



ELECTRONIC PRESCRIBING: BECOMING MAINSTREAM PRACTICE

*A Collaborative Report From
The eHealth Initiative and*

The Center for Improving Medication Management

eHEALTH INITIATIVE
Real Solutions, Better Health

THE CENTER
for
Improving Medication Management

A collaborative of providers, payors, employers and pharmacies

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eHI • 818 Connecticut Ave. N.W., Suite 500 • Washington, D.C. 20006
www.ehealthinitiative.org

CIMM • 5971 Kingstowne Village Parkway, Suite 200 • Alexandria, V.A. 22315
www.thecimm.org



Foreword

Dear Colleagues:

We are pleased to present “E-Prescribing: Becoming Mainstream Practice,” which has been prepared as a collaboration of eHealth Initiative and the Center for Improving Medication Management. The effort was undertaken to provide an update to eHealth Initiative’s 2004 report, “Electronic Prescribing: Toward Maximum Value and Rapid Adoption,” in light of the significant progress that has taken place over the past four years and the anticipated momentum in continued growth in e-prescribing.

The overall goal of the eHealth Initiative’s Electronic Prescribing Project in 2004 was to expand the adoption of electronic prescribing; in particular, to understand the relationships among different stakeholders, identify barriers, and create recommendations that would foster widespread adoption of high-quality, high-value electronic prescribing throughout the United States. This report provides an overview of progress made since 2004 in e-prescribing, which is significant and notable. Yet more work remains to be done in removing the barriers to adoption of e-prescribing, encouraging its use among all stakeholders in the prescribing process, and supporting its use among small physician practices and other health care providers like hospitals and nursing homes. It is also important to ensure that all providers, including pharmacists, take full advantage of e-prescribing. We strive to educate consumers and address the legal barriers while continuing to improve the infrastructure that enables e-prescribing.

The report was developed with the guidance of an expert Steering Group, whose diverse multi-stakeholder members are listed in the Team and Process section. This report is intended to set the stage for rapid growth in the adoption and use of a technology that can significantly improve medication safety, practice efficiency, and consumer convenience, and has important implications for management of medication costs and improvement of medication-related health outcomes. Its focus is primarily on prescribing within physician practices and community pharmacies, rather than within the hospital or long term care facility settings. To cover all delivery settings would add significant complexity to this report. The Steering Group recognizes the importance of e-prescribing in all delivery settings and encourages its use. The Next Steps section outlines some thoughts on how to do this.

In addition to providing an updated report, we include two practical guides to assist key stakeholder segments that have significant roles to play in e-prescribing: health care payers, and consumers who are interested in moving forward with e-prescribing and/or understanding its implications. A third guide for prescribers is under development now.

The eHealth Initiative, the Center for Improving Medication Management, and the Steering Group are optimistic that this report will be a valuable resource for policy makers, health systems, health plans, employers, providers, and consumer organizations to help drive growth in e-prescribing.



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Executive Summary

The *E-Prescribing: Becoming Mainstream Practice* report is intended to set the stage for rapid growth in the adoption and use of e-prescribing technology that can significantly improve medication safety while better managing medication costs and improving health outcomes related to medications. It provides an overview of the progress that has occurred, and challenges that still exist, since the launch of the eHealth Initiative's Electronic Prescribing Project in 2004.

More than 3.52 billion prescriptions are now written annually in the United States,ⁱ and prescription medications are used by 59% of the under-65 population and approximately 80% of the over-65 population.ⁱⁱ In the context of this considerable growth in medication use, this report explores the current state of e-prescribing as it relates to physicians, pharmacies, payers, Pharmacy Benefit Managers, and others. It describes the current landscape in public policy and the roles of the various stakeholders; explains the current e-prescribing process; examines best practices and lessons learned in e-prescribing deployment for physicians; and lays out a series of consensus recommendations to guide accelerated progress in the years ahead.

Since 2004, a number of markets across the country have moved forward with community initiatives related to e-prescribing, and a review of these case studies offers lessons learned and best practices. The essential ingredients in a market-based e-prescribing initiative include stakeholder commitment and leadership; financial incentives; education and support for physician practices and pharmacies; and a robust, standards-based infrastructure to enable electronic prescription information exchange. The Steering Group that guided the creation of this report has also outlined a set of principles that can further guide ethical, technical, policy, and financial developments in this field. Stakeholders are encouraged to utilize these principles as they develop their strategic and tactical initiatives on electronic prescribing.

Despite all the progress that has been made since the last report in 2004, there is still much to be done to promote effective and widespread use of e-prescribing. While e-prescribing is increasing rapidly, the adoption level at the end of 2007 represented approximately 2% of the potential for electronic prescribing.

Challenges that have hindered more widespread adoption are briefly noted here, and are explored in greater detail in the full report.

- 1. Financial Cost:** Physician practices need to invest in hardware and software, and cost estimates vary depending on whether an EHR is adopted versus stand-alone e-prescribing. Even physicians receiving free e-prescribing systems may still face financial costs in the areas of practice management interfaces, customization, training, maintenance, and upgrades.

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2. **Workflow Change:** New systems, particularly in the beginning, are likely to add time to tasks like creating new prescriptions, and this can be a barrier. Roles and responsibilities in the practice may change to the point that activities that staff handled in the past may be taken on by physicians. Despite the fact that efficiencies and time savings can be gained within the practice by automating renewal authorizations, workflow change is still difficult and time consuming, and practices (especially small practices) would benefit from additional resources to support them during this transition.
 3. **Change Management:** It is important not to underestimate the change management challenges associated with transitioning from paper prescribing to e-prescribing. It is difficult and time consuming for practices to figure out how to change workflow around the management of prescriptions when e-prescribing or EHRs are introduced. The change requires adequate planning, training, and support for effective management.
 4. **Ban on transmitting prescriptions for controlled substances:** Because the Drug Enforcement Administration (DEA) prohibits the electronic transmission of prescriptions for controlled substances, both physician practices and pharmacies are forced to use multiple workflows to manage prescriptions. The provider can still use its e-prescribing or EHR system to generate and document all prescriptions; however, the controlled substances prescriptions cannot be transmitted electronically.
 5. **Hardware and Software Selection:** Choosing the right software and hardware can be an overwhelming task for some physician practices, especially small practices that are extremely busy, are experiencing declining reimbursements, and lack expert information technology staff.
 6. **Pharmacy, Payer/PBM, and Mail Order Connectivity:** Approximately 73% of independent pharmacies are not connected even though the vast majority of them are using certified software.ⁱⁱⁱ While the majority of payers/PBMs are connected (representing about 200 million lives), if the formulary, eligibility, or medication history information is not comprehensive enough, prescribers may choose not to e-prescribe because they do not have confidence in the accuracy and coverage of the process.
 7. **Remaining Standards:** Three standards were finalized and adopted by CMS in early 2008 to support formulary and eligibility transactions, medication history, and fill status notifications. However, three additional standards remain to be finalized, although CMS is in the process of finalizing them: prior authorization, structured and codified SIG, and RxNorm. Electronic prescribing works today and will continue to grow without these standards being final; however, these standards will add value in the future when they have been fully tested and refined. The Policy Landscape section of this report provides further detail.

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- 8. Medication History and Medication Reconciliation:** E-prescribing can help provide information to prescribers at the point of care on what medications their patients are taking. This may be an improvement over reliance on paper medical records and patients' memories; however, the information that is available may not be comprehensive or accurate, and tools to adequately reconcile medication histories from multiple sources are needed.

To help address these challenges and move e-prescribing into mainstream practice, the Steering Group offers the following recommendations:

Steering Group Recommendations:

- 1. The federal government must address the DEA prohibition on e-prescribing of controlled substances.** The federal government must act soon to end the DEA ban on e-prescribing of controlled substances. Electronic generation, transmission, and tracking of prescriptions offer more security and accountability than does the current paper-based system. With an estimated 20% of prescriptions involving controlled substances, prescribers and pharmacies should not have to maintain alternative workflows for these prescriptions.
- 2. Payers, employers, health plans, health systems, and federal and state governments should consider replicating and expanding successful incentive programs.** Aligning incentives is critical to accelerating adoption and effective use of e-prescribing and of health information technology more broadly. The primary goal of the alignment of financial and other incentives is to improve the quality, safety, and efficiency of health care. While larger-scale payment reform is needed, incentive programs can help accelerate the widespread adoption of e-prescribing by providing upfront subsidies and modest incentives to ensure use of e-prescribing for prescribers and, potentially, independent pharmacies. In addition to financial incentives, stakeholders should provide non-financial incentives in the form of deployment assistance to help practices gain successful with e-prescribing.

The eHealth Initiative's "[Blueprint: Building Consensus for Common Action](#)" provides guidance for appropriately aligning incentives. According to the Blueprint, any financing or incentive program involving health IT should be meaningful and result in improvements in quality, safety, efficiency, or effectiveness in health care, and should assure interoperability. Incentive programs should use a phased approach beginning with implementation of health IT and leading to effective use of health IT to support performance improvement. In addition, stakeholders that benefit should share some of the costs related to health IT financing or incentives.^{iv}

- 3. Care providers across every setting of health care should adopt and effectively use e-prescribing.** All prescribers should adopt e-prescribing as it becomes mainstream practice. Small practices, small hospitals, and long term care facilities in particular will need incentives, resources, and support, as well as high-quality, well-designed application products to begin transforming the way they prescribe and manage medications. There is a significant amount of work to be done in these settings, including developing a better understanding of the impact that e-prescribing has on their workflow and care processes, as well as creating model practices for adoption and effective use. All stakeholders should collaborate on ways to effectively support e-prescribing adoption across all settings of health care.



4. Create a public-private multi-stakeholder advisory body to monitor, assess, and make recommendations to accelerate the effective use of e-prescribing. The advisory body should:

- Measure and monitor national, state, and local community progress in electronic prescribing across care providers and settings. This data should piece together all available sources, including systems such as the Veteran's Administration and large closed integrated delivery systems, and strive for information on the use of e-prescribing that is as comprehensive as possible.
- Identify methods to support effective use of e-prescribing and serve as a forum for sharing those methods among all interested stakeholders.
- Explore critical pathways among e-prescribing, EHRs, and health information exchange.
- Identify barriers for each type of stakeholder involved in the prescribing process, and make recommendations on how to remove those barriers.
- Monitor unanticipated consequences of widespread e-prescribing, and make recommendations to address issues and overcome barriers.
- Measure effective use of e-prescribing in terms of outcomes on the quality, safety, and efficiency of medication management and health care.
- Develop an effective, efficient model for providing assistance to small practices.
- Create an "expert resource center" to provide assistance in adoption and use of e-prescribing.
 - Access to tools, resources, and a network of experienced colleagues would be important for providers during the adoption and effective utilization of e-prescribing and EHRs as well as other functions of health IT.
 - Understanding costs and benefits, financing options, workflow and care process redesign, implementation guidelines, technical questions, and ongoing maintenance and use issues is critical to avoiding implementation failures for e-prescribing and EHRs, and also for ensuring that the quality, safety, and efficiency benefits are realized.
 - A resource center could help physician practices and ultimately other settings such as hospitals and long term care facilities as they move forward with e-prescribing.

A resource center could be created at the federal level, or in the private sector by medical and professional societies, or by others in the private sector. Over the next year, the eHealth Initiative and the Center for Improving Medication Management will work with multiple diverse stakeholders across every sector of health care to design the attributes of such an organization and make recommendations regarding how it should be created and sustained.

5. All stakeholders should advance the e-prescribing infrastructure. Pharmacies and payers/PBMs have built a national infrastructure connecting their systems. At the same time, many technology vendors have certified their e-prescribing applications. The industry should encourage all pharmacies to accept electronic prescriptions; all payers/PBMs to deliver formulary, eligibility, and medication history information through e-prescribing; and all vendors to deploy and support high-quality e-prescribing applications.

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6. **The federal government and the private sector should continue, and accelerate, the development of standards for e-prescribing.** While fully connected e-prescribing can and is delivering real benefits based on the national standards in place today, additional standards will improve the process and the availability of data in the future. A well-established process is in place to continue to develop, improve upon, test, and adopt new e-prescribing standards, and modifications of current standards, through processes sponsored by the National Council for Prescription Drug Programs (NCPDP). These standards development and adoption processes should be supported and accelerated and all stakeholders in the prescribing process should be involved.



Team and Process

To guide the creation of this updated report in 2008, the eHealth Initiative and the Center for Improving Medication Management (the Center) convened a Steering Group to provide thought leadership and expertise throughout the development of the report. Steering Group members had a wide range of perspectives and experiences, and included health care providers, pharmacies, health plans, employers, consumer organizations, and policy experts.

The Steering Group was convened three times between April and June 2008. The group began its work by revising and expanding the 2004 report's guiding principles and providing guidance on the report's outline. Subsequently, the Steering Group reviewed and provided input on draft sections of the report, including the report recommendations.

We are extremely grateful for the time, expertise, and guidance that Steering Group members provided to the development of this report, and we thank them all for their time, talent, enthusiasm, and active participation.

They are:

Scott Barclay

Senior Portfolio Manager
Strategy and Innovation
CVS Caremark

Michael J. Berkery, MBA

Chief Technical Officer
American Medical Association

Mark Blatt, MD

Director of Global Healthcare Strategies
Digital Health Group
Intel Corporation

Jeremy Coote

Chief Executive Officer
InterComponentWare Inc.

Paul Cotton

Senior Legislative Representative
AARP

Adrienne Cyrulik

eHealth Innovation
BlueCross BlueShield of Massachusetts

Ria Eapen, MPH

Health Policy Program Associate
National Consumers League

Terry Hammons, MD

Senior Fellow
Medical Group Management Association

Donald C. Huonker, RPh

Senior Vice President
Healthcare Innovation
Walgreens

Ken Majkowski, PharmD

Vice President
Clinical Affairs and Product Strategy
RxHub, LLC

James Morrow, MD

Vice President and Chief Information
Officer
North Fulton Family Medicine

Stephan Oosterman, DO

Assistant Professor and Medical Director
University of Florida Family Practice
Center at Lem Turner



Steve Waldren, MD, MS
Director, Center for Health IT
American Academy of Family Physicians

James Walker, MD, FACP
Chief Medical Information Officer
Geisinger Health System

David Gans, MSHA, FACMPE
Vice President
Practice Management Resources
Medical Group Management Association

Patricia Hale, MD, PhD, FACP
Office of Health Information Technology
Transformation, New York State
Department of Health
American College of Physicians

Dennis White, MBA
Senior Vice President
National Business Coalition on Health

Ken Whittemore, Jr., RPh, MBA
Senior Vice President, Clinical Practice
SureScripts

Staff leadership and coordination was provided by Christine Bechtel, Vice President, the eHealth Initiative, and Kate Berry, Executive Director, the Center for Improving Medication Management. A number of additional staff at both organizations also supported the development of this report, including Brian Wagner of the eHealth Initiative and Michael Lake of the Center for Improving Medication Management, and their time and contributions are greatly appreciated.



SECTION I: INTRODUCTION TO ELECTRONIC PRESCRIBING

Definition of Electronic Prescribing

Electronic prescribing has been around for many years, and over time the use of the term has meant different things to different people. When first introduced, the term typically referred largely to the handheld devices that most solution providers deployed. Today electronic prescribing generally refers to the solution sets packaged as either a stand-alone prescribing-focused solution or as an integrated module within a more comprehensive solution set for physician practices, such as an electronic health record (EHR). The term will likely continue to carry different meanings in different circumstances for a long time, which is part of our challenge in this report.

