

Adoption of Electronic Prescribing for Controlled Substances Among Providers and Pharmacies

Meghan Hufstader Gabriel, PhD; Yi Yang, MD, PhD; Varun Vaidya, PhD; and Tricia Lee Wilkins, PharmD, PhD

Electronic prescribing (e-prescribing) refers to the process by which a prescriber generates and transmits an “accurate, error-free and understandable” prescription directly to a pharmacy through a special secure network.^{1,2} While evidence is still accumulating, research has shown that e-prescribing is perceived to be efficient by providers. E-prescribing may help reduce medication errors and adverse drug events, improve formulary adherence by prescribers, and improve patient adherence to prescription medications, therefore improving quality of care and reducing healthcare costs.³⁻⁵

Although early adoption of e-prescribing was slow due to concerns over the potential for unintended consequences, as well as some organizational barriers such as financial constraints of small medical practices, significant growth was seen in the adoption and use of e-prescribing in recent years.⁶⁻¹⁰ For example, a recent study using data from Surescripts shows that the proportion of providers e-prescribing via an electronic health record (EHR) increased from 7% in December 2008 to 54% in December 2012.⁷ It is reported that financial incentives authorized by the Medicare Improvements for Patients and Providers Act of 2008 has played a significant role in the increase in the adoption and use of health information technology such as e-prescribing.¹¹

Controlled substances, such as opioid narcotics and stimulants, have potential for abuse and may cause dependence when abused. Approximately 27,000 unintentional drug overdose deaths occur in the United States each year, and opioid drugs are the most common causes of drug overdose mortality.¹² Controlled substances account for approximately 10%-11% of all prescriptions in the United States.¹³ Historically, a prescription for a controlled substance was required to be “written in ink or indelible pencil or typewritten and must be manually signed by the practitioner on the date when issued” and could not be e-prescribed.¹⁴

However, in June 2010, the Drug Enforcement Administration (DEA) revised its regulations on controlled substance prescribing in a DEA Interim Final Rule (IFR) to allow e-pre-

ABSTRACT

Objectives

Electronic prescribing for Schedule II through V controlled substances was legalized in the United States by the Drug Enforcement Administration in June 2010. However, little information exists about adoption and use of the electronic prescribing of controlled substances (EPCS) at the national level. Therefore, the objective of this study is to present the first information about national trends surrounding the adoption and use of the newly allowed EPCS by providers and pharmacies in the United States.

Study Design

Trends of EPCS adoption and use were examined for the number of EPCS, number of pharmacies enabled to accept EPCS, and the number of providers prescribing controlled substances electronically.

Methods

Using nationally representative transactional Surescripts data from July 2012 to December 2013, we examined EPCS trends.

Results

During the study period, the total number of EPCS increased from 1535 to 52,423, and the number and percentage of all pharmacies enabled for EPCS increased from 8768 (13%) to 20,498 pharmacies (30%). The proportion of all providers prescribing controlled substances electronically is currently 1%, but increasing steadily each month.

Conclusions

There is a positive national growth for EPCS in pharmacy preparedness to accept EPCS, the number of EPCS prescriptions sent each month, and the number of providers with the ability to send EPCS.

Am J Manag Care. 2014;20(11 Spec No. 17):SP541-SP546

Take-Away Points

The electronic prescribing of medications is on the rise, but only recently did federal regulations in the United States allow for the electronic prescription of controlled substances (EPCS).

- As of December 2013, one-third of pharmacies in the United States are enabled for EPCS, although only about 1% of all e-prescribers are enabled.
- On the provider side, the initial adoption of EPCS has been slow, but the rate of growth in adoption is substantial.
- Using the most recent nationally representative transactional data, we show a significant upward trend in the adoption of EPCS in the United States by pharmacies and providers.

scribing for drugs in schedules II (for example, opiates and opioids such as morphine and fentanyl used for moderate to severe pain), III (for example, anabolic steroids and preparations of narcotic drugs), IV (primarily benzodiazepines), and V (for example, narcotic and non-narcotic preparations such as cough syrup with codeine).¹⁵ It is believed that e-prescribing for controlled substances (EPCS), because of its potential to reduce prescription forgery and to identify multiple prescribers at the point of prescribing and dispensing, may improve pain management. Thus, it may play an important role in alleviating the growing public health problem of the abuse and overdose of controlled substances.^{16,17}

