The National e-Prescribing Patient Safety Initiative
Removing One Hurdle, Confronting Others

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Efforts to improve safety in the US healthcare system have been a focus of publicity for almost a decade, since the Institute of Medicine's report 'To Err is Human' estimated that 98 000 deaths per year were due to medical errors.[1] Medication errors have been identified as a major source of preventable adverse outcomes. In recent years, electronic prescribing (e-prescribing) has been promoted as a tool to reduce medication errors, with additional potential to improve the efficiency of prescribing processes and control the costs of prescription drugs.

On January 16 2007, a group of healthcare organisations and technology companies announced the National ePrescribing Patient Safety Initiative (NEPSI).[2] Under this new programme, web-based e-prescribing software (eRx NOW, developed by Allscripts) would be provided free of charge to any American physician or practice that requests it. The announcement generated considerable excitement and received widespread media coverage. Advocates argue that by overcoming the economic barriers to adoption of e-prescribing, this initiative will dramatically improve patient safety and improve problems of overspending on medications.

Will this initiative improve patient safety? Will providing free e-prescribing software to American physicians solve the problems with prescribing? To answer these questions, we need to understand the current evidence on e-prescribing, the limitations in prescribing practices, and to what extent this initiative addresses them.

1. The Potential Safety Impact of e-Prescribing

Reaction to the NEPSI announcement revealed important assumptions about e-prescribing. Statements that drug use will now be safer and that substantial savings will be achieved presume a degree of efficacy for outpatient e-prescribing that exceeds what has been proven so far. Most prior research on e-prescribing has been performed in inpatient settings,[3-5] and the evidence that e-prescribing works well in this setting is large and convincing. Reviewing just a subset of these studies reveals research demonstrating that hospital-based e-prescribing systems can result in safer medication use,[6-9] more appropriate prescribing in the elderly,[10] better prescribing of potentially dangerous medications[11] and reduced use of costlier versions of medications.[12]

Although e-prescribing has been successful in inpatient settings, the bulk of prescribing occurs in outpatient care and most of these practice settings still use paper-based prescribing. It has been estimated that e-prescribing systems, providing automated warnings and updated patient information at the time of prescribing, could reduce outpatient adverse drug events by 25% per year.[13] However, for outpatient e-prescribing systems to achieve these gains, they must include the sophisticated decision support that is often a part of inpatient systems. The inpatient e-prescribing systems in which most prior studies were performed were part of larger electronic hospital records systems and were able to use patient data (e.g. laboratory results, comorbid conditions) to develop complex clinical decision support

to drive the interventions that changed prescribing patterns. Whether these benefits of e-prescribing will translate into the outpatient setting depends on the types of e-prescribing systems deployed and the kind of errors that the systems target.

Problems with prescription legibility receive a great deal of attention and anecdotes regarding cryptic physician handwriting and dispensing of incorrect medications or transcription of incorrect instructions have been widely reported in the popular press. e-Prescribing can clearly reduce this type of error, although it is likely that illegible prescriptions in outpatient practice create inefficiencies by requiring callbacks to physician offices and delays in filling prescriptions as much as they create true errors. Although these inefficiencies have real costs to patients, pharmacists and prescribers, it is not clear how many actual outpatient medication errors are accounted for by legibility problems.

Most adverse drug events occur for prescriptions that are dispensed exactly as they were originally prescribed. These adverse events may be caused by medications to which patients are allergic, medications that interact with previously prescribed drugs or dosing regimens that are inappropriate for a patient's age or comorbid conditions. Pharmacists already make efforts to avert these types of errors by checking patient allergies, age and history of other medications dispensed at that pharmacy. However, pharmacists are limited by the data that are available in their dispensing systems. Stand-alone e-prescribing systems without access to other patient information may face the same type of data limitations, building in a second layer of exactly the same type of safety check without necessarily offering any additional clinical benefit.

Initial studies of outpatient e-prescribing highlight important barriers and limitations. Adoption of health information technology in general – and e-prescribing specifically – remains slow in the outpatient setting.[14,15] Simply writing prescriptions electronically did not actually reduce medication errors,[16] and even when e-prescribing systems were used in ambulatory care settings, most safety alerts (≥90%) that appeared were dismissed by prescribers.[17,18] A recent study demonstrated that more nuanced approaches can increase the rate of alert acceptance,[19] but these improved alerts were

developed in the setting of an integrated electronic health record, incorporating clinical data elements to improve the relevance of the alerts. For stand-alone e-prescribing software to deliver clinically relevant alerts, the appropriate clinical data must be available at the time of prescribing. Getting these data into e-prescribing systems may require significant additional office staff time for up-front data entry. It is not clear that mechanisms are in place for such data entry.

