

HIT

HEALTH INFORMATION TECHNOLOGY



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*This document was prepared with assistance from Point-of-Care Partners,
the AMCP Special Projects Committee, and
the AMCP HIT Advisory Council.*

This project was funded through a sponsorship from



INTRODUCTION

The health care industry has used information technology (IT) since the beginning of the computer age. Until recently, the primary focus has been to streamline communications and data management, improve revenue and accounts receivable performance, and manage health services utilization. For decades, community pharmacies have used IT to process enrollment and manage drug claims. Hospitals first installed information systems to admit and track patients, streamline the billing process and increase the efficiency of other tasks such as the ordering of tests, procedures, and prescriptions.

In ambulatory physician offices, IT was first used to bill patients; process claims and manage scheduling via practice management systems (PMSs). Recognizing the value of automating the clinical aspects, some companies began to develop electronic medical records (EMRs), which were effectively computerized versions of paper charts. Some of those systems integrated with PMSs and some of the PMSs evolved their technology to help manage the clinical aspects of therapy.

Electronic prescribing (e-prescribing) was one of the earliest applications of HIT. Pharmacies realized the countless hours of interpretation and reentering of data that could be saved by the transformation of a paper prescription into an electronic pre-

scription, while managed care recognized the increased ability to influence the prescribing process at the point of prescribing. Although e-prescribing has been around for decades, often functioning as an electronic prescription writer, e-prescribing is now much more than that, often including eligi-

While basic HIT concepts and acronyms are described within the body of this text, a more extensive glossary can be found at www.amcp.org/HITGlossary.pdf.

bility driven formulary information as well as clinical input. This expanded influence of HIT and e-prescribing is evident now, as e-prescribing becomes mainstream, and will even be more apparent in a few years as e-prescribing becomes the predominant form of prescribing.

Today, unlike just a few years ago, the majority of e-prescribing occurs within the context of an electronic medical record (EMR). While EMRs have been established in hospitals for some time, (more than 68 percent were using EMRs by 2006),¹ only 15 percent of medical groups had EMR systems installed². Even now, we are in the midst of another HIT transition as electronic health records (EHRs) become the successor to EMRs.

HIT encompasses a broad array of technologies involved in managing and sharing patient information electronically, rather than through paper records, of which e-prescribing, CPOE, PMS and EMRs are just a few.

A convergence of forces is driving a significant increase in the growth trajectory for HIT applications, especially those used by clinicians at the point of care. A new generation of Web-based health care applications is making systems more accessible and affordable. Quality and usability is improving, and the federal government is providing

unprecedented levels of funding to promote HIT innovation and adoption.

This HIT Primer is intended to provide an overview of the HIT landscape with a particular emphasis on the drivers, trends, and elements of health IT impacting providers and managed care pharmacy. The primer starts with a review of pivotal HIT events. It follows with an overview of the emerging “ecosystem”, including definitions of key terms such as EHR and e-prescribing. The paper concludes with a summary of the major aspects of HIT that readers should watch closely as HIT evolves, including the implications of an environment where most prescribing involves EHRs at the point of care.

BACKGROUND

The Federal government has been a significant and, until recently, largely unrecognized driver of IT development and adoption (Figure 1). In 1996, the Health Insurance Portability and Accountability Act (HIPAA) was signed into law and established privacy regulations around patient data. What is less known is that HIPAA mandated the use of standardized electron-

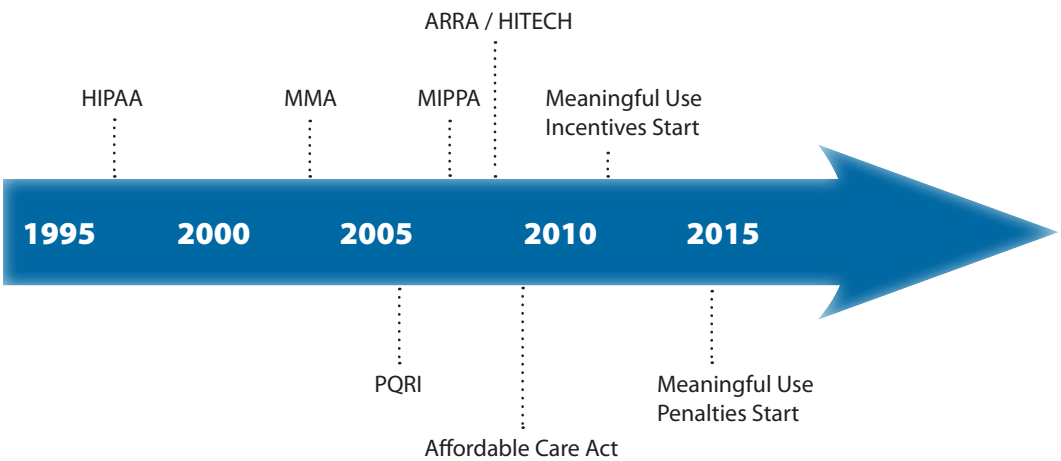
ic transactions. Consequently, there was an explosion in electronic claims and data. Health care entities seized the opportunity by leveraging their data to better monitor and manage their business.³

The next landmark piece of legislation profoundly impacting HIT was the Medicare Drug Improvement and Modernization Act of 2003 (MMA). Most widely known for providing a federally funded prescription drug benefit for Medicare recipients (Medicare Part D), it also contained a number of provisions that advanced HIT. Some of the game-changing events either written into the MMA or derived from it include:

1. Exceptions to the Stark Safe Harbor and Anti-Kickback laws permitting entities, such as hospitals, physician organizations and health plans to provide e-prescribing and EMR solutions to physicians, thereby increasing adoption.
2. Requirements that health plans accommodate e-prescribing and adhere to certain standards when an eligible professional e-prescribes for Medicare patients.

Note: The legislation did not require that eligible professionals prescribe electronically.

Figure 1. Timeline of Pivotal HIT Events



Source: POCP

- As of April 1, 2009 — all Medicare Part D plans must provide medication history, formulary and benefit information in a standardized electronic format to those physicians prescribing electronically
3. Funding of pilot studies on transaction and terminology standards for key e-prescribing components: medication history, formulary and benefit status, fill status, patient instructions, drug name standardization, and electronic prior authorization.

