

# The Promise--and the Reality--of ePrescribing\*

By Ronald C. Wacker

## Introduction

Electronic prescribing (ePrescribing; eRx) has shown the potential to greatly improve patient safety, care quality and cost effectiveness, but there are numerous challenges to implementation, and adoption has not been widespread. This paper aims to explore the various issues that must be addressed to insure that ePrescribing processes work efficiently and effectively to realize full benefit. Historically, achieving broad eRx adoption and use has been described as “low-hanging fruit,” because of the benefits that would be expected to result from the confluence of specific organizational interests (provider, health plan, pharmacy); but while these benefits have been realized in many locales, ePrescribing has not been broadly adopted. The process continues to be dependent on both the coordinated actions of many stakeholders and the continuing evolution of standards, capabilities and competencies to insure that robust and stably performing ePrescribing data transmission and work flow processes are the rule rather than the exception.

While there are significant challenges to achieving high ePrescribing adoption and use, it is important to recognize that ePrescribing processes--and, more importantly, the organizations that develop and support them--are relatively new, have evolved quickly, and are complex, especially to the extent that coordination across multiple organizations and data systems is required.

At the core of ePrescribing processes is Surescripts. Surescripts is the leading national ePrescribing network and its evolution is indicative of the rapid growth of eRx technology infrastructure. Founded in 2001<sup>1</sup> by the National Association of Chain Drug Stores (NACDS) and the National Community Pharmacists Association (NCPA), the company has evolved rapidly. With its initial focus on processing prescriptions and renewals between prescribers and pharmacies, its development was paralleled by the 2001 founding of a separate company, RxHub, by three pharmacy benefit management companies--Caremark, Express Scripts and Medco; RxHub focused on transmitting pharmacy benefit, eligibility, formulary and medication history information to prescribers. RxHub and Surescripts began network operations in 2002 and 2003 respectively.

From the initial founding of both companies to the present, major changes that enabled ePrescribing included:

- Creation of incentives for eRx adoption under the Medicare Modernization Act (2003)

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\*Ronald Wacker is an independent consultant. This paper was prepared with funds provided by the California HealthCare Foundation (CHCF) and presented at the Annual Meeting of the California ePrescribing Consortium (CaleRx), November 9, 2010, Oakland CA. Comments may be sent to [ronwacker@yahoo.com](mailto:ronwacker@yahoo.com)

<sup>1</sup> “Advancing Health Care in America, 2009 National Progress Report on E-Prescribing,” Surescripts, 2010. This publication provides an excellent historical summary of ePrescribing and key events that shaped increased adoption and use

- Initial efforts under the National Committee on Vital and Health Statistics to create eRx standards under Medicare Part D (2004)
- CMS pilot testing of proposed Medicare Part D eRx standards (2006)
- The legalization of ePrescribing in all 50 states (2007)

In 2008, Surescripts and RxHub merged under the Surescripts name and initiated a process for integrating key processes critical to ePrescribing success, including physician identification methods and prescription routing processes for mail order and retail pharmacies. More recently, resources are being devoted to address the quality of prescriber and pharmacy directories and to improve pharmacies' matching of prescriber information.<sup>2</sup>

Also in 2008, other significant events included CMS's issuance of Medicare Part D ePrescribing incentive regulations; the DEA's proposing a rule to allow ePrescribing for controlled substances; and the passage of the Medicare Improvements for Patients and Providers Act (MIPPA), which included eRx adoption incentives and, ultimately, penalties for prescribers who don't adopt ePrescribing.

The impetus for increased ePrescribing was intensified with the passage of the American Recovery and Reinvestment Act (ARRA)<sup>3</sup> in 2009 and its provision for up to \$27.3 billion in prescriber incentives toward the adoption of health information technology. ARRA required "meaningful use" of EHR technology, and in 2010 CMS issued regulations defining meaningful EHR use; among other outcomes, CMS regulations established ePrescribing as a key component of meaningful EHR use.

The Surescripts National Progress Report is the primary source of information on ePrescribing adoption and use.<sup>4</sup> Adoption of ePrescribing has increased greatly from year to year; for example, over 190 million prescriptions were routed electronically in 2009, a 181% increase over 2008. Measured nationally, by December 2009, 15% of eligible prescriptions were being routed electronically and 25% of office-based prescribers were ePrescribing.<sup>5</sup> For California, however, Surescripts estimated that only 9% of eligible prescriptions were being routed electronically by the end of 2009; these findings did not

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<sup>2</sup> Mohr R., Surescripts and EPrescribing v1.7. Paper prepared for the California HealthCare Foundation, August 1, 2010

<sup>3</sup> PL 111-5

<sup>4</sup> Note: The Surescripts data base does not include e-prescribing data for those health systems in which prescriptions are delivered through "in house" pharmacies, e.g., Kaiser Permanente, Veterans Administration

<sup>5</sup> "Surescripts Reports E-Prescribing Use Jumped 181 Percent in 2009 to 190 Million," Surescripts Press Release, March 2, 2010; Measures included in the Surescripts reports include: % and number of prescribers using ePrescribing; Prescription Benefit: the number of electronic requests for prescription benefit information; Prescription History: the number of prescription or medication histories delivered to prescribers; Prescription Routing: the number of prescriptions routed (initial and renewal); Deployment of EMR-based and standalone based e-prescribing software, by function; % of patients in the United States for which Surescripts can provide prescription benefit and history information; % and number of pharmacies (community pharmacies, including chain and independent, and mail order pharmacies) that are connected to Surescripts.

include data for some key large health systems such as the Veterans Administration and Kaiser Permanente<sup>6</sup> Attachment I shows Surescripts data comparing California eRx adoption with national ePrescribing adoption rates on several key measures.

The remainder of this paper is organized as follows:

- Part I is a review of recent literature that establishes both the benefits and the implementation issues associated with ePrescribing.
- Part II looks specifically at eRx adoption identified by the many stakeholders that compose the California ePrescribing Consortium (CaleRx Consortium).
- The Discussion and Conclusion and Recommendations sections synthesize the issues identified in the previous sections and suggest potential activities to address these issues.

### **Part I--Review of the Recent Literature**

The purpose of this brief literature review is to provide a foundation for a discussion of the many issues associated with achieving effective, stable ePrescribing processes. The review looks at the expected benefits associated with ePrescribing and the necessary actions, infrastructures and tools that are required to achieve those benefits.

#### **The Benefits of ePrescribing: Improvements in Health Care Quality and Efficiency**

There is substantial evidence that ePrescribing processes can improve the quality and efficiency of patient care. Van Doormaal,<sup>7</sup> Ammenwerth,<sup>8</sup> Jani<sup>9</sup> and Devine<sup>10</sup> demonstrated that eRx systems have the potential to reduce medication errors and preventable adverse drug events (ADEs). Beyond eliminating illegible prescriptions, these improvements are dependent on the integration of effective clinical decision support (CDS) systems in ePrescribing processes. Studies demonstrating that ePrescribing can lead to actual or hypothetical reductions in ADEs in ambulatory care settings can benefit from estimates of the cost of ADEs and of the estimated savings associated with their reduction. Burton et al<sup>11</sup> determined that ambulatory visit charges were higher for patients who were determined

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<sup>6</sup> Due to Kaiser Permanente's substantial market share, Inclusion of its data in the estimation of overall ePrescribing utilization would likely increase the estimated California utilization rate to over 20%

<sup>7</sup> Van Doormaal JE et al. The Influence that Electronic Prescribing has on Medication Errors and Preventable Adverse Drug Events: An Interrupted Time-Series Study. J Am Med Inform Assoc. 2009 Nov-Dec; 16 (6): 816-25. Epub 2009 Aug 28.

