Editorial

Setting a standard for electronic prescribing systems

***James Reeve**, Program manager, and **Michelle Sweidan**, Deputy program manager, Pharmaceutical Decision Support, National Prescribing Service, Melbourne*

Key words: general practice.

(Aust Prescr 2011;34:2–4)

In Australia, electronic prescribing (e-prescribing) systems in general practice were first developed in the early 1990s by a few innovative general practitioners who wrote software for their own use. The uptake of e-prescribing systems was accelerated in 1999 because of Commonwealth government incentive payments of $10 000 to practices that acquired an email address and used e-prescribing software to write the majority of their prescriptions. Currently over 90% of general practitioners use one of the 20 or so commercial systems that are available to write prescriptions, order pathology and other tests, record medical progress notes or communicate with other healthcare providers.[1] Despite the widespread use of e-prescribing systems, there are no clear standards or guidelines for their development. This has led to a variety of systems with markedly different capabilities, particularly in terms of assisting general practitioners to prescribe safely and effectively.

Overseas studies have shown that e-prescribing systems can enhance the safety and quality of prescribing by ensuring complete and legible prescription orders, improving the detection of drug allergies and by reducing medication errors and adverse reactions.[2–5] However, these systems can also have unfavourable effects on workflow and communications, and can have unintended effects on prescribing. For example, they may introduce new types of errors[6–8] and high levels of unhelpful alerts, and impact on repeat prescribing.[9] General practitioners have also expressed concern about the comprehensiveness and accuracy of some of the information provided in their software.[10] In a comparative study of nine electronic prescribing and dispensing systems used in primary care in Australia in 2006, an expert panel found that most systems do not offer consistently useful and relevant information for general practitioners and pharmacists to make decisions about drug interactions.[11]

Recently, a number of organisations and researchers have identified desirable functionality and safety features for e-prescribing systems in various healthcare settings.[12–16] In Australia, the National Prescribing Service (NPS) has worked with general practitioners, professional organisations and the Medical Software Industry Association to identify the key features of e-prescribing systems which support patient safety and quality care.[17] Many of the safety and quality features identified for general practice apply equally to other settings such as hospitals or aged care.

For safety and quality, an ideal system needs suitable information resources, interoperability with other systems and clinical decision support. The goal of clinical decision support is 'to provide clinicians or patients with clinical knowledge and patient-related information, intelligently filtered and presented at appropriate times, to enhance patient care'.[18]

The ideal system should record clinical data such as diagnoses, medicines and allergies in a standard coded format. This helps to facilitate one system being able to 'talk to' another system and easily exchange patient data, for example with hospital systems or personal electronic health records when they become available. Information about recommended therapeutic options for the current diagnosis should be offered. The system ought to ensure that medicine selection processes are safe. In addition to drug interaction alerts, the system should provide warnings if a drug is contraindicated, the dosage regimen is potentially harmful, or if the drug is the subject of new safety advice from the Therapeutic Goods Administration. Warnings

In this issue…

Electronic systems can help health professionals find information quickly. Examples could be looking up the safety of analgesics for use during pregnancy, as discussed by Debra Kennedy, or the efficacy of non-surgical treatments for skin cancer, as reviewed by Stephen Shumack. However, James Reeve and Michelle Sweidan inform us that there are no standards for electronic prescribing systems.

Delirium is a common problem in older patients, but Gideon Caplan says that the diagnosis is often missed. The investigation of delirium may include tests of thyroid function and these are reviewed by Robin Mortimer.

A risk factor for delirium is dementia. As there are few drugs for dementia, people may try complementary medicines for cognitive impairment. While these products may not be very effective, Ken Harvey and Con Stough remind us that complementary medicines can have adverse effects and interactions.

need to be prioritised by clinical importance otherwise they may be ignored. Users should be able to see the reason for the alert.

Decision support and therapeutic information offered by the prescribing system must be underpinned by high quality, up-to-date evidence and guidelines. Independent, evidence-based drug information and clinical practice guidelines should be accessible from within the software. High quality patient resources, such as printable information leaflets and a suitably formatted current medicines list, are also important. The ideal system should have sophisticated reporting capabilities to enable clinicians to monitor clinical care and audit individual or practice performance. The system needs to be intuitive and easy to use in clinical practice.