One way to approach the definition of electronic prescribing is to view it as a set of tools that targets improvements to the medication management process. This would include the writing of the prescription, the transmission between prescriber and dispenser, the dispensing of the medication and support for its administration, and ultimately monitoring of the impact. Seen in this way, the industry is in the beginning stages of what is likely to be a long process that impacts virtually all health care stakeholders.

The Centers for Medicare & Medicaid Services (CMS) issued a definition of e-prescribing in its final regulation in 42 CFR Part 423 that is focused more on the electronic transmission of the prescription, but is inclusive of prescribers, dispensers, PBMs, and health plans:

*Medicare Program; E-Prescribing and the Prescription Drug Program;
Final Rule*

E-prescribing means the transmission, using electronic media, of prescription or prescription-related information between a prescriber, dispenser, pharmacy benefit manager, or health plan, either directly or through an intermediary, including an e-prescribing network. E-prescribing includes, but is not limited to, two-way transmissions between the point of care and the dispenser.

The definition of e-prescribing in this report also encompasses clinical decision support to aid in safer, more informed prescribing such as access to information on drug-drug interactions, drug-allergy interactions, patient medication history, pharmacy eligibility, formulary (which specifies a patient's drug coverage), and benefits information.

It is important to emphasize that e-prescribing is increasingly used by physician practices within the context of EHRs, which provide broader functionality and support more gains in quality and safety. In 2004, there were very few if any EHRs with bidirectional, electronic connectivity with pharmacies and payers/pharmacy benefits managers (PBMs). But by 2008, significant progress has been made. Now, more than 50 EHRs have the ability to offer interoperable electronic prescribing within their systems, and it is critical to ensure that those practices that make the investment and implement EHRs are fully benefiting from electronic prescribing with pharmacy and payer/PBM connectivity.



Thus, e-prescribing functionality is not specific to particular hardware or software. The clinical decision support functionality described above is available through full-functioning EHRs as well as stand-alone e-prescribing systems. In terms of hardware, physician practices have implemented e-prescribing using hand-held devices, tablet personal computers, desktop personal computers, and other hardware made available by technology vendors.

Many believe that e-prescribing can serve as a pathway to full EHRs, acting as a bridge that allows prescribers to become more technologically proficient with and comfortable using electronic systems to support patient care. Both stand-alone e-prescribing systems and full EHRs with bidirectional connectivity can be useful. EHRs offer significant benefits to many practices, including clinical decision support such as drug-lab and drug-drug problem checking and documentation for the full range of care processes. For other practices, however, there are significant benefits to stand-alone e-prescribing solutions, and some e-prescribing systems have some components of an EHR such as problem lists. As an industry, we are always looking for the match of functional benefits, ease of implementation, and reasonable cost, particularly for smaller practice environments that can lag larger practices in automation. Electronic prescribing is part of that solution.

Today's solutions focus on supporting the writing of the prescription, its electronic transmission, patient education about the medication, and information for the prescriber that alerts him or her to patient non-adherence. When connected to a personal health record, these solutions have the potential to add additional monitoring functions. The table on the following page identifies and describes the potential functions that are creating value in these processes.

Functions in Electronic Prescribing that Can Create Value

Process Phase	Key Functions of Innovations	Description	Empowerment & Satisfaction	Health Outcomes	Efficiency & Cost
Prescribe	1 Patient identification	The prescription is linked to detailed patient demographic information including birth date, gender, and zip code.			
	2 Current medication list	The prescriber can access medication history across providers from PBM claims data, retail pharmacy transaction data, a health information exchange (HIE) initiative, or a combination of these.			
	3 Medication selection	Medication can be selected from a list; options may be driven by diagnosis; accurate dosing; favorites lists			
	4 Safety alerts, clinical decision support	Can alert the prescriber when a medication is selected that is contraindicated or has a significant precaution based on the patient's allergies, current medications, medical conditions, body size, and/or laboratory test results			
	5 Formulary alerts	Can alert the prescriber when medication is selected that is contraindicated by the patient's health benefit, e.g., non-preferred, prior authorization, step therapy, higher co-pay			
	6 Renewal authorizations	Can alert the prescriber that a refill authorization is required and allows for generation of the renewal			
Transmit	7 Bidirectional electronic data interchange	Can communicate medication information among prescribers, dispensers, and payers, including new scripts, renewal authorizations, change requests, pharmacy benefit information, medication history, counseling results, etc.			
Dispense	8 Pharmacist assessment and counseling	Assessment tools can identify patients likely to become non-adherent and encourage pharmacist counseling; makes a personal medication profile available to the patient			
Administer	9 Patient education materials	Education materials can be made available about the condition, the therapy, and potential side effects			
	10 Administration aids	Can provide graphical/visual medication administration support for complex dosing schedules involving multiple medications			
	11 Collaborative medication management	Can connect physicians, other prescribers, pharmacists, health plan care coordinators, and individual care managers to support collaboration for management of medication therapy			
Monitor	12 Linkages to lab testing	Can remind prescribers and patients to obtain lab tests associated with the monitoring of certain medications			
	13 Adherence alerts	Can use medication history to alert prescribers, pharmacists, and others that a patient is non-adherent			
	14 Patient outreach	Can query patients regarding their experience with therapy, e.g., side effects, via interactive voice, e-mail, or text messaging			
	15 Refill reminders	Can remind patients that medications need to be refilled			
	16 Remote compliance monitoring	Can alert the patient, caregiver, or care monitor when administration of doses are late or missed			



Electronic Prescribing Statement of Principles

The Steering Group suggests the following principles that represent consensus among diverse stakeholders. These principles should help guide ethical, technical, policy, and financial developments in this field, and stakeholders are encouraged to utilize them as they develop their strategic and tactical initiatives on electronic prescribing.

Principle 1:

We believe widespread adoption of e-prescribing can provide many benefits, including:

- Improved medication safety
- Enhanced practice efficiency
- Cost savings
- More effective medication management
- Increased patient adherence
- Improved integrity of the prescribing process

Principle 2:

All health care stakeholders* should collaborate to encourage widespread adoption and optimal use of standards-based e-prescribing through:

- Appropriately aligned incentives to support effective use of the technology in diverse practice settings
- Collaborative development and delivery of innovative programs, education resources, training, and support
- Efficiencies in workflow for the physician and pharmacist in diverse practice settings;
- Connectivity and tools to facilitate medication reconciliation, formulary and medication history information, and transmission

Principle 3:

E-prescribing system design and/or the implementation of e-prescribing should:

- Enhance the patient-clinician relationship by providing more comprehensive clinical information at the point of care
- Preserve the patient's choice of pharmacy
- Facilitate the clinician's informed choice of medication
- Be part of an integrated plan toward full implementation of an electronic health record

Principle 4:

Both electronic health records (EHRs) and stand-alone e-prescribing may be utilized to realize the functionality and benefits of e-prescribing. Overall quality of care can be enhanced by implementation of e-prescribing that is integrated within an EHR.

Principle 5:

Consumer organizations, providers, pharmacists, payers, and educators should help patients understand and experience the benefits of e-prescribing. Informed patients will play an important role in the encouragement for providers and pharmacists to use e-prescribing.

**Health care stakeholders include patients, caregivers, providers, pharmacists, consumer groups, vendors, payers, regulators, educators, and researchers.*



Why Electronic Prescribing Is Important

Electronic prescribing is increasingly being viewed by health care stakeholders as an important step toward improved medication safety, better management of medication costs, increased practice efficiency, and improved health care quality. Many recognize that the increasing volume and complexity of prescriptions written in the United States, coupled with the rate of medication errors, pose threats to quality and safety that e-prescribing can help address.

High Volume and Growing Complexity of Prescriptions

Americans made 964 million visits to physicians' offices in 2005^v and, according to the National Association of Chain Drug Stores (NACDS), four out of five patients who visit a doctor leave with at least one prescription.^{vi} More than 3.52 billion prescriptions are written annually in the United States^{vii} and prescription medications are used by 59% of the under-65 population and approximately 80% of the over-65 population in a given year.^{viii} Prescription volume is expected to grow to 4.1 billion in 2010.^{ix}

Of these 3.52 billion prescriptions, about half (1.47 billion) can be addressed with e-prescribing—including new prescriptions and renewals. The remaining prescriptions such as refills don't require another prescription, while a number remain unfilled.^x

Reducing Medication Errors

With the increasing volume and growing complexity of prescriptions comes an increased risk of errors and adverse events. The Institute of Medicine (IOM) in its report, *Preventing Medication Errors*, found that more than 1.5 million adverse drug events (ADEs) each year are preventable, and the report's authors considered that a very low estimate.^{xi} Many errors result from miscommunication due to illegible handwriting, unclear abbreviations and dose designations, unclear telephone or verbal orders, and ambiguous orders and fax-related problems. As a result of these serious deficiencies, in July 2006 the Institute of Medicine recommended that all prescriptions be written electronically by 2010.^{xii}

In a subsequent study, the Center for Information Technology Leadership (CITL) identified a far greater number of ADEs—more than 8.8 million each year in ambulatory care alone, of which more than 3 million are preventable.^{xiii} The CITL study is not without methodological drawbacks, and these figures depend on how well electronic prescribing systems are used in practice. However, whether the number is 1.5 million or 8.5 million, there is a clear opportunity for e-prescribing to address some of these challenges.

In most care settings today, prevention of prescribing errors is dependent on a system of downstream inspection, usually made by the dispensing pharmacist. While pharmacists and pharmacy technicians are remarkably good at catching prescribing errors, many errors still slip through this safety net. The focus should shift upstream through a system of error checking at the point of care, a process that can be greatly supported by e-prescribing.



Reducing the Burden of Callbacks and Rework

Pharmacy staff make more than 150 million calls to busy physician practices each year to discuss possible errors or otherwise clarify prescriptions.^{xiv} Physicians and their staff, and pharmacists and others in the pharmacy, spend hours each day returning phone calls and following up on faxes as they try to ensure that patients receive their prescriptions in a safe and timely manner. In fact, the Medical Group Management Association found that these tasks cost practices on average \$19,444 a year for a ten-physician practice.^{xv} This figure is based on time and cost associated with manually processing refills and resolving issues related to formulary as well as issues related to dosage and legibility. Of course, there are additional costs associated with managing fax communication with pharmacies.

Callbacks occur for many reasons. If the pharmacy technician cannot decipher the prescription information, discovers the patient was prescribed a medication that is not covered by insurance, or finds the patient is on another medication that may interact with the prescription, he or she will call the prescriber for clarification. If the patient asks for the prescription to be filled and does not have any more refills, the pharmacist needs to get the prescriber to authorize the renewal. The patient may experience a delay in receiving the refill if the pharmacist and prescriber have trouble connecting by phone. In addition, when a pharmacy receives a prescription through fax, phone, or paper, a pharmacist or pharmacy technician must manually enter the prescription into the computer system. Not only does this create inefficiencies, but there is a risk that this manual process may result in transcription mistakes.

It is important to understand the economies of scale related to this business case. Larger practices have a greater benefit potential than do smaller practices and will realize these benefits sooner. Properly implemented, e-prescribing has the potential to save practices time and costs in many settings.

Electronic prescribing can dramatically reduce the burden of returning phone calls and tracking down faxes to clarify prescription information and authorize prescription renewals. A physician who is e-prescribing as defined in this report will have information available up front on pharmacy eligibility, formulary, benefits, and patient medication history, making it much more likely that the pharmacist will receive a prescription that does not require a follow-up call. The prescription renewals authorization process can be streamlined with electronic prescribing, and e-prescribing can also significantly reduce the need for pharmacy staff to manually enter prescription information into their computer systems.

A Brown University study on the prescription renewals process before and after e-prescribing supports these findings. In this study, the average prescriber time spent per day was cut in half, from 35 to 17 minutes, and the average staff time spent per day was cut in half from, 87 to 43 minutes, for the prescription renewals authorization process.^{xvi}



Improving Medication Adherence

According to its landmark report in 2003, “Adherence to Long Term Therapies,” the World Health Organization found that adherence among patients in developed countries suffering from chronic diseases averages only 50%.^{xvii} This has been confirmed in numerous subsequent studies on conditions such as hypertension, diabetes, congestive heart failure, hyperlipidemia, and asthma.

One important mechanism to improve adherence, and therefore health, is to increase knowledge that prescribers have about non-adherent patients. Medication history from pharmacies, health plans, and pharmacy benefit managers can be transmitted to prescribers through an electronic prescribing solution, either as a stand-alone application or as a part of an EHR. These applications are beginning to use history to calculate adherence and alert prescribers during the patient visit, and thus encourage a deeper dialogue about the importance of adhering to the therapies prescribed. Pharmacy organizations are reporting that they are also beginning to use their own electronic prescribing resources to identify non-adherent patients and to support a dialogue between patients and pharmacists. Challenges remain in medication history reconciliation; these are described further in the section on barriers.

Making the process of refilling prescriptions easier for patients contributes to increased adherence. According to a poll by the National Community Pharmacists Association in 2007, nearly one third (31%) of new prescriptions are never filled.^{xviii} But a recent study released in October 2007 by SureScripts, Walgreens, and IMS reported an 11.21% increase in patients picking up a new medication when prescribers used e-prescribing versus relying on hand-delivered scripts.^{xix} Medication adherence can also be enhanced by the decreased costs for the patients as a result of the prescriber having access to real-time formulary information.

In the future, electronic prescribing solutions should extend their functionality through increasing interoperable communication between the prescriber, pharmacist, and patient. By integrating with personal health record solutions and home monitoring devices, electronic prescribing can be a major force in helping patients understand the importance of adherence and in making it easier for them to obtain and administer the medications prescribed.

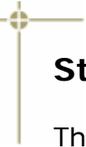


Cost Savings

There are additional benefits to e-prescribing, including the following.

- Electronic prescribing enables real-time availability of information on formulary, benefits, and medication history. Health plans and health systems save money when prescribers stay on formulary and prescribe lower-cost medications. For example:
 - Blue Cross Blue Shield of Massachusetts, one of the health plans playing a leadership role in the acceleration of e-prescribing, estimates a \$20 to \$25 savings per prescription if the provider selects a lower-cost-drug when prompted by a formulary message.^{xx}
 - E-prescribing helped Henry Ford Medical Group improve its overall generic use rate by 7.3%; this will save \$3.1 million in pharmacy costs over a one-year period.^{xxi}
- The IOM's 2006 *Preventing Medication Errors* report described evidence that each preventable ADE taking place in a hospital costs approximately \$8,750 (in 2006 dollars). According to the IOM, if there were 400,000 such events each year, a conservative estimate, the total annual cost of preventable ADEs would be \$3.5 billion for this one group.^{xxii} While information technology cannot prevent every single ADE, it can prevent many and thus contribute to significant cost savings.^{xxiii}
- The Center for Information Technology Leadership (CITL) projects that nationwide adoption of electronic prescribing would save \$27 billion a year, primarily as a result of decreased spending on prescription drugs.^{xxiv} As noted earlier, this particular study is not without its drawbacks and methodological challenges, and the amount of savings would depend on how well/fully e-prescribing is used by providers.
- Patients can save money through reduced prescription costs as a result of their prescriber having access to real-time formulary information.

