eMedication Management:
A New Paradigm for Creating Value in Today's Health Care Ecosystem

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Table of Contents

Executive Summary

As America's health care system evolves to a value-based payment model, better coordination of care is widely viewed as key to improving quality and reducing costs. How patients' medications are managed across the continuum is a major factor in the effectiveness of care coordination.

That is especially true in light of several drivers for change, foremost the expanded availability of insurance and, subsequently, increased drug spending. Second is the growth of pharmacy as a significant portion of the nation's economy and payer and patient expenditures. A related trend is the growing importance of medications—especially specialty medications—in the treatment of care, especially for the elderly and chronically ill. Another significant trend is the shift from fee-for-service to value-based payments (shared savings, bundled payments and partial capitation). Delivery will also be restructured, with accountable care organizations, patient-centered medical homes, newly constituted integrated delivery networks and integrated health networks playing increasingly prominent roles.

Pharmacists, pharmacies and related health information technologies are key elements in ensuring that cost and quality targets are met, patients are engaged in their care and outcomes improve. Electronic prescribing (ePrescribing) is a start toward realizing the promise of technology to improve medication management processes. However, a broader view of health information technology (health IT) is needed to stimulate innovation and ensure that health IT systems are not locked into today's technologies.

As a result, a new paradigm is needed. This paper introduces eMedication Management and explains why it is needed to highlight where and how health IT can improve processes for patient assessment, prescribing and dispensing medications and monitoring outcomes. These components reflect today's ePrescribing processes, but go beyond them to conceptualize today's changes in emphasis on care delivery and coordination. eMedication Management takes into account today's new dynamic of patient-centric care, in which the patient is at the core of the model and is connected via health IT with payers, pharmacies and the care team. These, in turn, are linked through health IT in sharing the patients' clinical, medication and related administrative information. They ultimately inform the eMedication Management processes, as well as help payers and providers better understand costs and quality—the keys to financial sustainability and risk management. Moreover, eMedication Management serves as a model on which stakeholders can most efficiently manage specialty prescriptions, critically important given the prevalence of specialty medications in the drug pipeline. A sustainable health care system is possible with the help of smart technology.

This paper also explores ways to improve the building blocks and effectiveness of eMedication Management. These include improving connectivity with pharmacies; enabling pharmacists to better share information with the care team; improving care management; addressing the rise of specialty medication use; upgrading the content and availability of medication history; improving the quality of prescription information; facilitating the use of ePrescribing for controlled substances; improving medication reconciliation; facilitating patient engagement and increasing medication adherence.

Introduction

American health care is undergoing an unprecedented transformation. Skyrocketing costs, the rise of chronic diseases, government mandates and other factors are driving fundamental changes in delivery and payment systems. The system is rapidly moving from fragmented, episodic care that is driven—and paid for—by volume to integrated delivery models that are patient-centric, risk bearing and rewarding of quality and value.

Medications and their management are integral parts of the care continuum, essential for improved patient outcomes and safety. However, drug spend is rising exponentially, especially for the specialty medications needed by the growing chronically ill and elderly populations. Usage of medications is skyrocketing as well, but also is accompanied by patient noncompliance that results in avoidable deaths, hospitalizations and emergency department visits.

Swirling around these factors impacting the effectiveness of medication management is the promise of health information technology (health IT). The result: stakeholders are looking to leverage health IT to reduce the costs of medication usage as well as improve quality and patient outcomes.

Traditional models for conceptualizing the prescribing and use of medications do not take into account the new realities of new payment and delivery models and the integral role of health IT to facilitate patient-centered accountable care. As a result, a new model is needed: eMedication Management. The eMedication Management model serves as a catalyst for change to improve every step of what should be an integrated, continuous medication management process. Such process improvement will improve the costs, quality and safety of patient care, as well as impact the sustainability of value-based care.

By definition, eMedication Management is a patient-centric, information technology-based set of processes for conducting the fundamental steps of medication management. It includes patient assessment, medication reconciliation, prescribing, dispensing, and monitoring. In contrast to traditional models of managing a patient's medication therapy, eMedication Management enables patients, their care teams, pharmacies and payers to collaborate in the medication decision-making and management processes using decision support tools and by sharing clinical, medication, and administrative information.

The purpose of this paper is to articulate factors supporting the need for eMedication Management, including clinical and economic factors. It describes the building blocks of use of eMedication Management and how health IT is then used to link these building blocks to patient-centric care that is data-driven and coordinated across the continuum of care. It describes how eMedication Management can create value for stakeholders and opportunities for improvements in the model's foundational elements.

Drivers for Change

Four forces of change exhort the need for eMedication Management: the increased use of prescription drugs; America's rising drug spend; the impact of new care delivery and payment models; and the health care ecosystem's increasing reliance on health IT. These are briefly described below.

