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e-Prescribing and Patient Safety: Results From a Mixed Method Study

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ABSTRACT

Objective: To describe ambulatory care clinicians' perspectives on the effect of electronic prescribing (e-prescribing) systems on patient safety outcomes.

Study Design: Mixed method study of clinicians and staff in 64 practices using 1 of 6 e-prescribing technologies in 6 US states.

Methods: We used clinician surveys (Web-based and paper) and focus groups to obtain clinicians' perspectives on e-prescribing and patient safety.

Results: Providers highly valued having medications prescribed by other providers on the medication list and the ability to access patients' medication lists remotely. Providers thought that there will always be prescription or medication errors and that the implementation of e-prescribing software changes rather than eliminates prescription or medication errors. New errors related to the dosing or scheduling of a medication, accidentally prescribing the wrong drug, or duplicate prescriptions.

Conclusions: Lessons from the ambulatory care trenches must be considered as technology moves forward so that the hypothesized patient safety gains will be realized.

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According to the 2001 National Ambulatory Medical Care Survey, 61.9% of all outpatient office visits resulted in a clinician prescribing at least 1 medication.[1] During 2001, an estimated 1.3 billion medications were prescribed during outpatient office visits, with an estimated average of 2.4 prescriptions per medication-related office visit.[1] The Institute of Medicine report *To Err is Human, Building a Safer Health System* estimated that medication errors were responsible for more than 7000 deaths annually.[2] Given that at least $887 million is spent on preventable adverse drug events among Medicare recipients in the ambulatory setting,[3] systems to prevent medication errors in ambulatory settings are sorely needed.

Electronic prescribing (e-prescribing) systems hold promise to improve the safety, quality, and efficiency of healthcare.[4] While e-prescribing is the direct computer-to-computer transmission of prescription information from physician offices to pharmacies, these systems also allow for patient safety features including clinical decision support and sharing of patient pharmacy data across multiple prescribers. Great strides have been made to address the regulatory and high-level operational issues required to permit this form of prescribing. All 50 states and Washington DC have implemented regulations permitting this form of prescribing.[5] In 2009, about 18% of eligible prescriptions were prescribed electronically.[5] While e-prescribing adoption is increasing in the United States, a greater understanding of the role of e-prescribing technology solutions in improving patient-centered pharmacy care is warranted.

This large 1-year study, conducted to evaluate proposed standards for new e-prescribing transactions, provided the opportunity to evaluate healthcare providers' opinions about the role of e-prescribing applications in improving patient safety. This study summarizes qualitative and quantitative data collected via focus groups and surveys of 64 practices in 6 states who used 1 of 6 different e-prescribing software systems. No other study to date has been performed on this

scale. Including multiple vendors in multiple practice settings provided a unique opportunity to fully understand perceptions about patient safety with respect to e-prescribing in primary care settings.

The purpose of this study is to describe ambulatory care clinicians' perspectives on the effect of electronic prescribing systems on patient safety.

PRACTICAL IMPLICATIONS

Clinicians viewed the following aspects of electronic prescribing (e-prescribing) to be most beneficial for improving patient safety:

- e-Prescribing enabled remote access to medication lists.
- e-Prescribing allowed clinicians to see what other providers were prescribing for their patients.
- While e-prescribing eliminated handwriting errors in the prescribing process, clinicians feared a new generation of errors related to the technology.

METHODS

Study Sample

The Brown University Institutional Review Board approved the study protocol. SureScripts, LLC, the nation's largest e-prescribing network, identified states with the highest e-prescribing activity on their network in the fall of 2005. To provide geographic diversity while considering practical and logistical issues, we selected the 6 states with the highest volume of e-prescribing transactions to be targeted for inclusion in the study: Florida, Massachusetts, New Jersey, Nevada, Rhode Island, and Tennessee. Within these states, SureScripts, LLC, identified physician software vendors with substantial activity who agreed to participate in the study: *OnCallData*, InstantDX, LLC (Gaithersburg, Maryland) in Rhode Island; *PocketScript*, Zix Corporation (Dallas, Texas) in Massachusetts and New Jersey; *Rcopia*, DrFirst, Inc (Rockville, Maryland) in New Jersey; *Care360*, Medplus, Inc (Mason, Ohio) in New Jersey and Florida; *eMPOWERRx*, GoldStandard Multimedia, Inc (Tampa, Florida) in Florida; and *Touchworks*, AllScripts, LLC (Chicago, Illinois) in Nevada and Tennessee.

