at making such data readily accessible and accurate for all insured patients by encouraging all health plans to participate with vendors.
2. It is important to choose an e-prescribing system that is relatively easy to use. Providers typically find systems with enhanced features that are automated and fully integrated into the prescribing workflow more user-friendly. Cumbersome systems can limit the usefulness of e-prescribing and lead to inefficient usage.
3. Education and training is necessary for provider uptake and effective use and of the various components in a fully functioning system.¹⁵ Providers and clinical staff should be aware of the capabilities and limitations of this technology and prepared to integrate it into the clinical work flow. Furthermore, practices should have timely access to high quality technical support and support for managing the organizations changes that health information technology implementation demands.

Appendix

E-Prescribing in Michigan

Michigan ranks second in the nation for e-prescribing. In 2009, 20 percent of eligible prescriptions were ordered electronically, up from only 4 percent in 2007.¹⁶ Two initiatives have played a key role in increasing the adoption of e-prescribing in Michigan:

1. In 2008, Michigan enacted legislation requiring that the Michigan Department of Community Health (MDCH) develop and create a three-year strategic plan to implement e-prescribing in the Medicaid program. MDCH worked with Surescripts, a company which provides technical support to Medicaid providers and monitors e-prescriptions, and completed a plan in July 2010. The plan focuses on increasing e-prescribing awareness among health care providers and developing a health information system capable of tracking Medicaid e-prescribing transactions.¹⁷
2. The Southeastern Michigan E-Prescribing Initiative (SEMI)—a broad coalition of the big three automakers, the United Auto Workers, Blue Cross and Blue Shield of Michigan, Health Alliance Plan, Henry Ford Medical Group, Medco Health Solutions, Inc. and CVS Caremark Corporation—launched an initiative in 2005 to increase the adoption of e-prescribing. SEMI is one of the largest employer-driven initiatives for increasing e-prescribing and evaluating its impact. To date, SEMI has funded e-prescribing implementation for more than 3,800 physicians.

Most recently, the Office of the National Coordinator for Health Information Technology awarded the Ann Arbor-based Altarum Institute over \$19.6 million in 2010 to establish the Michigan Center for Effective IT Adoption (M-CEITA) as the state's federally-designated regional extension center.¹⁸ M-CEITA is managed by Altarum and acts as Michigan's resource for all issues related to health information technology (HIT) adoption and implementation. Beginning in 2015, the Patient Protection and Affordable Care Act of 2010 requires health care providers meet "meaningful use" standards to receive full Medicare and Medicaid reimbursement. M-CEITA will specifically help providers prepare to implement the meaningful use criteria for Electronic Health Records.¹⁹ As defined in the Health Information Technology for Economic and Clinical Health Act (HITECH) under the American Recovery and Reinvestment Act (ARRA), e-prescribing is a core objective of meaningful use and as such M-CEITA will continue to play a critical role in e-prescribing implementation.

Other Statewide Actions around Electronic Prescribing

E-prescribing is one of many strategies states have promoted in attempt to improve patient safety and quality of care while reducing health care costs. In addition to participating in statewide public/private collaboratives to influence e-prescribing, direct state influence typically falls under three categories: governor-initiated actions, implementation through Medicaid agencies, and enacted legislation.

Governor-Initiated Actions

Governors have played an important role in setting the stage for the adoption of e-prescribing in their respective states. Some governors have built support by establishing statewide initiatives charged with developing and/or implementing e-prescribing policy recommendations, launching communication campaigns to build awareness, and implementing regulatory changes, such as a requirement for e-prescribing adoption.

- **Arizona:** In 2005, Arizona's governor created the Arizona Health-e Connection, an initiative focused on promoting widespread electronic health record adoption in the state by 2010. The Health-e Connection created a steering committee in 2008 to implement e-prescribing strategies across the state by establishing and overseeing the e-prescribing initiative, EAzRx. The EAzRx Steering Committee reports to the board of the Health-e Connection on the

progress of the mission: to achieve an e-prescribing rate of nearly 100 percent among eligible prescriptions by April 2013. Following the creation of EAzRx, the governor issued an executive order that directed state agencies to work with the Arizona Health-e Connection and EAzRx on various e-prescribing initiatives, including (1) educating providers and employers about the benefits of e-prescribing, (2) increasing the use of e-prescribing in the contracted health plans of state agencies, and (3) identifying barriers to e-prescribing adoption and making recommendations to address them.