Increased use of prescription drugs

Prescription drug use is rising. More than 3.5 billion prescriptions are written every year. A recent Mayo Clinic study estimated that 70 percent of Americans are on at least one prescription drug; more than half receive at least two prescription medications; and one out of five patients leave their doctor visit with five or more prescription drugs.[1] Usage should continue to rise, due in part to increased availability and uptake of insurance—primarily through Medicaid expansions and newly available plans in the individual insurance market. This will enable more consumers to fill prescriptions.[2]

Rising drug spend

Pharmacy is an important component of overall health care spending, representing 12% of domestic gross domestic product. While growth in drug spend was essentially flat in 2011 and 2012, annual spending in 2012 reached $325.8 billion. In 2014, prescription drug spending is projected to grow at a rate of 10.7% and average 7.2% from 2015 through 2020.[3] Those outlays are expected to rise rapidly in the near future because of emerging therapies, such as biologics, and specialty medication spending, which is expected to quadruple and reach about $402 billion annually by 2020.[4] The latter is due to the significant increases in the chronically ill and the elderly. Both populations require expensive specialty medications to address their complex care needs, which can range from $2,000 to as much as $750,000 per patient per year.[5]

Impact of new patient-centric care delivery models

In an attempt to mitigate the increase in costs, there is a shift from fee-for-service to value-based delivery models. These include accountable care organizations (ACOs), patient-centered medical homes (PCMHs), newly constituted integrated delivery networks (IDNs) and integrated health networks (IHNs). Their success hinges on new, enhanced ways to deliver well-coordinated care—including medication management—that drives higher quality outcomes, while controlling and decreasing system-wide costs. Moreover, these new delivery systems will leverage health IT and depend on a health IT backbone. These are needed to deliver proactive, coordinated and team-based care, which allows the care team—patients, physicians, pharmacists, nurses and care managers—to share the health information required to collaboratively develop and manage effective medication therapy for patients. Health IT and health information exchange will be essential to the reporting on outcomes, quality and costs—both within and across organizational participants and their trading partners.

Increased reliance on health information technology

The health care sector is becoming increasingly reliant on health information technology (health IT). That dependency is enabled by four health IT trends. Their components improve interoperability, connectivity and processes for wisely managing medications across the continuum of care for various populations. They also connect all stakeholders, including the care team, patients and their caregivers, and payers.

1. **Adoption of electronic health records (EHRs).** According to the federal government, the majority of physicians and hospitals have EHRs[6] and overall adoption should reach 90% by 2019. EHR adoption is being accelerated by requirements and incentives from both public and private payers.

2. **Pervasiveness of electronic prescribing (ePrescribing).** ePrescribing is now mainstream. Most prescriptions (69%) were written electronically in 2012 and nearly half of dispensed prescriptions were routed electronically. Almost all retail pharmacies can receive ePrescriptions. Uptake should continue and will be enabled by EHR adoption because most ePrescriptions are written using EHRs, instead of stand-alone systems.

3. **Expansion of health information exchanges (HIEs).** HIEs are necessary to connect all stakeholders involved in a patient's medication management, so that hospitals, providers, and pharmacies can collect and exchange administrative, clinical and pharmacy data. Experts believe there are some 280 HIEs in the United States and participation in them is skyrocketing—particularly by hospitals[7] and by ACOs and PCMHs as they go live and become financially viable.

4. **Increased connectivity through emerging applications,** including telehealth, mobile health (mHealth) applications, and Web-based portals. These will enable communications and the exchange of clinical and administrative data among the care team and patients—thus improving care coordination, creating better quality care and outcomes and reducing costs. These emerging applications also will allow patients to become more in engaged in the management of their care.

eMedication Management:
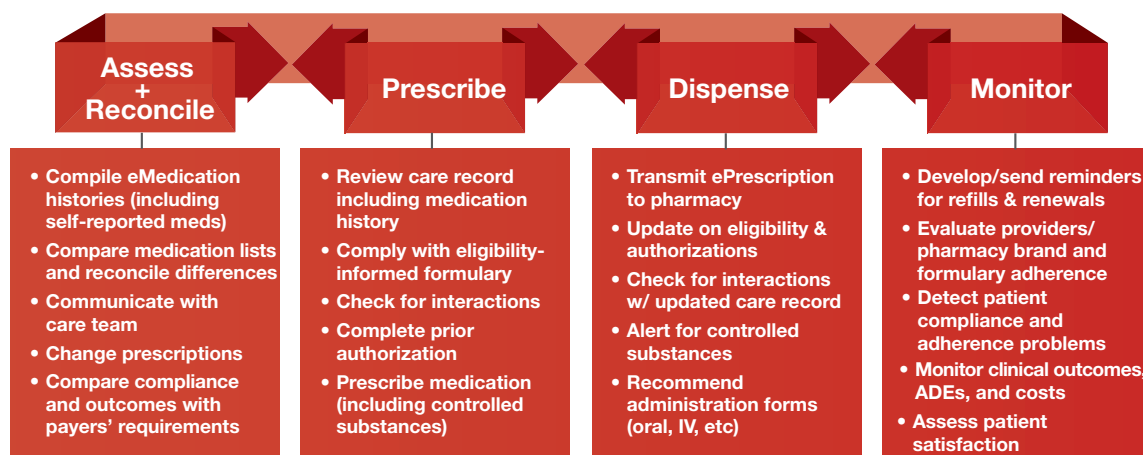# A New Model for a New Age