Given the increasing volume and the growing complexity of medications, the alarming rate of medication errors, the burden of callbacks and rework, and new research that supports the idea that e-prescribing can improve medication compliance, even a small improvement in quality attributable to electronic prescribing would translate into significant health care cost and safety benefits if broadly adopted. Patients, clinicians, hospitals, pharmacies, health plans, and purchasers all stand to gain from the effective use of this technology.



Stakeholders in Electronic Prescribing and the Value They Derive

There are a variety of stakeholders involved in the electronic prescribing process. Each stakeholder plays a critical role in the complex prescribing and medication management process. E-prescribing has implications for each of these stakeholder groups.

- **Patients and family caregivers.** E-prescribing can improve the prescribing process by catching possible errors at the point of care. E-prescribing is also more convenient for some patients, since they only need to make one trip to the pharmacy to pick up the prescription. Patients can also see lower out-of-pocket expenses when their prescriber has access to formulary information. They may be more likely to continue to take the medication as well. It is important that prescribers and pharmacists communicate with patients and their caregivers about e-prescribing so they understand what it is, how it works, and the benefits and implications for the patient. Patients tend to respond favorably when their providers are using state-of-the-art technology and appreciate that their providers are using a safer, more efficient technology to improve the prescribing and medication management process.
- **Prescribers and practice staff.** With e-prescribing, prescribers and practice staff have the potential to access clinical decision support information such as patient medication history, formulary, benefits and pharmacy eligibility information, drug-drug interaction alerts, drug-allergy interaction alerts, and other information that can result in a safer prescribing decision. By having more comprehensive and accurate information at the time of prescribing, the practice can improve the quality of care, potentially increase adherence, and also reduce the number of call backs from the pharmacist to clarify prescription information. If bidirectional electronic connectivity is in place between the practice and the pharmacy, the prescription renewal authorization process can be streamlined; this then improves the timeliness of medication delivery to the patient. E-prescribing challenges for prescribers and practice staff include the cost of purchasing hardware and software as well as productivity losses and workflow changes while getting accustomed to using the system. Solo physicians and small practices can have even greater challenges associated with selecting and implementing e-prescribing, as can practices in rural settings with limited broadband connectivity and a higher proportion of independent pharmacies.
- **Pharmacies, practicing pharmacists, and associated staff.** With e-prescribing, prescriptions can arrive directly in the pharmacy's computer system so pharmacy technicians spend less time interpreting handwriting or re-keying information into their computer systems. Since the prescriber has better information available at the time of prescribing, there is a lower chance that a call back to the practice will be needed to clarify prescription information. Automation of the prescription renewals process is a big time saver in the pharmacy, since the communication process is streamlined and electronic. Pharmacies have made significant investments to upgrade hardware and software and to train pharmacy staff because they view e-prescribing as strategically important to improving quality, safety, efficiency, and consumer convenience. Pharmacies also pay transaction fees to SureScripts, operator of the Pharmacy Health Information Exchange, to enable prescribers to exchange prescription information electronically with pharmacies through their e-prescribing and EHR systems. There may be workflow challenges in the pharmacy, depending on how its systems work, until staff become accustomed to the process.



- **Pharmacy Benefit Management (PBM) organizations.** PBMs are very supportive of e-prescribing because it enables them to deliver formulary, benefits, pharmacy eligibility, and medication history information to prescribers at the time of prescribing. Having this information at the time of prescribing enables prescribers to make more informed decisions including prescribing on the patient's formulary, prescribing medications that are covered by the patient's medication benefits, and prescribing generic or other lower-cost medications. This ultimately enables prescription of a drug that is of lower cost and more likely to be picked up and taken by the patient. With the availability of medication history information, the prescriber also will be better informed about potential interactions. PBMs have made substantial investments to enable the delivery of this information to support safer, more cost-effective prescribing decisions; among other things, they have paid transaction fees to RxHub to deliver the information to prescribers through their e-prescribing or EHR system. Mail order pharmacies are another important stakeholder in e-prescribing. Patients who use mail-order pharmacies that are connected to the provider through a network would see improved convenience, and providers could see improved efficiencies.
- **Health systems and hospitals.** Some health systems are deploying e-prescribing and EHRs with employed and affiliated physician practices as a way to improve their quality, efficiency, and productivity and bring them closer to the health system. There is also interest in accessing medication history information to support the Joint Commission requirements for medication reconciliation to improve accuracy and efficiency over manual processes. Some technology vendors are connecting with RxHub and SureScripts to meet this need. Some hospitals are also interested in being able to transmit discharge medications electronically to the pharmacy of the patient's choice. Within hospital walls, computerized provider order entry (CPOE) systems typically use different industry standards than does NCPDP SCRIPT, which is widely used in the ambulatory prescribing setting. This creates challenges with interoperability for health information exchange.
- **Employers, health plans, and other purchasers.** This stakeholder group benefits because the prescriber has information at the time of prescribing to enable a lower-cost prescribing decision. This might include prescribing on the patient's formulary or offering a generic or other lower-cost alternative medication, which in turn may help with patient compliance with medication therapy. The prescriber also has important clinical information available at the time of prescribing such as drug-drug and drug-allergy interaction alerting. Data from the Southeast Michigan E-Prescribing Initiative shows that when e-prescribers are presented with safety alerts, they cancel or change the prescription about 31% of the time. Presumably these instances prevent adverse drug events that could have resulted in downstream costs such as an emergency visit, hospitalization, or physician visit, although pharmacists typically catch many of these errors. Medication costs and potentially overall health care costs are expected to decline with e-prescribing. Employers, health plans, government, and other purchasers have important roles to play in providing incentives for e-prescribing, given that they benefit from the cost savings. The corresponding guide for health plans provides additional detail.



- **Federal and State Governments.** The federal government, as a major purchaser of health care through Medicare and Medicaid, can benefit from e-prescribing. The federal government pays for nearly half of all health care in the United States. State governments also fund state health programs such as Medicaid and the State Children's Health Insurance Program. As payers, federal and state governments receive financial benefit from reduced ADEs and improved formulary compliance in Medicaid. The patients covered by Medicare and Medicaid tend to be elderly and/or suffer from multiple complex diseases, and are often on several complex medications from multiple providers. This leads to more challenging medication management, putting patients at higher risk for complications. In addition, law enforcement is a stakeholder in electronic prescribing, to ensure the security of electronically transmitted prescriptions (once allowed) and potentially to utilize electronic means of tracking prescription fraud.
- **Health care information technology producers/suppliers (vendors).** Most e-prescribing and EHR vendors have been certified by SureScripts for bidirectional electronic connectivity with pharmacies and have been certified by RxHub for connectivity with payers/PBMs to receive formulary, benefits, pharmacy eligibility, and medication history information. Health IT suppliers receive value when health care providers purchase their products, and deliver value through the functionality and connectivity of those products. There are currently several hundred e-prescribing and EHR vendors, but there has been consolidation that is likely to continue. Given the relatively low penetration of e-prescribing and EHR adoption, the vendors are competing for significant market opportunities as adoption continues to grow. The pressure on vendors from their growing customer base is likely to intensify as practices and their advocates demand better training and support and product enhancements.
- **Pharmaceutical manufacturers.** Pharmaceutical companies often have mixed views about e-prescribing. On one hand, they are supportive of the neutrality enforced by the pharmacy industry to protect prescriber choice of medication. They also see potential value in e-prescribing's support of programs that increase patient adherence when taking chronic medications. On the other hand, they are concerned that e-prescribing facilitates increased generic substitution.
- **Public health organizations.** E-prescribing holds promise for public health organizations. With e-prescribing, better information is more quickly available on prescribed medications. This can support getting the word out to patients in the event of a drug recall, or if an epidemic occurs that impacts patients on certain types of medications. Following Hurricanes Katrina and Rita, the health care industry came together very quickly to aggregate medication information on the many people displaced by the disaster and to make the medication information available to prescribers and pharmacists through a secure electronic system. A plan is now in place so that, in the event of a disaster, medication history on affected people can be made available through a secure electronic system within 48 hours. This data includes medication history information regardless of whether the prescription was handwritten, faxed, or electronically prescribed.



- **Research and academic institutions.** Research and academic institutions have studied the impact of e-prescribing and EHR use and should continue to do so. Under the Medicare Modernization Act (MMA), CMS disbursed grants to several research groups to test the e-prescribing standards. These pilot projects resulted in important findings that have continued to inform the standards process. Several e-prescribing and EHR deployment initiatives have included research and evaluation and published statistics on the safety and efficiency impact. More work is needed in this area to build a body of knowledge that will encourage adoption and use of the technology. This will help all stakeholders with the transition from paper prescribing to electronic medication management.
- **Professional and lay societies representing each of the above.** E-prescribing is receiving more attention than ever at the national, regional, and state levels. Policy makers, provider organizations, payer organizations, employers, and consumers are all in agreement that e-prescribing is the right thing to do and will become mainstream practice in the coming years. Professional and lay societies representing the stakeholders above are playing important advocacy, education, and support roles on behalf of their members, and this is likely to expand in the near future given the widespread consensus around e-prescribing.
- **Infrastructure providers.** Those such as RxHub and SureScripts provide secure networks for medication history and formulary information (RxHub), pharmacy connectivity (SureScripts), and medication history (from claims data through RxHub and others and from pharmacy data through SureScripts).

Current State of Adoption

Physician Adoption

In April of 2004, there was very little adoption of electronic prescribing. At the end of 2007, at least 35,000 prescribers were actively e-prescribing, not including those operating in closed systems.^{xxv} Based on the American Medical Association's (AMA) estimates for office-based physicians^{xxvi}, this means that approximately 6% of ambulatory care providers are e-prescribing, including those using EHRs and stand-alone e-prescribing solutions. By the end of 2008, estimates indicate, there will be 85,000 active users of e-prescribing.^{xxvii}

Recent growth patterns have been rapid, and yet the vast majority of prescribers have not adopted e-prescribing for a variety of reasons. The adoption level at the end of 2007 represented approximately 2% of the 1.47 billion prescriptions eligible for electronic prescribing. The 1.47 billion potential for e-prescriptions is a subset of the total prescriptions written (3.52 billion) and includes new prescriptions and prescription renewals. New prescriptions typically include a certain number of refills, so those refills are not counted as separate transactions. This figure also does not include currently unfilled prescriptions.

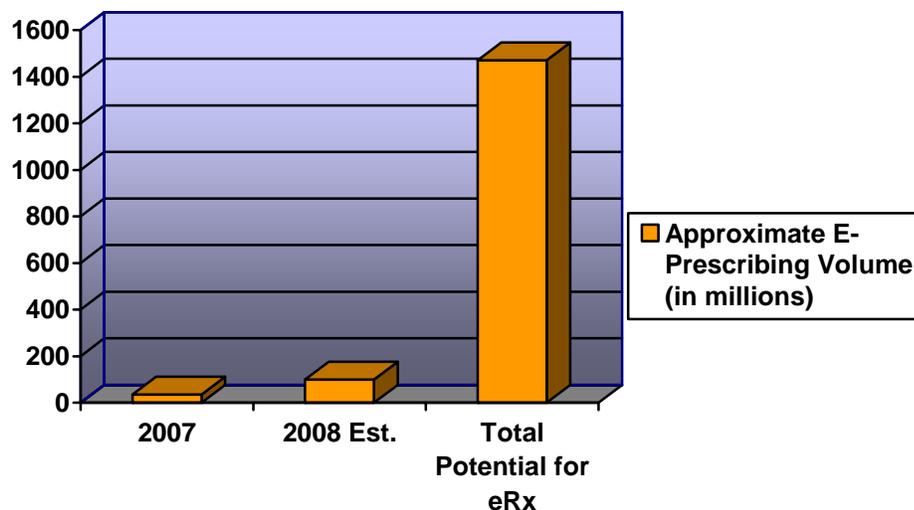
Barriers to physician adoption and recommendations for overcoming those barriers are described later in this report.

E-Prescription Volume

In 2004, the underlying infrastructure provided by RxHub and SureScripts—payer/pharmacy benefits manager connectivity and pharmacy connectivity, respectively—was in its infancy. The industry has progressed a great deal in the last four years in terms of infrastructure development, vendor functionality and certification, standards development and refinement, health plan, health system and other market-based initiatives encouraging e-prescribing.

In 2007, 35 million prescription transactions were sent electronically between physician practices and pharmacies over a secure network known as the Pharmacy Health Information Exchange, operated by SureScripts. Since 2004, more than 50 million prescriptions have been processed electronically.^{xxviii} In addition, RxHub's National Patient Health Information Network now provides prescribers with patient-specific medication history and pharmacy benefit information on more than 200 million patients.^{xxix}

SureScripts estimates that 100 million prescription transactions will be processed electronically in 2008, representing an increase to 7% of the potential. These data do not include prescriptions generated electronically but printed or delivered via fax, a process that falls outside the definition of e-prescribing used in this report. In addition, these estimates do not include data from large closed systems such as Kaiser Permanente or the Veterans Administration (VA). It is in fact difficult to collect data accounting on all e-prescribing volume in the United States. Moving forward, the Steering Group recommends that improved measurement methods for calculating and tracking total e-prescribing volume integrated across both public and private systems be explored.



Source: SureScripts Pharmacy Health Information Exchange, 2008.

Note: E-prescribing volume includes new prescriptions and prescription renewals only, which make up a subset of the total prescriptions written. It does not include automatic refills or currently unfilled prescriptions.



Pharmacy Adoption

At the end of 2007, 41,000 chain and independent pharmacies were activated on the Pharmacy Health Information Exchange, representing 72% of all 57,000 community pharmacies nationwide.^{xxx} “Activated” means the pharmacies are live on the Pharmacy Health Information Exchange and able to receive electronic prescriptions and send electronic prescription renewal requests to prescribers. Approximately 97% of chain pharmacies and 27% of independent pharmacies were activated for e-prescribing at the end of 2007.

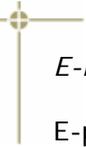
In addition, 95% of pharmacies are “e-prescribing capable,” meaning the software used by the pharmacy has the ability to receive electronic prescriptions and transmit electronic renewal requests, but that capability has not been activated on the Pharmacy Health Information Exchange. Barriers to pharmacy connectivity are discussed further below.

Technology Vendor Readiness

Since 2004, significant headway has been made on improving the technical ability of software for both physician practices and pharmacies to transmit prescriptions electronically. At the end of 2007, 105 technology vendors were certified as able to transmit electronically via the Pharmacy Health Information Exchange. This number is expected to grow to 150 by the end of 2008. This represents a significant number, but does not include all vendors.

Significant changes have also occurred in the number of electronic prescribers using an EHR since 2004, when this report was first released. Then, more than 95% of the electronic prescribers on the Pharmacy Health Information Exchange were using stand-alone e-prescribing applications. But at the end of 2007, approximately 60% were using stand-alone e-prescribing and 40% were using EHRs. As of May 2008, 60% of the e-prescribers on the network are using EHRs. This trend is likely to continue, and indeed accelerate.^{xxxi}

In terms of pharmacy software, the vast majority of software vendors are certified, although a few are not and some pharmacies still utilize legacy systems. This is more common with independent pharmacies, of which only 27% are able to accommodate e-prescribing.^{xxxii}



E-Prescribing Growth by State

E-prescribing has been growing in every state. This table provides rankings by state in terms of the number of prescriptions routed electronically in 2007 as a percentage of the total number of prescriptions eligible for electronic routing and the overall ranking by electronic transmissions.