- **New Hampshire:** The governor issued an executive order in 2006 directing the New Hampshire Citizens Health Initiative (a health care initiative he created in the previous year) to develop a strategic plan for health information technology/exchange in the state. Delivered to the governor in January 2009, the strategic plan included a component to advance e-prescribing. Led by the state's Department of Health and Human Services, the Citizens Health Initiative has worked to implement the strategic plan and accelerate the adoption of e-prescribing among providers.²⁰ In 2009, 12 percent of eligible prescriptions in New Hampshire were routed electronically, up from 3percent in the previous year.²¹
- **Tennessee:** In December 2008, Tennessee's governor launched e-Prescribe Tennessee, an initiative to accelerate the use of e-prescribing as the principal prescribing method in the state. E-Prescribe Tennessee is a collaboration of health care providers, pharmacies, major health plans and other health care stakeholders with the mission to: establish requirements for e-prescribing standards and best practices, incorporate e-prescribing into the daily workflow for providers and pharmacies, perform provider education and outreach about e-prescribing opportunities, and evaluate recommendations to remove barriers to statewide e-prescribing adoption.

E-Prescribing in State Medicaid Agencies

One of the best opportunities for states to have an impact on e-prescribing activities is by leveraging state-administered health care programs—mainly Medicaid. States are increasingly expanding Medicaid's information technology systems to accommodate e-prescribing by linking the Medicaid Management Information Systems (MMIS) with e-prescribing networks.

- **Florida:** Since July 2003, Florida's Medicaid program (the Agency for Health Care Administration or the Agency) has provided resources to assist Medicaid physicians in adopting e-prescribing. Specifically, the program supplies high-volume Medicaid physicians with free personal digital assistants (PDAs), fully equipped with software to e-prescribe, access to medication history, Medicaid drug lists, drug utilization reports, and drug pharmacology information. Established in November 2009, the Florida Medicaid Health Information Network (Medicaid HIN) provides another option for providers to access e-prescribing through an online tool that provides e-prescribing and drug information software at no charge. The agency continues to monitor the use of e-prescribing among Medicaid providers, identify the barriers to implementation, and create initiatives aimed at addressing those challenges.²²
- **New York:**²³ New York's Medicaid program developed a program offering financial incentives to providers for e-prescribing with three goals: (1) reducing medication errors, (2) increasing patient safety, and (3) reducing costs. As of March 2010, the Medicaid program pays \$0.80 to physicians and \$0.20 to pharmacies for each electronically-prescribed medication for a Medicaid enrollee, and an additional incentive for refill prescriptions. Physicians are paid the incentive through quarterly bundled payments and the pharmacies receive payment when prescriptions are filled as an add-on in the dispensing fee. The program is strictly for incentive purposes and does not include any penalty for non-participating physicians or pharmacies. New York budgeted \$119,504,000 for the program in FY2009-2010.

To establish this program, the Office of Health Insurance Programs (which administers New York's Medicaid program) spent two years researching the potential impact of e-prescribing and working with various stakeholders to develop the program and gain legislative support. Stakeholders included representatives from Medicaid, the

Office of Health Information Technology Transformation, and the State Pharmacy Board. The incentive program was developed based on the workgroup's estimate that Medicaid would save \$1.82 per each electronically-prescribed medication due to the decrease in medication errors and the cost of printing official New York paper prescriptions. The committee proposed that the cost savings be shared among Medicaid, the prescribing physician, and the pharmacy.²⁴

- **Tennessee:** In March 2008 TennCare, Tennessee's Medicaid program, partnered with the state's largest health information exchange to launch a pilot program aimed at increasing e-prescribing in 13 of the state's rural counties. The pilot provided fully functioning e-prescribing software, training, and support and Internet access to rural physicians in the program at no charge, allowing prescribers to route prescriptions directly to participating pharmacies. TennCare paid approved pharmacies a transaction fee associated with filling prescriptions from participating counties. The partnership is evaluating e-prescribing utilization patterns and the program's effectiveness to determine which program features were most useful for rural physicians.

Legislative Action Related to Electronic Prescribing

All U.S. states have legislation that authorizes and permits e-prescribing as of August 2007. Similar to the executive orders issued by governors, some state legislatures have passed laws to specifically initiate or further encourage e-prescribing adoption and use.