<sup>8</sup> Ammenwerth E. et al. The Effect of Electronic Prescribing on Medication Errors and Adverse Drug Events: A Systematic Review. J Am Med Inform Assoc. 2008 Sept-Oct; 15 (5): 585-600. Epub 2008 June 25.

<sup>9</sup> Jani YH et al. Electronic Prescribing Reduced Prescribing Errors in a Pediatric Renal Outpatient Clinic. J Pediatr. 2008 Feb; 152 (2): 214-8. Epub 2007 Nov 19.

<sup>10</sup> Devine EB et al. Characterization of Prescribing Errors in an Internal medicine Clinic. Am J Health Syst Pharm. 2007 May 15; 64 (10): 1062-70.

<sup>11</sup> Burton MM et al. The Cost of Adverse Drug Events in Ambulatory Care. In AMIA Annu Symp Proc. 2007 Oct 11: 90-3.

to have one or more ADEs, and estimated that a single ADE costs \$926 (year 2006 dollars); the authors estimated the cost nationally to be \$8 billion annually.

Another important benefit of ePrescribing is increased efficiency and cost effectiveness. Research indicates that, much like quality and safety, efficiency benefits depend on integrating CDS systems into eRx processes and on the availability of accurate, up-to-date and complete pharmacy eligibility, benefit and formulary information. McMullin<sup>13</sup> determined that, where average costs for new electronic prescriptions had been lowered over the first six months of use, cost savings were sustained over the following 12 months. The authors also found that use of a CDS system was associated with a sustained reduction in prescription costs, at an average of \$4.12 (9%) per new prescription. The authors concluded that an electronic prescribing system with integrated decision support that provides diagnosis-specific information during the prescribing process shifted prescribing behavior away from high-cost therapies and significantly lowered prescription drug costs.

An important factor in the effectiveness of ePrescribing is the availability, at the point of care, of a patient's pharmacy benefit and formulary information. In a Massachusetts study associated with the provision of an ePrescribing system to community-based practices by two large Massachusetts insurers, Fischer<sup>14</sup> studied the effect of electronic prescribing with formulary decision support on medication use and cost. Results showed that ePrescribing corresponded to a 3.3% increase in Tier 1 prescribing, with corresponding decreases in Tier 2 and 3 prescriptions. Based on average costs for private insurers, it was estimated that ePrescribing with formulary decision support at this rate could result in savings of \$845,000 per 100,000 patients.

In an unpublished study,<sup>15</sup> the Henry Ford Health System piloted ePrescribing in its 800-member Henry Ford Medical Group (HFMG) as part of a "big three" auto company-initiated Southeast Michigan ePrescribing Initiative (SEMI). Henry Ford Health System leadership determined that ePrescribing was associated with a more rapid increase in the prescribing of generic medications, lower overall administrative costs and reductions in potential ADEs caused by drug-drug and drug-allergy interaction effects. The results were so successful in the pilot sites that the ePrescribing program was rapidly implemented for all HFMG physicians.

### **The Importance of ePrescribing System Functionality**

Bell<sup>16</sup> provides an excellent, seminal perspective<sup>16</sup> on the potential for ePrescribing to improve health care quality and efficiency but points out that the available ePrescribing systems are complex and difficult to

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<sup>13</sup> McMullin ST et al. Twelve Month Drug Cost Savings Related to Use of an Electronic Prescribing System with Integrated Decision Support in Primary Care. *J Manag Care Pharm.* 2005 May; 11 (4): 322-32.

<sup>14</sup> Fischer 44 MA et al. Effect of Electronic Prescribing with Formulary Decision Support on Medication Use and Cost. *Arch Intern Med.* 2008 Dec 8; 168 (22): 2433-9. See also Tseng CW et al. Health Information Technology and Physicians' Knowledge of Drug Costs. *Am J Manag Care* 2010 Apr 1; 16 (4) : e105-10.

<sup>15</sup> Muma and Walsh Presentation at the World Healthcare Congress Executive Forum on Rx Benefit Management, July 11, 2007

<sup>16</sup> Bell D et al. "A Conceptual Framework for Evaluating Outpatient Electronic Prescribing Systems Based on Their Functional Capabilities," *J Am Med Inform Assoc.* 2004; 11:60-70

compare. He developed a conceptual framework for evaluating eRx systems using a process model for medication management. His work emphasizes the importance of evaluating alternative eRx systems for both effectiveness and unintended hazards.

The importance of robust clinical decision support as part of ePrescribing systems cannot be overstated. Kaushal<sup>17</sup> evaluated a standalone eRx program with a CDS feature that included dosing recommendations and alerts for drug-allergy and drug-drug interaction effects and duplicate therapies. Preliminary findings suggest that standalone ePrescribing with clinical support may significantly improve ambulatory medication safety. The importance of effective CDS features in an eRx system is also emphasized by a recent Leapfrog Group report<sup>18</sup> in which 214 hospitals tested the Leapfrog Group's simulation tool to assess their ability to detect common medication errors and errors that could lead to fatalities. The CPOE systems on average missed half of the routine medication errors and a third of the potentially fatal errors

To lead to maximum care quality and efficiency, an eRx system must also enable prescribers and pharmacists to communicate with each other, not just in one direction or the other. Johnson<sup>19</sup> looked at the limitations current CDS systems have in adequately communicating prescribers' medication orders to pharmacists, and evaluated a possible approach to addressing these limitations. The system, called Show Your Work (SYW), appends alerts and "override" comments to bridge the communication gap. The authors used a randomized, double-blinded, controlled study to assess pharmacy callback rates and types, and found that SYW favorably impacted callbacks, increasing them when necessary and decreasing them in other situations.

Warholak and Rupp<sup>20</sup> found that unnecessary callbacks can have a significant financial impact on a pharmacist. Their study found that interventions related to prescribing errors required an average of over 6 minutes of a pharmacist's time, per prescription, to intervene; this represented an incremental dispensing cost of \$4.74. Pharmacists most commonly had to intervene either to supplement omitted information (particularly, missing directions) or to correct dosing errors.

An important aspect of care quality, especially for patients with chronic conditions, is patient adherence to prescribed medication regimens. Based on a study of low adherence rates for blood pressure medications, Mabotuwana<sup>22</sup> developed a generic computational framework that can be used with EMRs

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<sup>17</sup> Kaushal, R et al. Electronic Prescribing Improves Medication Safety in Community-based Office Practices. *J Gen Intern Med.* 2010 Jun; 25 (6). Epub 20120 Feb 26.

<sup>18</sup> "Leapfrog Group Report on CPOE Evaluation Tool Results June 2008 to January 2010," Leapfrog Group, June 2010

<sup>19</sup> Johnson KB et al. Showing Your Work: Impact of Annotating Electronic Prescriptions with Decision Support Results. *J Biomed Inform.* 2010 Apr; 43 (2) : 321-5. Epub 2009 Dec 6.