State	% of Rx Transmitted Electronically 2007	State Ranking 2007
Massachusetts	13.43%	1
Rhode Island	9.05%	2
Nevada	7.06%	3
Delaware	4.21%	4
Michigan	4.20%	5
Maryland	3.17%	6
North Carolina	3.07%	7
Arizona	2.89%	8
Connecticut	2.57%	9
Washington	2.57%	10
New Jersey	2.51%	11
Pennsylvania	2.46%	12
Ohio	2.46%	13
New Hampshire	2.34%	14
Idaho	2.17%	15
Maine	2.04%	16
Louisiana	1.97%	17
Oregon	1.65%	18
Florida	1.62%	19
Virginia	1.61%	20
New York	1.55%	21
California	1.44%	22
West Virginia	1.34%	23
Colorado	1.22%	24
Missouri	1.21%	25
Minnesota	1.20%	26
District of Columbia	1.16%	27
Illinois	1.15%	28
Tennessee	1.14%	29
Texas	0.96%	30
Vermont	0.96%	31
Kentucky	0.95%	32
Indiana	0.91%	33
Utah	0.89%	34
Wyoming	0.84%	35
Alabama	0.84%	36
New Mexico	0.75%	37
Georgia	0.65%	38
Arkansas	0.60%	39
Iowa	0.58%	40
Oklahoma	0.58%	41
Kansas	0.50%	42
Nebraska	0.48%	43



State	% of Rx Transmitted Electronically 2007	State Ranking 2007
Wisconsin	0.37%	44
Hawaii	0.30%	45
Montana	0.24%	46
South Carolina	0.23%	47
Alaska	0.18%	48
Mississippi	0.13%	49
South Dakota	0.09%	50
North Dakota	0.09%	51

Source: SafeRx State Rankings, SureScripts 2007

This progress has been facilitated in part by changes to state laws that helped clear the way for e-prescribing in all 50 states and Washington, DC. In 2004, only about half of the states in the United States had laws and regulations that allowed e-prescribing as defined in this report. The 2004 report called for the removal of those barriers, and thanks to the hard work of a number of stakeholders across the country, as of August 2007 all 50 states and the District of Columbia now allow e-prescribing.

The chief remaining legal barrier is the current prohibition by the federal Drug Enforcement Administration on e-prescribing of controlled substances, which the AMA indicates account for somewhere around 20% of all prescriptions.^{xxxiii} In addition, there is some variability across states in the legal requirements for e-prescribing. Technology vendors should be mindful of this in their design and implementation of e-prescribing systems or modules. Finally, a few comparatively smaller barriers remain in a handful of states; for example, in New York, if a prescriber wants to prohibit generic substitution, he or she can only do so in writing.



PBM/Payer Connectivity

E-prescribing begins with patients, and much of the basic information on them comes through the RxHub network. Founded in February 2001 by three major Pharmacy Benefit Managers (PBMs), RxHub delivers a standardized communication framework that links prescribers, mail order pharmacies, PBMs, and benefits plans for the purpose of sharing prescription benefit information and exchanging prescriptions electronically with mail order and retail pharmacies. Today, RxHub works with more than 60 technology partners and nearly 20 PBMs, payers, and health plans that provide managed care, Medicare Part D, and Medicaid plan services.

When a visit is scheduled or a prescription is written, the patient is identified through RxHub's Master Person Index (MPI), which covers more than 200 million, or two out of three, Americans. The MPI is a directory of patients with minimal demographic information (name, date of birth, gender, and zip code). This demographic information is used by complex matching algorithms to identify data sources (such as insurance plans or PBMs) that have medication history and formulary benefit information for the specific patient. Through the RxHub network, the prescriber's e-Prescribing technology application is securely linked to the major health plans and to pharmacy benefit managers to retrieve patient eligibility and medication history as well as the information about how the health plans support a particular drug, known as their formulary. This pre-prescribing process accounts for 70% of the safety and value associated with e-prescribing, according to a 2007 Gorman Group study.^{xxxiv}

E-prescribing volume related to patient eligibility, benefits, and formulary information has grown substantially. By 2006, for example, there were:

- 38.5 million requests for patient eligibility, benefits, and formulary information for 2006.
- 4 million requests for medication history on patients seen in the ambulatory setting in 2006.
- Almost 1 million requests were made for medication history information for patients in acute care settings.



RxHub received more than 16 million requests for patient decision support information in the first quarter of the year. Multiple pharmacy benefits coverage was identified more than 18% of the time. The top states requesting eligibility, benefits, and formulary information from RxHub during the first quarter of 2008 were as follows:

	State	Patient Events, Q1 2008
1	Massachusetts	1,933,546
2	Michigan	1,307,985
3	Pennsylvania	1,162,978
4	New Jersey	1,087,965
5	Texas	906,068
6	Washington	816,501
7	New York	814,360
8	Ohio	668,591
9	Florida	538,989
10	North Carolina	508,323

- To help pharmacy payers demonstrate the true value of e-prescribing to plan sponsors, something that is becoming a requisite for funding and incentive plans, RxHub developed the Rx 4 Success Program. It provides standardized reporting formats and data elements, consistent data, and documentation of process improvements that are reflected in improved quality of care. Features and outcomes include evidence-based performance measures that can support incentive and process improvement program requirements, data usage trends identifying overall industry adoption rates, and statistical data demonstrating the economic impact of e-prescribing on drug trends.



Current Landscape in Public Policy

There is increasing recognition among key federal government officials—including members of both parties of Congress, the White House, the Department of Health and Human Services, the Veterans Administration, the Department of Defense, and other federal agencies—that information technology can help address our nation’s systemic health care shortfalls. Considerable momentum has been built since 2004 around the need for federal investment in the creation of a health information infrastructure, and the information technology that will support it, to realize the quality, safety, and efficiency gains that are supported through various uses of IT, including e-prescribing.

Congress

E-prescribing has been the subject of a significant amount of attention recently from Congress, after the introduction of legislation in both the House and the Senate that would provide financial incentives and disincentives for e-prescribing by ambulatory physicians under the Medicare program. Such legislation, originally known as the E-MEDS bill, would provide a lump sum bonus for the use of e-prescribing for those physicians who meet a minimum threshold volume of prescriptions specified by the Secretary of Health and Human Services. It would also provide ongoing incentives for e-prescribing by physicians under Medicare. However, for any physician not electronically prescribing by the year 2011, reimbursement would be reduced by a certain amount. The Secretary may waive these reductions for a period of one to two years for any physician demonstrating hardship.

Congress’s intense interest in this legislation is not just related to the desire to increase e-prescribing (although there is clear bipartisan support for the issue, and many in Congress see e-prescribing as a positive first step to increasing the use of health IT among providers). This type of legislation is expected to save the federal government significant dollars over a ten-year period.

This in no way takes away from the validity of the policy argument in support of e-prescribing in federal health programs, but it does set up the potential for real tension among stakeholders about the best path for accelerating adoption—financial incentives or financial penalties.

Despite bipartisan support in the House and Senate, and from a number of stakeholder groups, support for such legislation is not universal. Physician organizations in particular have expressed concerns about the penalty in later years for physicians who do not adopt or use e-prescribing at a minimum threshold volume. They point out that in other industries, when a business invests in innovation that adds value to the consumer, the business can increase the price of its product and services; but this is not the case for physicians who have invested in health-IT innovations. Thus, they say it is unfair to mandate physician investment in the technology while others reap the benefits.

In addition, even though the legislation in its most recent form allows the Secretary to grant exceptions in certain cases—especially for small and rural practices—it is unclear that the exception will be granted at all in the future, or how broad the exception would be if granted. This uncertainty is compounded by the fact that a change in administration will occur in January of 2009, and views of the future HHS secretary are unknown.



Physician groups also want to know how the barriers to e-prescribing that persist today will be addressed in the future, before the penalty provisions begin—particularly the ban on e-prescribing of controlled substances, the lack of a complete set of standards, the need for universal pharmacy and payer/PBM connectivity, and the need for adequate tools for medication reconciliation. Physicians are concerned that if these barriers aren't addressed, some doctors may choose to stop accepting Medicare patients rather than face the reimbursement-reducing penalty.

A few advocates have also raised separate concerns about privacy in the context of e-prescribing. These advocates argue that e-prescribing could increase the amount of electronic data available for prescriptions, and that this would facilitate increased data mining of prescriptions without patients' informed consent. They support new laws that prohibit data mining without consent when it comes to de-identified data.

Supporters of the bill note that e-prescribing is compliant with HIPAA privacy and security rules, as well as with stronger state laws. They also note that patients must give consent before physicians can access their information electronically or share it for certain uses.

The Administration

Standards and Computer-Generated Faxes

On December 8, 2003, President Bush signed into law the Medicare Prescription Drug Improvement and Modernization Act of 2003 (MMA), which contained a number of provisions related to e-prescribing.^{xxxv} While the MMA did not mandate the use of e-prescribing by physicians or pharmacies, it did require that the Secretary of Health and Human Services (HHS) develop, adopt, recognize, or modify initial uniform standards related to e-prescribing when it is used during the process of providing medical care to beneficiaries of the Medicare program.

Through a final rule published in November 2005, HHS adopted "foundation" e-prescribing standards for use by physicians, pharmacies, and Part D plans and their application vendors in connection with prescriptions under Medicare Part D, effective January 1, 2006.^{xxxvi} The standards included the NCPDP SCRIPT Standard Version 5.1 for communications between physicians and pharmacies regarding prescriptions, including new prescriptions, refill renewal requests, and authorizations, plus prescription change and cancellation requests and responses. Use of the NCPDP Telecommunications Standard and the ASC X12N 270/271 standards was also required for transmitting eligibility information to pharmacies and prescribers.

Although the 2005 e-prescribing final rule mandated the use of the SCRIPT standard, it also provided that entities that transmit prescriptions and other prescription-related information via computer-generated faxes (i.e., faxes generated by a prescriber's computer and sent to a dispenser's fax machine) were exempt from using the SCRIPT standard (the "Fax Exemption").

Absent this exemption, entities using e-prescribing software that generated faxes would have been required to comply with the SCRIPT standard (which does not allow for computer-generated faxes) or revert to paper-based prescribing. CMS expected that entities using computer-generated fax software would adopt the use of the SCRIPT standard and total electronic prescribing over time, but this did not occur at the rate that CMS expected.



Accordingly, in a push to accelerate e-prescribing in late 2007, CMS amended the first e-prescribing final rule to eliminate the Fax Exemption as of January 1, 2009. CMS believed that eliminating the exemption would encourage e-prescribers and dispensers to move as quickly as possible to e-prescribing using the SCRIPT standard. Therefore, after January 1, 2009, prescribers will not be able to send a prescription or other prescription-related information covered by Part D via a computer-generated fax. They will have to comply with the SCRIPT standard or generate a paper copy of the information and fax it by hand through a stand-alone fax machine or telephone a verbal prescription to the pharmacy.

Also in late 2007, CMS released a second proposed rule on standards to be used for MMA e-prescribing. The standards proposed for adoption in this rule had been tested and shown to be effective by five research pilot teams during calendar year 2006 pursuant to grants funded by CMS and administered by the Agency for Healthcare Research and Quality (AHRQ). Following the end of the comment period, and after CMS had considered all comments that had been submitted, the agency published a second final rule on e-prescribing standards on April 2, 2008, that adopted the following:

- (1) NCPDP SCRIPT 8.1, retiring NCPDP SCRIPT 5.0
- (2) Prescription Fill Status Notification (RXFILL—part of SCRIPT, but not adopted in 2006)
- (3) Medication History functionality (which was part of SCRIPT 8.1)
- (4) NCPDP Formulary and Benefits Standard 1.0
- (5) The National Provider Identifier (NPI) to specify the identity of prescribers and pharmacies (but other identifiers would still useable for transaction routing)

These additional standards must be met for Medicare e-prescribing beginning April 1, 2009.

Although CMS's two final rules have established a core set of industry standards that support the transmission of complete prescription and other related information between physicians and pharmacies, three additional standards remain that were originally recommended as e-prescribing standards but were not shown to be ready for adoption by the 2006 MMA e-prescribing pilots. These were the National Library of Medicine's RxNorm (for identifying the drug prescribed), NCPDP's Structured and Codified Sig (for conveying patient instructions), and an electronic prior authorization methodology. These three standards are now undergoing additional analysis, development, and refinement.

Should the time come when CMS judges that these three additional standards have been sufficiently enhanced, the agency will probably fund research pilots to test them a second time to demonstrate their readiness to be adopted as MMA e-prescribing standards. If they are deemed ready for adoption, CMS would recommend this in a third proposed e-prescribing standards rule.

It is likely that all of these activities will take well into 2009, and possibly into 2010, to complete. Industry experts note, however, that the fact that these last three standards have not yet been adopted does not prevent today's e-prescribing infrastructure from delivering substantial, measurable benefits to physicians, pharmacists, and patients.

E-Prescribing of Controlled Substances

Currently, U.S. law prohibits e-prescribing of controlled substances, but momentum has been building at the national level—spurred in part by increasing congressional attention—to change this. These controlled substances include some widely used pain medications, anti-



anxiety agents, and sedatives. Many view this legal barrier as a major inhibitor to the widespread adoption of e-prescribing systems because providers and pharmacies must use dual workflows for controlled substances and all other prescription medications.

On December 4, 2007, the Senate Judiciary Committee held a hearing on the issue, in which a number of senators called for the Drug Enforcement Administration to revise its regulations to permit full e-prescribing of Schedule II-V controlled substances.^{xxxvii} At the hearing, the Centers for Medicare and Medicaid Services testified that it is supportive of e-prescribing of these classes of controlled substances, while the DEA was unable to provide a timeline for proposing such revised regulations. The DEA, in its annual statement of budget priorities, ultimately committed to publishing a new proposed rule before September 2008.

The States

With few pieces of federal legislation addressing electronic prescribing directly, many states have begun to move forward with legislation in this area. In 2004, approximately half the states in the United States had laws and regulations that prohibited electronic prescribing. As of August 2007, however, all 50 states plus Washington, D.C., allow their physicians and pharmacists to electronically exchange prescriptions and prescription information.^{xxxviii}

In 2007, 83 different pieces of legislation were introduced across 14 different states that addressed either the promotion or regulation of e-prescribing. Of those proposed bills, three were passed and signed into law, though few addressed the promotion of electronic prescribing exclusively; rather, most were part of broader health IT legislation. E-prescribing is generally addressed in two different ways on the state level. First, it has been addressed in a targeted approach where legislation directly focuses on e-prescribing systems through the development of e-prescribing infrastructure, providing incentives for adoption and use of e-prescribing, or creating demonstration projects to assess the financial and efficiency gains of e-prescribing. Second, legislative approaches sometimes roll e-prescribing requirements into larger health reform bills.

As of May 2008, 52 separate pieces of legislation have been introduced across nine different states that include provisions related either directly or indirectly to e-prescribing systems. Some states such as **California** have proposed legislation^{xxxix} that would require e-prescribing systems to meet specified standards and requirements and be adopted by all health care providers contracting with the California Medicaid program by January 1, 2010.