With all of that as a backdrop, it is clear that today's new payment and delivery models demand a new paradigm for managing a patient's drug therapy—electronic medication management (eMedication management)—for comprehensive medication management within and across sites of care, as well as for transitions of care.

eMedication Management relies on technology to streamline processes and connect the dots between the clinical, administrative and patient sides of the equation. It leverages technology to facilitate accountable, patient-centered and cost-effective care for defined, attributed populations. It creates value for all stakeholders through the capture, linkage and exchange of real-world, actionable data concerning clinical care and prescription therapies within care sites and transitions of care. This can be used to assess outcomes, mitigate risk and address quality and cost targets—the keys to profitability and sustainability in today's evolving health care environment.

The eMedication Model embraces traditional models for treatment and dispensing of medications in patient care, such as the model developed by Bell *et al* for ePrescribing when the technology was in its infancy in 2004.[8] The eMedication Management model further builds on the foundational work on medication management developed under the auspices of the Office of the National Coordinator for Health Information Technology (ONC).[9] It also takes into account findings from a literature review about the impact of health IT on medication management processes, which are detailed in a 2011 report from the Agency for Healthcare Research and Quality (AHRQ).[10]

Figure 1 illustrates four interlocking building blocks of the eMedication Management process: **assess and reconcile, prescribe, dispense, and monitor**. They reflect the ePrescribing foundation articulated by Bell *et al*. However, they go beyond ePrescribing to conceptualize and accommodate the changes taking place in care delivery, medication management and care coordination in today's health care ecosystem.

Figure 1: Four Building Blocks of the eMedication Management Model

| Assess + Reconcile	Prescribe	Dispense	Monitor
• Compile eMedication histories (including self-reported meds) • Compare medication lists and reconcile differences • Communicate with care team • Change prescriptions • Compare compliance and outcomes with payers' requirements	• Review care record including medication history • Comply with eligibility-informed formulary • Check for interactions • Complete prior authorization • Prescribe medication (including controlled substances)	• Transmit ePrescription to pharmacy • Update on eligibility & authorizations • Check for interactions w/ updated care record • Alert for controlled substances • Recommend administration forms (oral, IV, etc)	• Develop/send reminders for refills & renewals • Evaluate providers/pharmacy brand and formulary adherence • Detect patient compliance and adherence problems • Monitor clinical outcomes, ADEs, and costs • Assess patient satisfaction

For example, medication reconciliation is part of the assessment process that ideally takes place before another drug can be prescribed; communication with the care team is essential. Beyond its traditional roles for examining clinical outcomes, detecting adverse drug events and tracking costs, monitoring may be expanded to evaluate formulary/brand adherence, detecting patient compliance problems, educating patients and assessing patient satisfaction. Post-dispensing interactions with patients and follow-up monitoring are critically important, especially for therapies that address chronic conditions or are self-administered.

However, this is only the beginning. The eMedication Management model reflects the basic tenet of patient-centric care facilitated by health IT. As shown in Figure 2, the patient is at the core of the model and is connected via health IT to payers and the range of providers that can comprise a care team or provide care. The necessary supporting roles of health information exchanges and clinical decision support are clearly shown. The model also is applicable to all types of payer and delivery systems and sites of care.

The model also shows how patient-centric care is informed and enabled by health IT through data analytics, information exchange and clinical decision support. These interdependencies 1) improve the quality of care through clinical decision support; 2) share the patient's clinical, medication and related administrative information among stakeholders; 3) engage patients and make them participants in their care; and 4) facilitate data-driven care processes and care-team collaborations. The result is lower costs, better outcomes, and improved patient safety.

The eMedication Management model is meant to be illustrative without being prescriptive. In other words, the model aims to show the basic eMedication management processes, their interdependencies and how they are supported and informed by stakeholders and health IT. The intent is to create a conceptual framework that portrays how today's value-based world leverages health IT to manage medications across the continuum of care among various stakeholders without specifically detailing all applicable technologies, processes and entities that are involved.