<sup>20</sup> Warholak TL and Rupp MT. Analysis of Community Chain Pharmacists' Interventions on Electronic Prescribing. *J Am Pharm Assoc* (2003). 2009 Jan-Feb; 49 (1): 59-64. See also Astrand B. et al. Assessment of ePrescription Quality: An Observational Study at Three Mail-Order Pharmacies. *BMC Med Inform. Decis. Mak.* 2009 Jan 26; 9:8.

<sup>22</sup> Mabotuwana T et al. A computational Framework to Identify Patients with Poor Adherence to Blood Pressure Lowering Medication. *Int J Med Inform.* 2009 Nov; 78 (11): 745-56. Epub 2009 Jul 23.

and ePrescribing to identify patients with poor adherence. Their study highlights the importance of pharmacist communication of fulfillment information to prescribers.

In 2005, the American Medical Informatics Association (AMIA) published a position paper<sup>23</sup> addressing the importance of clinical decision support in electronic prescribing that contained both formal recommendations and an action plan. Key AMIA recommendations included insuring the inclusion of core CDS functionality in all products and enhancing the knowledge management infrastructure for eRx-related CDS. Other important AMIA recommendations were development of a drug dictionary (RxNorm), and the development of standards for the structure and terminology of drug classes and drug status (e.g., branded, generic, formulary status); SIG standard messaging and vocabulary; standard vocabulary for allergy/sensitivity reactions; standard dictionary and IDs for payers and drug plans; and normalization of state board of pharmacy requirements for wording and formatting of a prescription.

The overall value ePrescribing can bring depends in large part on the eRx system being used. An early study<sup>24</sup> noted wide variation among 29 ePrescribing systems (standalone and EHR) in the performance of specific recommended functions. Specifically, among 52 expert panel recommendations rated as clearly beneficial for improving patient safety and health outcomes, one system fully implemented 67% and partially implemented 12% and, at the other extreme, another system fully implemented 29% and partially implemented 3%.

Prescriber willingness to use ePrescribing is based in large part on the functionality of the chosen system, including the robustness and usability of patient eligibility, benefits, formulary and medication history, and on the system's CDS capabilities (e.g., drug-drug, drug-allergy, drug-diagnosis interaction effects) and associated medication safety alerts. Smith<sup>25</sup> identified functionality issues with several specific eRx systems, including poor drop-down menu and screen design and incomplete or inaccurate patient medication lists, and found that, generally, an adequate CDS system was key.

In a Swedish study involving prescribers of six different EHR systems, Hellstrom<sup>26</sup> reported that while ePrescribing was regarded as time-saving and safer, weaknesses included unclear display of drug prices, complicated drug choice and lack of receipt confirmation from the pharmacy after transmitting a prescription.

Medication safety alerts are key to eRx functionality and such alerts make eRx systems valuable to enhancing the quality and safety of patient care. But alerts often need to be adjusted or customized to the specific prescriber, for example, by running drug alerts on only active medication lists or enabling

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<sup>23</sup> AMIA Position paper, Clinical Decision Support in Electronic Prescribing: Recommendations and an Action Plan. Amer Med Info Assoc, 2005.

<sup>24</sup> Wang C et al. Functional Characteristics of Commercial Ambulatory Electronic Prescribing Systems: A Field Study. J Am Med Inform Assoc 2005. 12: 346-356.

<sup>25</sup> Smith M et al. E-Prescribing: clinical Implications for Patients with Diabetes. J Diabetes Sci Technol. 2009 Sep 1; 3 (5) : 1215-8.

<sup>26</sup> Hellstrom L. et al. Physicians Attitudes Towards ePrescribing—Evaluation of a Swedish Full-scale Implementation. BMC Med Inform Decis Mak. 2009 Aug 7; 9:37.

prescribers to set thresholds for severity of alerts.<sup>27</sup> Weingart<sup>28</sup> conducted a study of prescribers' satisfaction with eRx systems, particularly their perceptions of the effectiveness of medication alerts. While more than three-fourths of respondents indicated that ePrescribing improved the quality of care delivered and prevented medical errors, fewer than half were satisfied with drug interaction and allergy alerts. In order of cited frequency, problems included alerts that were triggered by discontinued medications, alerts that failed to account for appropriate drug combinations and an excessive volume of alerts. Importantly, on the positive side, more than one-third of respondents said that electronic alerts caused them to modify a potentially dangerous prescription.

Prescribers have experienced other problems in implementing ePrescribing. Grossman<sup>29</sup> reported that while physicians were positive about the most basic eRx features, they reported major barriers to maintaining complete patient medication lists, using clinical decision support, obtaining formulary information and electronically transmitting prescriptions to pharmacies. Grossman identified three contributing factors to these findings: eRx system limitations, external implementation challenges and physician preferences in using specific ePrescribing features.

Wang et al<sup>30</sup> conducted a survey of ePrescribing users and non-users that focused on use of medication history and formulary and benefit information. The authors reported that users were more likely than non users to perceive that they could identify clinically important drug-drug interactions; however, quitting use of ePrescribing was associated with perceptions of poor usability.

Variation in the functionality and usability of ePrescribing systems begs the question of quality standards to which such systems should adhere. Surescripts operates the nation's largest electronic prescription network, and requires that prescribers, pharmacies and payers use software that has completed the Surescripts certification process in order to connect to the Surescripts network. Surescripts' certification is focused on three major services and seven associated messaging types as follows:

- Prescription Benefit—Two Message Types (Eligibility/Formulary and Reporting)

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<sup>27</sup> Isaac T. et al. Overrides of Medication Alerts in Ambulatory Care. *Arch Intern Med.* 2009 Feb 9; 169 (3): 305-11.

<sup>28</sup> Weingart SN et al. Clinicians' Assessments of Electronic Medication Safety Alerts in Ambulatory Care. *Arch Intern Med.* 2009 Sep 28; 169 (17): 1627-32. See also Seidling who demonstrated the importance for an ePrescribing system setting maximum recommended therapeutic doses (MRTDs) to prevent excessive doses—Seidling HM et al. Detection and Prevention of Prescriptions with Excessive Doses in Electronic Prescribing Systems. *Eur J Clin Pharmacol.* 2007 Dec; 63 (12): 1185-92. Epub 2007 Sep 5. ; For other research concerning medication alerts see Weingart SN et al. An Empirical Model to Estimate the Potential Impact of Medication Safety Alerts on Patient Safety, Health Care Utilization, and Cost in Ambulatory Care. *Arch Intern Med.* 2009 Sep 14 ; 169 (16): 1465-73. Weingart SN et al. Assessing the Value of Electronic Prescribing in Ambulatory Care: A Focus Group Study. *Int J Med Inform.* 2009 Sep; 78 (9): 571-8. ePub 2009 Apr 22. Isaac T. et al . Overrides of Medication Alerts in Ambulatory Care. *Arch Intern Med.* 2009 Feb 9; 169 (3): 305-11. and Lapane KL. et al. A Mixed Method Study of the Merits of ePrescribing Drug Alerts in Primary Care. *J Gen Intern Med.* 2008 Apr; 23 (4): 442-6.

<sup>29</sup> Grossman JM et al. Physicians' Experiences Using Commercial ePrescribing Systems. *Health Aff (Millwood).* 2007 May-Jun; 26 (3): w393-404. Epub 2007 Apr 3.