While the DEA IFR sets the minimum standards, state laws and regulations can lay out further restrictions and requirements for EPCS. As of now, 49 states allow EPCS for scheduled drugs, with only 2 states limiting it to schedules III through V.¹⁸ However, use of EPCS is not mandatory from the DEA's perspective; pharmacies are still able to dispense controlled substances based on paper-and-ink prescriptions from providers.¹⁵ Providers and pharmacies interested in adopting EPCS need to undergo identity-proofing to ensure the security of EPCS; various technologies such as a hard token or certain biometric information (eg, fingerprints) have been employed for identity-proofing purposes. Providers and pharmacies also need to ensure that their software system is compliant with DEA requirements.^{19,20} Currently, 26 software solutions are certified and actively available for EPCS, with another 3 that are certified but may not yet be available to route EPCS.²¹

Research on EPCS has been scarce. Preceding the DEA IFR, Thomas et al¹⁷ surveyed a group of 102 prescribers in a community to assess prescribers' early experience with a testing EPCS program. They found that even though pharmacy participation was limited, over half of the surveyed prescribers rated EPCS positively. Thomas et al¹⁶ also reported that prescribers were gen-

erally optimistic about the benefits of EPCS while expressing concerns about some of its security measures. However, more than 4 years have passed since the DEA IFR became effective; little is known about the actual adoption and use of EPCS nationwide.

The objective of this study is to present the first information about national trends surrounding the adoption and use of the newly allowed EPCS by providers and pharmacists in the United States, using 18 months of pharmacy and provider transactional data (July 2012 to December 2013) from Surescripts.