Figure 2: The eMedication Management Model
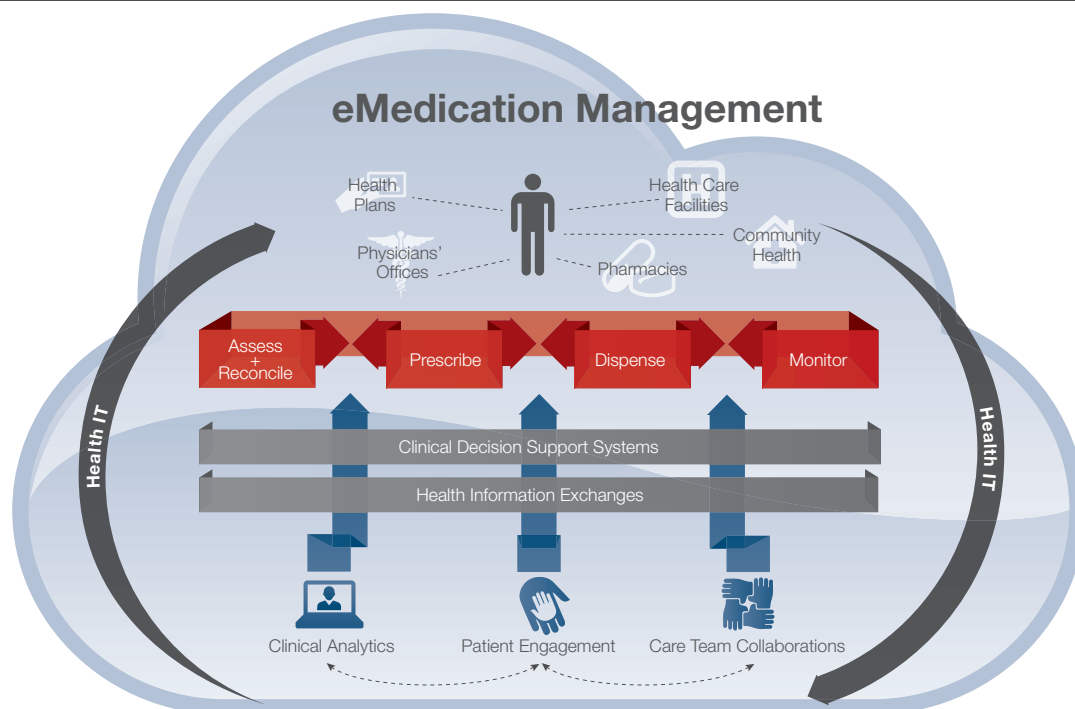
Source: © Point-of-Care Partners

The result is a health IT-based platform for eMedication Management applications that can:

- Identify individuals in attributed populations who are at risk of health problems and may require new or revised medication therapy plans
- Facilitate prescribing medications that take into account a patient's medical history (such as test results and comorbidities)
- Optimize and synchronize best practices, such as formulary adherence, within and across care settings
- Reconcile and manage medications for patients as they transition among inpatient and outpatient settings and multiple types of providers. This is especially important for the elderly and chronically ill, which are core patient population groups of many ACOs. They may go back and forth between acute care, ambulatory care, home health and long-term care (LTC) facilities of service. Appropriate and cost-effective care depends on an accurate listing of all the medications they are taking and any changes that have been made along the way. This helps prevent medication omissions, duplications, incorrect dosages or adverse drug events and the resulting complications, preventable readmissions and unnecessary deaths. A comprehensive list of medications for patients must be maintained at all times and account for patients who switch health plans

- Actively monitor patient adherence and progress toward clinical outcome targets. Patients' noncompliance with medication regimens cost an estimated at $289 billion a year[11]—much of that due to expensive hospital readmissions, avoidable emergency room visits and unnecessary deaths
- Engage patients in their care to better understand their medication regimens and boost compliance. This also helps providers meet meaningful use (MU) requirements
- Assess outcomes and report on results to meet quality and payment targets, both at the ACO and federal levels
- Help payers optimize their health plans' medical loss ratios, as eMedication Management represents a health IT investment to improve quality
- Measure and calculate pharmacy costs

eMedication Management:
A Catalyst for Value and Innovation

What makes the eMedication Management model a catalyst for tremendous innovation potential is the power now available by supporting ePrescribing and EHRs with robust clinical decision support engines and an HIE infrastructure (see Figure 2).