<sup>30</sup> Wang CJ et al. Perceptions of Standards-based Electronic Prescribing Systems as Implemented in Outpatient Primary Care: A Physician Survey. *J Am Med Inform Assoc* 2009 Jul-Aug; 16 (4): 493-502. Epub 2009 Apr 23.

- Prescription History—One Message Type (Rx History)
- Prescription Routing—Four Message Types (New Rx/retail pharmacy, Rx Renewal/retail pharmacy, New Rx/mail order pharmacy, Rx Renewal/mail order pharmacy)

Surescripts certifies eRx systems by message type and designates “Surescripts Solution Provider” status, on a version-specific basis, to those vendors that are certified for all seven message types. Notably, Surescripts has also initiated a Premier Participant Program through which vendors can receive “Surescripts Gold Solution Provider” status for specific versions of their software.<sup>33</sup> Importantly, Gold Solution-level program criteria emphasize the standardization, functional robustness and usability of the ePrescribing system, including addressing such issues as error handling, directory quality, message display, message receipt verification and summary screen information display.

Electronic prescribing is a core function of virtually all electronic health records and the broader issue regarding the usability of electronic health records is pertinent to ePrescribing. This subject is the focus of a recent Agency for Healthcare Research and Quality (AHRQ) report<sup>34</sup> whose authors conducted a series of structured discussions with selected certified EHR vendors and to solicit recommendations based on these findings from a panel of multidisciplinary experts. The report documents the importance of improving designing software that is user focused and that can be subjected to formal testing. The report recommends that an independent body be created to facilitate vendor collaboration and standards development.

### **The Importance of Accurate, Complete and Up-to-Date Data**

Robust CDS systems are dependent on accurate and up-to-date information. Bell<sup>35</sup> evaluated the technical adequacy of two National Council for Prescription Drug Programs (NCPDP) standards for delivering prescribers information, the *Medication History* standard and the *Formulary and Benefit* standard. Using an expert panel review process, the standards were assessed in six domains pertaining to data quality, completeness, usability, interoperability, systems architecture and overall functioning.

While the structures of each standard were assessed as adequate to insure delivery of accurate and complete information, implementation problems rendered the data difficult to use for decision support. A common problem was the lack of unambiguous drug identifiers, and there were other problems associated with the medication history standard as well: false alerts were generated because important data fields (prescriber’s identity, Sig, quantity dispensed and dispensing pharmacy) were left blank; erroneous safety alerts were caused by duplicate medication histories; information was not available on some patients due to non-participation by local health plans; and accurate patient identification was difficult when the patient was one of many family members covered under a family-level benefit plan.

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<sup>33</sup>“Surescripts 2009 Premier Participant Program” 2009

<sup>34</sup> McDonnell C. et al. Electronic Health Record Usability: Vendor Practices and Perspectives. AHRQ Publication No. 09(10)-0091-3-EF. Rockville, MD: Agency for Healthcare Research and Quality. May 2010.

<sup>35</sup> Bell DS et al, Evaluating the Technical Adequacy of Electronic Prescribing Standards: Results of an Expert Panel Process. In AMIA Annu Symp Proc. 2008 Nov 6: 46-50

With respect to the formulary and benefit standard, several problems led to the unavailability of formulary and benefit information for many patients. These problems included: an inability to access pharmacy benefit information due to the absence of eligibility verification; an inability to select primary coverage when the patient had more than one drug plan; inaccurate data associated with differences in coverage among different employer-level groups within individual health plans; and variation in the use of the standard among health plans and PBMs.

### **Prescriber and Pharmacy Adoption: the Importance of Implementation Planning and Work Flow Re-Design**

Preparation of prescribers' practices and pharmacies for ePrescribing, including work flow redesign, is critical to successful ePrescribing.

Crosson<sup>36</sup> conducted a qualitative case study of twelve ambulatory practices before and after eRx implementation. The successful practices exhibited greater familiarity with the capabilities of health information technologies and had a more modest view of expected benefits. The less successful practices had a more limited understanding of ePrescribing, and reported difficulties with technologic aspects of the implementation as well as inadequate implementation support. The authors conclude that practices need to plan and support implementations well, with a view toward careful integration of ePrescribing into clinical work flow.

Redesigning clinical practice to achieve the benefits of ePrescribing is important. Stock et al<sup>37</sup> studied the use of an eRx system, with medication interaction warnings and allergy checks, to ensure accurate medication lists in a large multidisciplinary medical group. They demonstrated the importance of redesigning clinical practice to dramatically increase the number of accurate medication lists, with fewer discrepancies between what the patient is actually taking and what is recorded in the EMR.

Achieving a high rate of pharmacy adoption and use of ePrescribing is the critical "other end" in terms of receiving initial prescriptions and initiating renewal requests. On the one hand, pharmacy adoption can be coordinated through the several large chain and mail order pharmacies (with the notable exception of independent pharmacies), but, on the other hand, pharmacies are generally not incentivized to adopt ePrescribing processes and may have a difficult business case to make in terms of short- or long-term return on investment.

Rupp<sup>38</sup> conducted a cross-sectional study of 422 chain community pharmacies in six states to measure the attitudes and beliefs of pharmacists towards ePrescribing and to identify best-practice recommendations for changes to improve ePrescribing. Improved clarity and/or legibility of prescriptions were the most frequently cited advantages of ePrescribing, followed by improved speed or

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<sup>36</sup> Crosson JC et al. Variation in Electronic Prescribing Implementation Among Twelve Ambulatory Practices. *J Gen Intern Med.* 2008 Apr; 23 (4): 364-71.

<sup>37</sup> Stock R et al. Using an Electronic Prescribing System to Ensure Accurate Medication Lists in a Large Multidisciplinary Medical Group. *JT Comm J Qual Patient Saf.* 2009 May; 35 (5): 271-7.

<sup>38</sup> Rupp MT and Warholak TL. Evaluation of e-Prescribing in Chain Community Pharmacy: Best Practice Recommendations. *J Am Pharm Assoc (2003).* 2008 May-Jun; 48 (3): 364-70.

efficiency of processing. Prescribing errors were the most commonly cited negative feature of ePrescribing.

Chain pharmacy personnel emphasized a number of key points in their best-practice recommendations, including the need for: physician prescription data entry or review of prescriptions and involvement of patients in the eRx process; prescriber-based decision support software to prevent errors; bundling of prescriptions for the same patient; pharmacy-based screen indicators or alerts that an electronic prescription has been received, including the associated training of pharmacy personnel; improved pharmacy-based software to eliminate the need for printing and re-entering prescription information; the ability of pharmacists to communicate to prescribers for supplemental or clarifying information; prescriber ePrescribing systems to utilize common formats and procedures; and DEA determination, with prescribers and pharmacists, of methods to permit ePrescribing for controlled substances.

Results of a University of Arizona evaluation of a California-based eRx pilot<sup>39</sup> involving the Northern Sierra Rural Health Network and area pharmacies are informative regarding the diverse factors affecting eRx adoption and use. Most prescribers expected that ePrescribing would be associated with comparable if not better work flow processes. However, many found that they needed to maintain a bi-modal work flow due to inadequate adoption of ePrescribing by area pharmacies and prescriber work flow requirements when patient visit volume was high. Also, manual work flow was required for controlled substances. In particular, some pharmacies faxed renewal requests due to limitations of their pharmacy software systems or because they were unable to “match” to the correct prescriber. Also, there were difficulties in processing electronic prescriptions to mail order pharmacies.