METHODS

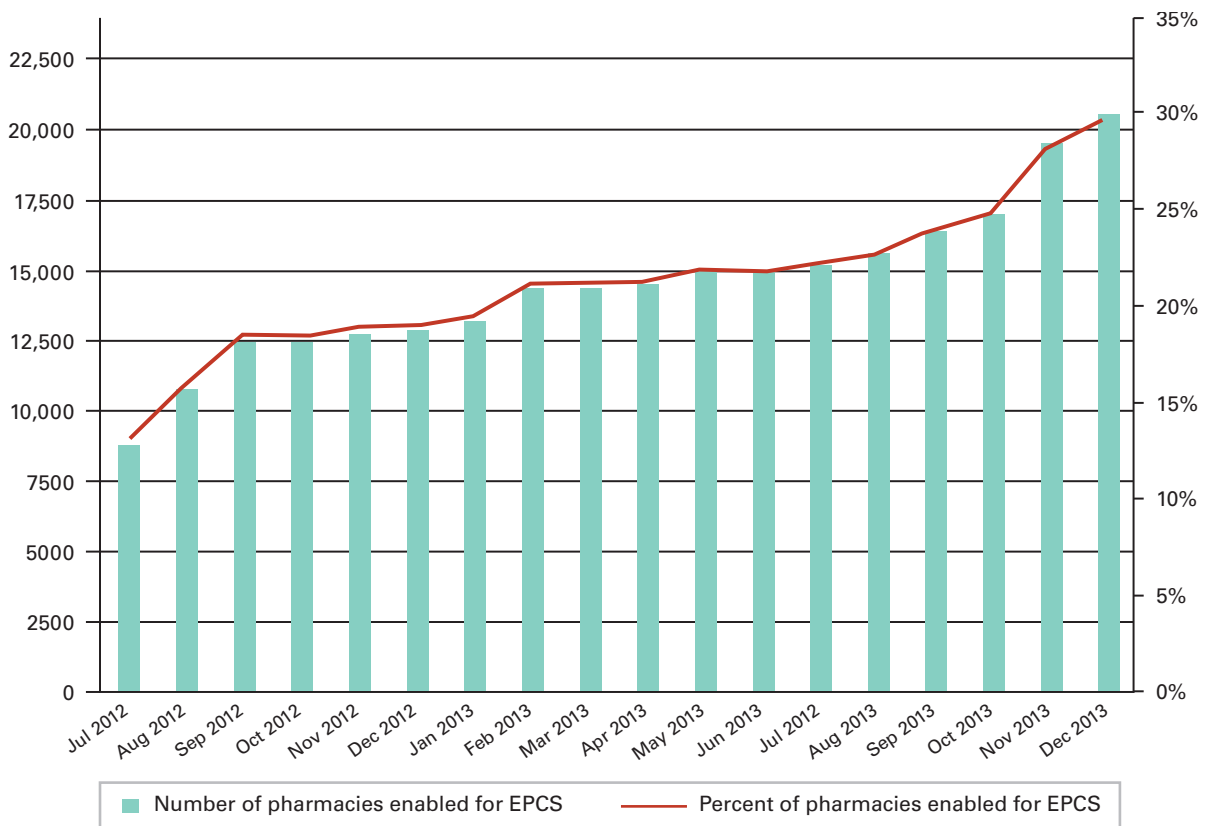
Data Source and Analysis

Surescripts is a leading e-prescription network utilized by a majority of chain, franchise, and independently owned pharmacies in the United States. It routes prescriptions for more than 240 million patients through its network, excluding closed systems such as Kaiser Permanente. In 2013, about 73% of office-based physicians sent over 1 billion electronic prescriptions via Surescripts, representing 58% of eligible prescriptions written in the United States.²² In 2011, Surescripts began a limited deployment to upgrade its network to allow for EPCS in states in which it was legal. After the upgrade was completed in those states, pharmacies and providers were required to use certified software applications and successfully complete a DEA third-party audit before a controlled substance could be e-prescribed. The network expanded as states allowed for EPCS. The data used in this study represent electronic transactions of controlled substances from all states that have granted state regulatory approval for EPCS.^{18,22}

Surescripts data contain 2 components: pharmacy data and provider data. Surescripts pharmacy data include all pharmacies registered with the National Council for Prescription Drug Programs (NCPDP) containing indicators of whether each pharmacy is connected to the Surescripts network and whether a pharmacy is enabled to receive prescriptions for controlled substances electronically. For this analysis, we included physicians, nurse practitioners, and physician assistants as providers.

Using transactional Surescripts data, we examined trends from July 2012 to December 2013 in the quantity of EPCS, the number of pharmacies enabled to accept EPCS, and the number of providers enabled to electronically prescribe controlled substances.

■ **Figure 1.** Number and Percentage of All Pharmacies on the Surescripts Network Enabled for Electronic Prescribing of Controlled Substances (EPCS) (July 2012-December 2013)



RESULTS

During the study period, the total volume of prescriptions for controlled substances sent electronically increased from 1535 to 52,423 (Figure 1). On average, the total number of EPCS increased by an average of nearly 3000 scripts every month during the study period.

As shown in Figure 2, during the study period the number and percentage of all pharmacies enabled for EPCS increased from 8768 (13%) to 20,498 pharmacies (30%). On average, 690 new pharmacies are becoming enabled for EPCS every month.

On the provider side, only 1% of all e-prescribers were enabled for EPCS as of December 2013. EPCS adoption is steadily increasing, however, with an average of 287 providers adding this capability every month (Figure 3). In July 2012, 424,629 total physicians, nurse practitioners, and physician assistants were e-prescribing on the Surescripts network. Of these, 225 were sending electronic prescriptions for controlled substances (0.05%). As of December 2013, of 552,497 total physicians, nurse practitioners, and physician assistants on the net-