Real-time, electronic access to a patient's health records across the continuum of care provides the information needed for clinical decision support to be more comprehensive and meaningful to the care team. For example, access to a patient's comorbidities and key physiological metrics (e.g., liver function) enables more accurate dose guidelines. Where ongoing lab tests are needed to monitor a drug's level in the patient's system or physiological functions, eMedication Management can assist the care team in effectively monitoring these protocols. Evidence-based care that is directed with clinical decision support is central to the clinical integration that is core to a successful ACO and PCMH nucleus. Health IT can facilitate data analytics, which will be essential to help payers and providers balance quality and costs.

The eMedication Management model is a platform for creating new value for stakeholders. For example, it can be used to:

1. Explain the management of medications to consumers.
Patients have little understanding of their medical conditions, much less how their care and treatment are coordinated in vastly different ways under ACOs and PCMHs. Having a visual representation of eMedication Management can help providers educate patients as they explain how ACOs and PCMHs work, how their medication therapies will be coordinated, and what medication reconciliation is, how it works and its importance. "They'll get this," one provider exclaimed.

2. Help payers and providers align staffing and processes for more effective care management. The eMedication Management model brings home the fact that cost-effective, accountable and high-quality medication management involves more than ePrescribing and billing. It is more than technology. It can be used as a model for organizational change, redefining the roles of medical management, pharmacy management, and care managers at the payer organization, for example. Population health management—in the form of proactive medication assessment and ongoing monitoring—becomes an increasingly strategic function that cuts across most departments. eMedication Management shows the need for these functions of the payer organization to work in harmony, creating a collaborative environment for patients to manage their health. The model can better help payer executives understand the far-reaching implications of leveraging health IT for medication management across the continuum of care, which in turn can help align staffing with the new process needs. Similarly, the model can help providers as they strive to improve the coordination and continuity of care.

3. Help stakeholders meet reimbursement and quality requirements as care delivery moves from volume- to outcomes-based models. The eMedication Management model depicts a holistic overview of how all phases of medication management are connected electronically. This can help stakeholders better align their processes with the ACOs in which their patients are members. For example, significant increases in the elderly and chronically ill populations make health IT adoption a business imperative for Long Term Care (LTC) facilities to improve quality, reduce costs and better align with reimbursement criteria by public- and private-sector payers. The eMedication Model emphasizes the role of automation in rehabilitation and LTC with the critical functions of medication reconciliation during every assessment, as well as ongoing monitoring of the patient's medication therapy.

4. Provide a platform for research. Gaps exist in our knowledge of the effectiveness of leveraging technology to improve medication management in many sites beyond physician offices and hospitals. These include long-term care (LTC) facilities, community clinics and patients' homes. The eMedication Management model can provide a framework on which researchers may build on previous efforts to assess the impact of health IT on each component of medication management for specific population groups and within and across specific sites of care.

Research especially needs to be conducted on ways technology can improve medication administration in LTC facilities and after patients are discharged because most residents take several prescription medications and transition among several sites of care.

5. Provide pharmaceutical manufacturers with a new communication channel for delivering drug information to the point of care and directly to the patient. Clinical indications, adherence patterns, and dosing requirements unique to a particular drug class or product can be programmed into meaningful care guidelines that are based on a patient's specific health profile. Patient self-management guidelines to optimize adherence and reduce the risk of adverse drug events can be simultaneously communicated electronically to all members of the care team, including the patient.

Enhancing the Building Blocks of eMedication Management

The eMedication Management model serves as a catalyst for change to improve every step of what should be an integrated, continuous medication management process. Such process improvement will improve the costs, quality and safety of patient care, as well as impact the sustainability of value-based care. Examples include:

Improve connectivity with pharmacies. Leaders of retail pharmacy chains and independent pharmacies could be motivated to pursue connectivity of their information systems with the broader EHR ecosystem to enhance the role of their pharmacists in caring for an ACO's patients. The goal is to strengthen these patients' affinity with a particular pharmacy and forge a strategic relationship with the ACO's care providers.

Tools and enhancements also are needed to manage specialty prescriptions electronically. While nearly all retail and institutional pharmacies can receive and process ePrescriptions, specialty pharmacies lag way behind. The lack of electronic prescription connectivity of specialty pharmacies has implications for costs, quality and patient safety. In fact, specialty medications are a significant and growing part of care regimens and drug spend, which impact the financial success and risk sharing for ACOs and other value-based systems. Outlays have grown significantly in recent years, and specialty medications are estimated to comprise 31% of drug outlays by 2016. The impact of specialty medications is even more critical because of their particular use by the chronically ill and elderly—key population groups for nearly all public and commercial ACOs.