- **Florida:** The passing of HB 1155 in the 2007 legislative session required the Agency for Health Care Administration to create an online clearinghouse of e-prescribing information by October 1, 2007, and directed the agency to publish an annual report on the progress of e-prescribing implementation in Florida. The legislation requires the online clearinghouse to report e-prescribing trends and provide information promoting e-prescribing adoption among providers, health care settings and pharmacies. Florida's Electronic Prescribing Clearinghouse is available at: <http://www.fhin.net/eprescribe/>.²⁵
- **Minnesota:** In 2008, Minnesota became the first state in the U.S. to enact a law mandating the use of e-prescribing for all providers and pharmacies, specifically requiring that all physician clinics, hospitals, pharmacies, and payers be able to transmit prescriptions electronically. As of January 1, 2011, "all providers, group purchasers, prescribers, and dispensers must establish, maintain, and use an electronic prescription drug program."²⁶ Further, the law requires that all health care providers and hospitals have an interoperable electronic health record system by 2015 and that the Department of Health develop a statewide implementation plan to meet the requirement. Currently, there is no legislated enforcement mechanism or fine for non-compliance of these requirements.
- **Massachusetts:** Ranked first in the country for e-prescribing in 2009, Massachusetts enacted SB 2863 in 2008. SB 2863 requires that hospitals and community health centers implement federally-certified computerized physician order entry systems (which include ordering lab tests, services and referrals electronically, in addition to prescription medications) by October 2012, and electronic health record (EHR) systems by October 2015. The law links hospital and community health center licensing with the adoption of health information technology systems by mandating implementation as a requirement for licensure. In addition to mandating EHR systems, the law contained a number of health information provisions:
 - Establishes the Massachusetts e-Health Institute.
 - Adds health information technology competency to the standards of eligibility for physician licensure.
 - Appropriates \$25 million for health IT grants.

In 2009, a bill was introduced requiring all pharmacies in the state to implement and use an e-prescribing system that is compatible with statewide interoperable electronic health records networks by January 1, 2012.

Federal Actions related to Electronic Prescribing

State actions and initiatives around e-prescribing are often inspired and/or supported by federal regulations, enacted legislation or available grant funding. The introduction of federal incentives in the last three years has sharpened the focus on e-prescribing nationwide, including the following actions:

- The Centers for Medicare and Medicaid Services (CMS)—authorized under the Medicare Improvements for Patients and Providers Act of 2008 (MIPPA)—established regulatory standards for e-prescribing under Medicare Part D in 2008. These rules have become the industry standard for all e-prescribing systems. MIPPA also created the E-Prescribing Incentive Program, which began offering incentive payments to physicians who electronically prescribe medications for Medicare beneficiaries. Physicians receive a 2 percent increase in reimbursement for Medicare Part B covered services in 2009-2010, a 1percent increase in 2011-2012, and 0.5 percent increase in 2013. Physicians who do not meet e-prescribing standards in the first six months of 2011 will receive a reduction in Medicare reimbursement for each year of non-compliance beginning in 2012.
- States have received and continue to be eligible for federal funding support to implement e-prescribing initiatives. Since FY2007, CMS has issued Medicaid Transformation Grants focused on health information technology, including e-prescribing. In FY2010, the American Recovery and Reinvestment Act (ARRA) began providing \$564 million in funds for states and qualified state designated entities to develop health information technology infrastructure, including e-prescribing systems.
- The HITECH Act of 2009 promotes the use of health information technology through the adoption of electronic health records. The Electronic Health Record Incentive Program provides incentive payments to eligible professionals that implement EHRs, of which e-prescribing is a core requirement.
- The Drug Enforcement Administration (DEA) issued a final rule in 2010 permitting electronic prescribing of controlled substances, expanding the scope of medications eligible for electronic submission.