All physician software systems were required to assist in recruitment of ambulatory care practices with a patient mix of at least 25% Medicare-eligible patients. We developed participation agreements (approved by the Brown Institutional Review Board) and provided recruitment packets and training of information in the recruitment packets for each company. The resulting practices represented a convenience sample, as companies approached practices with which they had positive relations and which had participated in research previously. Thus, we were unable to estimate participation rates among potentially eligible practices. The data for the current study were derived from clinician surveys and focus groups. All data were collected before any changes to the e-prescribing software were made to accommodate the e-prescribing standards.

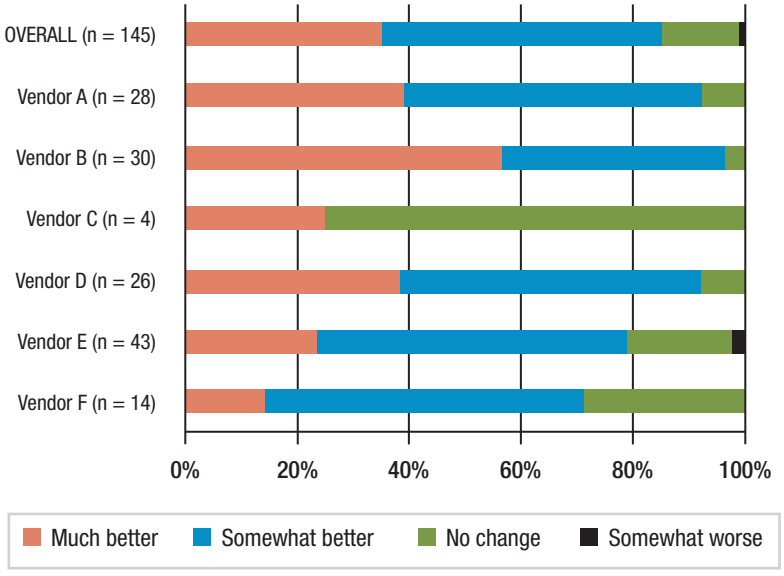
Clinician Surveys

Clinicians (n = 157) completed surveys available via the Web (75%) or paper (25%) in advance of or during the site visit. The survey captured perceptions of the impact of e-prescribing on efficiency, work flow, and quality, as well as clinician views on patient communication regarding medication issues (**Appendix A**). The survey included 2 questions regarding the impact of e-prescribing on patient safety and quality of care (see **Figures 1** and **2**). We estimated the clinician responses to the drug-alerting questions for each physician software system. Vendor-specific results are presented without identifying the name of the vendor. To provide context in which to evaluate differences in these proportions, we described the software in relation to frameworks on recommended best practices for e-prescribing software.[6,7] Two trained interviewers who had received one-on-one instruction regarding the functionality of all of the software products independently evaluated each product in relation to the 60 recommendations. They coded each recommendation as being fully implemented, partially implemented, not at all implemented, or not applicable. Summary proportions for each conceptual domain were estimated from the 60 recommendations.

Focus Groups

Two highly trained research assistants held focus groups (with a meal provided) before hours, at lunch, or after hours at the discretion of each practice between April and August 2006. A total of 276 clinicians and staff members participated in 64 focus groups after providing written informed consent. A sign listing the main topics for discussion was placed on the table for participants to view (**Table 1**). We used an open-ended approach to elicit information about the benefits and drawbacks of e-prescribing, as well as the features often embedded within the e-prescribing software. Participants were encouraged to describe their experiences with e-prescribing software and to provide suggestions for improving e-prescribing. Probes included questions about what aspects of e-prescribing were valuable, what

Figure 1. Perceptions of the Impact of e-Prescribing on Patient Safety, Overall and by e-Prescribing Technology Solution[a]



[a]The participant survey asked "How do electronic prescriptions (submitted by your computer directly to the pharmacy's computer) compare to other prescription methods you use… in terms of patient safety?" No respondents indicated that electronic prescribing was "much worse" than other prescription methods in terms of patient safety.

participants found difficult, suggested improvements in office procedures and software functionality, and other potentially valuable resources. Research assistants also used facilitative (eg, "Can you tell me more about that?" or "Any other opinions?") and clarifying (eg, "When you say…, what do you mean by that?") probes. Participants spontaneously addressed patient safety issues in the context of these discussions. Focus groups were recorded using 2 digital recorders with Pressure Zone Microphones. Once all digital recordings were transcribed, research assistants double-checked every transcript for potential errors.

