

E-Prescribing

Where Health Information and Patient Care Intersect

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KEYWORDS

E-prescribing, medication therapy management, computerized provider order entry, pharmacy benefits manager, prescription exchange network, clinical decision support.

ABSTRACT

Medication therapy management can play a key role in the rising costs of healthcare, as it relates to both workflow efficiency and patient safety. E-prescribing allows for prescribing the most medically appropriate and cost effective prescription at the point of care and transmitting the prescription electronically to the patient's choice of pharmacy. E-prescribing can help eliminate medication errors, improve patient safety, and reduce costs by making the medication therapy management process more efficient.

Because of the rising costs of healthcare in the United States, there is a need for some type of healthcare reform. Many leaders view health information technology as an important tool to assist with reducing variations in quality and improving outcomes and efficiency. One of the key areas of focus and opportunity is medication therapy management.

Considerable opportunity exists with medication therapy management relative to both cost and patient safety. Approximately \$287 billion was spent on prescription drugs in the United States in 2007, which was about five times the amount spent in 1993.¹ In addition, the World Health Organization has reported that only 50 percent of people typically take their medications as prescribed. The rates are actually lower for certain medical conditions.² It is estimated that each year approximately 530,000 adverse drug events take place among Medicare beneficiaries alone because of drugs negatively interacting with other drugs the patient is already taking, or there is inadequate information about the patient's medical history.³ In a 1996 report by the Institute of Medicine (IOM), it was reported that more than 1.5 million Americans are injured annually by drug errors in hospital, nursing homes, and doctors' offices and more than 7,000 die from preventable medication errors due to illegible handwriting on prescription forms.⁴ These negative drug events may require costly interventions in order to stabilize the patient.

Electronic prescribing, often referred to as e-prescribing, helps eliminate errors, improve patient safety, and reduce costs by mak-

ing the medication prescribing process more efficient. E-Prescribing is the process of prescribing medications using a computerized provider order entry system (CPOE) that electronically exchanges prescriptions directly with the pharmacy and/or the pharmacy benefits manager (PBM).⁵ e-Prescribing can be a way to prevent medication errors caused by difficulties in reading or understanding handwritten prescriptions. In addition, e-prescribing can help reduce adverse drug events by making information, such as drug interactions and contradictions, available to prescribers at the time they are ordering a prescription. e-Prescribing might also reduce out-of-pocket costs if formulary coverage and co-payment information is available at the time the medication is being ordered.⁶

EVOLUTION OF E-PRESCRIBING

RxHub was created in 2001 by three leading pharmacy benefit manager organizations. The purpose of a pharmacy benefit manager is to fund and administer drugs on behalf of insurance companies and employers in order to control costs. RxHub also routes patient medication histories, based on claims data, and pharmacy benefit information to providers. This helps determine if a patient is eligible to receive certain medications based on the insurance plan.⁷

SureScripts was also founded in 2001 by the National Association of Chain Drug Stores and the National Community Pharmacists Association. The purpose of the SureScripts link is to provide the electronic communication between pharmacies and physicians. In July, 2008, SureScripts and RxHub merged to form SureScripts-RxHub. In 2009, Sure-Scripts-RxHub was relaunched as SureScripts®. Today, SureScripts® operates the largest electronic prescribing network and is used every day by thousands of providers across all 50 states.⁸