In summary, although the safety-enhancing potential of outpatient e-prescribing has been demonstrated, it is less clear that the presently available tools are able to achieve that potential. Preliminary studies of outpatient e-prescribing embedded in fully integrated electronic medical record systems show great promise, but data on stand-alone e-prescribing systems such as the eRx NOW software provided by NEPSI remain limited. Recent pilot studies of proposed standards for e-prescribing found that many of the key elements of e-prescribing systems are not yet ready for widespread implementation.[20] Even though the safety benefits of NEPSI may not yet be totally clear, removing economic barriers to e-prescribing adoption offers other important benefits.

2. Other Effects of Outpatient e-Prescribing

2.1 Possible Improvements in Efficiency

Every day, considerable effort is expended in attempts to address problematic prescribing.[21,22] Pharmacists may detect potential medication interactions or dosing errors, or inform patients of less expensive medications, such as generic or preferred formulary agents. However, making these changes cannot be done without again contacting the prescribing physician's office to confirm that alterations are acceptable. It has been estimated that almost 1 billion prescriptions per year require telephone calls back to the prescribing clinician.[23] Each of these calls creates additional work for physicians, nurses and office support staff, introducing tremendous inefficiency into the processes of medical care. In this sense, an e-prescribing system may offer large benefits to physicians and practices

through reduced labour costs. By removing the initial costs of purchasing e-prescribing software while offering potential gains in efficiency, NEPSI has the potential to overcome one barrier to the adoption of e-prescribing specifically and health information technology in general.

2.2 Potential Savings on Prescription Drugs

Although reducing adverse drug events remains the main focus of quality improvement efforts, an equally important concern for many patients is the excessive costliness of the medications they are prescribed. Especially among elderly patients, the high cost of drugs may leave them unable to afford their medications.[24] Prior research has demonstrated significant excess spending on medications,[25-28] and has further shown that many physicians are not aware of the costs faced by patients in filling prescriptions.[29,30]

E-prescribing can help direct patients to more affordable medications. For example, an e-prescribing system can identify drugs that are generically available and prompt the physician to choose the generic version, avoiding more expensive brand-name drugs. A more sophisticated approach is to build in formulary decision support, identifying medications that are preferred for a patient's insurance plan and will require a low co-payment at the pharmacy. Studies on these types of interventions in the community setting are ongoing, and initial results suggest large savings on drug spending when physicians are prompted to prescribe on-formulary medications.[31] These savings will accrue largely to insurance companies and partially to patients; there is not a clear gain for physicians from such changes. Once again, by removing the initial costs to physicians of acquiring e-prescribing software, NEPSI may speed adoption of e-prescribing and allow patients and payors to realise these potential economic gains.

3. Other Challenges for e-Prescribing

In addition to the challenges of getting physicians to adopt e-prescribing systems and of developing alerting systems that will achieve real safety improvements, there are other challenges to the implementation of e-prescribing. In order to function

properly, an e-prescribing system must interact with a variety of other systems, such as databases for insurers and pharmacy benefit managers and dispensing systems at pharmacies. The infrastructure that will provide this connectivity is still developing. In some circumstances, prescriptions are written electronically but are received at a pharmacy in the form of a paper fax, or received electronically but need to be re-entered into a pharmacy dispensing system. In these cases, e-prescribing systems may enhance efficiency somewhat, but unless there is end-to-end communication, the full efficiency gains may not be realised. Since, as noted above, the savings on prescription drugs accrue to payers and patients but not physicians, increasing office efficiency will be critical in making e-prescribing attractive to physicians, even when the e-prescribing system is free.

For many community-based medical practices, the initial provision of free e-prescribing software removes one barrier, but important questions remain. Technical support represents a major concern: how will it be provided, how rapid will the response be and will practices be able to keep their systems running throughout the day? In today's primary care reimbursement environment, problems that slow the flow of patient visits may create significant financial difficulties. Who is responsible for ongoing technical support, maintenance of systems, upgrades of basic software and updating of related applications? Addressing these questions will be critical in order to convince physicians that adopting e-prescribing systems will be a true gain for their patients and practices and not an unfunded mandate creating downstream expense and hassles. It is not clear that the eRx NOW system being provided by NEPSI will be the first choice for a large number of physicians and practices, so it is difficult to evaluate how many physicians will begin e-prescribing as part of this initiative.

4. Where to Go From Here

In the long term, most medical practices are likely to move to full electronic health records, of which e-prescribing will be just one function. Based on the evidence to date, one cannot predict with confidence that NEPSI will have a major impact on patient safety in the near term. However, there are

potentially important benefits in physician office efficiency and reduced drug spending. Moreover, by encouraging more physicians and practices to adopt technology in the office, this initiative may pave the way for eventual acceptance of full electronic health systems. NEPSI is not a panacea for medication errors, but this commendable initiative removes one important hurdle blocking the wider uptake of health information technology, allowing all of those with an interest in the safer and more effective use of medications to confront the many remaining challenges.

Acknowledgements

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