Massachusetts has been very active in the area of HIT during its 2008 legislative session. It considered a bill which would, among other things, create a change management tool kit to enable physicians and their staff to successfully prepare practice workflows for adoption of EHRs and electronic prescribing systems. The tools would also assist purchasers of these systems by providing guidance related to the selection of vendors of health IT products and services that are appropriate within the context of the individual practice and community setting.^{xi}

Two governors have also issued executive orders in 2008 dealing with e-prescribing. The most recent was issued by **Arizona** governor Janet Napolitano (D-AZ) in May 2008. Napolitano's Executive Order 2008-21 directs a number of Arizona's regulatory agencies to work with the Arizona Health-e Connection and its EAzRx initiative to "significantly increase the utilization of e-prescribing in Arizona." The order also creates initiatives designed to educate providers, prescribers, payers, and patients on the benefits of e-prescribing systems.^{xii}



In 2008, **Pennsylvania** governor Ed Rendell (D-PA) issued Executive Order 2008-03, which created the Pennsylvania Health Information Exchange (PHIX) Governance Structure. The order cites the connection between providing the architecture to support the statewide use of electronic prescribing and a reduction in preventable medical errors as well as improved clinical outcomes.^{xlii}

In June 2007, Governor Tim Pawlenty (R-MN) announced that the State of **Minnesota** would implement e-prescribing for 115,000 state employees and their dependents. By implementing an e-prescribing program and consolidating to a single PBM, the state expects to save \$5 million per year. Minnesota is also requiring that all hospitals and health care providers implement interoperable EHRs by January 1, 2015. The governor signed a bill to provide \$14 million to assist rural health care providers and community clinics in meeting that goal.

At a keynote address at HIMSS in February 2007, **Tennessee** governor Phil Bredesen (D-TN) said, “We need to reduce the size of the landscape that we are working with to concentrate on one area and work through the problems there. I want to suggest the management of prescription medications—and e-prescribing in particular.” In June 2007, the Tennessee E-Prescribing Acceleration Project Team came out with recommendations to accelerate e-prescribing in Tennessee for the Tennessee eHealth Advisory Council, convened by the governor. Recommendations encompassed governance, education, and pilot projects. With regard to governance, the recommendation was to create a Steering Committee to provide oversight and direction to the effort, recommend funding sources, set a budget, determine metrics, and engage a project manager. Education recommendations included creating a comprehensive communication and education strategy such as support and implementation resources to assist with adoption and use of e-prescribing. Initial deployment recommendations included securing initial state funding, defining a realistic deployment model, and identifying three to six sites in which to deploy e-prescribing.



Challenges of E-Prescribing

Despite the momentum of the past four years, significant challenges remain. Today, only about 6% of ambulatory physicians are e-prescribing, whether through stand-alone e-prescribing systems or within an EHR. Challenges that have hindered more widespread adoption are described below, and the Going Forward section of this report offers ways to address these critical issues.

1. **Financial Cost:** Prescribers, especially those in small practices, bear more than their fair share of the cost of e-prescribing, since other stakeholders also benefit from the savings and quality improvements that are achieved, or receive fees from the use of e-prescribing. Physician practices need to invest in hardware and software, and cost estimates vary depending on whether an EHR is adopted or stand-alone e-prescribing is used. Even physicians receiving free e-prescribing systems may face financial costs in the areas of practice management interfaces, customization, training, maintenance, and upgrades.
2. **Change Management:** It is important not to underestimate the change management challenges associated with transitioning from paper prescribing to e-prescribing. In a busy practice setting where providers and their staff are accustomed to their current management of patient prescriptions, change management is important. Furthermore, if some of the providers and staff are particularly technology averse, it can be difficult to get everyone on board with such a dramatic change. It is difficult and time consuming for practices to figure out how to change workflow around the management of prescriptions when e-prescribing or EHRs are introduced. The change requires adequate planning, training, and support for effective management.
3. **Workflow:** New systems, particularly in the beginning, are likely to add time to tasks like creating new prescriptions, and this can be a barrier. Required workflow changes are greater with a full EHR, but either way, practices often experience lost productivity during the transition while they modify the practice workflow and become adept at using the system. In addition, roles and responsibilities in the practice may change, such that activities that staff handled in the past may be taken on by physicians. Despite the fact that efficiencies and time savings can be gained within the practice by automating renewal authorizations, workflow change remains difficult and practices (especially small practices) would benefit from additional resources to support them during this transition. Practices taking care of elderly patients with complex conditions and medication history management issues need improved functionality to provide accurate medication histories that are reconciled from multiple sources. Practices with mostly new patients may also face challenges, as they will need timely patient demographic feeds into their e-prescribing system to avoid having to repeatedly duplicate demographic data entry.



4. **Controlled Substances:** Because the DEA prohibits electronic transmission of controlled substances, both physician practices and pharmacies are forced to use multiple workflows to manage prescriptions. This adds complexity to the prescribing process and is a barrier to adoption and use of e-prescribing, given that, according to AMA estimates, about 20% of all prescriptions are for controlled substances.^{xliii} Typically, the vendor system forces prescriptions for controlled substances to be printed. The provider can still use its e-prescribing or EHR system to generate and document all prescriptions; however, the controlled substances prescriptions cannot be transmitted electronically.
5. **Hardware and Software Selection:** Choosing the right software and hardware can be an overwhelming task for some physician practices, especially small practices that are extremely busy, are experiencing declining reimbursements, and lack expert information technology staff. Some struggle with how to get started—e-prescribing vs. EHR – and if they decide to move forward they struggle with vendor selection, negotiation, and implementation.
6. **Pharmacy, Payer/PBM and Mail Order Connectivity:** Not all pharmacies are connected to the Pharmacy Health Information Exchange—about 3% of chain pharmacies have yet to be connected and approximately 73% of independent pharmacies are not connected even though the vast majority of them are using certified software.^{xliiv} Providers can use their e-prescribing or EHR system to communicate with all pharmacies without any change in workflow; if the pharmacy is not connected, the prescription can be printed for the patient or can be converted to a fax by the technology vendor through a fax service they provide. However, this process is efficient and may create additional errors. Not all payers/PBMs are connected to deliver formulary, eligibility, or medication history information, and not all mail order pharmacies are electronically connected. While the majority of payers/PBMs are connected (representing about 200 million lives), if the formulary, eligibility, or medication history information is not comprehensive enough, prescribers may choose not to e-prescribe because they do not have confidence in the accuracy and coverage of the process. When a mail order pharmacy is not connected, providers must print the prescription and either fax it to the mail order pharmacy or give it to the patient to mail in.
7. **Remaining Standards:** In late 2005, CMS published a set of “foundation standards” that became effective on January 1, 2006.^{xliv} Three standards were finalized and adopted by CMS in early 2008 to support formulary and eligibility transactions, medication history, and fill status notifications. However, three additional standards remain, although CMS is in the process of finalizing them: prior authorization, structured and codified SIG, and RxNorm. Electronic prescribing works today and will continue to grow without these standards being final; however, these standards will add value in the future when they have been fully tested and refined. The Policy Landscape section of this report provides further detail.
8. **Medication History and Medication Reconciliation.** E-prescribing can help provide information to prescribers at the point of care on what medications their patients are taking. This may be an improvement over reliance on paper medical records and patients’ memories; however, the information that is available may not be comprehensive or accurate, and tools to adequately reconcile medication histories from multiple sources are needed.



These challenges generally apply to most practice types, but some challenges are magnified for small or rural practices. Rural practices face a particular set of challenges in e-prescribing, including lack of access to broadband connectivity and to skilled information technology professionals who can help them with hardware selection and maintenance. Pharmacy connectivity can also be an issue, since a large number of independent pharmacies are not yet fully e-prescribing. These barriers are in addition to the barriers already faced by many small physician practices as described above. Therefore, pharmacy connectivity for e-prescribing in rural areas must also be addressed.

Costs of E-Prescribing

A stand-alone e-prescribing application is relatively inexpensive. The National E-Prescribing Patient Safety Initiative (NEPSI) is a program that makes Web-based e-prescribing available to every prescriber in the United States free of charge. However, the freely available system may or may not meet a clinician's needs in terms of functionality. Other stand-alone e-prescribing applications are available, ranging in price from approximately \$500 to \$2,500 per year.

EHRs offer more comprehensive functionalities, including e-prescribing. According to the Congressional Budget Office, "The few detailed studies available report that total costs for office-based EHRs are about \$25,000 to \$45,000 per physician (Gans et al., 2005; Kibbe & Waldren, 2005). Estimates of annual costs for operating and maintaining the system, which include software licensing fees, technical support, and updating and replacing used equipment, range from 12% to 20% of initial costs, or \$3,000 to \$9,000 per physician per year (Miller et al., 2005; Wang et al., 2003)."^{xlvi}

There is also the cost of the hardware required to support either an e-prescribing or an EHR system. And, as noted earlier, the need for training, redesigning workflow, and converting files, along with the resultant temporary decrease in efficiency, add additional significant costs that can be more than the cost of the software and hardware.

To support the infrastructure and connectivity, pharmacies pay transaction fees to SureScripts when they receive electronic prescriptions and send electronic renewal requests. Pharmacies also must install or upgrade appropriate software.

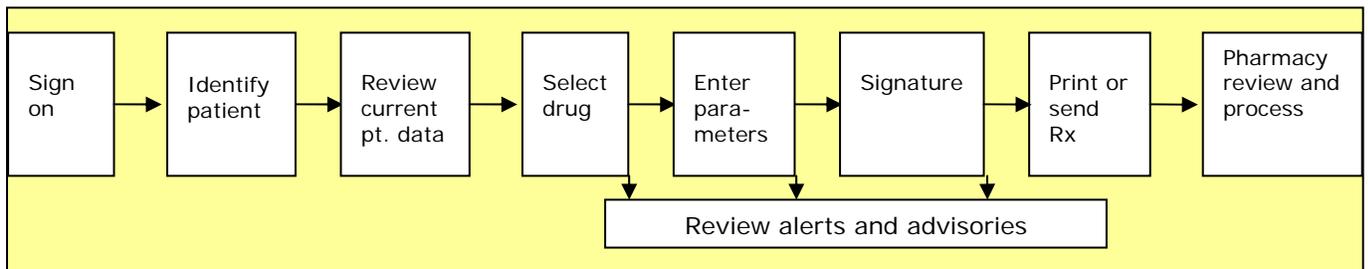
Pharmacy Benefits Managers (PBMs) pay RxHub transaction fees to deliver eligibility, formulary, and medication history information. Prescribers need to acquire a certified e-prescribing or EHR application, with the price agreed upon by the prescriber the selected technology provider. Typically, technology providers do not charge prescribers transaction fees for e-prescribing; however, some technology providers charge an upgrade or connectivity fee for e-prescribing.

SECTION II. THE PRESCRIBING PROCESS

The overall prescribing process is much more complex than simply writing a prescription and dispensing the prescribed medication for a patient.

E-prescribing systems use a variety of devices and methods; among the most popular are handheld devices, tablet computers, and desktop computers. System infrastructure may be based entirely on the device, or on a server located in the local environment or remotely through an application service provider (ASP) environment. Each of these technologies brings its own benefits and challenges to the e-prescribing process.

Creation and management of electronic prescriptions in the clinician's office involve several steps, as illustrated in the process map below. By looking at each of these steps, we can analyze many specific features, concerns, and needs that are important to the optimal design of electronic prescribing systems. For the purposes of this report, we have outlined certain expectations and considerations involving several of the steps.





Process for Creating and Managing a Prescription Electronically

Signing On

A user of the system—clinician, staff, etc.—signs in by performing some sort of *authentication* to prove his or her identity. Typical authentication is by username and password, although other technologies such as random-number cards (SecureID™), digital certificates, or fingerprint readers are used as well. Once authentication is complete, the system should know the user's role and type of *authorization* to use in the prescribing system. As described below, different types of clinicians may have different legal permissions to enter, review, or modify prescriptions.

Identifying the Patient

In order for the e-prescribing process to begin, the clinician needs to identify the patient within the e-prescribing system. Clear and seamless communication between patient registration data, clinical records, and the actual e-prescribing system are critical to this process. There are a number of elements that are key to successful identification of the patient:

- Ideally, patient demographic information should only need to be entered once (or not at all if provided by an electronic interface) at the clinician office. Some of the best examples include a master patient index that links administrative and clinical systems in the clinician office.
- Effective methods to update and transmit changes in demographic information, especially insurance and patient contact information, should be present. This may require query capabilities with external organizations, particularly health insurance company databases.
- Patient identification information should include information about the patient's health insurance coverage and drug benefit. For example:
 - Name of insurance company or PBM that handles the drug benefit
 - Link to correct formulary for the patient
 - Patient-specific benefit information
- The e-prescribing system should offer different ways to list patients. Some effective methods in current practice include locating the patients by:
 - Clinician's daily schedule
 - Patient's name
 - Clinician's overall panel of patients
- Systems should have methods for dealing with potential mismatches or similar names. Effective methods currently include:
 - Use of a Soundex¹ system or probabilistic matching, which does not require the system to identify an exact match on a full name
 - Mapping alternative representations of patient names (or aliases) to the same person. This is useful when calls are received from patients or pharmacies, and when a patient commonly goes by something other than his or her full legal name.

¹ The Soundex algorithm is a very popular phonetic matching algorithm, based on consonant sounds, that is designed to help find names that are misspelled in common ways.

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- Patient registration information should be smoothly updated and coordinated across multiple information systems (e.g., practice management system, e-prescribing system, EHR). Note: While this may be an implementation issue, it is important that a practice determine early on (1) who can update patient information, and (2) whether the changes can be made on any information system with an update to the master patient index or whether the master patient index should be the only updated source.
 - To provide for patient privacy while satisfying HIPAA privacy regulations, a patient's data should only be viewed by someone with documented need to know that data for clinical or billing purposes. This implies that a documented *relationship* should have been established between the practice and/or clinician and the patient. Relationships can be created in the booking-scheduling-registration process, or they can be automatically created from other information, e.g., the existence of a prior visit, or the patient's selection of the clinician as primary care provider. Where a relationship is not established in advance, the system may need to block access. In practical use, under certain circumstances the policy may allow the user to gain access immediately by documenting the immediate need-to-know right on the screen (known as a *challenge* or a *break-the-glass* access). Where this is allowed, this access should be recorded in an audit trail and reviewed frequently for possible violations.
 - Current health plan information should be available at all times, and patient-specific formulary information should be updated and accurate.