In addition to the creation of the technical infrastructure to allow for the communication between pharmacies and physicians, the federal government established incentives for the adoption of e-prescribing. Provisions in the Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003 were intended to foster e-prescribing by requiring standards for interoperability and by permitting third parties to offset the implementation costs. The MMA provided prescription drug coverage starting in January, 2006.⁹ To further promote the adoption of e-prescribing systems, the Medicare Improvements for Patients and Providers Act of 2008 (MIPPA) provided that starting in 2009, physicians would be eligible for incentive payments when they e-prescribe for Medicare patients seen in their clinics. Providers will receive a bonus equal to 2 percent of their charges billed to Medicare in 2009 and 2010 with gradual bonus decreases beginning in 2011.⁶ The Centers for Medicare and Medicaid Services (CMS) did add a fax exemption, to continue to allow computer-generated facsimile transmissions through January 1, 2012. However, in order to qualify for the e-prescribing incentive payment program, the provider cannot electronically create a prescription and fax it to the dispensing pharmacy. The prescription must be generated and transmitted electronically from the provider's e-prescribing

system even if the prescription is ultimately converted into a fax on the pharmacy end.⁶ Providers who are not using e-prescribing functionality by the deadline will actually have their Medicare reimbursements cut by 1 percent beginning in 2012, with the penalty increasing to 2 percent in 2014 and beyond. In addition, the meaningful use of an electronic health record matrix, as a part of the American Recovery and Reinvestment Act of 2009, provides incentives for the implementation of e-prescribing.¹⁰

E-prescribing allows for prescribing the most medically appropriate and cost effective prescription at the point of care and transmitting the prescription electronically to the patient's choice of pharmacy.

E-prescribing reduces costs, improves safety, and increases efficiencies by electronically connecting providers, pharmacists and payors. There are benefits as well as challenges to overcome for each of these stakeholder groups.

BENEFITS OF E-PRESCRIBING

There are many documented benefits to electronically prescribing medications. e-Prescribing offers clinical and economic decision support at the point of care. There are four key components of e-prescribing that must be in place to fully realize the benefits. They include: a point of care e-prescribing application, a bidirectional electronic prescription exchange network (i.e., SureScripts®), pharmacy software certified and enabled to accept e-prescriptions, and payers sharing data through an electronic prescription exchange network. If all four components exist and are effectively integrated, the following e-prescribing benefits exist.

Complete and legible prescriptions can eliminate medication errors and decrease pharmacy initiated clarifications and rejected prescriptions. When a provider has the patient's entire medication history available created by all providers and dispensing pharmacies at the point of care, better decisions can be made about overall medication management. In addition, drug interactions, contraindications, and allergy information available to the provider at the time a medication is ordered helps make better medication choices and can lead to fewer medication errors and adverse drug events. When a provider has prescription benefit information available at the time of placing a medication order, he or she can check the patient's eligibility, benefits, and formulary information prior to ordering the medication. This helps the provider order a medication that is covered by the formulary whenever possible.¹¹ Providing medication history at the point of care allows the provider to assess patient medication compliance and adherence. This allows the provider to identify and work with patients who are not compliant with their medication regimen as prescribed.

e-Prescribing benefits pharmacists by reducing the opportunity for medication errors, offering providers access to patient prescription benefit coverage. This results in fewer rejected claims and less rework for the pharmacy, and reduces paperwork and re-keying, which allows pharmacists to spend more time with patients or reallocate that time to other service activities such as

medication therapy or inventory management.¹² If the pharmacy has a certified pharmacy system, the e-prescriptions go directly into the computer system, unlike faxes or paper prescriptions. Renewal authorizations can be managed very quickly. It has been shown that e-prescriptions can reduce the amount of staff time needed to complete dispensing activities by 27 percent for new prescriptions and 10 percent for renewals.¹³ Patient compliance is another benefit of e-prescribing. Research shows that 20 percent of prescriptions are not received by pharmacies. Walgreens and SureScripts conducted a study that showed that typically once e-prescribing is implemented in a pharmacy, 11 percent more of the prescriptions get dispensed.¹² This means that more medications get picked up which results in better patient compliance. Providers prefer to do business with pharmacists that can accept electronic orders, and in the future, e-prescribing will be a requirement if a provider does not want to incur penalties in payment.