In 2006, the Physician Quality Reporting Initiative (**PQRI**) was established by the Tax Relief and Health Care Act of 2006.^A This program allows eligible professionals to earn additional Medicare Part B income by reporting on various quality measures related to patient treatment and conditions. As it relates to HIT, it established quality measures for e-prescribing. Originally, the program required an e-prescription to be issued at 50 percent of Medicare visits that had a prescription. In 2009, the e-prescribing measure was removed from the PQRI, and was made into an independent program (called the CMS e-prescribing Incentive Program). As a separate incentive, providers are eligible for a 2 percent e-prescribing incentive payment, which can combine with PQRI for a 4 percent total. The recently passed Affordable Care Act dictates another change — that these incentives will be integrated into Meaningful Use in 2012.

In 2008, provisions within the Medicare Improvements for Patients and Providers Act (**MIPPA**) created both incentives (carrots) and penalties (sticks) around e-prescribing use. Eligible professionals that transmit electronically at least 50 percent of their prescriptions would receive up to an additional 2 percent per year on

Pharmacists are not defined as eligible professionals in Federal legislation. Therefore any subsequent legislation that utilizes the term “eligible professional” is currently not applicable to pharmacies or pharmacists. Most specifically, ARRA and Meaningful Use incentives are not available as the current regulations stand.

their Medicare Part B claims for five years starting in 2009. Eligible professionals that don't achieve 50 percent will start incurring penalties in 2012, with penalties escalating to 2 percent in 2014.

In 2009, the Federal government set aside up to \$29 billion dollars to encourage the adoption and use of electronic health records in the Health Information Technology for Economic and Clinical Health (**HITECH**) component of the American Recovery and Reinvestment Act (**ARRA**), making the term health information technology (HIT) more prominent. This unprecedented investment is driven by the Federal government's belief that HIT is critical to the transformation of health care in the United States, and represents a watershed event whose impact on HIT cannot be overstated. With it, the Federal government provided both a blueprint for the future of health care and HIT, and financial incentives (*Figure 2*), up to \$63,750 for each eligible provider and millions to each hospital that qualifies as a “Meaningful User.” The rationale behind **Meaningful Use** and the foreseeable future of HIT was made quite clear by the HIT Policy Committee:

“We recommend that the ultimate goal of Meaningful Use of an Electronic Health Record is to enable significant and measurable improvements in pop-

^A For more information on PQRI visit: <https://www.cms.gov/PQRI/>

Figure 2. Meaningful Use Incentives

Medicare Incentives

Certified Meaningful User	2010	2011	2012	2013	2014	2015	2016	Total Incentive
2011		\$18,000	\$12,000	\$8,000	\$4,000	\$2,000		\$44,000
2012			\$18,000	\$12,000	\$8,000	\$4,000	\$2,000	\$44,000
2013				\$15,000	\$12,000	\$8,000	\$4,000	\$39,000
2014					\$12,000	\$8,000	\$4,000	\$24,000
2015+								\$ Penalties

Medicaid Incentives

Cap on Net Average Allowable Costs, per the HITECH Act	Maximum Yearly Incentive (up to 85%)	Maximum Cumulative Incentive Over 6-Year Period
For most eligible professionals		
\$25,000 in Year 1	\$21,250	\$63,750
\$10,000 in Years 2–6	\$8,500	
For pediatricians with 20-30% Medicaid patient volume		
\$16,667 in Year 1	\$14,167	\$42,500
\$6,667 in Years 2–6	\$5,667	

Source: POCP 2009

ulation health through a transformed health care delivery system. The ultimate vision is one in which all patients are fully engaged in their healthcare, providers have real-time access to all medical information and tools to help ensure the quality and safety of the care provided while also affording improved access and elimination of health care disparities. This “north star” must guide our key policy objectives, the advanced care processes needed to achieve them, and lastly, the specific use of information technology that will enable the desired outcomes, and our ability to monitor them.”⁴

Subsequent governmental actions have reinforced the belief that health care needs to transform and that HIT will play a pivotal role in that transformation. The Office of the National Coordinator for Health Information Technology (ONC or ONCHIT) has laid out a clear conceptual framework for Meaningful Use with five public policy priorities:

- Improve quality, safety, efficiency and reduce health disparities
- Improve population and public health
- Ensure adequate privacy and security protections for protected health information

Despite thousands of different health information technologies, equating HIT with the Meaningful Use effort has become commonplace. Therefore, this primer will focus on those aspects of ambulatory HIT encouraged by the Federal government under ARRA: EHRs, e-prescribing, PHRs and health information exchange (HIE).

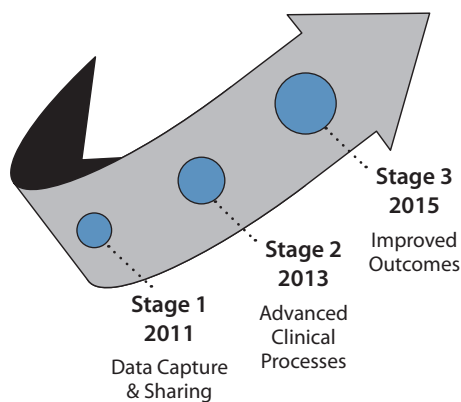
- Engage patients and families
- Improve care coordination

These priorities are addressed in three stages: Stage 1 – data capture and sharing, Stage 2 – clinical processes, and Stage 3 – improved outcomes (Figure 3). To achieve Meaningful Use in each stage, a number of criteria need to be met, including a minimum threshold for e-prescribing, interoperability (discussed on page 8), clinical decision support (CDS) and quality metrics.^B One criterion is the inclusion of formulary information, which, for managed care pharmacy, is critically important. Surprisingly, the requirement for verifying formulary was made optional and verifying insurance eligibility was dropped from the requirements going into effect in 2011. At this time, it is believed that the formulary requirement will be mandatory for 2013, though the status of the insurance eligibility check is unknown.