Selecting the Drug, Entering Parameters, Signing

Many of the steps in the process map correspond to the actual work of reviewing the medical history and entering and editing a prescription. Many specific tasks fall within this process; e-prescribing systems should allow clinicians to perform a number of functions, including the following:

- 1) Review patients' current medication list and medication history information
 - Update medication history
 - Correct medication history
 - Reconcile with multiple history sources
- 2) Work with an existing medication
 - View details of a medication
 - Discontinue or remove a medication
 - Change dose, etc., for a medication
 - Renew one or more medications



- 3) Prescribe or add new medication by:
 - Choosing a medication from quick choices/favorites
 - By name (generic or trade)
 - By indication
 - By formulary
 - Displaying search results of drugs with prefilled, known, favorite, or standard dosing
 - Selecting drug from the results
 - Reviewing warnings
 - Entering the sig and other parameters
 - Automatically populating and updating favorites list of drugs with prefilled known dosing based on frequency of utilization by clinician

- 4) Complete the prescription
 - Sign one item
 - Sign multiple items
 - Cosign items created by ancillary staff, residents, or others

- 5) Output prescriptions
 - Choose print, fax, transmit options in real-time or batch mode
 - Print formats and prescription information, conforming to state regulations
 - Handle restrictions on certain medications (e.g., class II)

- 6) Other functions
 - Enter/view/delete current allergies or intolerances
 - Enter preexisting medications
 - Recognize limited prescribing authorization for some clinicians (e.g., midlevel clinicians in some states cannot sign class II prescriptions)
 - Cosign prescriptions written by such persons
 - Other "prescriptions," e.g., durable equipment, syringes



Important Functionality of Electronic Prescribing Systems/Modules

Research and best practice experiences have suggested that electronic prescribing systems can successfully increase the efficiency of the prescription entry and/or editing process. For this to happen, the following must be done:

- Minimal key strokes or clicks should be needed to create a prescription.
- The drug dictionary (from which medications and doses are selected) should be tailored for optimal clinician use. Some databases may be too detailed or have too much information for practical use at the point of care (see Standards and Vocabulary section). Applications that require specifying drugs at the NDC-code level, for example, are likely to be difficult for most clinicians. In general, clinicians using an e-prescribing system should be able to enter drug names and prescribing information using the same level of specificity and detail that they currently utilize when handwriting a prescription.
- A Soundex or similar matching algorithm should be used to look up drugs even when spelling is incorrect.
- Common abbreviations and synonyms should be mapped to drugs to simplify typing. E.g., HCTZ for hydrochlorothiazide.
- The amount of detail that must be entered about the prescription should be similar to what is customary in the paper-prescribing world; requests for new types of data and fields that make the prescriber's work harder should be avoided.
- Formulary on/off status should be displayed during the drug selection or search process.
- Applications should pre-populate data fields automatically when answers are obvious (e.g., drug strength/form when only one exists).
- Complex but common dosing, such as prednisone tapers, alternate-day dosing, etc., should be supported in an efficient, easy-to-use manner. For the major unusual doses (taper, titrate, alternate-day, variable-dose, sliding scale), special templates or on-screen forms may be needed.
- Clinical decision support warnings should advise but not force the clinician to take a particular course of action.
- Discontinuing, renewing, and modifying a medication should be simple and straightforward.
- Renewals of multiple medications can be done in a single, rapid operation.
- It must be easy to acquire the patient's current medication list, even when a patient uses multiple pharmacies or when a patient uses a variety of health plans.
- The patient must select preferred patient pharmacy with assistance from practice staff prior to the interaction with the prescriber.



Summary

The prescribing process is complex and involves many steps, including signing on to the system, identifying the patient, reviewing current patient information, writing the prescription (medication, dosage, form, instructions), signing off on the prescription, and printing or transmitting it to the pharmacy of the patient's choice. E-prescribing should support those steps and offer additional information and functionality that helps make prescribing safer and more efficient while also streamlining communication with pharmacies and payers/PBMs.



SECTION III: OVERVIEW OF BEST PRACTICES AND LESSONS LEARNED FOR SUCCESSFUL E-PRESCRIBING DEPLOYMENT

Based on the past four years of experience, several best practices for e-prescribing deployment have emerged. We also have a much better understanding of the typical barriers to e-prescribing use. By helping physician practices understand what to expect when they deploy e-prescribing, and widely disseminating e-prescribing best practices and lessons learned about barriers and how to overcome them, we will enable physician practices to successfully move forward with e-prescribing. This section offers an overview of e-prescribing best practices and lessons learned. The Guide to E-Prescribing for Physician Practices offers more detail. The corresponding guide for payers also offers best practices and lessons learned for health plan and employer initiatives.

Analysis of past challenges also offers additional insight into e-prescribing best practices. In the past, some early adopters of e-prescribing took a “try it and see” approach. When they encountered unexpected challenges they were quick to completely stop using the technology. In practices where a few prescribers were using e-prescribing and others were not, they often also stopped e-prescribing or used it at a persistently low level. Barriers to success include a low level of commitment to start with, poor choice in software and hardware, disappointment in functionality, lack of an interface with practice management system (so the prescriber has to enter each patient one by one), implementation of electronic new prescriptions but not electronic renewals, and inadequate training and support.

Leadership/Prescriber Vision and Commitment

- It is important for the practice to have a vision of what they hope to accomplish through e-prescribing. The vision should encompass an understanding of the functionality and benefits offered by e-prescribing and should be grounded in realistic expectations about how to achieve that vision and realize results. There should be a clear plan to implement all e-prescribing functions for all prescribers and all patients.
- Effective leadership in the practice can play a key role in building commitment among the team. Staff appreciation of the benefits, particularly of automating prescription renewals, can help create a stronger commitment for the practice as a whole. To achieve this, the entire practice should be involved and engaged in the project.
- Characteristics of successful practices include a commitment to adapt workflow to take full advantage of e-prescribing rather than to automate existing workflow, and to resolve problems as they arise. The benefits of e-prescribing should be explicit in the planning phase, reinforced in the training program, and actively measured and pursued following implementation. The barriers and challenges in adopting e-prescribing should also be articulated so they can be planned for and addressed, allowing realistic expectations for the project's progress.



Planning and Selection

- The process of evaluating solutions should take into account and perhaps even expand the practice's vision of what it is trying to accomplish through e-prescribing. In evaluating solutions, consulting with colleagues who have successfully implemented e-prescribing is a great way to understand the benefits and drawbacks of potential solutions, including their functionalities and impact on workflow, and get additional ideas on what questions vendors should be asked.
- Planning for implementation is critical. The practice must commit to appropriate implementation resources, including time for training and workflow integration. During the planning and selection phase, a project leader should be assigned and practice staff and physician leaders should be closely involved in the process.
- The practice should execute a formal agreement with the solution provider. Costs, timeframes, and milestones should be documented in planning documents that clarify functionality, implementation process, service and support expectations, purpose and benefits.
- The practice should also be sure to let the pharmacy know it is planning for e-prescribing, and should work with the pharmacy to understand the e-prescribing process.

Product Capabilities and Integration

There are a number of product capabilities and integration features that are important for successful e-prescribing. These items should be considered prior to deployment of e-prescribing in order to optimize prescriber and patient satisfaction.

- Software usability:
 - Minimal keystrokes to write, renew, and send prescriptions
 - Easy patient lookup process
 - Connection with current patient management systems to integrate patient demographics into the e-prescribing application quickly and easily
 - Access to medication history information—with multiple history sources reconciled to a single view
 - Ability to renew multiple prescriptions for a patient at once
 - Favorite medication list feature
 - Easy medication search (including trade names)
 - Pre-filled default fields
 - Ability to do complex sigs through templates (like sliding scales, tapers, etc.)
 - Ability to order supplies like syringes
 - Incorporates alternative and non-prescribed medications in the medication list
 - Clinical decision support warnings such as drug-drug and drug-allergy alerts that are advised but not forced. Drug-lab, drug-problem checking are also desirable functions.
 - Inclusion of reasons for prescribing (match to problem list or diagnosis)
 - Easy signing and cosigning
 - Easy pharmacy selection
 - Easy and most efficient output

- Ability to receive delivery confirmation or failure notice once prescription reaches pharmacy
 - Ability to handle callbacks/renewal requests (from patient or pharmacy)
- Hardware: Hardware in the practice that enables access to e-prescribing and EHRs in the exam room and throughout the practice encourages optimal use of e-prescribing. The practice needs to think through how it can manage the prescribing process most effectively, and must determine the best use of hardware to support the workflow and avoid barriers to utilization. Some practices provide tablet computers, which the prescribers carry around with them. Others mount laptops on carts that can be wheeled around the practice. Some put a desktop in the exam room. If the hardware does not support the workflow, prescribers may revert to handwriting prescriptions and then entering the prescription into the computer after the patient visit, which is less efficient. It is also important to keep in mind what implications the hardware that is used may have for clinician interaction with patients. Devices also need to be efficient and secure while allowing rapid synchronization to other electronic systems in the office, as well as communication with printers and other devices or networks. In addition, practices must have Internet connectivity with a redundant Internet connection backup in place.
- Transmitting Prescriptions: The default routing should be set for electronically sending prescriptions to the pharmacy rather than faxing them. Solutions that provide the option for prescribers to decide whether to fax, print, or electronically send prescriptions tend to result in underuse of electronic transmittance. However, clinicians should always have the ability to print the prescription for the patient and to fax to pharmacies that are not ready for electronic communication.
- Automated Renewals: Automating the process to authorize prescription renewals as part of e-prescribing and EHRs is a key benefit for the practice and a key driver of utilization, given the streamlining of communication with the pharmacy to authorize prescription renewals. E-prescribing and EHR solutions with effective renewal functionality encourage more staff involvement in the prescribing process and result in stronger commitment to the project vision and goals.



Workflow and Change Management

- Determining how prescribing workflow should change with e-prescribing is critical to success. Successful adoption depends upon the ease and speed with which the clinicians can learn to use the system in their medical practice.

Workflow considerations need to be included in the planning phase, integrated into the training program, and continuously monitored. Automating prescribing without considering workflow implications increases the risk of failure.

- An electronic prescribing system that easily adapts to the workflow of *all* appropriate staff in the practice is critical to adoption. Once the prescribing clinician has written or edited a prescription, various other tasks must be performed to complete the work. Workflow that needs to be considered includes entering and editing a new prescription; producing the output of a prescription (printing or transmitting the prescription); and renewing a prescription (all of the above, plus handling requests from patients and pharmacies).
- Overall prescribing workflow considerations include:
 - The role of the front desk and/or medical assistants in the prescribing process
 - The role of practitioners in the prescribing process
 - How to effectively implement prescriber preferences into the solution
 - Hardware implications of the prescribing roles and responsibilities of the practice
 - How to communicate with patients about electronic prescribing
 - How error logs are maintained and monitored
 - How to monitor electronic renewal requests from the pharmacy
 - How to best engage with local pharmacies in mutual problem solving
- The office workflow should have mechanisms for responding to a patient's or a pharmacy's request for renewals by phone, direct system linkages, secure e-mail, or Web-based secure messaging. When the office staff receives requests from patients for renewals, the system should make it easy to check information against the clinical record, and to route this information electronically to the clinician for review and approval. The system should have efficient workflow for processing and documenting pharmacy callbacks. Secure messaging technologies with standard messaging conventions should be included for bidirectional communication between the pharmacy and the practice.

To help manage change, a designated project leader in the practice can play an important role in adapting practice workflow to ensure that the benefits of e-prescribing are fully achieved. The project leader can also assist prescribers and practice staff in getting comfortable with the new technology and workflow, and help overcome barriers as they are encountered.



Communications

Communication on a number of levels is critical to the success of e-prescribing.

- Involving the entire practice in the process and communicating with all staff on a regular basis are hallmarks of successful e-prescribing practices. Prescribers and staff should be aligned in their commitment to e-prescribing and they should openly share insights on best practices and lessons learned.
- Communicating with pharmacies to alert them that the practice will be e-prescribing and may need to work through issues is important. Practices that reach out to local pharmacies during their initial e-prescribing implementation enhance the likelihood of increased cooperation to improve the prescribing process.
- Communicating with patients regarding e-prescribing and its benefits and implications is important. Some patients may express initial reluctance in response to a new system; prescribers can make patients more comfortable by explaining how e-prescribing works and what its benefits to patients, providers, and pharmacies are (see related guide for consumers accompanying this report). Practices that initially provide patients with a prescription document of some kind that takes the place of the physical prescription, such as a prescription receipt, generally make patients more comfortable with e-prescriptions. From a workflow standpoint, printing paper during the visit can be inefficient, so this step should be viewed as an early transition phase. In addition, patients should be advised to call the pharmacy to request prescription renewals, since this streamlines the communication between pharmacy and practice and will reduce the time it takes for the patient to receive the renewed prescription.
- Communicating prescription fill time expectations to staff and patients, and making sure that the pharmacy and the patient know that the practice handles prescriptions electronically, are also important. Inform patients that their prescriptions have been sent electronically and will arrive in the pharmacy's computer system. Prescriptions are typically filled on a first-come first-served basis. There is an advantage to e-prescriptions in that a patient does not have to make one trip to the pharmacy to drop off the order and another to pick up the prescription.
- Communicating between the software provider and the practice, particularly during the transition from the sales part of the organization to the implementation team, and ultimately to the support team, will increase likelihood of success. The practice should make sure it understands the support process to follow with the vendor when issues related to the technology are encountered.



- Common communication problems that practices encounter when they begin to e-prescribe include patients arriving in the pharmacy and being told the prescription is not there, electronically enabled pharmacies sometimes sending electronic renewal requests and sometimes sending fax renewal requests, and lack of adequate training and support by their technology vendors. The issue of “mishandled prescriptions” typically goes away over time and frequently is due to the need for additional training in the pharmacy. Sometimes the practice workflow exacerbates this issue if prescriptions are sent out in batches rather than individually as they are written for the patients. A mix of fax and electronic renewal requests is usually due to the prescribers being matched and electronically enabled in the pharmacy systems. When problems do occur, they should be reported to the technology vendor, the pharmacy, and SureScripts, which operates the Pharmacy Health Information Exchange, so they can be addressed promptly.

Deployment and Effective Use

- The designated project leader for e-prescribing plays a vital role in deployment. This individual will be a central point of contact and reference for e-prescribing implementation. This staff member, by becoming increasingly adept at using the system, will generate additional value by making the process run more smoothly. He or she will also serve as a resource to the team, helping everyone get comfortable with e-prescribing. A good choice for the champion may be the individual who is responsible for managing the practice relationship with the vendor and/or the person responsible for managing prescription renewals. The project leader can also play an important role by ensuring regular monitoring of prescription renewal requests that come into the practice electronically. This person can also streamline the process by pulling charts as needed and recommending that requests be approved or denied. The physician or other authorized prescriber, then, has only to provide the final response. Note that these approaches may be different for small practices.
- Integration of patient demographic information from the practice management system in advance of e-prescribing implementation is an important driver of use. If the prescriber has to add each patient to the e-prescribing system one by one, the ramp-up of e-prescribing use will be dramatically slowed.
- A process should be in place to regularly update patient information with accurate data, such as birth date, as needed when submitting prescriptions to the pharmacy.
- Ensure that the patient’s preferred pharmacy is already populated or entered into the system when the patient checks in or is visiting.
- It is important to respond to electronic refill requests as soon as possible, and always within 24 hours. If pharmacies do not see a response within that time frame, they may send duplicate refill authorization requests. This may also happen if the patient is waiting in the pharmacy to pick up a renewed prescription that has not yet been authorized. It helps to designate someone to manage the electronic refill response process.



- Practices should avoid queuing or “batching” prescriptions before sending them to pharmacies electronically. Sending prescriptions to pharmacies as soon as possible after they are prepared ensures that the pharmacy has adequate time to receive the prescription before a patient arrives to pick it up. Otherwise, the practice may receive unnecessary calls from pharmacies asking where the prescription is, further delaying the patient’s receipt of the medication.
- Advise patients to call their pharmacies to request prescription refills. This will reduce the volume of calls coming into the practice from patients and pharmacies. It will further streamline the process of authorizing prescription refills by taking full advantage of bidirectional electronic connectivity between the practice and the pharmacy.
- Use the e-prescribing system consistently to send new prescriptions electronically. This can improve the efficiency of the practice through reduced phone calls and faxes associated with legibility, pharmacy eligibility, formulary and benefits, and refill authorizations. Consistent and frequent use of e-prescribing is necessary to get used to it and to realize the benefits.
- Follow DEA regulations by refraining from electronic transmission of prescriptions for controlled substances until these regulations are changed to allow electronic transmission. Prescriptions for Schedule II drugs can never be sent electronically. Hand-signed hard copies of prescriptions for Schedule III through V drugs can be sent using manual fax. Neither computer-generated faxes containing electronic signatures nor totally electronic prescriptions for controlled substances can be sent to pharmacies at this time.
- Keep your software vendor informed about any problems. By keeping your vendor aware of issues that arise, you ensure that problems can be fixed quickly, and help to eliminate future issues before they occur. Be sure that everyone who uses the e-prescribing system in the practice is aware of the support process with the vendor.