Providers also expected that specific functionalities (medication history list, clinical decision support, formulary information) within their ePrescribing system would contribute value to the quality and efficiency of patient care. With respect to medication history, clinic personnel experienced “diminished utility” due to the unavailability of information from some health plans and for uninsured patients.

With respect to clinical decision support, providers expected value from electronic checking of drug-drug and drug-allergy interaction checking and alerts. However, some clinics turned off many of the alerts because of barriers in work flow and associated decreases in productivity, and because of “alert fatigue” caused by the generation of multiple and duplicate safety and therapy messages.

Area pharmacies also experienced similar problems. Many found that they also needed to maintain bi-modal work flow processes, partly because they were unfamiliar with eRx processes (for example, some pharmacists converted electronic prescriptions to faxes before processing them or had difficulty processing renewal requests electronically). Other pharmacies found that electronic prescriptions took longer to reach them, and they also experienced time delays in having to direct inquiries to providers practicing in multiple locations. A related issue was that of matching specific prescribers with pharmacies’ prescriber directories.

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<sup>39</sup> Boesen K. et al. Technical Report: The Impact of e-Prescribing in the Northern Sierra Rural Health Network. Evaluation Report prepared for the California HealthCare Foundation 2009.

With funds provided by AHRQ, the RAND Corporation is developing toolsets for ePrescribing implementation in physician practices and pharmacies which are expected to address many of the issues prescribers and pharmacies face in optimizing eRx adoption and use.<sup>40</sup>

### **Part II--Learnings from the California eRx Consortium**

Through the generous funding provided by several key organizations,<sup>41</sup> for over two years the CaleRx Consortium, to which the author provides consulting services, has pursued the goal of broad eRx adoption and use in California with programs and activities such as:

- Convening key stakeholder groups (provider organizations, pharmacies, health plans) to achieve increased coordination on eRx efforts;
- Conducting regionally based and statewide educational programs on ePrescribing;
- Offering, through its website, publicly available key eRx adoption and use information by county; and
- Increasing communication with key national organizations and vendors and involving these groups in our statewide and regional efforts.

Over this time period, it has become clear to all stakeholders that, as we “peel the onion” on the sorts of issues and barriers identified in the published literature, the challenges to realizing the benefits of ePrescribing are substantial but solvable.

Five formal questions concerning ePrescribing implementation experience were posed to a limited set of CaleRx stakeholders (see Attachment II for a list of interviewees) as the basis for telephone interviews with these stakeholders. The goal of this process was to get a better sense of whether these key stakeholders perceive eRx issues similarly and of the degree to which some issues are perceived as more important than others. Generally, the stakeholders that were interviewed fall into one of three groups--prescriber, pharmacy or health plan—and they agreed broadly on the nature of eRx problems and the sorts of solutions that should be pursued. Interviews asked three questions exploring perceived ePrescribing barriers, and the summary below describes the more salient points stakeholders made.

*Question 1: What do you perceive as the main technologic and functional barriers to optimal spread and use of ePrescribing?*

Stated barriers include eRx system limitations, lack of pharmacy and prescriber readiness, data flow integration through multiple software systems, data quality and data standardization, inability to perform “end-to-end” (from prescriber to pharmacy and pharmacy to prescriber) testing of processes, lack of funds, and work flow barriers such as DEA rules governing ePrescribing processes for controlled substances.

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<sup>40</sup> Bell, Douglas, DRR-4988, Rand Corporation

<sup>41</sup> CaleRx Funders have included Blue Shield of California, California HealthCare Foundation, CalOptima, CVS Caremark, LA Care Health Plan, McKesson

*Question 2: What do you perceive as the main “market-based,” socio-political or behavioral barriers to optimal use of ePrescribing?*

One noted barrier was that a low eRx “penetration rate” in the market inhibited pharmacy readiness. Other behavioral barriers to eRx adoption included lack of prescriber and pharmacy understanding of its benefits, inadequate collaboration and coordination among competing organizations (pharmacies, prescribers), and the limited ability prescribers have to influence eRx performance, including system performance.

*Question 3: How does your perception of barriers change based on the specific ePrescribing messaging functionality in question (new prescriptions, prescriptions renewals, eligibility, benefit and formulary messaging, medications history messaging)*

Stakeholders generally perceived all types of barriers as important. At least one interviewee in each of the three stakeholder groups offered the comment that “we are designing the plane as we fly it,” or “the technology is immature” or “eRx is very complex and there are many points of potential failure” or “it will take a generation of prescribers and pharmacists to get this right and we need to build ePrescribing into medical, nursing and pharmacy school curricula.” One stakeholder focused on the ultimate patient care benefit that can be realized through well functioning ePrescribing processes by observing, “Given the aging baby boomers and the chronic illness burden, it is important that we get ePrescribing right!”

Common themes that emerged in the interviews included:

- End-to-end testing of ePrescribing processes is highly desirable but not generally encouraged or facilitated by eRx system vendors and network intermediaries.
- Due to the opaque nature of the underlying technologies, including how many technologies are involved in a single prescription or pharmacy benefit transmission, it is difficult if not impossible to diagnose messaging failures; this factor often leads to non-productive finger-pointing between, for example, prescribers and pharmacies, or POC vendors and network vendors. Examples include:
  - inability to diagnose low rate of processing renewal requests electronically
  - inability to diagnose low rate of response on prescriber requests for patient-specific pharmacy eligibility, benefit, formulary and medication history information
- The differences in functionality, performance and features among eRx systems are not well known, and there is not an easy way to learn about these differences, making comparison difficult.
- Electronic prescription information and processes need greater standardization, and existing standards need greater enforcement. This is especially relevant to maintaining prescriber and pharmacy directories, which must adhere to United States Postal Service addressing standards.
- Stakeholders perceive a range of prescriber expectations of ePrescribing with some interested in some but not all possible eRx functionality, and they also perceive a wide range of pharmacy

readiness for ePrescribing. This leads to what can be described as a “chicken and egg” conundrum:

- A number of prescribers have commented that they are not implementing key eRx features due to the poor experience other prescribers are having with those features (such as electronic processing of renewal requests). This reduces a pharmacy’s return on eRx investment because pharmacy staff needs to maintain two work flow processes.
- In return, high variation in pharmacy adoption of ePrescribing causes prescribers to need to maintain two work flow processes. For example, the ability for chain and mail order pharmacies to process electronic renewal requests can vary greatly.
- Significantly, some stakeholders observed that the inconsistency and instability of basic eRx transactions has the deleterious effect of taking the focus off of the bigger-picture benefits of ePrescribing, such as the documented increase in patient quality of care when prescription information is integrated into the patient’s medical records.
- The lack of financial incentives for pharmacies to implement ePrescribing continues to be an impediment—especially for independent pharmacies. Related, the return on investment for even the large chain pharmacies is premised on the receipt of “clean” ePrescriptions but these prescriptions continue to require a substantial amount of manual re-work before processing.

Regarding question 3, significant issues—or at least questions about actual performance versus expected performance—were raised with respect to renewal processing and receiving patient-specific pharmacy benefit, eligibility, formulary and medication history information.