From the payor standpoint, there are many efficiency gains by e-prescribing. First of all, e-prescribing lowers the overall medication cost because the provider has formulary information available at the time the order is placed. There is improved patient safety when drug interaction and contraindication information used at the point of care drives the informed selection of the most clinically appropriate medication. Because the patient compliance rate improves, the likelihood that their overall health will improve is better. Better overall health means decreased costs in the long run.

The patient benefits from e-prescribing because of improved patient safety, decreased cost, and convenience. Because providers have allergy, drug interaction and medication history available at the time of placing the order, better decisions can be made about the medication that is ordered. Having formulary information available informs the provider of which medications are covered and which ones are not, to determine if a comparable medication can be ordered if a health plan's formulary does not cover a particular medication. While the patient shouldn't expect immediate access to the medications once an order is placed, it does mean the order arrives at the pharmacy faster. Additionally, e-prescribing reduces the need for pharmacy initiated prescription clarification such as illegible prescriptions. An added benefit for the patient is the fact that the provider has the patient compliance information available. If a patient is not taking their medication like it has been ordered, it allows the provider to counsel the patient, which in the long run, means better understanding and health of the patient. In addition, the medication renewal process is much less cumbersome for the patient, pharmacy, and provider involved.

CHALLENGES OF E-PRESCRIBING

The cost, quality and efficiency benefits of e-prescribing are dependent on how well the technology is implemented. A successful implementation requires substantial changes in workflow. Many practices do not have sufficient support and resources to manage that change, especially smaller practices.¹⁴ In addition, different practice settings have different needs as they relate to the implementation of technology.

Even though computerizing the pharmacy ordering process can reduce medication errors, if not designed properly, new types of errors can occur. Computerized drug prescribing alerts can improve

patient safety, but are often ignored because of poor specificity and alert overload. In an effort to minimize workflow disruptions, only the critical to high-severity alerts should be added.¹⁵

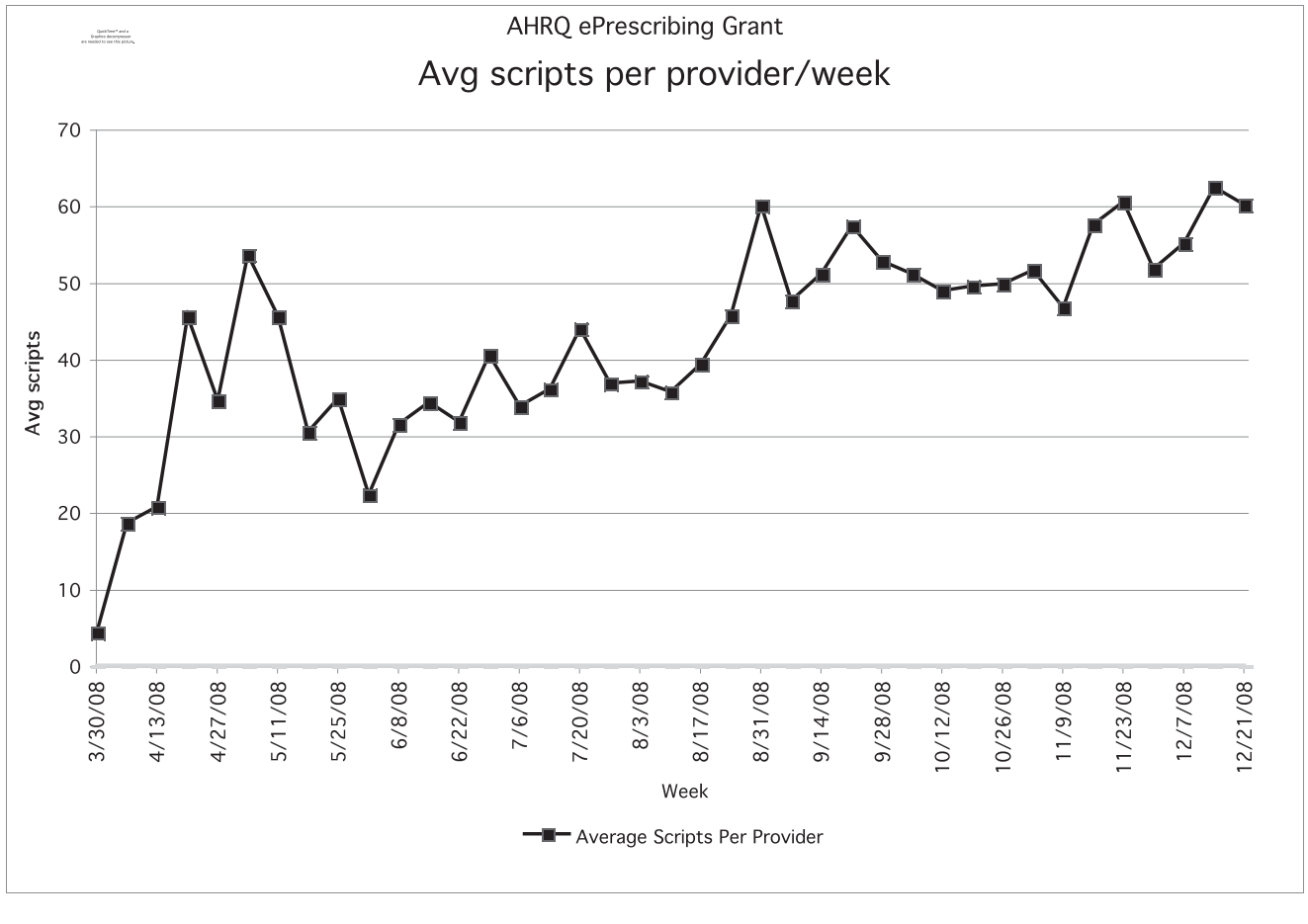
At the present time, controlled substances cannot be submitted electronically. A proposed rule has been published by the Drug Enforcement Administration (DEA), but the results of a proposed change are not yet known.