Training and Support

- Ensure that the entire practice receives appropriate training.
- Work with your vendor to ensure that prescribers and staff who will use e-prescribing understand how to prepare and send a new prescription to a pharmacy electronically and how to look for, review, and respond to prescription refill requests that are sent electronically by the pharmacy.
- Frequent use will make staff adept at getting value from the system. The more people who are trained and really know and use the system, the more support and momentum for e-prescribing the practice will have.



Summary

For the practice to have the optimum experience with e-prescribing, it is important that leadership is committed to realizing its benefits and working through issues rather than giving up when they hit a bump in the road; the entire practice is involved in planning and selection and chooses software and hardware solutions that have robust functionality and support the practice workflow; the practice communicates with pharmacies, patients, and the vendor about e-prescribing; an individual is assigned to manage prescription renewal and provide assistance to all users of the system to help them get comfortable; and training and support is adequate.



SECTION IV: CASE STUDIES ON MARKET AND PAYER INITIATIVES

Many health care stakeholders have demonstrated leadership to encourage adoption and use of e-prescribing across a growing number of markets. This section provides examples of several of these market-based e-prescribing initiatives, although it is by no means a comprehensive list. As these examples demonstrate, leadership can come from different types of organizations, including health plans, employers, health systems, government agencies, medical groups, and multi-stakeholder collaborative groups. Several themes—indeed, critical success factors—emerge from these examples and will be summarized at the end of the section.

Massachusetts

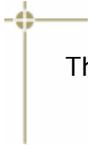
As noted above, Massachusetts was the top state for penetration of electronic prescribing in 2006 and 2007. In 2007, according to SureScripts^{xlvii} and RxHub:^{xlviii}

- More than 4.5 million prescriptions, or 13% of eligible prescriptions, were transmitted electronically.
- There were over 4,000 e-prescribers, about 25% of office-based physicians in the state.
- There were more than 900 (82% of total) pharmacies e-prescribing in 2007.
- Approximately 4.4 million patient records related to medication history and eligibility were accessible through RxHub in Massachusetts, representing 71% of total Massachusetts residents.
- Prescribers requested pharmacy eligibility, formulary and medication history records on 3.8 million patients through RxHub and nearly 2 million (53%) were provided. Additionally, 933,000 medication history requests were made through SureScripts and 340,900 (37%) were provided.

Massachusetts is a uniquely collaborative health care community; there have been multiple stakeholder efforts to improve the safety and efficiency of prescribing and to leverage health information technology to improve the outcomes of health care delivery. Three groups in particular have played leading roles in the state when it comes to the use of health IT: the eRx Collaborative, the RxGateway created by MA SHARE, and the Massachusetts eHealth Collaborative (MAeHC).

The eRx Collaborative

The eRx Collaborative, formed by BlueCross BlueShield of Massachusetts (BCBSMA), Tufts Health Plan, and Neighborhood Health Plan, has a mission to collaboratively promote and enable the use of electronic prescribing in Massachusetts. The goals are to enhance patient safety, improve office efficiencies, increase provider and member satisfaction, and improve health care affordability.



The eRx Collaborative sponsorship includes:

- Choice of hand-held device loaded with an e-prescribing software application (Zix PocketScript or DrFirst Rcopia)
- One-year license fee and support
- Six months of Internet connectivity where applicable
- Deployment (including training and one time patient data download)
- Participants can also access a browser version of the software from any PC with Internet connectivity (*funding for PC not included*)

In the four years since the program was launched, eRx Collaborative participants transmitted a total of 13.5 million prescriptions, with nearly 5 million transmitted in 2007 alone.

A key benefit of the e-prescribing program to date has been the detection of harmful drug-drug or drug-allergy interactions. In 2007, about 104,000 e-prescriptions (2.1%) were changed or cancelled as a result of drug safety alerts.

In addition, participants in the program were surveyed in 2007 and 81% of the prescribers said they would recommend e-prescribing to a colleague. Nearly three-quarters (71%) of respondents said e-prescribing saves time, with the majority indicating a savings of one to two hours per day. Two-thirds said that e-prescribing results in fewer calls from pharmacies.

Lessons learned by the eRx Collaborative that may be helpful for other market initiatives include:

- If you build it, they may not come—Initially, the eRx Collaborative created forums in centralized locations for providers to learn about the technology and sign up for the free offer—but attendance was low. To increase effectiveness, technology vendors should to go to the physician office directly to engage clinicians and their staff.
- Free is not cheap enough—Initiatives should subsidize initial start-up costs and provide additional incentives to promote utilization. Initiatives should also highlight prescriber savings opportunities, specifically with prescription renewal requests.
- Importance of training—It is critical to ensure that the technology is intuitive and that provider training is focused. Providing targeted office staff training and onsite support during rollout, and identifying site champions where applicable, can support success.
- Perceived lack of value—Cooperation between health plan competitors can send a powerful message. The eRx Collaborative promotes discussion of e-prescribing benefits for all stakeholders within health care delivery to improve quality, delivery, and affordability.

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- **Technology Infrastructure**—It is important to evaluate and confirm appropriate technological infrastructure to support e-prescribing prior to implementation. Initiatives should engage the practice's IT team early on in the deployment process, ensure that technology is consistent with the organization's security standards and requirements, and ensure interoperability with existing or future technologies (e.g., EHRs).
 - **Utilization**—Office staff support is fundamental to effective utilization. Initiatives should ensure utilization monitoring and reach out proactively when issues are detected. Rewarding and recognizing prescribers for successful utilization is critical, as is incentivizing vendors to focus on utilization.

MA SHARE Rx Gateway

MA-SHARE's Rx Gateway will provide a community solution to accelerate adoption of e-prescribing by providing a single point of access to comprehensive prescription-related data from multiple data sources, and using standards-based interfaces to route prescription data between stakeholders. The Project's goal is to improve the speed of adoption, accuracy, and value of e-prescribing applications by electronically linking them with all major payers, prescription benefit managers, and prescription dispensing locations, including retail pharmacies and mail order services. Ultimately, the Rx Gateway will serve as the prototype for a broader clinical data exchange.

MA SHARE created the Rx Gateway to provide a single point of connectivity to RxHub for access to eligibility, medication history and formulary data, and SureScripts Pharmacy Health Information Exchange for routing prescriptions to community and mail order pharmacies electronically. Initially, the effort focused on the home-grown EHRs used by CareGroup and Partners Healthcare; it is now expanding to other e-prescribing and EHR tools.

Almost 1,000 Beth Israel Deaconess Medical Center physicians are e-prescribing. A pilot is underway with Partners Healthcare/Brigham and Women's Hospital. RxHub certification for eligibility and formulary is complete, and work is under way to integrate the Harvard Pilgrim Health Care formulary.

With the community utility live and expanding its offerings, MA-SHARE is seeking to partner with other organizations to integrate e-prescribing capabilities and expand the availability of Massachusetts community data. Discussions are under way with several Massachusetts payers, hospitals, and EHR vendors to understand the community benefits of Rx Gateway integration.



MA eHealth Collaborative

The Massachusetts eHealth Collaborative (MAeHC) was formed in 2004 as an initiative of the physician community to bring together the state's major health care stakeholders for the purpose of establishing a connected EHR system to enhance the quality, efficiency, and safety of care in Massachusetts.

The value of EHRs is widely acknowledged, but the significant capital and time required to implement such a system are frequently cited as significant barriers to adoption. It has been estimated that universal statewide adoption of EHRs would cost approximately \$500 million.

MAeHC is fortunate to have a \$50 million commitment from BlueCross BlueShield of Massachusetts to fund its demonstration project phase of implementing EHRs and health information exchange in three communities. By pooling the resources, talent, and experience of its 34 member organizations and participating pilot communities, the Collaborative hopes to achieve a major leap forward in realizing its vision of better care for the citizens of the Commonwealth.

Greater Brockton, Greater Newburyport, and North Adams are the three communities that were selected for the MAeHC demonstration project. The three pilot communities were selected from a group of 35 applicants to embark on a 24- to 36-month project to study and demonstrate the effectiveness and practicality of implementing EHRs in community settings. These communities have a high capture of medical encounters; a wide array of ancillary providers; diverse patients, practices, locations, and size; and will provide a cross section of models to enable statewide expansion.

As of April 2008, 130 medical practices with 417 participating physicians are live on EHRs in these three communities. Health information exchange (HIE) in North Adams has been live for about a year. HIE in Brockton and Newburyport is now being rolled out. Based on a recent survey, 86% of participants expect to be able to provide higher-quality care with the EHRs.

In May 2008, the MAeHC announced that the North Adams HIE reached a critical milestone with more than 25,000 patients consenting to have their information shared in the HIE. This represents 94% of all patients who have been asked to participate. The HIE is being used by more than 50 physicians in 14 practices; it enables them to access eHealth Summaries, which include lists of medical problems, medications, allergies, test results, and other vital patient information.

The original grant was expected to fund the demonstration project through June 2008. Recently the MA eHealth Collaborative announced that, as a result of efficient project management, participating physicians would be offered the option to continue with certain aspects of the pilot, most notably participation in health information exchange, through the end of 2008.



Rhode Island

Rhode Island had the second highest penetration of e-prescribing in both 2006 and 2007. In 2007:

- 750,000 prescriptions, or 9% of eligible prescriptions, were transmitted electronically.
- There were almost 800 e-prescribers, representing 39% of office based physicians.
- 179 (89%) pharmacies e-prescribing in 2007.^{xlix}
- Approximately 837,000 patient records related to medication history and eligibility were accessible through RxHub, representing 80% of total residents.
- Prescribers requested pharmacy eligibility, formulary and medication history records on 106,000 patients through RxHub and 30,849 (29%) were provided. Additionally, 23,100 medication history requests were made through SureScripts and 12,600 (55%) were provided.

Rhode Island is an example of a public-private partnership in e-prescribing. The Rhode Island Quality Institute (RIQI) worked with SureScripts to beta test e-prescribing in June 2003 with 40 prescribers and 80 pharmacies. The beta test was successful with one participant, Anchor Medical, receiving 40-50 fewer phone calls per day, resulting in the elimination of a phone line dedicated to prescription calls, and saving 1.3 RN full-time equivalents per month. Since the beta test, several major medical groups have adopted e-prescribing.

Early phase success factors include:

- Starting with a true value proposition
- Ensuring that major stakeholders are supportive before beginning the project
- Broad participation in design and implementation
- Built-in flexibility
- Significant support for the early adopters
- State regulators and insurers provide incentives and other key stakeholders support the initiative.

Early phase obstacles included:

- Difficulty with pharmacy system conversion (training, workflow redesign)
- Problems encountered with electronic refills when physicians practice in multiple sites
- Retro-fitting into the systems of the more advanced offices
- Early advantage opportunity for prescriber vendors resulted in only one vendor in Rhode Island at first
- Such a low percentage of prescriptions ran through the system that electronic prescriptions weren't part of the pharmacies' normal workflow
- Difficulty getting the formularies on the system
- Workflow changes to electronically prescribe were significant—some physicians opted to wait for EHR implementation



The second phase of work on e-prescribing in Rhode Island involved forming an eRx Committee of RIQI led by David Gifford, MD, Director of the state Department of Health. Governor Carcieri announced e-prescribing as part of his health care platform and set the goal of the majority of prescriptions going electronically by the end of 2007. The RI Department of Health plays a role in providing statewide leadership, policy setting and legislation, regulation, purchasing, and consumer education including publicly reporting physicians who are actively e-prescribing on their Web site.

Recent initiatives of the eRx Committee and its members include vendor communication, such as requesting information from EHR vendors on how they make their e-prescribing available to providers; professional education, including health information technology fairs and an e-prescribing event featuring a panel of experienced e-prescribers; payers such as BlueCross BlueShield of Rhode Island's increased primary care reimbursement rates conditioned upon health information technology adoption; and consumer education such as patient education cards being offered at some clinics.

In fall 2007, the eRx Committee surveyed high prescribers who had not yet adopted e-prescribing. Almost half of the respondents said they believed e-prescribing would benefit them and they were interested in learning more. About 13% said they were planning to implement e-prescribing in the next six months. The biggest concerns among survey respondents were:

- Upfront costs and ongoing fees
- Software usability
- Potential negative impact on practice workflow
- Not enough vendor support or training for practice

Lessons learned by the eRx Committee to date include:¹

- Stakeholders influence each other.
 - eRx Committee provides a forum for generating ideas on how to implement key strategies.
 - Advocates are stronger in numbers, and in turn influence vendors, providers, lawmakers.
- Providers influence each other.
- Persistence pays off—for providers, pharmacies, consumers, and other stakeholders.
- EHRs are the ultimate end state.
- Prescriber workflow redesign and change management are crucial to long-term e-prescribing utilization success.
- Education to manage consumer expectations is key.



Nevada

Nevada was ranked the number three state for e-prescribing penetration in both 2006 and 2007. In 2007:

- 7% (896,000) of eligible prescriptions were transmitted electronically.
- There were almost 350 e-prescribers, representing 9% of office-based physicians.
- There were 390 (74% of total) pharmacies e-prescribing in 2007.
- Over 1.4 million patient records, or 60% of total residents, were accessible through RxHub.
- Prescribers requested records on 72,600 patients, and 18,400 (25%) were found through RxHub.

Leadership on e-prescribing in Nevada has come primarily from Southwest Medical Associates (SMA), the largest multispecialty medical group in the state.

In 2002, SMA began looking for an e-prescribing system with the goal to help reduce pharmacy expenses by increasing the efficiency of prescribing, increasing formulary compliance and generic use, reducing pharmacy phone calls, and streamlining prescription renewal authorizations. SMA selected and implemented Allscripts Touchworks EHR with an e-prescribing module beginning in February 2003.

SMA's launch of e-prescribing included a financial incentive program to ensure adoption and use of the technology by physicians. Even before this, physician bonuses were tied to the entire group's performance against the pharmacy budget. The group's bonus was designed to increase the extent to which SMA physicians prescribed generic alternatives to brand-name drugs. The incentive was modified in an important way when the EHR was implemented. Effective January 2004, only physicians who were using the EHR for e-prescribing 100% of the time would be eligible to receive bonuses. Within two months, every SMA physician who writes prescriptions was fully using the e-prescribing system. SMA physicians write approximately 80,000 e-prescriptions per month.

The e-prescribing system automatically notifies the physician of the formulary status of the selected medication and suggests generic substitutions, making it easy for the physician to select the lowest-cost medication for the patient. The system also checks for drug-drug, drug-allergy, and duplicate therapies to help ensure a safe prescribing decision for the patient.

The impact of e-prescribing for SMA has been significant. By increasing the use of generic medications by 4.8%, SMA saved \$4.75 million each year, which is about 7% of its 2005 drug spend.ⁱⁱ By automating prescription renewal authorizations, a time-consuming and labor-intensive process, SMA realized an indirect financial savings of over \$208,000 a year by increasing nurse productivity.ⁱⁱⁱ



Michigan

Michigan has improved its e-prescribing penetration and its ranking over the past three years, moving from tenth in 2005 to sixth in 2006 and fifth in 2007. In 2007:

- 2.5 million (4.2% of total) eligible prescriptions were transmitted electronically.
- There were over 2,500 e-prescribers, representing 16% of office-based physicians.
- There were 1,508 (61% of total) pharmacies e-prescribing in 2007.
- About 6.2 million patient records were available through RxHub, representing 62% of the total residents in Michigan.
- Prescribers requested records on 2.2 million patients, and 1.8 million (81%) were found through RxHub.