For eligible professionals and hospitals to qualify for Meaningful Use incentives, they must use a certified EHR.^C Not every system will qualify as an EHR certified for Meaningful Use, nor will every version of

an application. While certification is primarily a responsibility of the HIT vendor, those wishing to qualify for incentives need to

Figure 3. Meaningful Use Stages



ensure that their versions are certified. As of the time this manuscript was published, six entities were recognized as certifying entities: InfoGard Laboratories, the Certification Commission for Health IT (CCHIT), the Drummond Group, ICSA Labs, SLI Global Solutions, and Surescripts.

The ARRA incentives that provide an estimated \$27 billion to eligible profession-

^B A full list of the criteria may be found in the final rule on Meaningful Use at <http://edocket.access.gpo.gov/2010/pdf/2010-17207.pdf>.

^C HIT products certified as part of Meaningful Use can be found at: <http://onc-chpl.force.com/ehrcert>.

als “Meaningfully Using” certified EHRs^D will certainly boost EHR adoption beyond what might have occurred in their absence. However, not all providers will readily adopt EHRs for several reasons. First, although the \$44,000 that providers receive in incentives is a considerable sum of money (*Figure 2*), it must be earned over 5 years and only partially offsets the cost of EHR implementation and ongoing support. Second, some practitioners, accustomed to years of practicing medicine without EHRs, will be unwilling to change. Nevertheless, the front-loaded incentives are expected to stimulate EHR adoption in 2010 and 2011, with a second wave of adoption in 2015 fueled by the penalties, starting at 1 percent of Medicare reimbursement and increasing annually. Furthermore, it appears that many commercial insurers are starting to align their provider incentive programs with Meaningful Use, thereby reinforcing the vision that Meaningful Use of EHRs will be a standard of care in the very near future.

Before the incentives start, ONC will allocate \$2 billion through various Department of Health and Human Services (HHS) agencies to fund EHR adoption and connectivity of local HIT initiatives and HHS agencies. A portion of these funds are also slated for promoting telemedicine, the use of HIT by public health agencies, and the development of “best practices” for integrating HIT into care delivery and protecting patient health information.

The vision is that adoption will be facilitated through regional extension centers (RECs). The primary goal of these not-for-profit resource centers is to accelerate EHR adoption in small practice groups (<10 eligible professionals). Relatively few of these small practice groups currently have EHRs in place. By offering technical and purchasing assistance, education, guidance and best practice information to small practices,

RECs are expected to provide additional impetus for the adoption and use of EHRs. While the Meaningful Use incentives will certainly motivate some, the services offered by RECs to overcome implementation issues, often the biggest reason for HIT adoption failure, will raise the value threshold significantly. If constructed and managed correctly, RECs have the opportunity to dramatically improve EHR adoption and use.

Health information exchange (**HIE**) funding was also included in the HITECH Act. Responsible for creating the data exchange infrastructure, HIEs will knit together disparate information sources to provide health care professionals with a more comprehensive view of a patient’s medical information. HIEs tend to be very geocentric in nature, offering services to the majority of health care professionals in a defined area. HIEs will be the means by which a patient’s medical information can be shared electronically between physicians in different groups and/or the local hospital.

However, medical providers in one HIE are limited in their electronic communications to only those local providers that are also connected to their HIE; that is, HIEs are not currently interoperable with other HIEs. Thus, the health information of an individual that spends summers in New York is not readily available to the physician that treats that same patient during the winter months in Florida.

The ability to exchange health care information beyond the regionally-focused HIE is the realm of the National Health Information Network (**NHIN**).^E Specifically, ONC “is advancing the NHIN as a ‘network of networks’ which will connect diverse entities that need to exchange health information, such as state and regional health information exchanges (HIEs), integrated delivery systems, health plans that provide care, personally controlled health records,

^D Medicare providers are eligible for up to \$44,000 and Medicaid providers are eligible for up to \$63,750.

For a more detailed explanation of ARRA provider incentives see: <http://www.cms.gov/ehrincentiveprograms/>.

^E More information about the NHIN can be found at <http://www.hhs.gov/healthit/healthnetwork/background/>.

Federal agencies, and other networks as well as the systems to which they, in turn, connect.”⁵ While the reality of the NHIN remains a few years away, it is an environment that promotes “a more effective marketplace, greater competition and increased choice through accessibility to accurate information on health care costs, quality, and outcomes.” It also represents the final piece in HIT interoperability, which is the ability for an individual’s complete health care information to be accessed from anywhere in the country at any time.

The Federal government continues to influence HIT with the 2010 passage of the Patient Protection and Affordable Care Act and Health Care and Education Reconciliation Act, collectively referred to as the **Affordable Care Act (ACA)**. The legislative intent was to ensure that all Americans have access to high quality, affordable health care through structural changes intended to significantly reduce long-term health care costs. Three major elements of the legislation stand out because of HIT’s central role in the provisions: 1) the promotion and support of new care delivery models, 2) the expansion of coverage and use of quality measures and reporting, 3) the provision of incentives to health care providers and payers to improve health outcomes. With these three areas of focus, the ACA builds upon the central tenet of ARRA’s HITECH provisions: HIT as the means to health care transformation. Included in the ACA are numerous provisions that will shape HIT:

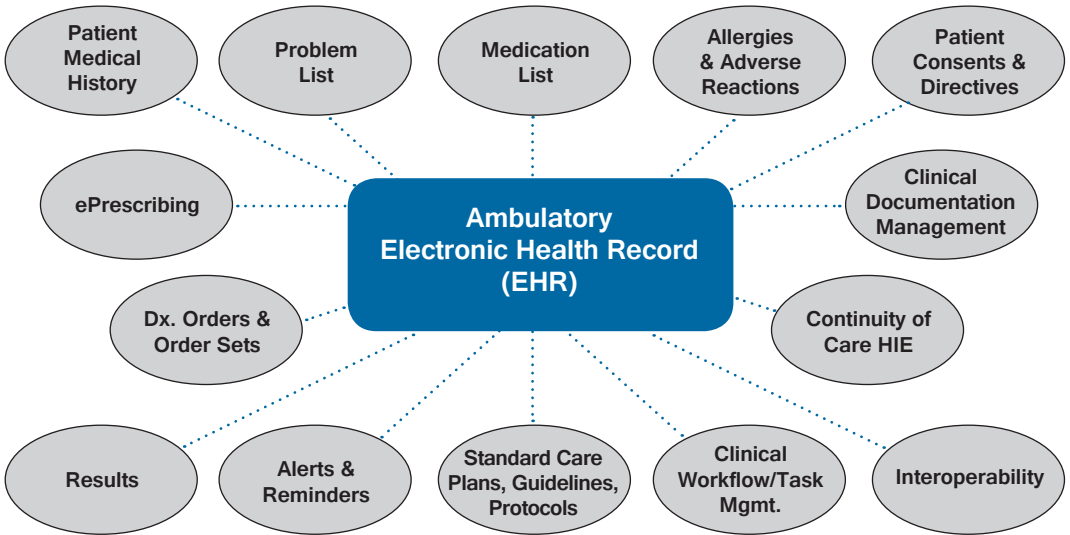
- Integrating Meaningful Use reporting with quality reporting
- Conducting a study examining methods to increase EHR usage
- Requiring EHR usage in most demonstration projects
- Requiring the Center for Quality Improvement to align best practices with Meaningful Use
- Providing grants to long-term care facilities to acquire EHRs

- Providing grants to provide HIT training to primary care residents
- Providing bonus payments to Medicare Advantage plans that incorporate HIT to help manage and coordinate patient care
- Requiring the Center for Quality Improvement and Patient Safety to expand demonstration projects for improving the quality of children’s health care and the use of HIT

Within the ACA are numerous provisions that indicate the Federal government’s intention to evaluate new ways of delivering and paying for health care, improve quality and decelerate rising costs. At the forefront are the accountable care organization (ACO) and patient-centered medical home (PCMH). Taken together the two are intended to replace the uncoordinated fee-for-service care model with a quality- and care-based model predicated on treating the whole patient, and with alternative payment models, including capitation. Central to the success of ACOs and PCMHs will be HIT, specifically the use of EHRs to manage coordination of care as well as providing the data necessary to perform macro-level organizational analysis of how best to deliver care.

In summary, there is a national consensus that our health care system needs to be transformed — that the cost of health care exceeds the value and quality of the care delivered. While there is significant debate surrounding many of the elements of that transformation, there is consensus that advancing from paper to computerized technology is critical to transformation. The Federal government has been leading that effort for more than a decade. An evolutionary path for HIT has been laid out in legislation from HIPAA through the HITECH component of ARRA and the Affordable Care Act. While this transformation is complex and roadblocks remain, these transformational elements bear watching because of the profound potential impact they are likely to have on stakeholders involved in health care.

Figure 4. EHR Functionality



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KEY HEALTH IT CONCEPTS

EMR / EHR

EHRs are the cornerstone of the modern physician’s clinical practice. In addition to performing clinical functions, they may also contain administrative and financial functions (Figure 4). EHRs also serve as the legal document for a practitioner. EHRs differ from traditional EMRs and other HIT technologies that have tended to be stand-alone applications, designed for a single purpose and disconnected from each other as well as limited in their ability to share information (**interoperability**).^F

Two of the more commonly used definitions of EHRs and EMRs are those adopted by CMS:

EMR: an electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one health care organization.

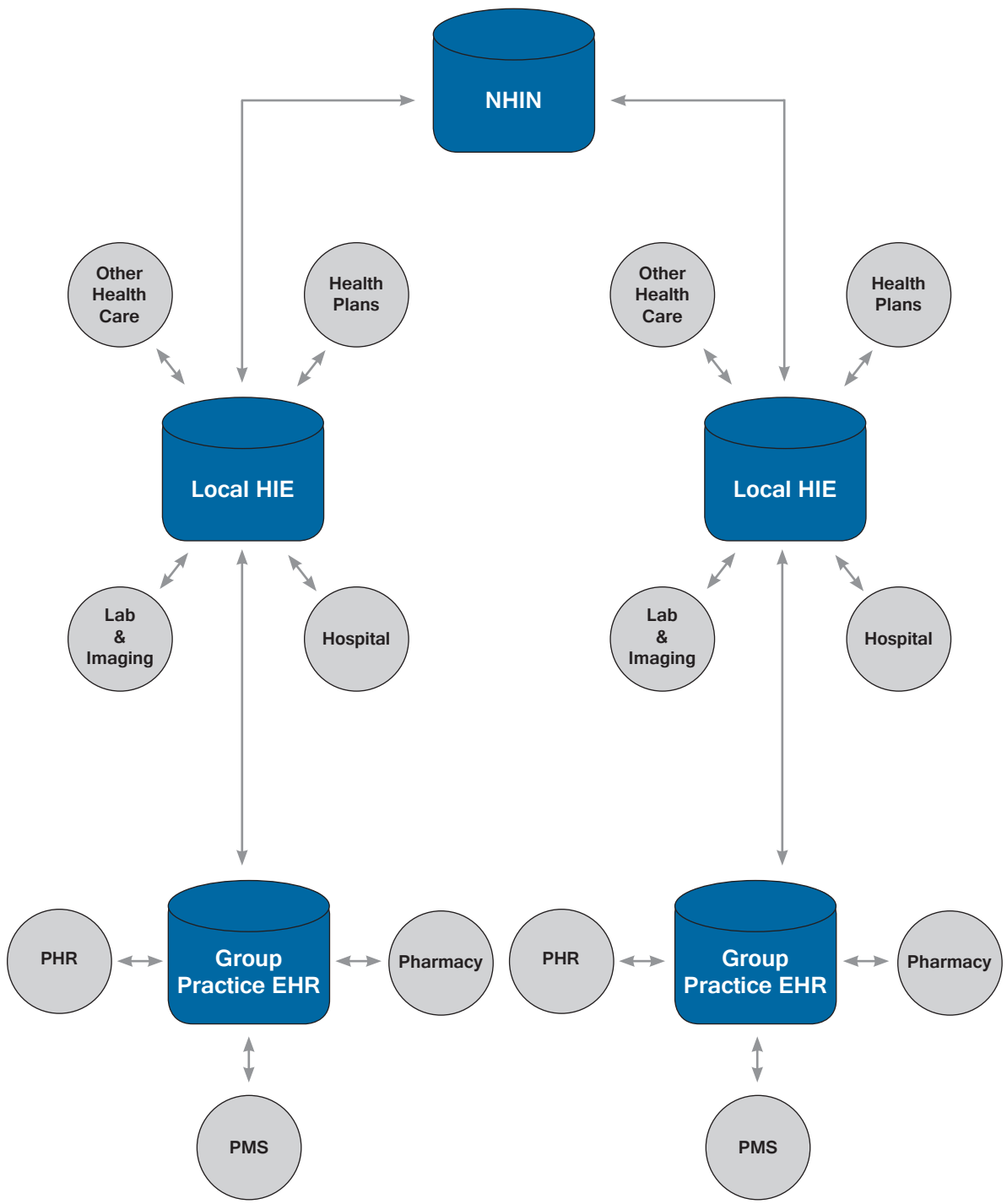
EHR: an electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be created, managed, and consulted by authorized clinicians and staff across more than one health care organization.⁶