Qualitative methods are useful for studying complex phenomena such as communication, thoughts, expectations, and meaning, and for investigating people's experiences.[8-10] An extensive hierarchical coding structure was initially developed to handle the large volume of qualitative data (**Appendix B**). This initial structure was based on the focus group protocol and review of initial transcripts, and was revised during active coding. Fifteen different parent nodes were defined to code all of the qualitative data. For this article, we honed in on the analysis of 2 nodes: (1) impact on clinical practice and (2) software features, because many e-prescribing software packages had additional features that may influence patient safety. Coders were instructed to include any comments regarding patient safety in a subnode specifically for this purpose. We also evaluated text coded under "quality of care," as patient safety issues were sometimes referred to in the context of quality of care.

Coders were trained in coding definitions and overall coding structure. A code book defined all codes and their relationships. All quotes were derived from the focus groups and individual interviews. We did not include information on drug alerts as part of this analysis, as the extensive nature of the findings related to drug alerts warranted a separate analysis.[11]

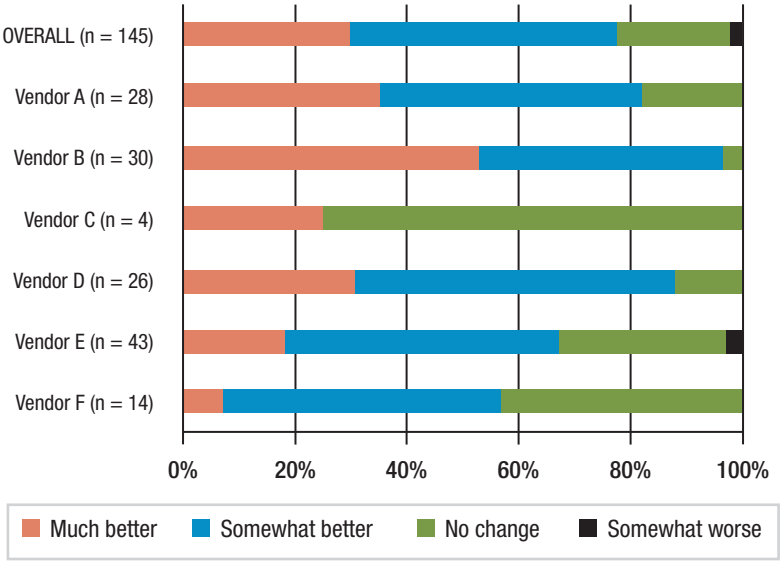
Consistency in the coding across team members was ensured by extensive training, coding meetings, a common code book, and group exercises. We also had 2 members of the coding team independently code approximately 20% of transcripts and compared reports to identify any areas of coding that were not consistently applied by coders and for which additional training was required. A qualitative data review of the double-coded transcripts revealed that passages coded by each coder commonly appeared twice, indicating effective coding among those transcripts by the research staff. Management and analysis of the data were conducted with NVivo qualitative analysis software (Version 7, QSR International, Melbourne, Australia).

RESULTS

Sample Characteristics

Overall, all software vendors fully implemented at least half of the best-practices recommendations (range of 63%

Figure 2. Perceptions of the Impact of e-Prescribing on Quality of Care, Overall and by e-Prescribing Technology Solution[a]



[a]The participant survey asked "How do electronic prescriptions (submitted by your computer directly to the pharmacy's computer) compare to other prescription methods you use…in terms of quality of care?" No respondents indicated that electronic prescribing was "much worse" than other prescription methods in terms of quality of care.

to 82%; **Table 2**). All security and confidentiality recommendations were met by all vendors. The proportion of recommendations fully implemented for other domains displayed significant variation across software vendors.