In an effort to be able to seamlessly transmit and receive information into other systems, a rigid set of standards must be adhered to. The foundation standards took place on January 1, 2006. The foundation standards relate to transactions involving: the communication of prescriptions and prescription-related information between providers and pharmacies; eligibility and benefits inquiries and responses between prescribers and Medicare Part D sponsors; and eligibility and benefits inquiries and responses between pharmacies and Part D sponsors.¹⁶ In addition to the foundation standards, CMS found formulary and benefit information and the exchange of medication history mature enough to implement standards and require e-prescribing stakeholders to meet. Potential future standards currently undergoing testing are: fill status notification; structured patient instructions; clinical drug terminology; and prior authorization testing.¹⁷ CMS is committed to the ongoing testing and working with industry experts related to the development of e-prescribing standards throughout the healthcare industry. Another issue is the need to map drug names between the e-prescribing system and the drug terms used in the clinic or hospital formulary, which is typically a much smaller and more precise list. An example is demonstrated in a project in the Regenstrief Medication Hub. Mapping of the National Drug Codes (NDCs) needed to be mapped to the Regenstrief drug term dictionary. First the NDCs were translated to the Medi-Span Generic Product Identifier Codes (GPIs). Medi-Span is a generic drug formulary database. The GPI's consolidated several NDC codes together. The NDCs are typically too granular to use in a clinic or hospital formulary listing. As an example, one drug, strength, and dosage form can have over 500 NDC numbers. The GPI's grouped several NDC numbers together that identify the same drug, strength, and dosage form. The GPI's were then mapped to the formulary drug terms as built in the Regenstrief drug terms.¹⁸

There is a cost to getting an e-prescribing program implemented. A standalone e-prescribing program typically ranges about \$800 per year for the use of the program and a service that includes online connections to pharmacies and regularly updated formulary and drug databases.¹⁹ Overall, this could average in the range of \$1,000 to \$3,000 per provider per year. If a provider already has a practice management system and/or an electronic health record and e-prescribing is a feature in the software, there will typically be an interface between the practice management system and the e-prescribing program. But by avoiding duplicate entry of patient demographic and insurance information, the interface can typically pay for itself rather quickly.