How do current systems used by general practitioners in Australia rate? The NPS has evaluated seven commonly used systems against a predefined set of criteria (J Reeve, M Sweidan, unpublished, 2011). It found that features to support safety and quality were highly variable between systems and there were some significant gaps. Clinical decision support features were ranked the most important for safety and quality, but in five of the systems fewer than 50% of these features were fully implemented (for example, there were no alerts for harmful doses or new safety warnings). One of the main reasons for this is the lack of clinical information resources in a format which is suitable for decision support. When systems included decision support, it was often unclear where the information was derived from and whether it was up to date. Features relating to the medicine selection process and the recording and display of patient data were also rated as important. Another important safety issue identified was that most systems did not clearly differentiate between similar-named medicines during prescribing, increasing the risk of selecting the wrong drug from a list of products.

The findings of this evaluation highlight the need for guidance or standards to ensure that essential functionality and safety features are included in all e-prescribing systems. There is some related work currently in progress in Australia. The National e-Health Transition Authority (NEHTA) is developing standards in relation to drug and disease terminologies, messaging and unique identifiers – these are important foundations. The Australian Commission on Safety and Quality in Health Care, in conjunction with NEHTA, has developed guidelines for the safe implementation of Electronic Medication Management in hospitals. Recent progress has been made in the UK[14–16,19] and USA[18] on desirable functionality and design of systems to optimise usability and patient safety – much of this guidance will be applicable to the Australian setting.

Given the widespread use of electronic prescribing systems in day-to-day practice, coordinated activity to ensure these systems meet key quality and safety criteria is overdue. Clear guidance and standards are a prerequisite. Government, professional bodies and the software industry have a shared responsibility to develop and support processes to improve quality and safety in e-prescribing systems in Australia.

References

1. Britt H, Miller GC, editors. General practice in Australia, health priorities and policies 1998 to 2008. Canberra: Australian Institute of Health and Welfare; 2009. www.aihw.gov.au/publications/gep/gep-24-10721/gep-24-10721.pdf [cited 2011 Jan 5]
2. Ammenwerth E, Schnell-Inderst P, Machan C, Siebert U. The effect of electronic prescribing on medication errors and adverse drug events: a systematic review. J Am Med Inform Assoc 2008;15:585-600.
3. Mahoney CD, Berard-Collins CM, Coleman R, Amaral JF, Cotter CM. Effects of an integrated clinical information system on medication safety in a multi-hospital setting. Am J Health Syst Pharm 2007;64:1969-77.
4. Shamliyan TA, Duval S, Du J, Kane RL. Just what the doctor ordered. Review of the evidence of the impact of computerized physician order entry system on medication errors. Health Serv Res 2008;43:32-53.
5. Wolfstadt JI, Gurwitz JH, Field TS, Lee M, Kalkar S, Wu W, et al. The effect of computerized physician order entry with clinical decision support on the rates of adverse drug events: a systematic review. J Gen Intern Med 2008;23:451-8.
6. Campbell EM, Sittig DF, Ash JS, Guappone KP, Dykstra RH. Types of unintended consequences related to computerized provider order entry. J Am Med Inform Assoc 2006;13:547-56.
7. Donyai P, O'Grady K, Jacklin A, Barber N, Franklin BD. The effects of electronic prescribing on the quality of prescribing. Br J Clin Pharmacol 2008;65:230-7.
8. Eslami S, Abu-Hanna A, de Keizer NF. Evaluation of outpatient computerized physician medication order entry systems: a systematic review. J Am Med Inform Assoc 2007;14:400-6.
9. Newby DA, Fryer JL, Henry DA. Effect of computerised prescribing on use of antibiotics. Med J Aust 2003;178:210-3.
10. Ahearn MD, Kerr SJ. General practitioners' perceptions of the pharmaceutical decision-support tools in their prescribing software. Med J Aust 2003;179:34-7.
11. Sweidan M, Reeve JF, Brien JA, Jayasuriya P, Martin JH, Vernon GM. Quality of drug interaction alerts in prescribing and dispensing software. Med J Aust 2009;190:251-4.
12. Avery AJ, Savelyich BS, Sheikh A, Cantrill J, Morris CJ, Fernando B, et al. Identifying and establishing consensus on the most important safety features of GP computer systems: e-Delphi study. Inform Prim Care 2005;13:3-12.
13. Bell DS, Marken RS, Meili RC, Wang CJ, Rosen M, Brook RH, et al. Recommendations for comparing electronic prescribing systems: results of an expert consensus process. Health Aff (Millwood) 2004;Suppl Web Exclusives:W4-305-17.
14. NHS Connecting for Health. ePrescribing functional specification for NHS trusts (2007). www.connectingforhealth.nhs.uk/systemsandservices/eprescribing/baselinefunctspec.pdf [cited 2011 Jan 5]
15. Microsoft Ltd. Microsoft Health common user interface. www.mscui.net/ [cited 2011 Jan 5]
16. Slee A, Cousins D. Guidelines for hazard review of ePrescribing systems (2008). NHS Connecting for Health. www.connectingforhealth.nhs.uk/systemsandservices/eprescribing/hazard_framework.pdf [cited 2011 Jan 5]