Thirty percent of practices were solo practices, 30% were single specialty groups, and 19% were multispecialty groups. Nearly 40% of the practices were family medicine and 45% were internal medicine. Patient case mix included a mean of 43% (SD 26%) eligible for Medicare. Focus groups (n = 64 involving 276 participants) were composed mostly of prescribers (physicians, residents, nurse practitioners, and physician assistants; 64%), but medical assistants (12%), nurses, office managers, pharmacists, and other office staff also participated in the focus groups. Eighty percent of survey respondents were physicians.

Quantitative Analysis

Of the 157 clinicians who completed the survey, 3 reported not using e-prescribing and 9 did not answer the 2 questions of interest (4 clinicians using software from vendor D and 5 from vendor E). Overall, 35% of responders thought that e-prescribing was much better than other methods in terms of patient safety, and an additional 50% reported that e-prescribing was somewhat better (Figure 1). There was variation across software vendors; the proportion of clinicians who felt that e-prescribing was somewhat or much better than other methods of prescribing ranged from 25% to more than 95%. Only 1 clinician reported a negative view of e-prescribing in relation to patient safety and quality of care. The proportion of clinicians who felt that e-prescribing was somewhat or much better than other methods of prescribing with respect to impact on the quality of care ranged from 25% to more than 95% depending on software vendor; overall, 78% of clinicians surveyed felt that e-prescribing was much or somewhat better (Figure 2).

Qualitative Analysis

Among users of e-prescribing software, a recurring theme was the importance of the medication list feature in improving patient safety. This feature was seen as a major advantage of e-prescribing. Participants reported using this feature to perform medication reconciliation.

Table 1. Focus Group Discussion Topics

• Experiences with electronic prescribing and e-prescribing software
• How did your practice change when e-prescribing software was implemented?
• What do patients think of electronic prescribing?
• Thoughts about medication history; thoughts about adherence?
• Thoughts about formulary and benefits features?
• Suggestions for improvement and other ideas

Table 2. Implementation of Best Practices Recommendations by e-Prescribing Software (Percentage of Recommendations Fully Implemented)

	Software Vendor					
Recommendation	A	B	C	D	E	F
Overall recommendations fully implemented	77	82	62	63	73	63
Patient identification and data access	100	100	100	50	75	100
Current medications/medication history	87.5	87.5	75	50	62.5	75
Medication selection	64	93	57	50	64	64
Alerts and other messages to prescribers	83	83	42	67	75	50
Patient education	100	50	100	100	100	100
Data transmission and storage	71	86	43	86	86	57
Monitoring and renewals	40	60	40	40	20	40
Transparency and accountability	50	0	50	100	100	0
Prescriber-level feedback	100	50	100	50	100	50
Security and confidentiality	100	100	100	100	100	100

One participant noted, "[A patient] was basically on everything he had before except for one…he didn't remember, but I knew it from the list…it helps in reduction of errors. It helps in compliance because you see when they get it and when they don't get it." Another highly valued e-prescribing software feature was the ability to know what medications were prescribed by other providers. One participant claimed to "love the fact that you get the drugs that were prescribed in urgent care on the list because 9 of 10 patients when they come in for their follow-up—which urgent care always tells them to do—they don't remember which medicine they were put on."

Although participants clearly articulated the patient safety value of having a medication list at the point of prescribing, the accuracy of the lists was questioned by some. Complaints about short-term medications (such as antibiotics) remaining indefinitely on the lists varied according to the specific e-prescribing software. Complaints about not having complete information on all of the patients were common. Overall, participants greatly valued the ability to access medication lists remotely. Clinicians commented on the need to prescribe after hours or away from their patients' records. Remote access to the medication list was believed to improve patient safety. Some participants reported printing the medication list for their patients. According to one participant, "It really helps because at least they can take it home and call us back and clarify any differences between the two."