Authors: Tomi Ogundimu, MPH
Peter Tommasulo

- ¹ Fischer MA, Solomon DH, Teich JM, and Avorn J. Conversation from intravenous to oral medications: assessment of a computerized intervention for hospitalized patients. *Arch Intern Med* 2006; 163:2585-2589.
- ² Ammenwerth E, Schnell-Inderst P, Manchan C, and Siebert U. The Effect of Electronic Prescribing on Medication Errors and Adverse Drug Events: A Systematic Review. *J Am Med Inform Assoc* 2000; 15:585-600.
- ³ Fischer MA, Solomon DH, Teich JM, and Avorn J. Conversation from intravenous to oral medications: assessment of a computerized intervention for hospitalized patients. *Arch Intern Med* 2006; 163:2585-2589.
- ⁴ Friedman MA and Bell DS. E-Prescribing And The Medicare Modernization Act Of 2003. *Health Affairs* 2005; 24(5):1159-1169.
- ⁵ "The National Progress Report on E-Prescribing and Interoperable Healthcare," Surescripts, 2010. Accessed from: <http://www.surescripts.com/about-e-prescribing/progress-reports/national-progress-reports.aspx>
- ⁶ "Michigan Progress Report on E-Prescribing," Surescripts, 2010. Accessed from: <http://www.surescripts.com/about-e-prescribing/progress-reports/state.aspx?state=mi>
- ⁷ Surescripts operates the nation's largest e-prescription network and works with health insurers and pharmacy benefit managers to provide physicians with access to external information like patient medication histories and formularies. Surescripts is the main intermediary e-prescribing system vendors use to provide physicians with access to these features.
- ⁸ Grossman, J, Boukus E, Cross D, and Cohen G. Even When Physicians Adopt E-Prescribing Use of Advanced Features Lags. Center for Studying Health System Change, Research Brief No. 20. May 2011.
- ⁹ Grossman, J, Boukus E, Cross D, and Cohen G. Even When Physicians Adopt E-Prescribing Use of Advanced Features Lags. Center for Studying Health System Change, Research Brief No. 20. May 2011.
- ¹⁰ Grossman J, Gerland A, Reed M, and Fahlman C. Physicians' Experiences Using Commercial E-Prescribing Systems. *Health Affairs* 2007; 26(3):w393-w404.
- ¹¹ Grossman, J, Boukus E, Cross D, and Cohen G. Even When Physicians Adopt E-Prescribing Use of Advanced Features Lags. Center for Studying Health System Change, Research Brief No. 20. May 2011.
- ¹² Crosson J, Isaacson N, Lancaster D, et al. Variation in Electronic Prescribing Implementation Among Twelve Ambulatory Practices. *J Gen Intern Med* 2007; 23(4):364-371.
- ¹³ Fischer M, Vogeli C, Stedman M, et al. Uptake of Electronic Prescribing in Community-Based Practices. *J Gen Intern Med* 2007; 23(4):358-363.
- ¹⁴ Tamblyn R, Huang A, Kawasumi Y, Bartlett G, Grad R, Jacques A, et al. The development and evaluation of an integrated electronic prescribing and drug managed system for primary care. *J Am Med Inform Assoc* 2006; 13(2):148-159.
- ¹⁵ Grossman, J, Boukus E, Cross D, and Cohen G. Even When Physicians Adopt E-Prescribing Use of Advanced Features Lags. Center for Studying Health System Change, Research Brief No. 20. May 2011.
- ¹⁶ <http://www.surescripts.com/about-e-prescribing/progress-reports/state.aspx?state=mi>
- ¹⁷ "State of Michigan MiHIN Shared Services Strategic Plan," DTMB, MDCH and Governor's Office.
- ¹⁸ <http://www.altarum.org/health-systems-research-news-releases/HHS-awards-Altarum-HIT-Grant>
- ¹⁹ <http://www.cms.gov/EHRIncentivePrograms/>
- ²⁰ NGA Center for Best Practices <http://www.nga.org/cms/home/nga-center-for-best-practices/center-publications/page-health-publications/col2-content/main-content-list/accelerating-the-adoption-of-ele.html>
- ²¹ "New Hampshire Progress Report on E-Prescribing," SureScripts, 2010. Accessed from: <http://www.surescripts.com/about-e-prescribing/progress-reports/state.aspx?state=nh>
- ²² Agency for Health Care Administration, "Fourth Annual Florida 2010 Electronic Prescribing Report." January 2011.
- ²³ Agency for Healthcare Research and Quality, "Case Study – Developing an Electronic Prescribing Incentive Program: Lessons Learned From New York Medicaid." July 2010. AHRQ Publication no. 10-0096-EF.
- ²⁴ The Michigan Department of Community Health's Fiscal Year 2010 Medicaid Strategic Plan for Electronic Prescribing includes evaluating the New York Medicaid e-prescribing incentives among its ongoing key activities for promoting e-prescribing adoption and use.
- ²⁵ Agency for Health Care Administration, "Fourth Annual Florida 2010 Electronic Prescribing Report." January 2011.
- ²⁶ Minnesota Statutes, section 62J.497