Enable pharmacists' care management. The innovative notion of the 'pharmacy' home can be operationalized into a core component of the ACO, working in tandem with the PCMH. Connecting pharmacists through HIEs with other members of the care team enhances the quality of the ACO's care management processes. Most patients with chronic medical conditions see their pharmacist more often than their physicians. Access to the EHR enables a pharmacist to be an integral member of a patient's care team by informing him or her of possible adherence issues, overdue immunizations and other needed preventive care services that can be communicated to the patient when a prescription is picked up. Sharing diagnosis, treatment plans, lab results, allergies, and other relevant clinical information, including medication histories, across pharmacies and providers can help improve quality of care and medication adherence. Pharmacies are now providing more clinical services such as medication therapy management and immunizations; therefore, electronically sharing these and other data across pharmacies and providers can ensure that medical and pharmacy homes have the most up-to-date clinical information to optimize patient care.

Get specialty medications to the right patient at the right time for the right condition as quickly and efficiently as possible. As stated previously, specialty medications are prescribed or ordered by a provider and generally either dispensed by a specialty pharmacy or shipped back to the provider for administration. Because of the expense and outcomes potential, it is critical that patients understand how to take the therapy and persist in taking this therapy. Payers also often require prior authorization. Today, the process of ordering and justifying specialty medications is largely paper-, phone- and fax-based. A new data standard for electronic prior authorization (ePA) for products covered by patients' pharmacy benefits has been developed by the National Council for Prescription Drug Programs (NCPDP), which will facilitate the migration to electronic prior authorization.

The new standard essentially is a framework incorporated into the NCPDP SCRIPT standard, which allows the provider to electronically request a PA question set from the payer, electronically return the answers, and receive a response (potentially in near real time). Efforts to educate patients and keep them adherent also predominately use traditional paper-based modalities despite the ubiquity of smartphones. Health IT can assist in automating all of this, improving both efficiency and effectiveness, and eMedication Management is a model for facilitating this process.

Upgrade the content and availability of medication history.

More especially needs to be done to make medication history available at the right time for the right patient. Medication history is still not a part of many office visits. Transitions of care are another place where medication history is needed but not fully available across the continuum of care. For example, because of the way hospitals bill, drugs for inpatients are assigned to the medical claim, not into a separate drug claim. This makes it extremely difficult for medication reconciliation to take place. Changes are needed to these and other processes so as to allow broader access to medication history, which ultimately impacts the quality and costs of care. In the meantime, providers and others are concerned about gaps and inaccuracies, which serve as barriers to use.

Leverage health IT to improve the quality of prescription information.

Many key pieces of information are not provided electronically in today's electronic medication management processes, making it more difficult and costly to manage medications throughout the continuum of care. These gaps and omissions also have major cost and patient safety implications, and hamper administrative processes for providers, pharmacies and payers. Opportunities on the horizon could improve the quality of prescription information, such as:

- Adding the diagnosis (in the form of ICD-10 codes) to prescriptions would eliminate the need for some prior authorizations (PAs), help speed processing of PA requests and aid medication reconciliation during transitions of care. A diagnosis is sometimes available upfront because EHRs, which are used to create the vast majority of ePrescriptions, capture it for billing and quality reporting. The move toward ICD-10 will provide the additional granularity that many payers require to process PA requests, and ePrescribing/EHR vendors have already built systems to accommodate these new codes. For these reasons, diagnoses could easily be incorporated into an ePrescription
- Including ICD-10 codes with the prescription
- Providing other useful information that could improve prescription quality. For example, laboratory values, patient information (such as weight, which is a critical element in dosing) and other indicators need to be passed to the pharmacy. Payers often request these kinds of information as well. While medication history is available electronically for many patients, it is provided only about half the time in ePrescriptions
- Standardizing medication terminology, clinical vocabularies and dosing instructions will speed processing, help prevent prescription rework and avert errors by prescribers and pharmacists. The codified SIG (patient instructions) standard is on the horizon. Work also is under way to adopt SNOMED (an extensive clinical terminology set) and RxNorm, which provides normalized names for clinical drugs and links those names to many of the drug vocabularies commonly used in pharmacy management and drug interaction software. Their widespread use will help to resolve some, but not all, of these issues