Improved legibility was also perceived as a major benefit of e-prescribing. However, participants felt that there will always be prescription or medication errors, and that the implementation of e-prescribing software would change rather than eliminate errors. A major type of error related to the dosing or scheduling of a medication. Other types of errors included accidentally prescribing the wrong drug or duplicate prescriptions. As one participant reported: "I've seen things where the staff handled a refill request and picked the wrong drug, a similar sounding name…I could have very easily prescribed the wrong drug or the wrong dosage." Participants reported that errors occurred because of difficulty distinguishing between items in menus or because of errors in selecting options. Factors leading to selecting the wrong agents included the small size of handheld devices and columns too close together on the display. One participant noted that a prescription "somehow got switched…the viewing screen on that handheld is small, and it was a combination medicine. I couldn't see all the components…he was getting one that contained aspirin instead of acetaminophen. He was somebody who shouldn't be getting aspirin. And he had a serious complication from that." Participants suggested ordering medications in ascending or descending order to prevent mistakes. Participants reported that medication errors stemming from e-prescribing were typically caught by the pharmacists, error checking within the e-prescribing software, or patients. **Table 3** summarizes key issues emerging from the focus groups.

DISCUSSION

This multistate, multivendor study confirms the value of e-prescribing for patient safety. Consistent with a recent study based on only 1 e-prescribing product in 1 state,[12] our study found that the majority of clinicians reported

Table 3. Summary of Key Advantages and Concerns About e-Prescribing That Emerged From Focus Groups

Patient Safety Advantages	Patient Safety Concerns
Value in doing medication reconciliation at point of prescribing	Validity and completeness of the information regarding medication
Knowing medications prescribed by other providers	Accidentally prescribing duplicate medications
Remote access to patients' medication lists so when clinician prescribes new medications off-site, it is done with knowledge of medication regimen	Drop-down menu issues resulting in wrong drug or dose being prescribed
Ability to share list of medications with patients so they can use it at home to check against actual medicines	Small screen size on handheld devices leads to wrong drug or dose being prescribed
Reduces errors due to illegibility of handwriting	Order of drop-down menus leads to wrong drug or dose being prescribed

at least some improvements in patient safety and quality of care with e-prescribing. Our study extends previous work by identifying the concerns of users regarding new forms of medication errors resulting from e-prescribing. Participants provided clear areas for improvement, as well as suggestions for preventing medication errors.

An estimated 7.6% of outpatient prescriptions have prescribing errors,[13] and 4.1% of new e-prescriptions and 2.1% of refill e-prescriptions require pharmacist intervention.[14] Our findings echo the work by Gandhi et al,[13] who argued that basic computerized prescribing systems may not be adequate to reduce errors. Our participants noted problems with dosages and directions, issues also brought up in interviews with pharmacy personnel.[15] An audit of pharmacist medication interventions found that among e-prescriptions requiring intervention, 32% were due to missing information and 17.7% were due to dosing errors.[14] While these data support the notion that more advanced systems with dose and frequency checking are needed to prevent potentially harmful errors, the extent to which such systems will be overridden remains unknown.[11] Another strategy to reduce errors in instructions and dosing is to develop and implement standards for terminology to code clinical drugs (RxNorm) and standards for medication instructions (structured and codified SIG). Indeed, a recent expert panel concluded that the lack of unambiguous drug identifiers in proposed standards suggests that more work is needed.[16]

Our study demonstrated that specific aspects of the software and hardware (eg, screen size, drop-down menus, order of choices) may contribute to the selection of wrong dose and drugs. Best practices should be identified by understanding the relationship of errors to characteristics of the software and hardware used for e-prescribing, with methods such as those conceptualized by Bell et al,[6] operationalized via consensus method with an expert panel,[7] and evaluated in a field study.[17] The human factors engineering approach to the development of tools such as e-prescribing may identify potentially dangerous usability flaws.[18,19]

Participants in our study believed the availability of a medication list as part of the e-prescribing software improved patient safety. Our finding that participants used the medication list to reconcile medications with their patients confirms previous work indicating that use of e-prescribing systems in a standardized way to ensure accurate medication lists leads to significant patient safety gains.[20] However, in another setting, when such data were provided, they were only accessed in 0.6% of clinical encounters involving prescriptions.[21] Our participants reported that medication lists were often incomplete or they did not have information on all of their patients. This is not surprising, because the extent of bidirectional flow of medication history data from comprehensive data sources is highly variable and is hampered by product limitations and external challenges related to implementation, including state variations in regulation of data and sharing of information across providers.[22] Our data suggest that clinicians believe that further patient safety gains could be realized if comprehensive, accurate medication lists were available at the point of prescribing.