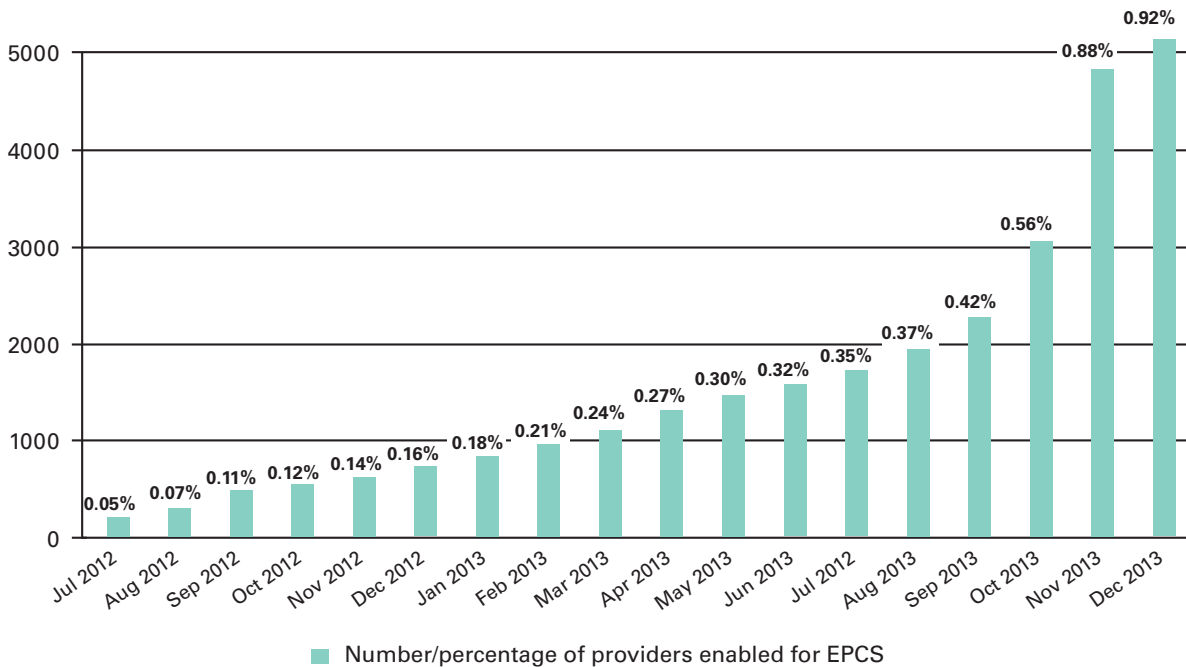
work, 5101 (1%) were prescribing controlled substances electronically.

DISCUSSION

In this analysis, our focus was to explore the adoption of EPCS by providers and the availability of pharmacies enabled to process EPCS in the United States. By using the most recent data available, we were able to plot initial trends of EPCS adoption and use by providers and pharmacies from July 2012 to December 2013.

We found that there is positive growth at both levels: pharmacy preparedness, and the number of controlled-substance prescriptions written by providers. In the relatively short period of 18 months, the number of EPCS-enabled pharmacies increased by 130%. Among providers, EPCS adoption is still very low compared with overall e-prescribing rates. Several reasons might explain the slower EPCS adoption among prescribers. First, there may be a lack of trust of technologies to handle prescriptions for controlled substances among prescribers, who may fear prescriptions getting “lost in the system.” Second, there is not enough

Figure 2. Trend of All E-Prescribers Enabled for Electronic Prescribing of Controlled Substances (EPCS) on the Surescripts Network (July 2012–December 2013)



perceived incentive for providers to adopt EPCS, while the authentication and registration process might be viewed as “additional work.”^{11,17} In contrast, the business case for adoption is stronger among pharmacies; if they do not keep up with the competition, they may lose business, and so they tend to adopt more quickly than providers. Compared with the beginning of the study period, when EPCS was almost nonexistent among providers, we observed a significant growth in number of providers participating in EPCS. Based on this 18-month trend, growth in the adoption of EPCS by providers and pharmacy systems is expected to rise significantly in the near future. Providers and pharmacies who will be engaged in EPCS should quickly familiarize themselves with federal and state requirements of EPCS. In addition, providers should undergo identity proofing and both providers and pharmacies should ensure that their software complies with DEA requirements.^{19,20}