Facilitate wider adoption of ePrescribing of controlled substances. More work needs to be done to facilitate widespread adoption of ePrescribing of controlled substances (EPCS). Although EPCS has been legal at the federal level for several years, uptake has been spotty and minimal. There are two sides to the transaction—the provider and his/her EHR and the pharmacy system—and both have been slow to adopt, saying "I'll do so when the other side is ready." This could represent the classic case of "which came first, the chicken or egg?" If that's the case, the "chicken"—or "egg"—has been the large retail pharmacies, such as Walgreens and CVS, as well as such mail-service pharmacies as Express Scripts. To stay competitive, pharmacy systems are working to catch up, although they don't seem to be in a big hurry. On the other side, some ambulatory provider systems have been ready for some time, but many providers have not had the appetite or business justification to meet authentication and technical requirements for EPCS as stipulated by the Drug Enforcement Administration. For many ambulatory providers, it is simply easier to write a paper prescription than electronically prescribe a controlled substance. In addition, a handful of states need to pass legislation or clarify rules and regulations of their Board of Pharmacy. Nationwide use of paper prescriptions for controlled substances contributes to the epidemic prescription drug diversion problem and related mortality, morbidity and unnecessary costs to the health care system. EPCS helps improve efficiency by creating one work flow for all prescriptions, helps reduce fraud and abuse by encouraging a much more secure channel with security measures and audit trails, condenses recordkeeping for patients' medication history and decreases adverse drug events by improving legibility and making sure that controlled substances are checked against drug utilization review engines.

Improve medication reconciliation processes. In today's increasingly complex medical environment, patients frequently transition among inpatient and outpatient settings and multiple types of providers and payers. That is especially true for the elderly and chronically ill, who may go back and forth between acute care, ambulatory care, home health and LTC facilities of service. Appropriate and cost-effective care depends on an accurate listing of all the medications they are taking and any changes that have been made along the way, helping to prevent medication omissions, duplications, incorrect dosages, or adverse drug events.

There are opportunities to improve the continuity and coordination of care by streamlining the medication reconciliation process and improving the quality of data, which includes data from ambulatory medication history and inpatient visits. Such improvements could help prevent complications, readmissions and unnecessary deaths. Examples include:

- The acquisition of data electronically from a trusted source using the HL7 Clinical Document Architecture (CDA) data sections (e.g., Admissions medication history) in the data exchange processes (eMedication reconciliation). This can help eliminate the guesswork and complement a patient's or caregiver's memory or records, providing the patient's complete medication history at each transition of care and comparing it with the regimen being considered for the new setting of care. The experiences of the Strategic Health IT Advanced Research Projects (SHARP) and ONC challenge grantees may help identify gaps and opportunities for improvements

- More comprehensive medication and clinical data are needed. EHRs and HIEs supporting the medication reconciliation process need to provide a comprehensive set of clinical data used in making decisions about a patient's medication therapy at the point of a care transition. Currently, there are multiple sources of medication history data, none of which are complete. An HIE infrastructure that connects providers' EHRs, payers' drug claims and enables patient self-reporting of medications via a portal or personal health record (PHR) can produce a comprehensive eMedication history containing all a patient's medications, including controlled substances, over-the-counter medications and vitamin supplements. Recent history of lab test results is also essential to many medication therapy decisions. Laboratory values, patient information (such as weight, which is a critical element for dosing) and other indicators are key when assessing medication therapy needs and medication reconciliation during care transitions. Payers often request this kind of information when processing PA requests for specialty medications

- Other gaps need to be filled. A universal patient identifier is needed so all data sources can ensure appropriate patient identification to support medication reconciliation via HIE services. Consensus needs to be developed regarding how eMedication reconciliation should be conducted and which data elements should be utilized. Existing medication history databases need to be reconciled because they contain differing data elements to support the medication reconciliation process

Improve patient adherence. According to a recent Mayo Clinic study, most Americans leave the doctor's office with at least one prescription and some 20% receive prescriptions for five or more medications during the year. Sadly, many of these prescriptions are never filled or the drugs are taken incorrectly or not taken at all. Patient medication nonadherence directly affects costs, quality and safety. Experts estimate that medication nonadherence results in 100,000 unnecessary deaths and $290 billion annually in poor health outcomes, unnecessary hospitalizations and disability.[12] Reimbursement is a powerful policy lever, and there is potential to use the ACO and PCMH models to address patient adherence. For example, incentives could be added to create a value proposition for participating providers and pharmacies to send/receive adherence alerts and act on them. A reimbursable procedure code could be developed for outreach related to patient adherence.

The eMedication Management model calls for detecting potential nonadherence and sending alerts to the care team for follow-up. A widely used method for detecting nonadherence, the medication possession ratio (MPR), can be calculated with data available via the health IT infrastructure supporting eMedication Management. Most Surescripts-certified EHRs currently have the data needed to perform basic MPR calculations to detect possible adherence gaps from claims or pharmacy medication history. However, more timely and accurate detection of adherence issues are possible with broad industry adoption of the eFill status transaction. Although rarely used due to pharmacy industry pushback, eFill status functionality enables a pharmacy system to send a notification to an ePrescribing or EHR system as to whether or not a prescription was dispensed to a patient. This feedback loop could help providers identify noncompliant patients and create an opportunity for providers to have the much-needed conversation with patients about why they did not pick up their prescription. According to a recent CVS Caremark study, $6.5 billion would be saved if patients who were prescribed medicines actually picked them up 80% of the time.