Our study is not without limitations. While nonresponse bias is possible, we do not know whether participants were overly supportive of e-prescribing or overly negative. It is likely that this convenience sample captured participants who were representative of the most experienced e-prescribing users in primary care settings. Because they were not new users, it may be that these participants liked the software enough to continue using it. Second, the data included in this report were from a geographically diverse group of physician practices using 1 of 6 e-prescribing products. The variability in the e-prescribing software may give rise to interesting hypotheses to be explored in future research. Concerns may exist over the purposeful sampling in this study. Yet for qualitative analysis, purposefully selecting an informative sample is a valid approach and

can increase the quality and information of the data. Nevertheless, even among e-prescribing users who are familiar with the technology, the findings did not appear to be overly optimistic regarding the impact of e-prescribing on patient safety in the ambulatory care setting.

CONCLUSIONS

Regardless of the e-prescribing software vendor, physicians representing diverse practice characteristics and locations overwhelmingly agreed that functionality included in many e-prescribing systems offers a patient safety advantage relative to other forms of prescribing. Given the conservative estimate of 530,000 preventable adverse drug events occurring in outpatient settings,[23] clinicians must have full knowledge of the current drug regimen to avoid preventable adverse drug events. While e-prescribing may be one method to improve patient safety related to medication errors, it is important to further identify and promote best practices to minimize a new generation of medication errors resulting from the adoption of this technology.

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Appendix A. e-Prescribing Previsit Web Survey: CLINICIAN SURVEY

This survey is part of a research project funded by the US Department of Health and Human Services (HHS) and supported by your employer. The purpose of the survey is to assess your opinions about electronic prescribing and how it has influenced how you do your job. The survey should take approximately 15 minutes to complete, and your responses will be kept confidential.

We greatly appreciate your cooperation. If you have any questions regarding this study, please contact me directly at [e-mail address] or call [phone number].

Thank you for your help.

1. What is your first name: _____

2. In what state is your group/practice located: _____
3. What is the name of your group/practice: _____
4. Which of the following e-prescribing software does your group/practice use?
   - a. OnCallData
   - b. eMPOWERx
   - c. TouchWorks
   - d. PocketScript
   - e. eMaxx
   - f. Rcopia
5. What is your gender?
   - a. Male
   - b. Female
6. What is the highest level of education completed?
   - a. Did not complete high school
   - b. High school diploma or GED
   - c. Vocational/trade school
   - d. Some college
   - e. Associate degree
   - f. Bachelor's degree
   - g. Postgraduate degree
7. Are you a clinician that prescribes medicines for patients?
   - a. YES
   - b. NO
8. What is your job?
   - a. Physician
   - b. Resident
   - c. Nurse Practitioner
   - d. Physician Assistant
   - e. Pharmacist
   - f. Other: _____

How many minutes per day do you now (or did you prior to implementation of electronic prescribing software) perform the following:

9. Resolve prescription problems with the pharmacy? Please enter average time. No ranges.
   _____ total minutes/day **before** e-prescribing _____ total minutes/day **after** e-prescribing

10. Respond to and process pharmacy refill/renewal requests? Please enter average time. No ranges.
    _____ total minutes/day **before** e-prescribing _____ total minutes/day **after** e-prescribing

11. Obtain prior approval for drugs as specified in patients' prescription plans? Please enter average time. No ranges.
    _____ total minutes/day **before** e-prescribing _____ total minutes/day **after** e-prescribing

12. Some e-prescribing technologies have computer-generated drug alerts. How often do you **override** computer-generated drug alerts?