A pharmacy that is already set up for e-prescribing may not incur any start-up expense. However, a pharmacy that cannot accept electronic prescriptions will need to make an investment of an upfront investment on the pharmacy information system.

Fig. 1: Average Scripts Per Provider/Week.



In addition, a fee will be charged to the pharmacy for each new prescription and renewal request transaction. The standard retail fee is \$0.215 per successful transaction. This amount is typically affected by the volume of electronic prescriptions received and whether or not the pharmacy is connected directly to SureScripts®. In addition, the pharmacy's vendor may also charge a fee per transaction. However, it should be noted that pharmacies can expect savings over the costs of filling paper prescriptions.

avera health experience with e-prescribing

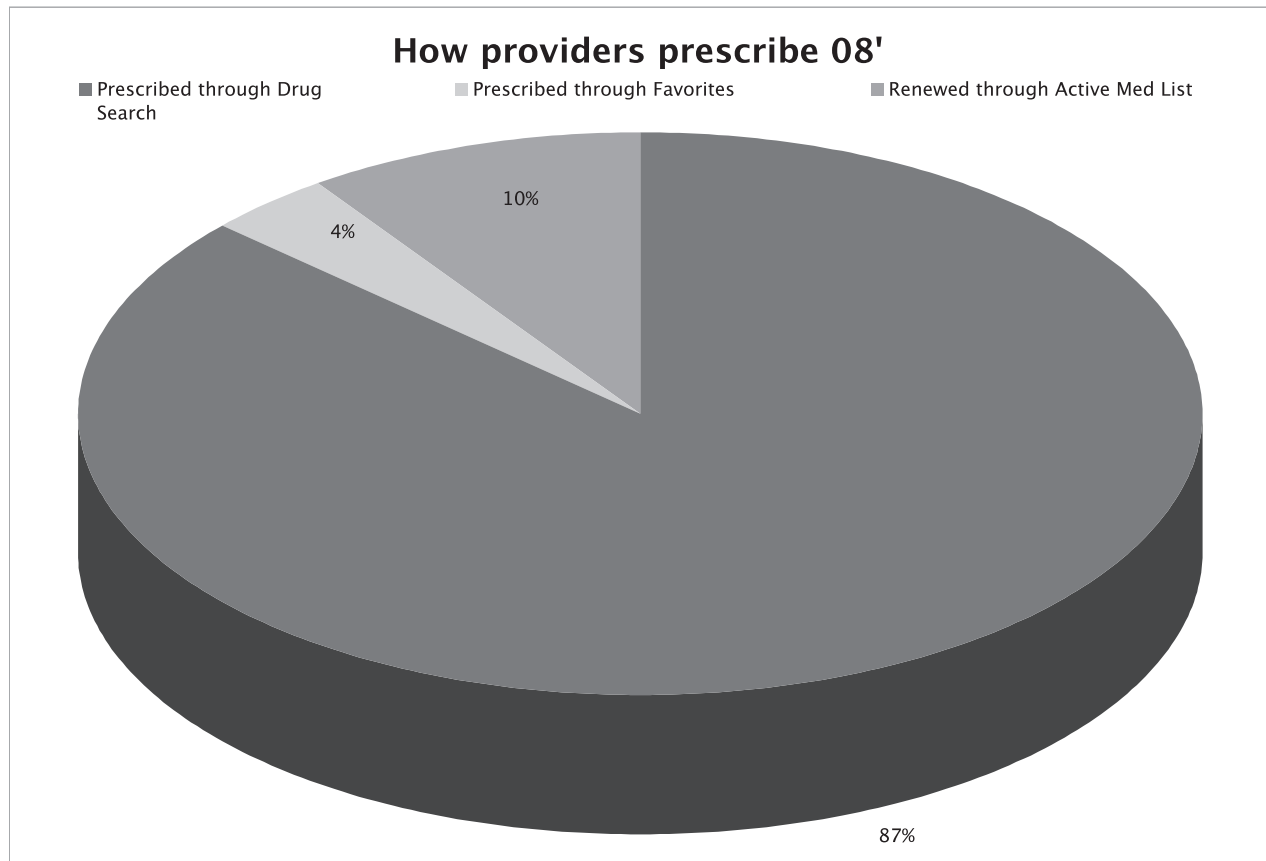
Avera Health consists of hospitals, nursing homes, clinics, home health agencies, and other healthcare entities at more than 231 locations in eastern South Dakota and surrounding states. In 2007, Avera Health began a project entitled *Improving Quality Through the Use of E-prescribing with Electronic Decision Support*. It is supported by an AHRQ grant to improve primary care. The purpose of the project is to examine whether, in rural ambulatory care settings, the use of an electronic prescribing system