The promise of EHRs is substantial, as interoperable HIT allows these systems to share decision-critical information (Figure 5) using consensus-based standards, which should improve individual direct patient care, but also promises to provide many public health benefits:

- Earlier detection of infectious disease outbreaks

^F “Interoperability of systems is the level to which diverse systems can exchange and process information (data) without human intervention. For systems to be interoperable a common communication protocol needs to be established. The vocabulary used by one system should be understood by the other. The International Organization for Standardization (ISO) defines interoperability as: ‘The capability to communicate, execute programs, or transfer data among various functional units in a manner that requires the user to have little or no knowledge of the unique characteristics of those units.’ “ http://cyrusxp.com/?page_id=18.

Figure 5. The Flow of Information with Interoperable HIT



Source: POCP
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Many people in the US healthcare industry, our government, and the press use the terms electronic medical record (EMR) and electronic health record (EHR) interchangeably. Definitions of EMRs and EHRs vary, but the important distinction between the two is the ability of the EHR to exchange information outside the organization (i.e., interoperability). Because EMRs will never reach their full potential without interoperability, EMRs are essentially evolving into EHRs. Thus, we will use that term for the remainder of the document.

- Improved care for chronic diseases
- Improved ability to evaluate health care through the national collection of de-identified price and quality information.⁷

According to the American Academy of Family Physicians, EHRs can provide many benefits to providers that fall broadly into the categories of productivity and financial management, quality of care, job satisfaction and patient satisfaction.⁸

Productivity and financial management can be improved through more efficient work processes, including reduced chart pulls and telephone messages. More efficient medication refills, billing and transcription; increased formulary compliance and cleaner prescriptions lead to fewer pharmacy call backs and improved coding. The use of EHRs can also improve

the reimbursement process and is often a requirement of pay-for-performance programs.

When EHRs are used to their fullest by providers, quality of care can be improved through more effective population management and proactive patient reminders. Point-of-care decision support, rapid and remote access to patient information, more coordinated chronic disease management and integration of evidence-based clinical guidelines all increase quality of care and ultimately result in a healthier population.

Job satisfaction results from fewer repetitive, tedious tasks, improved intra-office communication and easier compliance with regulations. Patients enjoy faster access to their records, reduced turn-around time for telephone messages and medication refills, and improved continuity of care.

Payers and managed care pharmacy professionals also benefit when health care professionals use EHRs. Those benefits generally fall into the categories of quality and efficiency. EHRs improve quality by providing more information at the point of care and in far less time.

Care coordination is another advantage of using EHRs. At the simplest level, care coordination is the ability to reduce redundant care, e.g., a primary care physician and specialist electronically viewing a single set of lab results. More sophisticated EHRs have applications such as clinical decision support and treatment guidelines. These applications can help payers ensure

Interoperability is the essential factor in building the infrastructure to create, transmit, store and manage health-related information.

providers are using treatment protocols consistently. As interoperable EHRs connect and share data among disparate inpatient and outpatient systems and providers, test results, medical histories, and treatments originating from various sources are available at the point of care, therefore optimizing patient care and decreasing costs.

Personal Health Record (PHR)

A **personal health record (PHR)** is “an electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards and that can be drawn from multiple sources while being managed, shared and controlled by the individual.”⁶ Thus, an important distinction between an EHR and a PHR is that a PHR is controlled by, and can be edited by, the patient, while an EHR is controlled and edited by health care providers. Similarly, while an EHR serves as the legal document for a practitioner, a PHR, which could be populated from an EHR, is owned by the patient. The PHR is the patient counterpart to the EHR.

While some companies market PHRs directly to individuals, most individuals have access to a PHR via their health plan. In such situations, the PHR is more a patient’s view of their claim history with a health plan than anything else. Individuals that use PHRs tend to use them for managing such things as their medication history and major medical event history. Because patients currently manage their medical information with varying degrees of attention, PHR effectiveness and adoption rates will be watched closely.

PHRs have great potential for getting patients involved in their health care. By putting all of a patient’s health-related

information in one place, it is much easier for patients to access and recall that information than having to remember each time they visit a new medical office. Furthermore, many hope that PHR use will engage individuals in their own health care and make them realize that they are a critical part of the process in providing quality and efficient care. Numerous studies have shown that engaged patients have better outcomes. However, the limiting factor is getting patients to be engaged in the first place.

There are several reasons for the lack of PHR use. In order to realize the advantages of a PHR, individuals must possess the desire to access them via the Internet, and have the intellect to understand, and willingness to follow through on the health care information that is available.⁶ While reasons for the lack of PHR use can be patient-focused, such as the fact that substantial numbers of patients have little or no understanding of their medical conditions or medications and lack the intellectual ability to navigate an increasingly complex health care system, there are things that can be done. Populating a PHR is onerous, even more so for those with lengthy medical histories. Some payers, such as Aetna and Kaiser Permanente, who realize the benefits of PHRs provide free populated PHRs to members.

e-prescribing

Many clinicians and patients have their first experience to HIT through e-prescribing. E-prescribing, as defined by Medicare Part D, is the transmission, using electronic media, of prescription or prescription-related information.⁹ In the 1990s, e-prescribing was little more than a hand-held electronic prescription writer that faxed prescriptions.