	Never	Sometimes	Most of the Time	Always
a. Allergy alerts	1	2	3	4
b. Drug-to-drug interactions	1	2	3	4
c. Dose checks	1	2	3	4
d. Drug-to-food interactions	1	2	3	4
e. Drug-to-alcohol interactions	1	2	3	4
f. Health state interactions	1	2	3	4

13. Are the alerts in the prescriber software system adequate? Please describe:
    _____
    _____
    _____

14. Please rate these different methods of prescribing from your perspective:

	Very Inefficient	Moderately Inefficient	Moderately Efficient	Very Efficient	Do Not Use
a. Handwritten	1	2	3	4	5
b. Faxed (fax machine)	1	2	3	4	5
c. Faxed (computer fax)	1	2	3	4	5
d. Sent electronically to the pharmacy's computer	1	2	3	4	5
e. Phone-in	1	2	3	4	5
f. Computer generated/printed out	1	2	3	4	5

15. Do you use any aspect of the e-prescribing software (such as OnCallData, eMPOWERx, TouchWorks, PocketScript, eMaxx, or Rcopia)?

a. NO (skip to question 17) b. YES (continue with question 16)

16. In a typical week, how often do you use these features of the e-prescribing software?

	Never	Sometimes	Most of the Time	Always	Not Available
a. Entering/revising patient information	1	2	3	4	5
b. Entering new prescriptions	1	2	3	4	5
c. Approving and/or submitting new prescriptions	1	2	3	4	5
d. Entering information for refills/renewals	1	2	3	4	5
e. Approving and/or submitting refills/renewals	1	2	3	4	5
f. Reviewing patients' medication history	1	2	3	4	5
g. Reviewing drug reference information	1	2	3	4	5
h. Reviewing formulary information	1	2	3	4	5
i. Entering over-the-counters, supplements	1	2	3	4	5
j. Entering samples given to patients	1	2	3	4	5
k. Checking and/or updating medication list with patient	1	2	3	4	5
l. Checking lab values in relation to medication use	1	2	3	4	5
m. Printing patient drug info sheets for patients	1	2	3	4	5
n. Accessing patient data from other locations	1	2	3	4	5
o. Ordering prescriptions from home, hospital, or other locations	1	2	3	4	5
p. Building a medication favorite list	1	2	3	4	5
q. Entering medications administered in MD office (ie, immunizations)	1	2	3	4	5
r. Printing reports for the patient's chart	1	2	3	4	5
s. Printing other reports	1	2	3	4	5

17. The next question addresses how you believe e-prescribing has impacted your workplace. From your perspective, how does using the e-prescribing software compare to previous methods in the following areas?

	Much Worse	Somewhat Worse	No Change	Somewhat Better	Much Better
a. Patient safety	1	2	3	4	5
b. Quality of care	1	2	3	4	5
c. Efficiency of care (eg, increased work flow and productivity)	1	2	3	4	5
d. Communications with the patient	1	2	3	4	5
e. Communications with the pharmacy	1	2	3	4	5
f. Overall relationship with the patient	1	2	3	4	5
g. Overall relationship with the pharmacy	1	2	3	4	5

18. The next few questions address issues of communication with respect to medication use.

	Never	Sometimes	Most of the Time	Always
a. How often do you have discussions with other other prescribers regarding coordination of medications?	1	2	3	4
b. How often do you have discussions with patients regarding lack of adherence?	1	2	3	4
c. How often do you have discussions with patients regarding potential adverse drug effects?	1	2	3	4
d. How often do you discuss the costs of medications with your patients?	1	2	3	4
e. How often would your patients tell you if they **did not want** a prescription you ordered for them?	1	2	3	4
f. How often would your patients tell you if they **did not plan to purchase** a medication you were ordering for them?	1	2	3	4

19. Based on your own experience, please rate your overall satisfaction with these different methods of prescribing:

	Very Unsatisfied	Somewhat Unsatisfied	Somewhat Satisfied	Very Satisfied	Do Not Use
a. Handwritten	1	2	3	4	5
b. Faxed (fax machine)	1	2	3	4	5
c. Faxed (via computer)	1	2	3	4	5
d. Sent electronically to the pharmacy's computer	1	2	3	4	5
e. hone-in P	1	2	3	4	5
f. Printed from computer	1	2	3	4	5

20. **OVERALL**—how would you say that the use of the e-prescribing software has affected your job compared to previous methods?

a. Made my job much more difficult
b. Made my job a little more difficult
c. No change
d. Made my job a little easier
e. Made my job a lot easier