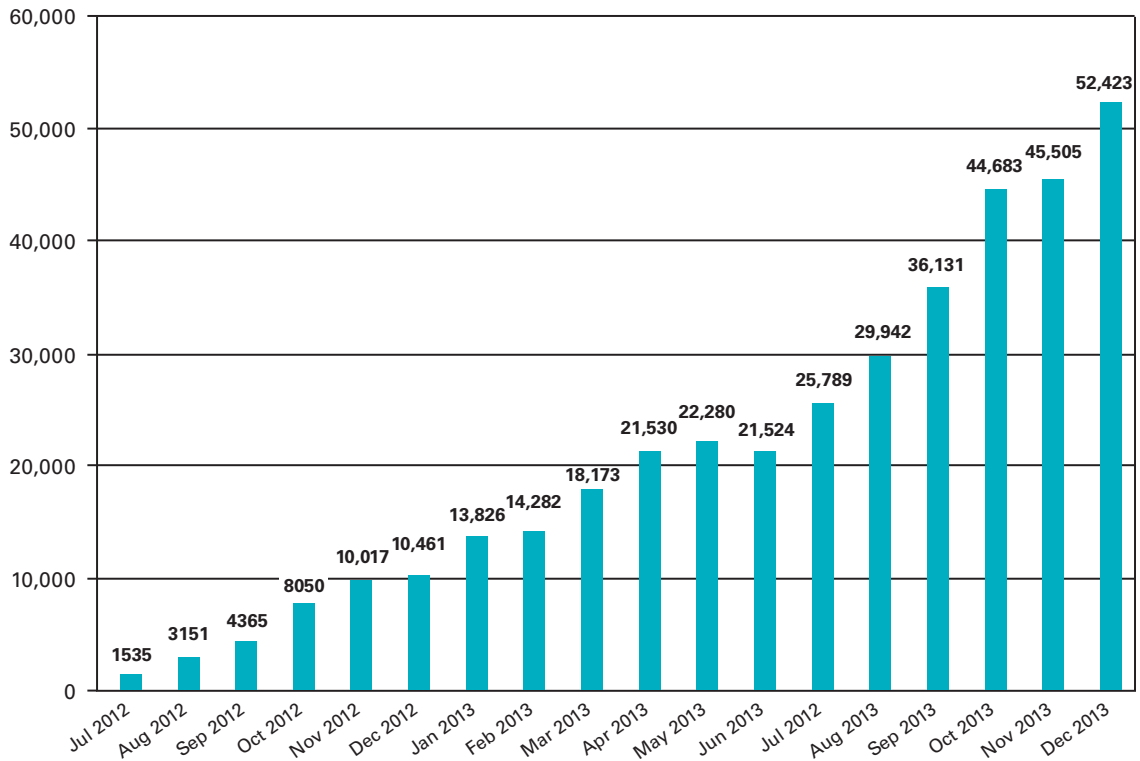
Due to increased efficiency⁵ and the reduced risk of associated errors, e-prescribing in general is a tool to help provide safe and effective care. In fact, Radley et al estimated that e-prescribing resulted in a decrease in the likelihood of prescription errors by 48%.²³ Despite initial limitations and barriers, e-prescribing has been adopted rapidly in the United States in the last few years,⁷ due in large part to the active role of federal agencies in crafting policies and incentive programs with this aim. Through funding delivered via the Health Information Technology for Economic and

Clinical Health Act and the American Recovery and Reinvestment Act, both CMS and the Office of the National Coordinator for Health Information Technology have worked closely to create a national framework for meaningful use of EHRs. One hallmark of the program is the adoption of health information technologies for electronic prescribing to support safe and efficient use of medications.

Although e-prescriptions overall have seen significant growth, concerns remain regarding EPCS. EPCS is a more secure and advanced way to handle controlled substances than traditional paper prescriptions, which according to the Institute of Medicine may account for as many as 1.5 million preventable injuries.²⁴ The highly sensitive nature of the scheduled agents poses several concerns among providers regarding regulatory and other technical complexities. For some providers, confusion exists about the legality of EPCS. For example, while 49 states allow the e-prescribing of Schedule II through V substances, Kansas and Vermont allow only Schedule III through V substances to be electronically prescribed.¹⁸

EPCS challenges are being overcome as the process becomes more streamlined and incorporates new technology. For instance, the availability of fingerprint scanners for many laptop and desktop computers help meet the required provider authentication. The potential benefits of EPCS include not only the capacity to streamline an otherwise lengthy, fraud-prone paper-based system, but

■ **Figure 3.** Total Volume of Prescriptions for Controlled Substances Sent Electronically on the Surescripts Network (July 2012-December 2013)



the ability to curb diversion and to reduce drug abuse and its associated deaths. Early evidence of using EPCS in a community setting supports the potential of EPCS for reducing medication errors and fraud related to controlled substances.¹⁶