⁶ According to the recent California HealthCare Foundation study: Consumers and Health Information Technology: A National Survey, April 2010, about 7 percent of those surveyed say they have used a PHR. That was double the proportion identified two years earlier. The survey found that higher-income individuals are the most likely to have used a PHR, but that lower-income adults, those with chronic conditions, and those without a college degree were most likely to benefit. The survey also found that more than half of adults are interested in using online applications to track their health. Of those who did not have a PHR, 40% were interested in using one.

Current definitions of e-prescribing reflect the change from a simple stand-alone application to something much more involved: the use of electronic tools to prescribe and transmit medication information to pharmacies. “ePrescribing tools can include both software programs, as well as hardware like personal computers, handheld and wireless devices, and touch screens.”¹⁰ Unlike a decade ago, the majority of e-prescribing occurs within an EHR. Recent reports indicate that 70 percent of all e-prescriptions emanate from EHRs¹¹ and this number will likely continue to rise. E-prescribing is becoming more prevalent as the population in general, including prescribers and physician office staff, becomes more comfortable with computer technology. The underlying driver behind increased use is that all key stakeholders, prescribers, patients, pharmacies, payers, health plans, and PBMs recognize the advantages of e-prescribing. Furthermore, more advanced applications provide more value. Advanced e-prescribing applications with clinical decision support interoperability, and access to electronic health records reduce medication errors, increase productivity of clinicians and their support staff, and improve formulary compliance.

The earliest and most frequently cited benefit of e-prescribing is improvement in patient safety. In 2007, the Institute of Medicine recognized e-prescribing as one of the most promising tools to reduce such errors and recommended that all prescriptions be written electronically by 2010.¹² A minimum of 1.5 million preventable medication errors occur each year in hospitals, nursing homes and ambulatory care settings, according to the Institute of Medicine (IOM).¹³

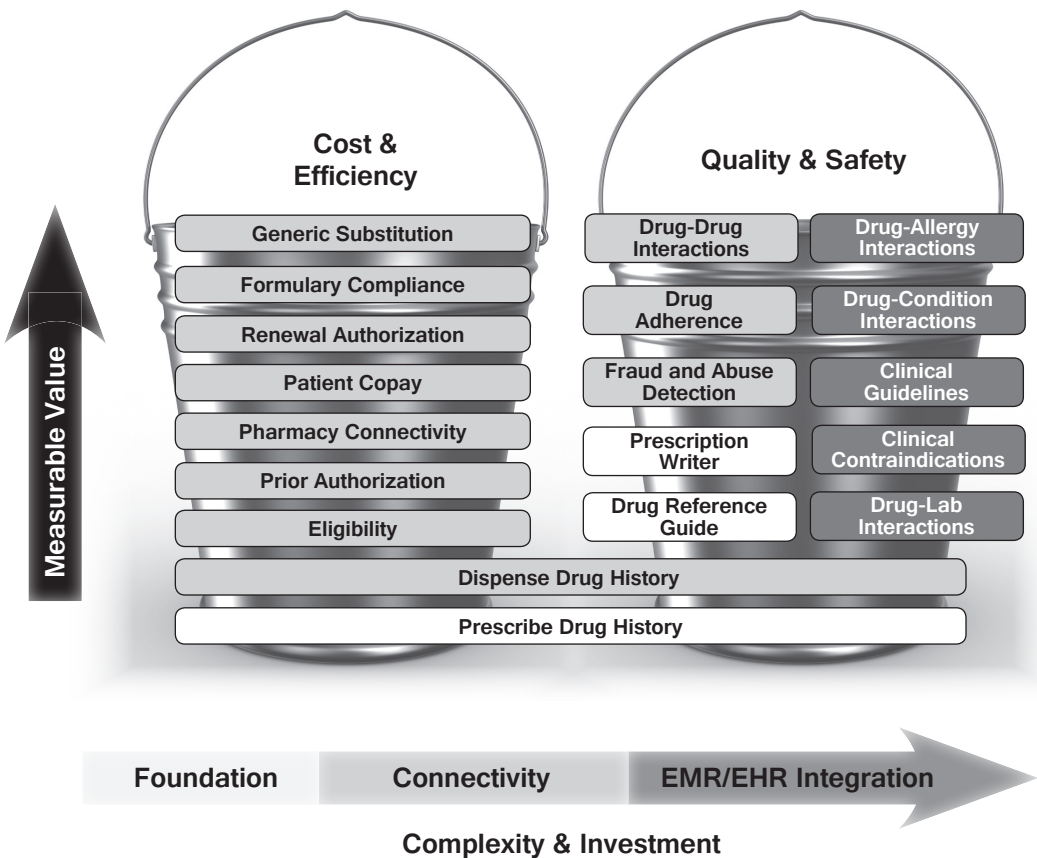
Initially, pharmacies and managed care drove the development of e-prescribing, as transforming a paper prescription into an electronic rendering saved pharmacists countless hours of interpretation and reentering of data, while managed care recognized the value of formulary feedback at the point of prescribing. Because of the substantial and sustained early investments by these stakeholders, e-prescribing is more advanced than other areas of ambulatory HIT, and has served as models for HIT product development, standards development, information transmission, and adoption.

In July of 2010, one of the last barriers to e-prescribing adoption was removed when the Drug Enforcement Agency (DEA) finally permitted the e-prescribing of controlled substances (EPCS). It may be some time before EPCS becomes widespread because many state e-prescribing laws may need to be modified. Vendors busy with meeting Meaningful Use requirements need to develop the new capability, and the prescriber requirements for EPCS are significantly more demanding, requiring prescribers and software to be certified by a third party and for prescribers to use two different forms of ID authentication.

While recent projections indicate that >300 million e-prescriptions will be transmitted in 2010, not all e-prescribing is the same.^H At its most basic level, e-prescribing is nothing more than an electronic prescription writer. Although this basic functionality mitigates the risk of medication errors caused by illegible written prescrip-

^H The availability of an e-prescribing application does not necessarily translate into its use. Furthermore, many EMRs allow prescribers to turn off features such as formulary or reduce the alert levels for drug-drug interactions, thereby limiting effectiveness.