21. Please enter what you feel is the biggest positive impact e-prescribing software has had on your work:

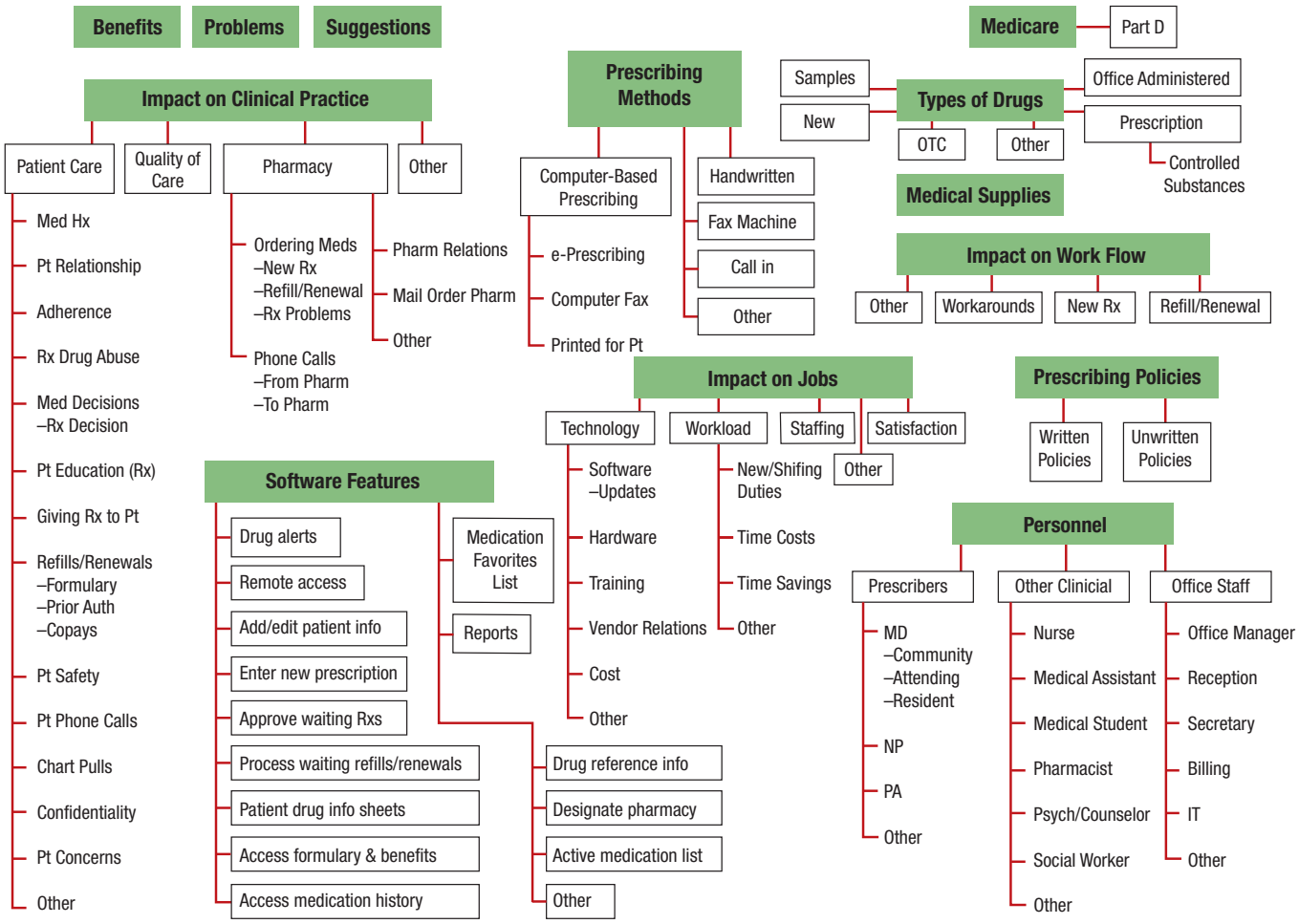
_____
_____
_____

22. Please enter what you feel is the biggest negative impact e-prescribing software has had on your work:

_____
_____
_____

THANK YOU!

Appendix B. e-Prescribing Code Structure



Auth indicates authorization; Hx, history; IT, information technology; NP, nurse practitioner; OTC, over the counter; PA, physician assistant; Pharm, pharmacy; Psych, psychologist; Pt, patient; Rx, prescription.