with clinical decision support related to medication management increases patient prescription adherence, improves health outcomes in hypertensive patients, and improves the medication management process. As part of its overall Avera HealthCARE™ Initiative, the health system is working with 28 hospitals and 116 clinics to implement a regional electronic health record. The technology package includes advanced electronic prescribing software that provides physicians the capacity to track the fill status of prescribed medications, as well as provide interaction alerts, formulary listings, dosing options, patient medication history, and printed wallet-size medication lists. The initial e-prescribing study is examining the impact of the technology on the medication management of hypertensive patients in nine rural/frontier primary care facilities.

The research is focusing on the following health IT systems:

- DrFirst Rcopia electronic prescription management system as a stand-alone product.
- DrFirst Rcopia integrated within the Meditech/LSS Medical

Fig. 2: How Providers Prescribe, 2008.



and Practice Management (MPM) Suite; the electronic health record system being implemented at Avera Health in the ambulatory setting. Meditech/LSS includes Zynx Health decision support technology.

The research project is not far enough along to evaluate the results of the health outcomes for hypertensive patients and the medication management process. However, all nine rural primary care facilities in the initial grant have implemented e-prescribing. Although Avera is beginning to realize many of the perceived benefits of e-prescribing, considerable information can be shared on challenges and lessons learned.