Figure 6. e-Prescribing Value



Source: POCP 2009

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tions, only when the full capabilities of HIT are leveraged, such as the use of clinical decision support to detect possible interactions and contraindications, will the value of e-prescribing be maximized (Figure 6).

Upon entering a patient name, many e-prescribing applications will display additional patient information, such as medication history. Upon drug selection, prompts for drug quantities and directions, easy access to the prescriber's commonly used medications (i.e., favorites), and an alternative medications list that includes generics and preferred brands occur almost instantly. More advanced e-prescribing applications have the potential to check drug information databases for appropriate prescribing guidelines, the patient's complete

medication profile for drug interactions, and the patient's electronic medical record for disease or allergy contraindications. This resource allows the prescriber to review the chart online while the patient is still in the office and to request additional information from the patient if necessary. After reviewing the prescription, the prescriber selects a dispensing pharmacy. The e-prescribing application can then be used to transmit the prescription electronically, send via fax, or even print the prescription and hand to the patient.

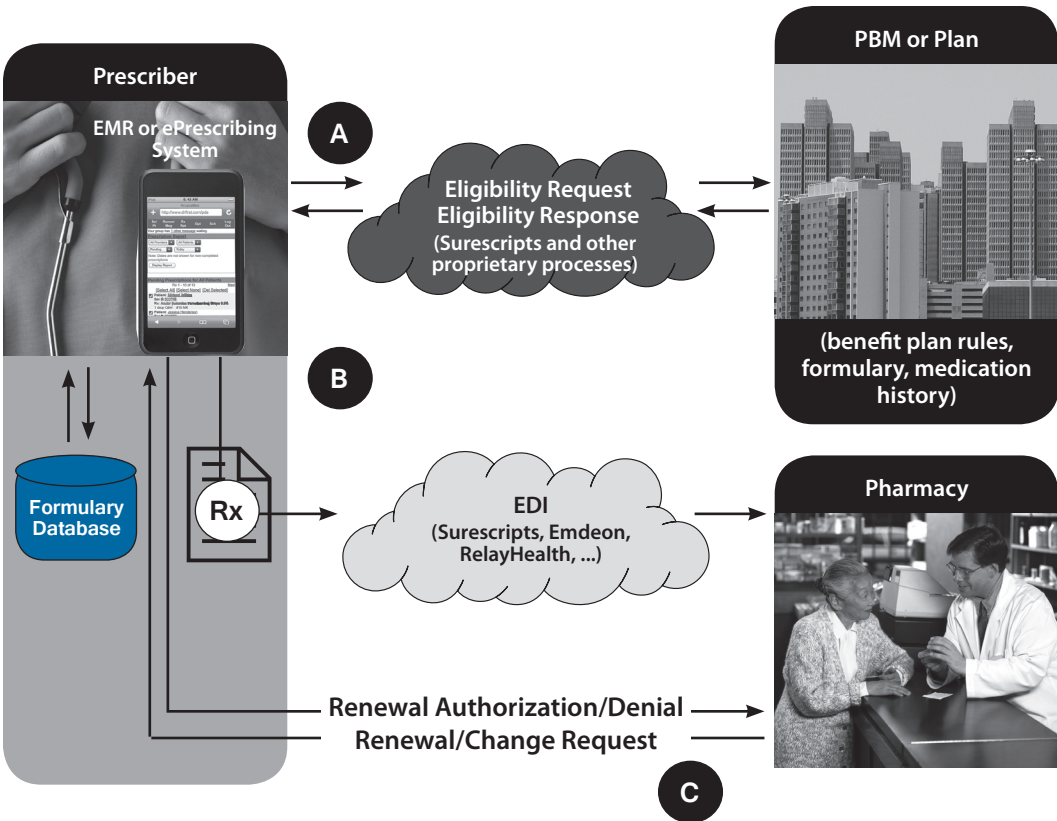
The ability to have real-time bi-directional e-prescribing connectivity, allowing communication between prescriber and pharmacy, represents a leap from the stand-alone disconnected health care of the past

(Figure 7). This progress is achieved by providing prescribers with the means to connect electronically, in real-time, with the patient’s health plan or pharmacy benefit management (PBM) company; determine patient insurance eligibility; obtain a medication history; and gain feedback as to whether a specific medication is included on the organization’s formulary, and if not, be provided a list of formulary alternatives. In 2010, more than 70 percent of patients had the potential to be part of this advanced form of e-prescribing.¹⁴ While many have held this form of e-prescribing up as a model for the advantages of interoperability, the requirement for this type of e-prescribing was dropped from the initial Meaningful Use requirements. However,

it is expected to be included in the next phase of Meaningful Use requirements scheduled to begin in 2013.

The benefits of e-prescribing are more than the oft-cited reduction in medication errors. e-prescribing improves the efficiency and quality of the process — physicians, pharmacists, and their support staff spend considerably less time with the prescribing process. Prescriber efficiency improves when e-prescribing is fully implemented in the office environment. When the prescriber enters the prescription into the e-prescribing application, the prescription is transmitted to the pharmacy, the patient’s electronic medical record is updated, and appropriate charges are automatically generated in the

Figure 7. Bi-directional Interoperable e-Prescribing



Source: POCP 2010

office billing system (assuming these systems are linked electronically).

Prescribers, pharmacists, and their staff also benefit because much of the “pain” encountered in the traditional paper-based prescribing process is minimized with e-prescribing; prescribers and patients can address such issues as copays, formulary alternatives, medication history, and prior authorization in the prescriber’s office. This makes it easier for the prescriber to consider alternatives and to discuss options directly with the patient while the patient is in front of the prescriber rather than while the patient is waiting at the pharmacy. One e-prescribing initiative found that when a formulary alert was presented, 39 percent of the time the physician changed the prescription to comply with the formulary.¹⁵ Furthermore, when formulary information is available at the point of prescribing the ability of patients to reduce their copayment expenses is significant and re-work when the patient arrives at the pharmacy is avoided.