17. Sweidan M, Williamson M, Reeve J, Harvey K, O'Neill JA, Schattner P, et al. Identification of features of electronic prescribing systems to support quality and safety in primary care using a modified Delphi process. BMC Med Inform Decis Mak 2010;10:21.
A complete list of features identified in this study can be found at www.biomedcentral.com/content/supplementary/1472-6947-10-21-s1.xlsx [cited 2011 Jan 5]
18. Teich JM, Osheroff JA, Pifer EA, Sittig DF, Jenders RA; CDS Expert Review Panel. Clinical decision support in electronic prescribing: recommendations and an action plan: report of the joint clinical decision support workgroup. J Am Med Inform Assoc 2005;12:365-76.
19. NHS National Patient Safety Agency. Design for patient safety: guidelines for the safe on-screen display of medication information. 2010. www.nrls.npsa.nhs.uk/resources/?entryid45=66713 [cited 2011 Jan 5]

Conflict of interest: none declared

Letters

The Editorial Executive Committee welcomes letters, which should be less than 250 words. Before a decision to publish is made, letters which refer to a published article may be sent to the author for a response. Any letter may be sent to an expert for comment. Letters are usually published together with their responses or comments in the same issue. The Editorial Executive Committee screens out discourteous, inaccurate or libellous statements and sub-edits letters before publication. The Committee's decision on publication is final.

Managing cardiovascular disease in Aboriginal and Torres Strait Islander people

Editor, – I found the article about cardiovascular disease in Aboriginal and Torres Strait Islander people (Aust Prescr 2010;33:72-5) fascinating.

My interest is in the possible use of a polypill in this scenario. Trials of the polypill began in Australia early in 2010 and I am interested to know if Aboriginal and Torres Strait Islander people have been included in these trials. I am also curious to know which polypill combinations have been favoured in the studies, either the antiplatelet-ACE inhibitors-statin-thiazide diuretic or the antiplatelet-ACE inhibitors-statin-beta-blocker combination.

Is it not possible that the four-in-one combination would serve to improve adherence to cardiovascular treatment in indigenous communities and help to minimise screening and prevention requirements?

Claude Rigney
Pharmacist
Epping, NSW

Professor Jenny Reath and Associate Professor Ngiare Brown, authors of the article, comment:

The Australia-wide, National Health and Medical Research Council-funded polypill trial to which Mr Rigney refers does include a number of Aboriginal and Torres Strait Islander communities. As for participants in other sites, general practitioners in these communities are advised to choose a formulation relevant to the individual patient. For example, in a patient who has suffered a myocardial infarction, the beta blocker formulation would generally be preferred.

The hope is certainly that use of a polypill formulation will improve adherence and reduce costs.

Combination analgesics in adults

Editor, – Thank you to Dr Murnion for the excellent review of combination analgesics (Aust Prescr 2010;33:113-5). My understanding of the efficacy of codeine is that it is predominantly a prodrug and that the major analgesic effects derive through the actions of two of its major metabolites, codeine-6-glucuronide and morphine.

Under normal circumstances, most of the codeine is metabolised to codeine-6-glucuronide, with perhaps 10% appearing as morphine. The latter is produced through the action of cytochrome P450 2D6. It has been noted that a small proportion of the population have little CYP2D6 and receive less analgesia than expected. A similar effect is noted in those taking drugs such as fluoxetine which inhibit CYP2D6.

The converse is true for those hyper-metabolisers who have multiple copies of CYP2D6 or who take drugs such as dexamethasone which induce the enzyme.

Given the comments by Dr Murnion regarding the usefulness of paracetamol or a non-steroidal anti-inflammatory drug in conjunction with morphine, could she please comment on the possibility of better prescribing codeine (in combination or otherwise) based on the patient's CYP2D6 status.

Peter Bowron
Senior hospital scientist
Toxicology Unit – PaLMS
North Ryde, NSW

Dr Bridin Murnion, the author of the article, comments:

The analgesic efficacy of codeine resides predominantly in the morphine metabolite. Codeine-6-glucuronide is reported to have the low efficacy of the parent compound.[1]

Low efficacy of codeine in those with low activity of CYP2D6 (poor metabolisers) is recognised. In addition, of concern is