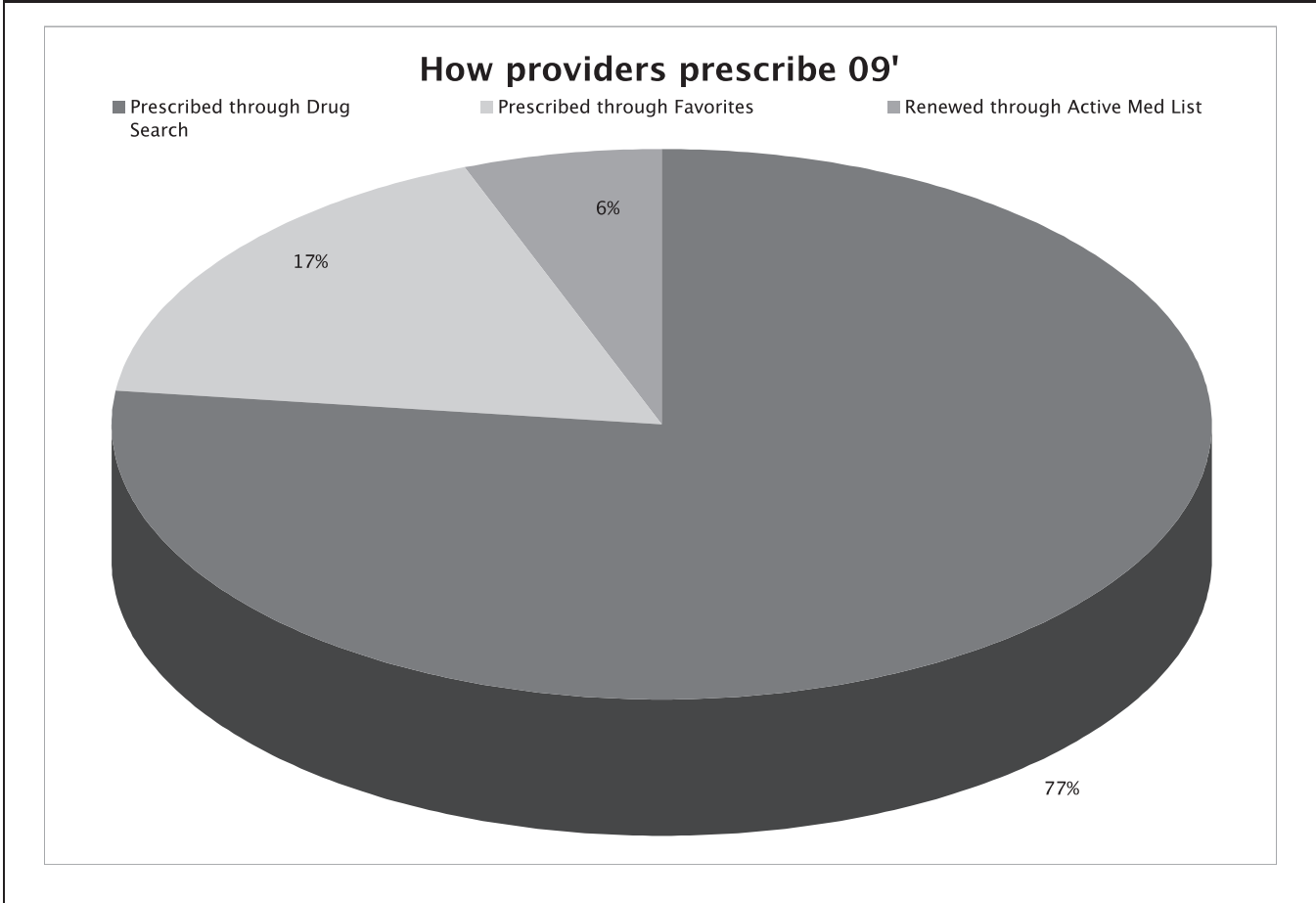
An instrumental success factor in the adoption of e-prescribing is clinic engagement. To ensure successful adoption, it is critical that the clinic staff embrace change. As such, it is imperative that clinics identify a champion of change. This role may be filled with either a physician or a clinic manager. The champion needs to be an individual in a leadership role who also has a good rapport with the rest of the staff. The Avera clinics with the most successful adoption of e-prescribing have a dedicated champion that fosters the value of change and weaves the effort into the fabric of daily operations.

Beyond the need for change advocates, there are four key com-

ponents that were previously mentioned that are necessary to realize the full benefit of e-prescribing. The components again are: a point of care e-prescribing application, a bidirectional electronic prescription exchange network (i.e., SureScripts®), pharmacy software certified and enabled to accept e-prescriptions, and payers sharing data through an electronic prescription exchange network. Unfortunately, not all pharmacies are set up to receive e-prescriptions. Additionally, not all payers share data with e-prescribing stakeholders. Pharmacy and payer participation varies across geographical regions. There is less participation in rural areas. In fact, roughly 65% of community pharmacies are connected to receive e-prescriptions through the SureScripts® network in South Dakota. Additionally, around 50 percent of payors in the area share data with e-prescribing stakeholders.⁸ The lack of consistent data sharing impedes full adoption.