Engage patients. Patient engagement is more than a buzzword—it's a requirement under meaningful use. More importantly, it is the key to successful patient-centered care and a key component of successful eMedication Management. While health IT developers are struggling to connect providers and payers, there does not seem to be as much activity to provide ways for patients to understand how their care delivery model works, how their medications are managed across sites of care and how they fit into the care team concept. This is confounded by gaps in patients' understanding of their disease state, medication regimens and overall treatment plans. The impact is important because there are significant economic consequences if medications aren't used more "wisely." Doing so could save some $213 billion per year by reducing medication overuse, underuse and misuse that cause complications and more-expensive treatments—including hospital readmissions and emergency room visits, according to one study.[13]

The eMedication Management model accommodates innovative ways to use health IT to connect patients to their care team. A patient portal can give patients access to their EHRs, self-management tools, recording of medication preferences, self-reporting of medications and messaging with their care teams. The Blue Button initiative across federal agencies gives patients the ability to view, print, download or share their medical history. Entrepreneurial developers in the private sector are working to help fill some of the gaps, particularly through mobile applications, telehealth and "wearables" (wireless health and wellness sensor devices).

However, there are barriers that must be addressed for health IT to fulfill unmet needs for increasing patient engagement. These include health literacy issues; language barriers (which are growing larger due to changes in America's patient demographics); and lack of understanding/knowledge by certain populations, such as the elderly or their caregivers. Patients also need to be sold on the value proposition for accessing their health information and becoming an active part of their care team. There is a digital divide for the elderly (which is growing even wider in the area of mHealth).

Conclusion

As America's health care system moves from volume-based to value-based payment, payer and provider organizations must re-design their operations to better manage care across the continuum. Because of the major role of drug therapy in health care, re-engineering the currently disjointed processes for managing medications to produce an integrated, patient-centered approach is a powerful lever for moving the needle on health outcomes. A more streamlined process and flow of information will also drive down costs.

eMedication Management, a new paradigm, is a patient-centric, information technology-based set of processes for conducting the fundamental steps of medication management, including patient assessment, medication reconciliation, prescribing, dispensing, and monitoring. In contrast to traditional models of managing a patient's medication therapy, eMedication Management enables patients, their care teams, pharmacies and payers to collaborate in the medication decision-making and management processes using decision support tools and by sharing clinical, medication, and administrative information.

Realizing the full potential of eMedication Management is a long-term proposition and will only happen if payers, providers, pharmacies and their health IT vendors all make a strategic commitment and invest in the resources needed. The foundation is already in place as electronic prescribing has modernized the medication ordering process and contributed to substantial reductions in medication errors and costs. Justification to build on this success is found in many places, including the ever-expanding role of prescription drugs in patient care – particularly specialty medications, the growing recognition that better coordination of care yields significant benefits, and the pressing need to address the huge problem of patient non-adherence. The building blocks of eMedication Management encourage incremental investment and transitional change; beginning with any one of the four areas will yield benefits in the near-term that will grow as additional capabilities are

added. Once these building blocks are in place, opportunities for innovation abound including medication reconciliation at every point of care, automated detection of non-adherence, and advanced clinical decision support to name a few.

Too often decisions about a patient's medication therapy are made with inaccurate or incomplete information resulting in suboptimal treatment and patient non-adherence. Breakdowns in the multi-step, multi-stakeholder process exacerbate the problem. The failure to implement the IT infrastructure necessary – as shown with the eMedication Management model described in this paper – will inevitably lead to disappointing results in achieving desired gains in health quality and outcomes overall. Those organizations that make implementation of eMedication management a centerpiece of their care management redesign efforts will be rewarded with clinicians making more informed decisions and more engaged patients, resulting in better health outcomes at reduced costs. These innovators will achieve the market advantages and financial viability needed to thrive in the new era of value-based care.

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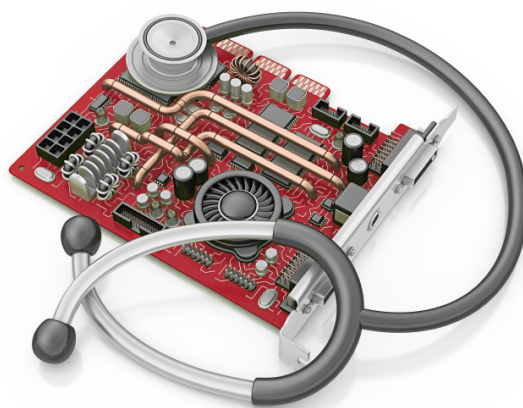
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