Michigan is an example of an employer-driven initiative that evolved to become a multi-stakeholder collaborative, called the Southeast Michigan E-Prescribing Initiative (SEMI). General Motors (GM) was the initial driver behind SEMI. GM spent \$4.6 billion on health care in 2007, providing coverage for 1 million employees, retirees, and their dependents. Every two seconds, GM pays for a prescription.

GM, Chrysler, and Ford are championing the initiative to improve the health and safety of their employees and retirees and their families. The positive response from the leading health plans has enabled over 3,000 physicians to implement e-prescribing solutions. Two leading pharmacy benefits managers (PBMs) are providing support and consulting services for the initiative. Medco is the PBM for GM and Ford, and processes mail order prescriptions for Health Alliance Plan (HAP) and BlueCross BlueShield of Michigan. CVS/Caremark is the PBM for Chrysler. RxHub built the infrastructure required to support the secure, bi-directional exchange of patient-specific prescribing information between physicians and PBMs. SureScripts provides the infrastructure to support the secure, bidirectional exchange of prescription information between physician practices and community pharmacies. Henry Ford Medical Group and HAP were the leading early sites where e-prescribing was fully deployed. SEMI counties include Wayne, Oakland, Macomb, Washtenaw, St. Clair, Monroe, and Livingston.

Phase 1 of the program built the infrastructure, chose vendors, identified physician champions, and educated the community. Phase 2 encouraged adoption, conducted community outreach, and began training and implementation. Phase 3 involves supporting utilization, including understanding why some prescribers are using e-prescribing at a low rate, and working to overcome barriers to use.

SEMI used a different approach to vendor selection and incentives than that used by most other market-based initiatives. The philosophy from the beginning was that the physician practice should have some "skin in the game," so the program did not cover the entire cost of e-prescribing implementation.

SEMI also conducted evaluations of e-prescribing vendors and initially provided a list of 12-15 solutions that were approved for physician practices to select from. The incentive payments were made directly to physicians with a \$500 upfront payment and another \$500 payment after six months of using the technology. This contrasts with most other programs in which the sponsor contracts with the vendors for a certain number of licenses and pays the vendor rather than the physician. Over time, SEMI reduced the number of technology vendors that were covered under the program because the long list offered physician practices too many options and seemed to slow initial adoption.



The impact of SEMI has been significant. Nearly 7.5 million e-prescriptions have been generated since the launch of the program in February 2005. Nearly 3,000 prescribers are writing about 300,000 e-prescriptions per month. SEMI coalition partners have invested over \$1 million in the program.

The SEMI results^{liii} show that, among a sample of 4.2 million e-prescriptions reviewed for analysis, a severe or moderate drug-drug interaction alert was sent to prescribers for 1.3 million prescriptions, or 31%, resulting in more than 508,000 prescriptions being changed or cancelled. Nearly 120,000 medication-allergy alerts were presented, with 49,000, or 40%, being acted upon. When a formulary alert was presented, 38% of the time the physician changed the prescription to comply with formulary requirements. These types of changes today are usually detected downstream by pharmacists when they are processing the prescriptions.

In January 2008, SEMI commissioned a survey of 500 physician practices. Physicians and other practice staff responsible for writing prescriptions and managing patient medications provided their insights on using e-prescribing. Issues addressed included frequency of use, functionality, perceived benefits, satisfaction, implementation challenges, and system enhancements.

Overall, respondents' experience with e-prescribing was very positive:

- For nine out of 10, e-prescribing met or exceeded expectations.
- Over 70% are very satisfied with e-prescribing, and nearly 70% highly agree that e-prescribing improves quality of care.
- About 75% highly agree that e-prescribing improves patient safety. Nearly 65% reported at least one change in a prescription due to a safety alert.
- Approximately 70% were very satisfied with the ease of identifying drug-drug or drug-allergy interactions.
- Over 80% of prescriptions are transmitted electronically, and over 40% of prescribers say they only write e-prescriptions (not including controlled substances).
- More than 50% highly agree that e-prescribing saves clinicians time and increases productivity; 16% highly disagree.
- Over 70% experienced a reduction in communications from pharmacies; for 40% the reduction was substantial.
- Over 70% highly agree the patient's transaction at the pharmacy is faster and easier.
- About 25% highly agree that e-prescribing will save patients money and reduce a practice's costs; 20% highly disagree.
- Two out of three respondents said they are more likely to prescribe a generic or plan-preferred drug with e-prescribing, which translates to significant savings for the patient and the health plan.



Arizona

Stakeholders in Arizona have been getting educated on e-prescribing and are now well organized and poised to aggressively drive growth in adoption and use. In 2007:

- Arizona was ranked number eight in the country for e-prescribing penetration.
- 2.9% of eligible prescriptions (over 1 million) were transmitted electronically.
- There were over 800 e-prescribers, representing 9% of office-based physicians.
- 873 (78% of total) pharmacies were e-prescribing in 2007.
- Over 3.8 million patient records, representing 65% of the total residents, were accessible through RxHub in Arizona.
- Prescribers requested records on 374,000 million patients, of which 180,000 (49%) were found through RxHub.

In May 2008, Arizona Health-e Connection convened the Second Annual Health Information Technology Summit in Phoenix. At this event, Arizona's statewide e-Prescribing initiative, EazRx, was announced. EazRx is a five-year plan to encourage provider adoption of electronic prescribing, either through a stand-alone e-prescribing system or by e-prescribing within an EHR.

The goal of EazRx is to achieve e-prescription of 96% of eligible prescriptions by April 2013 (5 years). Yearly goals include:

- April 2009 (6%)
- April 2010 (12%)
- April 2011 (24%)
- April 2012 (48%)
- April 2013 (96%)

The strategies to accelerate e-prescribing in Arizona include providing an umbrella coordination organization, the EazRx E-Prescribing Steering Committee; providing information and statistics in easy-to-access format; recognizing top e-prescribers; coordinating and publishing case studies to educate the provider community; working to identify incentives and apply for grants; and improving patient safety and encouraging patient involvement in the e-prescribing process. Arizona Health-eConnection has posted e-prescribing resources on its Web site at <http://www.azhec.org/ePrescribingResources.jsp>. These include a definition of e-prescribing, an explanation of the process and infrastructure, return on investment information, an e-prescribing primer, white papers, fact sheets, and an e-prescribing continuing medical education program.

Governor Janet Napolitano (D-AZ) issued an [Executive Order](#) in early May 2008 to significantly increase patient safety through the use of e-prescribing in Arizona. "E-prescribing can reduce mistakes and the associated costs dramatically," said Governor Napolitano. "Arizona has been a leader in developing electronic health records and the means by which to exchange those records while still protecting personal privacy. This order will ensure that we stay on that cutting edge of health care technology." The governor's Executive Order also urges Arizona's executive branch agencies to develop awareness and use of consumer tools that assist in medication safety. One example is the Med Form, available at www.themedform.com. In 2005, the governor also created Arizona's Health-e Connection to research, organize, and implement a statewide e-health information system. In 2007, Arizona was awarded a \$12 million federal grant to enhance and expand that work. Arizona Health-e Connection, along with executive branch agencies, will play a leading role in coordinating the promotion of e-prescription capabilities in Arizona.



Other Market Initiatives

There are many other market initiatives that should be reviewed to provide case studies and insight on effective methods for making e-prescribing mainstream practice. Although this is not meant to be comprehensive, some additional initiatives include:

- Anthem BlueCross BlueShield—Ohio, New Hampshire
- BlueCross BlueShield of Delaware
- BlueCross BlueShield of Illinois
- BlueCross BlueShield of Louisiana
- BlueCross BlueShield of North Carolina
- CareFirst BlueCross BlueShield
- ePrescribe Florida
- The Highmark eHealth Collaborative
- Horizon BlueCross BlueShield

Summary

Every health care stakeholder can play a role in and have a significant impact on e-prescribing, including state government, governors, health plans, employers, health system, physician practices, medical societies, and others. The essential ingredients in a market-based e-prescribing initiative include stakeholder commitment and leadership, financial incentives, education and support for physician practices and pharmacies, and a robust, standards-based infrastructure of pharmacy and payer/PBM connectivity to enable electronic prescription information exchange. It should be observed that many of the successful initiatives described above occur in well-funded, multi-stakeholder settings; this points out the need for additional incentives, education, and support in the broader environment so the widespread adoption and use of e-prescribing can be achieved. As more and more communities follow in the footsteps of these leading markets, we will see dramatic growth in e-prescribing across the United States and a transition from the early adoption phase to mainstream adoption.



SECTION V: GOING FORWARD

Quality and safety threats in the prescribing process have been well documented by the Institute of Medicine and others. There is mounting evidence of the benefits of electronic prescribing in addressing these challenges, and the progress of the last four years has resulted in substantially more experience with e-prescribing in markets across the country.

Yet more work remains to be done. In the Challenges section of this report, we outlined a number of remaining barriers to the widespread adoption of e-prescribing. To facilitate progress in the years ahead, the Steering Group makes the following recommendations to move e-prescribing to mainstream practice:

Steering Group Recommendations:

- 1. The federal government must address the DEA prohibition on e-prescribing controlled substances.** The federal government must act soon to end the DEA ban on e-prescribing of controlled substances. Electronic generation, transmission, and tracking of prescriptions offer more security and accountability than does the current paper-based system. With an estimated 20% of prescriptions involving controlled substances, prescribers and pharmacies should not have to maintain alternative workflows for these prescriptions.
- 2. Payers, employers, health plans, health systems, and federal and state governments should consider replicating and expanding successful incentive programs.** Alignment of incentives is critical to accelerating adoption and effective use of e-prescribing and of health information technology more broadly. While larger-scale payment reform is needed, incentive programs can help accelerate the widespread adoption of e-prescribing by providing upfront subsidies and modest incentives to ensure use of e-prescribing for prescribers and, potentially, independent pharmacies. In addition to financial incentives, stakeholders should provide nonfinancial incentives in the form of deployment assistance to help practices be successful with e-prescribing.

The [eHealth Initiative's Blueprint: Building Consensus for Common Action](#) provides guidance for appropriately aligning incentives. According to the Blueprint, any financing or incentive program involving health IT should be meaningful and result in improvements in quality, safety, efficiency, or effectiveness in health care. It should also assure interoperability. Incentive programs should use a phased approach beginning with implementation of health IT and leading to effective use of health IT to support performance improvement. In addition, stakeholders that benefit should share some of the cost related to health IT financing or incentives.^{liv}



3. **Care providers across every setting of health care should adopt and effectively use e-prescribing.** All prescribers should adopt e-prescribing as it becomes mainstream practice. Small practices, small hospitals, and long term care facilities in particular will need incentives, resources, and support, as well as high-quality, well-designed application products, to begin transforming the way they prescribe and manage medications. There is a significant amount of work to be done in these settings, including developing a better understanding of the impact e-prescribing has on their workflow and care processes, and creating model practices for adoption and effective use. All stakeholders should collaborate on ways to effectively support e-prescribing adoption across all settings of health care.

4. **Create a public-private multi-stakeholder advisory body** to monitor, assess, and make recommendations to accelerate the effective use of e-prescribing. The advisory body should:
 - Measure and monitor national, state, and local community progress in electronic prescribing across care providers and settings. This data should piece together all available sources, including systems such as the Veteran's Administration and large closed integrated delivery systems, and strive for information on the use of e-prescribing that is as comprehensive as possible.
 - Identify methods to support effective use of e-prescribing and serve as a forum for sharing those methods among all interested stakeholders.
 - Inform and educate prescribers, pharmacies, technology solution providers, health systems, health plans, employers, policy makers, and the public in collaboration with others, such as medical and professional societies.
 - Explore critical pathways between e-prescribing, EHRs, and health information exchange.
 - Identify barriers for each type of stakeholder involved in the prescribing process, and make recommendations on how to remove those barriers.
 - Monitor unanticipated consequences of widespread e-prescribing, and make recommendations to address issues and overcome barriers.
 - Measure effective use of e-prescribing in terms of outcomes on the quality, safety, and efficiency of medication management and health care.
 - Develop an effective, efficient model for providing assistance to small practices.
 - Create an "expert resource center" to collaboratively develop and deliver a comprehensive e-prescribing curriculum, including:
 - Access to tools, resources, and a network of experienced colleagues; this would provide an important resource for providers in terms of the adoption and effective utilization of e-prescribing, EHRs, and other functions of health IT.
 - An understanding of costs and benefits, financing options, workflow and care process redesign, implementation guidelines, technical questions, and ongoing maintenance and use issues is critical in avoiding implementation failures for e-prescribing and EHRs, and also for ensuring that the quality, safety, and efficiency benefits are realized.
 - Provide independent, objective information on e-prescribing and EHR system functionality, training and support, and cost to assist practices in choosing solutions



A resource center could be created at the federal level, by medical and professional societies, or in the private sector. Over the next year, the eHealth Initiative and the Center for Improving Medication Management will work with multiple diverse stakeholders across every sector of health care to design the attributes of such an organization and make recommendations regarding how it should be created and sustained.

- 5. All stakeholders should advance the e-prescribing infrastructure.** Pharmacies and payers/PBMs have built a national infrastructure connecting their systems. Many technology vendors have certified their e-prescribing applications. The industry should encourage all pharmacies to accept electronic prescriptions and provide medication history information, all payers/PBMs to deliver formulary, eligibility, and medication history information through e-prescribing, and all vendors to deploy and support high-quality e-prescribing applications.

- 6. The federal government and the private sector should accelerate the development of standards for e-prescribing.** While fully connected e-prescribing can and is delivering real benefits based on the national standards in place today, additional standards will improve the medication management process and the availability of data in the future. A well-established process is in place to continue to develop, improve upon, test, and adopt new e-prescribing standards, and to modify current standards; this is sponsored by the National Council for Prescription Drug Programs (NCPDP). These standards development and adoption processes should be supported and accelerated and all stakeholders in the prescribing process should be involved.

About the eHealth Initiative

The eHealth Initiative and its Foundation are independent, nonprofit affiliated organizations whose missions are the same: to drive improvements in the quality, safety, and efficiency of health care through information and information technology.

eHI engages multiple stakeholders, including clinicians, consumer and patient groups, employers, health plans, health care IT suppliers, hospitals and other providers, laboratories, pharmaceutical and medical device manufacturers, pharmacies, public health, and public sector agencies, as well as its growing coalition of more than 250 state, regional, and community-based collaboratives, to develop and drive the adoption of common principles, policies, and best practices for improving the quality, safety, and effectiveness of America's health care through information and information technology.

<http://www.ehealthinitiative.org>

About the Center for Improving Medication Management

The Center for Improving Medication Management serves as an industry resource by gathering and disseminating best and worst practices related to technology deployment for electronic medication management and for leveraging that technology and connectivity to test innovative approaches to improve patient adherence with prescribed medications. The Center was founded by American Academy of Family Physicians (AAFP), Humana Inc., Intel Corporation, the Medical Group Management Association (MGMA), and SureScripts. More information about The Center is available at <http://www.theCIMM.org>.

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