E-prescribing can significantly improve the efficiency of pharmacy dispensing operations. Electronically transmitted prescriptions do not have legibility issues, can improve work flow, and can reduce dispensing times. Systems are available where the electronic prescription data flows automatically into the pharmacy’s prescription dispensing software thereby eliminating re-keying of data and streamlining the prescription dispensing process. The efficiency of electronic prescribing is particularly evident in the renewal (sometimes known as refill) process when pharmacies send renewals/refill requests electronically and the prescriber approves electronically. Furthermore, electronic renewals can be quickly queued up and approved by a prescriber or legally authorized staff member by simply opening the request and accepting. Pharmacy efficiency increases when they receive an electronic prescription

One of the reasons that patients like e-prescriptions is that it avoids the necessity of having to first drop off a prescription at a pharmacy. On the other hand, one of the major reasons for the dispensing of paper prescriptions to patients of e-prescribers is the patient’s insistence that they have a paper prescription.

because many of the issues currently resolved at the pharmacy, such as benefit design, formulary alternatives, utilization management requirements, and quantity limits, are addressed upstream, before the prescriber transmits the prescription. E-prescribing also has the potential to significantly reduce issues around claim adjudication for pharmacies as well as payers because the prescription claim is more likely to be accepted by the payer when it has already been associated with the payer’s formulary.

Payers also benefit from e-prescribing. Drug costs may decrease due to increased formulary compliance via the shift from branded drugs to generics and the shift from non-preferred drugs to preferred drugs. E-prescribing software also provides an opportunity for PBMs and health plans to implement clinical decision support tools, or electronic guidance, which encourages providers to follow recognized prescribing guidelines. As e-prescribing develops and interoperability becomes the standard, it is likely that additional benefits will accrue such as real-time prior authorization.

Recently, e-prescribing as a means of promoting medication adherence has received considerable attention from many health care stakeholders, especially because of the opportunity to actively promote adherence at the point of care.

It remains unclear as to whether the actual process of electronic prescription writing and transmission impact adherence. While few studies have been published on e-prescribing's impact on medication adherence, the research is intriguing. One study found that there was an 11 percent increase in volume after physicians began e-prescribing.¹⁶ Furthermore, it was reported that as many, if not more, prescriptions were picked up at the pharmacy. A recent study presents a somewhat different view — electronic prescriptions were 64 percent more likely to be filled and not picked up.¹⁷ While there has been discussion about the possibility that patients pick up their e-prescriptions sooner, published research is lacking.

Challenges Remain

For all the promise of e-prescribing, it is not without its drawbacks and difficulties. e-prescribing and computerized physician order entry (CPOE) can also introduce new kinds of errors, either because the prescriber checks the wrong box or because the system has difficulty displaying information. Examples include fragmented displays that prevent a coherent view of patients' medications, pharmacy inventory displays mistaken for dosage guidelines, and inflexible ordering formats generating wrong orders.¹⁸

Developers of e-prescribing applications are generally still searching for the optimal balance between displaying alerts (e.g., possible drug interaction) that are perceived as useful by the busy clinician and alerts that are seen as counterproductive to the patient encounter.¹⁹ As electronic formularies proliferate to support the electronic prescribing process, the formulary status

of a particular drug may be represented incorrectly or incompletely. E-prescribing applications can also be problematic when a prescriber cannot find the desired drug. Sometimes this is a user issue and can be resolved with education. Occasionally, drugs are unavailable to be prescribed electronically because there is a lag between drug approval and appearance of the drug on an e-prescribing application. There are several reasons for a delay, including the lag between listing of a recently approved drug in a drug database and incorporation of information into an e-prescribing application.

E-prescribing has progressed considerably in the last few decades from when it was nothing more than a glorified electronic prescription writer to an application that can interact with other HIT functionality, such as clinical decision support and drug-drug interaction alerts. The use of bi-directional communications allows the use of eligibility informed formulary. It also increases the efficiency of the e-prescribing process, especially for renewals. It is very clear that e-prescribing, while not yet mainstream, will become the norm and the predominant form of prescribing within a few years.

CONCLUSION

HIT is poised to make an unprecedented impact on the quality, safety, and cost-effectiveness of health care in the United States. As the federal government's ARRA funds flow through the system, more health care professionals will meaningfully use EHRs and benefits will accrue to all stakeholders. As evidence mounts of the value of HIT to the various stakeholders, the rate of adoption will continue to accelerate.

Currently, one in three office-based prescribers are prescribing electronically²⁰ and that number is forecast to become one in two within a few years.²¹ Similarly, ambulatory EHR usage, which approached 19 percent in 2010 will likely approach 55 percent by 2017.²² Many of these medical practices and clinics will be connected to one of the 234+ health information exchanges operational or in development.²³ Just as electronic data interchange and automated teller machines transformed the banking industry forty years ago, the eventual ubiquity of interoperable electronic health records will change the health care landscape.

Widespread adoption of HIT is not without its challenges. "An important challenge for HIT is its cost: who should pay? Providers are expected to bear most of the cost of implementation, while much of the savings accrue to others — insurers, patients and governments. Another challenge is protecting patient privacy. Once confidential patient information has been stored electronically, only those with a legitimate need to know should have access to it."²⁴ Persistent gaps in electronic data standards will continue to inhibit the health care industry from realizing the full potential of EHRs. Particularly problematic is the lack of a standardized, common medical vocabulary. Although the advancement of HIT will likely be interrupted with setbacks along the way, its potential impact on quality, safety, and costs is mainly a question of magnitude.

The transformation in how health information flows among providers, payers, managed care organizations, pharmacies and health care consumers will have major impact. Stakeholders will need to respond accordingly. EHRs, clinical decision support, and eligibility-informed formularies will soon be within the norm of health care. HIT advances, such as these, closely align with the goals of Federal health care transformation: delivering better patient care and quality while lowering costs.

Acquiring a solid base of knowledge about the current state and future direction of HIT by reading this primer and other sources is a critical first step toward proactive engagement. Today's health care delivery relies heavily upon HIT. Tomorrow, it will be even more so.

A glossary of HIT terms can be found at www.amcp.org/HITGlossary.pdf.

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May 2011 10K