Despite low adoption numbers so far, the upward trend of EPCS in this country—making good progress at both the provider and pharmacy levels—is noteworthy. In the case of e-prescribing overall, once the upward movement began, it expanded rapidly into much larger adoption. Here too, it is critical to report the initial momentum and to document the viability of EPCS to create awareness among providers. We note several requirements to accomplish nationwide EPCS adoption, key among them being reducing real and perceived regulatory barriers and the adoption of ever-advancing technological capabilities. The challenges and barriers must be overcome so the potential benefits of EPCS fully materialize.

The current study has a few limitations. First, data used for this analysis included prescribers and pharmacies connected to the Surescripts Network and e-prescribing transactions for controlled substances that flow through that network. Due to the strength of market share, analysis of Surescripts data can serve as a proxy for national trends

analysis. However, while Surescripts captures the vast majority of outpatient transactions, it does not include transactions from numerous sources: inpatient e-prescribing during which prescriptions go directly to a hospital pharmacy; e-prescribing occurring within a closed integrated delivery network, such as Kaiser Permanente; and transactions completed solely on competing networks. Additionally, these transactional data only include states where EPCS is allowed and is occurring. This analysis includes states that have granted regulatory authority to electronically prescribe controlled substances. This analysis includes states granting authority for Schedules II through V and Schedules III through V. Forty-nine states allow for the electronic prescribing of Schedules III through V, of which 47 allow for Schedules II through V. Finally, due to the low adoption rates of EPCS among providers, we are unable to parse out state estimates or determine “hot spots” for provider adoption.

CONCLUSIONS

This is the first study to analyze the 18-month trend of relatively new EPCS in the United States using nationwide transactional data. The results show that while one-third of pharmacies are now enabled to accept EPCS,

substantial work remains to be done before a majority of providers will be able to send controlled substance prescriptions electronically. Pharmacy and provider software must have additional security to comply with DEA requirements. However, the rising adoption rate of EPCS is encouraging: continued increases may lead to reduced fraud and abuse, improved safety and care for patients, and a better work flow for providers who choose to send their prescriptions electronically.

Author Affiliations: Office of the National Coordinator for Health IT, Washington, DC (MHG, TLW); University of Mississippi School of Pharmacy, Oxford (YY); Department of Pharmacy Practice, University of Toledo College of Pharmacy, Toledo, OH (VV).

Source of Funding: None.

Author Disclosures: The authors report no relationship or financial interest with any entity that would pose a conflict of interest with the subject matter of this article.

Authorship Information: Concept and design (MHG, YY, VV, TLW); acquisition of data (MHG); analysis and interpretation of data (MHG, YY, VV); drafting of the manuscript (MHG, YY, VV, TLW); critical revision of the manuscript for important intellectual content (MHG, YY, VV, TLW); statistical analysis (MHG); administrative, technical, or logistic support (MHG); and supervision (MHG).

Address correspondence to: Meghan Hufstader Gabriel, PhD, Office of the National Coordinator for Health IT, 200 Independence Ave, SW, Ste 745H.2.5, Washington, DC 20201. E-mail: Meghan.gabriel@hhs.gov.