Questions 4 and 5 focused on potential solutions and the role of the Consortium in furthering ePrescribing.

*Question 4: In view of all of the barriers identified above, what solutions should be pursued?*

Stakeholders recommended a number of solutions they considered to be important, including:

- Improve the standardization of data integration and work flow processes from end to end for specific functionalities
  - Standardize data definitions, pharmacy “data matching” processes, and prescriber and pharmacy software vendor functionality,
- Increase the emphasis on eRx system vendor performance in training and in specific system functionality
- Increase the available resources for initial implementation support
- Expand coordination across prescribers in a region to insure broad pharmacy readiness
- Expand coordination across prescribers with the same POC vendor software to address software-based ePrescribing performance issues.

In answering the question of solutions to ePrescribing barriers, stakeholders emphasized a number of the same key points:

- Increased coordination of prescribers in a region and/or with the same ePrescribing software is a critical factor to insuring broad ePrescribing adoption and use, especially with respect to increasing pharmacy readiness.
- Absent being able to effectively diagnose ePrescribing failures, it is difficult to determine which solutions are the most important; message failure diagnosing tools are needed.
- Financial incentives should be provided to pharmacies to implement ePrescribing.
- Some stakeholders, expressing concern at the opaqueness of the underlying ePrescribing technology arrangements among proprietary vendors and networks, and at the associated “private” transaction fee arrangements, suggested that consideration of solutions should be expanded to include the creation of non-proprietary networks for data exchange and/or “direct connect” transmission of transactions.
- It may be necessary for prescribers to begin to “steer” ePrescriptions to those pharmacies that perform well.
- Health plans should articulate the benefits they expect to realize from ePrescribing in terms that lead to specific performance measures that eRx system vendors can routinely report.
- Prescribers should have available to them good information on how well different eRx systems perform on specific functions, for both prescriber training and implementation support.
- There should be increased standardization across all software vendors (prescriber and pharmacy) and in pharmacy “data matching” processes; however, while matching of prescriber data by pharmacies is important, the prescriber data must be entered accurately in the first place.

*Question 5: How can the California ePrescribing Consortium contribute best to improving ePrescribing adoption and use?*

Interviewees had a number of suggestions, including:

- Work with key larger organizations (chain pharmacies, large medical groups, high “market share” system vendors) statewide to address key eRx problems and solutions;
- Support regionally based multi-stakeholder projects aimed at achieving greater coordination among prescribers with pharmacies (for implementation of specific ePrescribing functions, addressing issues related to data matching and data quality, developing end-to-end user testing protocols, offering prescriber implementation support in conjunction with regional extension centers);
- Publish ePrescribing demographic and performance data for the different counties on a monthly or quarterly basis;
- Provide educational and other materials such as eRx implementation guides, return on investment information, problem-focused information and information on eRx system performance differences.

All of these activities were deemed to be important by most stakeholders. Some points of emphasis included:

- Facilitating collaboration and sponsoring educational efforts among key stakeholder groups including provider organizations, pharmacies and ePrescribing system vendors is critical to insuring smoother and more rapid adoption and use of ePrescribing. This facilitation needs to be increased, statewide and regionally.
- The Consortium should sponsor specific projects demonstrating multi-stakeholder collaboration.
- The Consortium should work to insure that physician executives are engaged in ePrescribing so that implementation efforts are maximally successful.
- The Consortium should publish key ePrescribing performance information with an emphasis on how system performance impacts quality of care, and should disseminate information on key ePrescribing issues.
- The Consortium should continue to address chronic ePrescribing barriers, should publish on its website a “known problems” list and should encourage the formation of a “community of users” on an ePrescribing system-specific basis.

### Discussion

The literature to date demonstrates that ePrescribing offers tangible benefits in terms of increased patient care quality and efficiency. However, the literature and “on the ground” experience also make it clear that there are substantial barriers to optimal use of ePrescribing. Heretofore, an important barrier for prescribers was the need for financial resources for implementing eRx systems as well as, more broadly, EHR systems. As previously noted, incentives—at least for prescribers—are available. At the practice level, prescriber readiness is critical and needs to be reflected in reasonable expectations, adequate resource commitment in terms of time and dollars and necessary modification of existing work flow processes. And, among prescribers, remaining issues to be addressed include selecting the “right” system, insuring that adequate implementation support and training is provided and integrating eRx processes and information into clinical work flow.

California’s experience with ePrescribing has not uncovered any issues or barriers that are unique to California. Further, examples of multi-stakeholder ePrescribing pilots that have had varying degrees of success point to the importance of multi-stakeholder collaboration.<sup>42</sup>

Within California, in 2006, a collaborative project was sponsored by the LA Care Health Plan to determine the feasibility, benefits and barriers to ePrescribing among a selected group of Medi-Cal providers. The health plan provided financial incentives for providers to adopt ePrescribing, using an eRx vendor that agreed to provide strong technical support and to insure processing of new and renewal prescriptions (including checking for drug interaction effects and enabling providers to review patient medication histories and access drug formularies). The pilot achieved significant benefits in terms of reduced pharmacy callbacks to providers, decreased numbers of adverse drug events, time savings for

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<sup>42</sup> Berry, Kate: “Examples of E-Prescribing Initiatives,” Surescripts, 2008.

provider staff in processing renewal requests and increased use of generic medications. However, issues identified included the need to adjust provider work flow and to insure provider internet connectivity, the unavailability of pharmacy eligibility, benefit and formulary information and the need to insure strong local pharmacy adoption and use of ePrescribing.<sup>43</sup>

Another good example of a collaborative project involving multiple stakeholders is the CalPERS ePrescribing pilot project.<sup>44</sup> CalPERS and its partners (Anthem, Blue Shield and Medco) launched an ePrescribing pilot with five physician groups that was initiated in the first quarter of 2009 and was concluded at the end of the second quarter of 2010. The goal of the pilot was to test a set of eRx adoption strategies and best practices through collaboration with a selected set of participating physician groups within the health plans. The objective was to enhance patient safety and quality of care by replacing paper prescriptions with ePrescribing. Anthem Blue Cross and Blue Shield of CA determined their own proposed pilot models and incentives packages. Both organizations coordinated their proposed pilot plans and incentive packages for their physician groups. Medco has managed the project.

Throughout the various phases of the pilot program, the project team worked with: the physician groups to help address issues and barriers; the pharmacy groups to address pharmacy-related issues and barriers; the eRx system vendors and Surescripts to address application, connectivity and support issues; the California ePrescribing Consortium to further promote the adoption and utilization of ePrescribing in California; and various associations and government entities such as the California Board of Pharmacy, California Pharmacy Association, Inland Empire (NAMM) and Med-Cal Managed Care Pharmacy Directors.

The pilot physician groups (Hill Physicians in Sacramento, San Jose Medical Group in San Jose, John Muir Physician Network in Walnut Creek, North American Medical Management of California (PrimeCare) in Riverside and San Bernardino counties and Santé Community Physicians in Fresno) have now implemented ePrescribing and are in utilization phase.

During the last few months, the pilot team finalized the pilot metrics, including conducting a physician survey and obtaining selected reports about pilot physician adoption and utilization from Surescripts (information not available to CalPERS, Anthem, Blue Shield, or Medco). The assessment of pilot results shows a moderate impact on increasing the adoption and use of ePrescribing and adds to the supporting evidence that ePrescribing improves medication safety, efficiency and lowers cost. However, there are still many issues and barriers that have to be overcome for a complete transition to electronic prescribing.