The tools employed to run e-prescribing applications are also instrumental in the success of adoption. Most e-prescribing applications are simply web-based. As such, they may be accessed through most hardware with a secure internet connection. In the Avera efforts a number of hardware options were employed. Some clinics have hardwired personal computers in every exam room. Others use mobile devices such as laptops with wireless connec-

Fig. 3: How Providers Prescribe, 2009.



tivity to the internet. Finally, some clinics perform e-prescribing functions from an existing station located in a nursing station. In our experience, the most successful e-prescribing encounters take place at the point of care. The clinical and economic decision support tools available during e-prescribing are most valuable at the point of care. As such, either hardwired personal computers in exam rooms or providers willing to transport wirelessly connected devices such as laptops appear to be most successful.

Interestingly enough, the most critical component to the successful adoption of e-prescribing has less to do with the technology itself and more to do with process. Figure 1 illustrates Avera's e-prescribing activity the first ten months after implementation. Notice an initial increase in e-prescribing volume followed by a sharp decline two months following implementation. Post implementation assessments revealed that as the novelty of new technology wore off, clinics struggled with incorporating the use of the technology efficiently in their existing clinic workflow. Additionally, post go live assessments demonstrated that the clinics were not leveraging the most useful functionality within the tool.

Figure 2 shows essentially three methods to create an e-prescription. The first and least efficient is searching for a medication, selecting it, and completing the entire e-prescription required

data fields individually. This method clearly takes more time to complete than manually writing or verbally calling a prescription to the dispensing pharmacy. This laborious process comprises the majority of the e-prescribing activity in this figure. The other two manners by which an e-prescription may be created are much more efficient. Providers may select prefabricated prescription strings from a list of favorite prescriptions. Favorite prescriptions are a list of prescriptions most commonly prescribed. Prescribing medications from a provider's favorite list is as simple as selecting the prescription from a predetermined list. Additionally, providers may "renew" prescriptions from a patient's individual active medication list. Similar to leveraging the favorites list, renewing medications from a patient's active medication list is as simple as selecting and renewing the prescription.

The graphical display in Figure 3 demonstrates that Avera's use of the e-prescribing tool is shifting toward more efficient functions. It also confirms additional process opportunities exist. Upon interviewing e-prescribing providers, they state roughly 80 percent of the prescriptions they issue are either to renew existing medication therapy or for medications they commonly prescribe. As such, in an ideal e-prescribing environment, we would see closer to 20 percent of e-prescribing activity

occurring through the very tedious process “drug search” pathway illustrated in Figure 2.

The Avera e-prescribing project team has come up with a few tips for success:

1. Decide ahead of time what you want to achieve – and think of your long term goals for the practice.
2. Use a project team for the implementation and ongoing improvement.
3. Change workflow to maximize efficiencies – do not simply automate your paper process.
4. Keep staff focused.
5. Change is difficult—manage it; do not avoid it.
6. Invest in technical (hardware, patient interfaces) and staff resources.
7. Promote strong physician/administrative teamwork and determine requirements, set goals, attend demonstrations and site visits, and develop an evaluation team.
8. Prepare your IT infrastructure – make sure the vendor has 24/7 help desk support, ensure the vendor has service level agreements relative to performance, monitor performance by capturing objective data, and develop a well defined plan to address performance concerns.
9. Be prepared—money, time and patience are needed.

CONCLUSION

The opportunity that exists with medication therapy management in healthcare is extremely important to the overall issue of

rising costs in healthcare. Because the concept of e-prescribing is relatively new, there are still challenges with issues related to workflow; usage with controlled substances; messaging, terminology, and transaction standards; and the overall costs of software, hardware, and integration. However, there are many documented benefits including economic alternatives for patients, eliminating errors from poor handwriting, reducing callbacks from the pharmacy, increasing convenience for the patients, spending less time on prescription renewals, and providing an opportunity for better patient compliance to taking medications.

With the additional financial incentives over the next few years to implement e-prescribing programs in healthcare facilities, we should see an enormous growth in the use of electronic prescriptions, and greater benefits should be realized not only in costs but also the quality of healthcare. **JHIM**

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