REFERENCES

1. E-prescribing. CMS website. <http://www.cms.gov/Medicare/E-Health/Eprescribing/index.html?redirect=eprescribing/>. Updated February 26, 2014. Accessed November 3, 2014.
2. How does e-prescribing work? HHS Health Information Technology and Quality Improvement website. <http://www.hrsa.gov/healthit/toolbox/HealthITAdoptiontoolbox/ElectronicPrescribing/epreswork.html>. Accessed August 8, 2013.
3. Fischer MA, Vogeli C, Stedman M, Ferris T, Brookhart MA, Weissman JS. Effect of electronic prescribing with formulary decision support on medication use and cost. *Arch Intern Med*. 2008;168(22):2433-2439.
4. Fischer MA, Stedman MR, Lii J, et al. Primary medication non-adherence: analysis of 195,930 electronic prescriptions. *J Gen Intern Med*. 2010;25(4):284-290.
5. Lapane KL, Rosen RK, Dube C. Perceptions of e-prescribing efficiencies and inefficiencies in ambulatory care. *Int J Med Inform*. 2011;80(1):39-46.
6. Fischer MA, Vogeli C, Stedman MR, Ferris TG, Weissman JS. Uptake of electronic prescribing in community-based practices. *J Gen Intern Med*. 2008;23(4):358-363.
7. Gabriel MH, Furukawa MF, Vaidya V. Emerging and encouraging trends in e-prescribing adoption among providers and pharmacies. *Am J Manag Care*. 2013;19(9):760-764.
8. Jariwala KS, Holmes ER, Banahan BF III, McCaffrey DJ III. Factors that physicians find encouraging and discouraging about electronic prescribing: a quantitative study. *J Am Med Inform Assoc*. 2013;20(e1):e39-e43.
9. Lluch M. Healthcare professionals' organisational barriers to health information technologies—a literature review. *Int J Med Inform* 2011; 80(12):849-862.
10. Weingart SN, Massagli M, Cyrulik A, et al. Assessing the value of electronic prescribing in ambulatory care: a focus group study. *Int J Med Inform*. 2009;78(9):571-578.
11. Joseph SB, Sow MJ, Furukawa MF, Posnack S, Daniel JG. E-prescribing adoption and use increased substantially following the start of a federal incentive program. *Health Aff (Millwood)*. 2013;32(7):1221-1227.
12. CDC grand rounds: prescription drug overdoses — a U.S. epidemic. *MMWR Morb Mortal Wkly Rep*. 2012; 61(1):10-13.
13. Drug Enforcement Administration, Department of Justice. Electronic prescribing of controlled substances interim final rule with request for comment. *Fed Regist*. 2010;75(61):16236-16319.
14. Practitioner's Manual: Section V: Valid prescription requirements. Drug Enforcement Administration, Department of Justice, Office of Diversion Control website. <http://www.deadiversion.usdoj.gov/pubs/manuals/pract/section5.htm>. Updated January 29, 2008. Accessed November 3, 2014.
15. Drug Enforcement Administration, Department of Justice. Electronic prescriptions for controlled substances clarification: clarification and notification. *Fed Regist*. 2011;76(202):64813-64816.
16. Thomas CP, Kim M, McDonald A, et al. Prescribers' expectations and barriers to electronic prescribing of controlled substances. *J Am Med Inform Assoc*. 2012;19(3):375-381.
17. Thomas CP, Kim M, Kelleher SJ, et al. Early experience with electronic prescribing of controlled substances in a community setting. *J Am Med Inform Assoc*. 2013;20(e1):e44-e51.
18. E-prescribing of controlled substances (EPCS). Surescripts website. <http://surescripts.com/products-and-services/medication-network-services/e-prescribing-of-controlled-substances>. Accessed August 6, 2014.
19. Figge HL. Technology support for pain management: e-prescribing controlled substances. U.S. Pharmacist website. <http://www.uspharmacist.com/content/d/techrx/c/41437/>. Published June 21, 2013. Accessed January 5, 2014.
20. Electronic prescriptions for controlled substances (EPCS): interim final rule with requests for comment; questions and answers for prescribing practitioners [as of 03/31/2010]. US Department of Justice, Drug Enforcement Administration, Office of Diversion Control website. http://www.deadiversion.usdoj.gov/ecomme/e_rx/faq/practitioners.htm. Accessed August 6, 2014.
21. Find e-prescribing software vendors. Surescripts website. <http://surescripts.com/network-connections/mns/prescriber-software>. Accessed August 6, 2014.
22. The nation's most comprehensive health information network. Surescripts website. <http://surescripts.com/about-us>. Accessed August 8, 2014.
23. Radley DC, Wasserman MR, Olsho LE, Shoemaker SJ, Spranca MD, Bradshaw B. Reduction in medication errors in hospitals due to adoption of computerized provider order entry systems. *J Am Med Inform Assoc*. 2013;20(3):470-476.
24. Committee on Identifying and Preventing Medication Errors. *Preventing Medication Errors: Quality Chasm Series*. Washington, DC: National Academies Press; 2007. ■

www.ajmc.com Full text and PDF