Even for those prescribers most dedicated to implementing ePrescribing, a myriad of issues need to be addressed. First, prescribers selecting an ePrescribing or EHR system need to take into account varying

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<sup>43</sup> "L.A. Care's E-Prescribing Experience," Presentation, March 2009

<sup>44</sup> Information provided by Patrick Robinson, CalPERS

performance of individual products in terms of functional robustness and usability, especially with respect to clinical and formulary decision support.

Achieving value from ePrescribing is also dependent on the readiness and willingness of other key stakeholders. Pharmacies (mail order, chain, independent) must be eRx-enabled, including training staff and maintaining software systems and prescriber directories capable of supporting ePrescribing. Also, health plans and other payers need to make their pharmacy benefit, eligibility, medication history and formulary information electronically available to prescribers. And, nationally, work needs to continue to standardize the ePrescribing knowledge management infrastructure, including data definitions and standards for populating key directories and databases.

Standardization of key medication related information is important. The National Council for Prescription Drug Programs (NCPDP) is a non-profit, ANSI-accredited, standards development organization whose mission is to create and promote the transfer of data related to medications, supplies and services within the health care system through the development of standards and industry guidance. With respect to ePrescribing, its work related to the SCRIPT standard supports messaging regarding new prescriptions, prescription changes, refill requests, prescription fill status notification, prescription cancellation, medication history and transactions for long-term care environments. Its activity related to this standard also includes working with other stakeholders in the industry to improve the communication of Sig (prescription instruction) information, prior authorization functionality and the use of RxNorm for standardized medication nomenclature. Improvements are reflected in new SCRIPT versions, such that for example, the ability to include the Sig in a structured and codified way is available in SCRIPT version 10.4 and above.<sup>45</sup>

A recent Deloitte<sup>46</sup> report concludes that while the development of the NCPDP SCRIPT standard has evolved to keep pace with technologic and business changes, eRx system vendors have evolved the necessary software capability at varying rates; therefore, advanced functionality based on the current standard is not universally available, and prescribers and pharmacies maintain inconsistent work flow processes. The report recommends the adoption of standards for drug terminology, codified detailed medication instructions, prior authorizations data exchanges and data transmission.

With respect to the SCRIPT standard, Surescripts' vendor certification standards and implementation guides are being updated to reflect NCPDP SCRIPT standard 10.6 and vendor ePrescribing software will need to be re-certified over a 24 month period.<sup>47</sup>

Surescripts is also addressing issues related to the quality of prescriber and pharmacy directory information. Among the various issues that create barriers to ePrescribing, directory management and

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<sup>45</sup> "E-Prescribing Fact Sheet" NCPDP Website, [http://www.ncdp.org/pdf/Eprescribing\\_fact\\_sheet.pdf](http://www.ncdp.org/pdf/Eprescribing_fact_sheet.pdf) Note: see also the NCPDP Formulary and Benefit Standard

<sup>46</sup> Shores T et al. The Evolving e-Prescribing Landscape. Deloitte Development LLC, 2010

<sup>47</sup> Aicklen C., Jariwala, A., Groom, T., Certification: Surescripts Presentation to the CalRx Health Plan Work Group, May 2010

maintenance issues are the most prevalent, accounting for 44% of issues reported to Surescripts.<sup>48</sup> Increased standardization of basic prescriber and pharmacy directory information, including name, address, and telephone and fax numbers is critical to the electronic processing of prescriptions, especially renewal requests.<sup>49</sup>

### **Conclusion and Recommendations**

As the adoption and use of ePrescribing increases at a more rapid rate, it will become more urgent to address the many barriers to ePrescribing. While this paper has highlighted many of these barriers, there are also challenges on the horizon that ultimately suggest an evaluation, from a policy perspective, of a number of the underlying premises on which ePrescribing is built. The complexity of organizational arrangements, work flow process integration and data related interoperability issues that must be addressed among provider organizations and their ePrescribing system vendors, intermediary networks, pharmacies, pharmacy benefit managers (PBMs) and health plans to reap the benefits of ePrescribing is formidable. And, there are important differences among these various organizations in their missions, ownership auspice and policies towards sharing of eRx-related information. Data regarding ePrescribing adoption and use is proprietary and can be difficult to obtain, especially as it pertains to measuring eRx implementation progress at the regional and local level; data is virtually impossible to obtain to the extent that it reflects the performance of specific organizations (software vendors, pharmacies) that are key to successful ePrescribing.

Further, the information technology architecture, organizational arrangements and transaction fee basis on which ePrescribing processes are built may need to be explored to address a number of questions:

- As the volume of ePrescriptions increases from current levels to achieve a virtual 100% of eligible prescriptions, are the existing architectures scalable to that volume of prescriptions?
- Given the architecture, can tools be developed to enable a more rapid and accurate method for determining the causes of messaging failures?
- What measures are available or can be developed to measure the overall performance of the ePrescribing network, e.g., system availability, expected and actual “delivery times” per transaction and variations in message content as measured against standardized norms?
- What is the ultimate cost of ePrescribing stemming from a transaction fee-based funding model in which those costs are generally not transparent to the health plans and purchasers that ultimately bear the cost?

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<sup>48</sup> Gray, M., ePrescribing Issues Discussion: Surescripts Presentation to the CaleRx Regional Provider Work Group, May 2010. Other issue categories are: Customer Service (mishandled scripts), 21%; Transaction Processing (Message Content Validation Errors), 17%; Network (Outages/Maintenance), 3%.

<sup>49</sup> See previous reference; an example of Surescript’s efforts to improve directory quality is increasing adherence to United States Postal Service Publication 28

- And, what are the implications for the evolution of structures and funding mechanisms for broader health information exchange that we can garner from our experience with ePrescribing?

Based on our experience in California, and recognizing that the issues that affect ePrescribing adoption and use require solutions ranging from national standard-setting to prescriber- and pharmacy-specific performance, described below is a recommended action plan for improving ePrescribing in California:

- Collaboration: Based solely on the availability of federal incentive monies for achieving meaningful use for ePrescribing, the immediate goal should be for each eligible prescriber to maximize the number and percentage of prescriptions that are transmitted electronically, in order to achieve and go beyond federal objectives for meaningful use. Achieving these objectives will be facilitated to the extent that ePrescribing implementation efforts are coordinated—or at least openly shared—among prescribers, pharmacies and other stakeholders *on a local and regional basis*.
  - As part of planned collaborative efforts, the financial, technologic and other resource needs of independent pharmacies, especially those serving at-risk populations, need to be addressed. In fact, for some prescribers, achieving meaningful use goals may be largely dependent on independent pharmacy adoption of ePrescribing, which suggests that it makes sense to provide incentives for these pharmacies to invest in eRx software, train pharmacy staff, etc. Also, independent of financial incentives, special resources may need to be focused on helping independent pharmacies select and install appropriate eRx software as well as redesign work flow processes to enable ePrescribing.
- Formal quality improvement projects: While some barriers to ePrescribing are well understood and the road to solutions clear (e.g., increased standardization of specific rules for entering key demographic and drug information), other barriers are not as well understood, which results in unfortunate finger-pointing among stakeholders.

Over the next several years, collaborative efforts will benefit from sponsorship of formal quality improvement projects that utilize accepted quality improvement methodologies and that involve key provider organizations, ePrescribing vendors, chain and mail order pharmacies and PBMs. In the era of broad health information exchange, achieving success for ePrescribing requires that we broaden our concept of processes, and the quality improvement teams created to improve these processes, to include data exchange and work flow interfaces among several independent organizations. This will require a level of collaboration that has been rarely achieved.

In order to better understand how the performance of different organizations contributes to variations in ePrescribing performance, formal quality improvement projects will need to focus on those key stakeholders with substantial market share, e.g., chain pharmacies, network

intermediaries and ePrescribing vendors, who have the ability to spread process improvements throughout the state (or nation) based on successful projects.

Achieving successful ePrescribing will require focus on a number of specific eRx processes. Once the basics of processing initial and renewal prescriptions are achieved for a high percentage of prescriptions, and pharmacy benefit information is routinely available, increased focus can also be put on developing integrated approaches for other high-value processes like reporting prescription fulfillment information to prescribers.

- Performance Measurement: ePrescribing is but one of several emerging information exchange processes that require seamless work flow and data integration among different organizations. As ePrescribing develops and matures, it will be important to initiate performance measurement systems along various dimensions, including:
  - the capabilities and performance of different eRx systems (whether standalone or as part of an EHR) with high priority focus on the robustness and usability of critical decision support services (clinical and formulary decision support), responsiveness to diagnosing and correcting messaging failures, willingness to be transparent about system performance issues and communicate to prescribers and others regarding these issues, etc.
  - the adoption and use of specific eRx functionality (initial prescription processing, renewal request processing, access and use of pharmacy benefit, formulary and medication history information) by specific pharmacies and prescribers, on a regional and local basis
  - the performance of health plans and PBMs in making accurate, comprehensive pharmacy benefit, formulary and medication history information available

The California ePrescribing Consortium's Health Plan Work Group has initiated a project aimed at standardizing the information (clinical and pharmacy benefit related) that is reported to health plans from PBMs and from prescribers and their ePrescribing vendors—with the expectation that this information can be used by health plans to help document their return on investment in paying transaction fees to make their pharmacy benefit, eligibility, formulary and medication history information available to prescribers. The goal is the creation of reporting requirements built around a core, minimum set of measures that all health plans agree should be available to demonstrate the benefits of ePrescribing. If this effort is successful, it will also contribute to achieving administrative simplification in the development of value-based measures for ePrescribing processes.

The involvement of all key stakeholders in the CaleRx Consortium will be critical to successfully pursue these recommended activities. It will also be critical to coordinate the Consortium's ePrescribing efforts with CaleConnect (the state entity responsible for achieving broad health information exchange) and with the state's designated regional extension centers, which are leading EHR adoption efforts.

While achieving meaningful use of EHRs for as many providers as possible is an immediate goal, broader longer term coordination efforts among these organizations should be focused on insuring that ePrescribing functionality in EHRs is robust, particularly in terms of clinical and formulary decision support, and that physicians and other providers have a recognized source for comparative information among software vendors' product features and performance. It will also be important for these organizations to work together to ensure that the vast majority of patients' eligibility, benefit, formulary and medication history information is available, current and accurate. Finally, it will be important to assess the long-term potential for the current transaction-fee-based, proprietary health information exchange system, versus alternative, quasi-public approaches, to serve our health information exchange needs from financial, technologic and performance measurement perspectives.

Attachment I

California versus National ePrescribing Adoption for Key Measures\*

METRICS	YE2007	YE2007	YE2008**	YE2008	YE2009**	YE2009
	National	California	National	California	National	California
California Safe-Rx Ranking***						45
USE						
% of Total eligible prescriptions Routed Electronically (State Ranking)	2%	1.44% (22)	4%	3.28% (28)	15%	9% (NA)
% of Patient Visits with a Prescription Benefit Request	NA	2.10%	8%	2.93%	30%	12%
% of Patient Visits with a Prescription Benefit Response	NA	.50%	NA	1.37%	62%	1.72%
Benefit Request Rate at Year End	NA	33.29%	NA	56.77%	NA	78%
ADOPTION						
% of Physicians Electronically Routing Prescriptions (State Ranking)	6%	3%	NA	6% (45)	25%	13% (NA)
% of Patients with Available Prescription Benefit Information (State Ranking)	55%	37%	64%	40% (48)	68%	47% (NA)
% of Patients with Available Prescriptions Histories	55%	NA	64%	40%	68%	47%
% of Total Community Pharmacies Activated for e-Prescribing (State Ranking)	70%	72%	76%	74% (34)	85%	86% (NA)
% of Independent Pharmacies Connected**	27%	NA	46%	NA	62%	NA

\*Surescripts SAFE-RX Information, California State Progress Report for Electronic Prescribing, 2009

\*\*Surescripts National Progress Report on E-Prescribing, December, 2007; Surescripts 2009 National Progress Report on E-Prescribing, initial publication and as updated April, 2010 note: data

\*\*\*California's ranking of 45<sup>th</sup> among the states is based on data which does not include the experience of Kaiser Permanente and Veterans Administration health care facilities, the exclusion of which results in a substantial underestimate of overall ePrescribing adoption and use in California. The Surescripts state ranking is based on three measures: total prescription benefit requests and responses as a percent of the total number of patient visits; total medication history requests and responses as a percent of the total number of patient visits; and the number of prescriptions routed electronically (new prescriptions plus prescription renewal responses) as a percent of all prescriptions that were eligible to be submitted electronically

## Attachment II

### Stakeholder Interview List

Blue Shield of California—Amy Lerner, Pharmacy Networks

CalOptima—Eileen Moscaritolo, Chief Information Officer

California Public Employees' Retirement System (CalPERS)—Patrick Robinson R. Ph., MBA, Senior Pharmaceutical Consultant

CVS Caremark—Roger Lee, Director, Operations—Physician Connectivity

HealthNet—Ned Hanson, Director, Formulary Management, HealthNet Pharmaceuticals

LA Care Health Plan—Elaine Batchlor MD, Chief Medical Officer; Sajid Ahmed, Director, Health Information Technology

Mercy Medical Group, Sacramento— Patricia Ostrander MD, Vice Chair of Quality Management; Elisa Ashton, Pharm. D. Health Sciences Assistant Clinical Professor, UCSF, School of Pharmacy; Tara Allen, Pharmacy Supervisor

Rite-Aid Pharmacy—Donna Litwak R. PH., Manager, Technology and Pharmacy Operations Support

San Mateo Medical Center—Chester J. Kunnapilly MD, Chief Medical Officer and Chief Quality Officer; Michael Aratow, MD, FACEP, Chief Medical Information Officer; Gary Horne, Director of Pharmacy

Sharp Healthcare—Sylvia Linardi, Senior System Analyst, Information Systems; Debbie Ochs, Manager IS/EHR

Walgreens—Michele Davidson, Manager of Pharmacy Technical Standards, Development and Policy

Others—Lynn Barr, MPH Candidate, School of Public Health University of California; Shannon Moore, Director, Health Information Technology, Texas Medical Association; Tim Andrews, Consultant, High Pine Associates