Electronic decision support in general practice

What's the hold up?

S T Liaw, *PhD, FRACGP, FACHI, is Professor of Rural Health, The University of Melbourne, Shepparton, Victoria, and member, General Practice Computing Group Management Committee.*
P Schattner, *MD, MMed, FRACGP, is Associate Professor, Department of General Practice, Monash University, Victoria, and member, General Practice Computing Group Management Committee.*

BACKGROUND The uptake of computers in Australian general practice has been for administrative use and prescribing, but the development of electronic decision support (EDS) has been particularly slow. Therefore, computers are not being used to their full potential in assisting general practitioners to care for their patients.
OBJECTIVE This article examines current barriers to EDS in general practice and possible strategies to increase its uptake.
DISCUSSION Barriers to the uptake of EDS include a lack of a business case, shifting of costs for data collection and management to the clinician, uncertainty about the optimal level of decision support, lack of technical and semantic standards, and resistance to EDS use by the time conscious GP. There is a need for a more strategic and attractive incentives program, greater national coordination, and more effective collaboration between government, the computer industry and the medical profession if current inertia is to be overcome.

The increasing use of computers in Australian general practice in the past decade[1] has prompted widespread interest in their use to support clinical decision making, especially as there is increasing evidence that computers may improve patient care and health outcomes.[2–6] Unfortunately, interest has not been accompanied by a commensurate uptake of electronic decision support (EDS)[7,8] even though there have been recent attempts to address this from both clinician and patient perspectives.[9–11] However, the range of expectations of EDS makes it difficult to pin down what it is, let alone trying to develop, implement and evaluate it.

What is EDS?

The National Electronic Decision Support Taskforce (NEDST) defined EDS as 'access to knowledge stored electronically to aid patients, carers and service providers in making decisions on health care'.[10] It encompasses a more traditional definition of the EDS system that 'compares patient characteristics with a knowledge base and then guides users by offering patient specific and situation specific advice'.[12] The NEDST definition encompasses a range of EDS systems based on the complex level of the underlying technology. These range from the use of simple knowledge databases such as electronic drug compendia through inference engines to complex decision making tools using artificial intelligence techniques. The Victorian Clinicians Health Channel,[13] which allows medical practitioners to browse electronic databases, is an example of a 'simple' EDS, while the United Kingdom based PRODIGY (**PR**escribing rati**O**nally with **D**ecision support **I**n **G**eneral practice stud**Y**)[14] which provides management advice upon entry of a diagnosis, is a 'complex' EDS. We prefer a more functional which classification[12] which distinguishes between:

- the simple management of information, eg. the internet medication record being developed as part of the commonwealth funded MediConnect project[15]
- opportunistic focussing of the clinician's attention, eg. prompts and reminders, and
- more complex consultation advice which may be opportunistic (eg. a

Table 1. Types of electronic decision support

Complexity of decision support technology	Example (opportunistic)	Example (reflective)
Level 1 Base level (information management)	A medication record or therapeutic guideline	List of patients on benzodiazepines
Level 2 Out of range prompts	Alerts about abnormal pathology results	List of patients with abnormal PAP smears
Level 3 Deductive inference engines	Prompts about potential drug–drug interaction	Self paced tutorial on management of hypertension in diabetics triggered by presence of patients with diabetes and systolic BP >130 mmHg in the system
Level 4 Artificial intelligence techniques	Automated prompts and advice on patient and situation specific management of asthma	Clinical audit of patients with asthma, cross tabulated with comprehensiveness of asthma action plans

warning that a patient should not be prescribed a beta blocker because of asthma) or reflective (eg. a clinical audit of all patients with asthma who are not on inhaled steroids) (Table 1).

EDS – what's the hold up?

The NPS studies

The limits of EDS and the required change that comes with its adoption must be recognised. The presence of decision support on the desktop does not mean it will be used.[16,17] A qualitative study by the National Prescribing Service (NPS) showed that GPs do not find it easy to agree on something as apparently straightforward as warnings for drug–drug interactions.[18] Too much detail and some general practitioners will, over time, ignore the warnings; too little detail means safety issues may not be adequately addressed, exposing GPs and their patients to increased risk.

The NPS tested a number of prescribing systems for drug–drug interaction prompts using standardised case scenarios.[19] They found large variations in whether prompts were offered as well as the nature of the prompts raising concerns about standards and benchmarks for quality and safety in EDS programs. The laissez faire approach to EDS places the clinician who uses it at risk. Stakeholders in EDS must include medical defence organisations as well as government, professional bodies, health informatics professionals, clinicians, patients and carers. We need a process for engaging and supporting vendors in developing modular software and for monitoring the safety and quality of these systems. We also need an explicit policy that addresses intellectual property issues while dealing with market realities.

The 2002 GPCG EDS workshop

At the General Practice Computing Group (GPCG) 2002 Annual Forum, 67 out of 100 delegates participated in four 90 minute EDS workshops. The participants comprised three main groups in almost equal proportions: GPs, staff from divisions of general practice, and a group comprising government employees and consumers. They were mostly men (60%), from metropolitan regions (70%), aged less than 50 years (84%) and knew 'a little bit' about EDS (66%). The concerns and issues raised by this sample are similar to those expressed in previous EDS conferences and the NEDST report. In addition, the following themes also emerged:

- the need to clarify what EDS means in general practice
- difficulty in pinning down who is responsible for the quality and safety of EDS
- the need for interoperability standards
- the need for accurate patient data
- resistance to EDS in general practice, and
- lack of national coordination.

This reflected a maturing perception of EDS over the years.

Interoperability

'Interoperability' refers to the ability to share clinical information between different software applications and databases. For example, in the absence of pathology messaging standards and a standard terminology to describe pathology tests, desktop software cannot directly import test results from electronic laboratory reports, thus requiring highly inefficient manual data entry. Such systems are unlikely to be widely used. This process of ensuring semantic, syntactic and technical standards needs to be driven forward, but it is currently unclear whether leadership

will come from government, professional bodies or the computer industry. It is also unclear who should pay for this.

Data entry issues

Electronic decision support requires data that must be accurate, comprehensive and uniquely linked to patient demographics. A unique patient identifier system and a structured dataset within the context of an overarching information model are needed. Organisational standards and benchmarks for data quality (and security) must be developed, implemented and evaluated. Prompts for drug–disease interactions require the GP to enter the appropriate drug and disease history for each patient. Data entry requires time, keyboard skills and familiarity with software. This highlights the importance of software and system design to improve flexibility and reduce technical inefficiencies and disruption of workflow.

A national approach

The lack of a national approach has led to a lack of agreement on issues such as interoperability standards and rules on intellectual property. The NEDST report noted but did not address the intellectual property issue. Should the government own and maintain databases such as a national formulary (eg. the Australian Medicines Handbook) and make it freely available? How may the owners of existing resources such as the Therapeutic Guidelines be meaningfully engaged in EDS development? Should it be mandatory that all systems meet the prevailing interoperability standards, eg. across the hospital–GP interface? How do we collectively address the issue of legacy systems, especially large hospital systems? Can we mandate the use of a standards based messaging system? Should there be a national training and support program for EDS implemented through divisions, and should there be an EDS research and development program? Once again, if the answers are affirmative, who should pay? So is there a way forward?

EDS — the way forward?

A business case must be made for EDS and an appropriate incentives package developed to compensate GPs for the workload involved in entering good quality data. While the evidence for effectiveness of EDS to date is patchy, there is enough to suggest that the potential for quality and safety may yet be realised, especially if the evaluation methodologies adopted are appropriate, allowing the intervention to 'settle in' before undertaking summative evaluations.[20]

At the user interface, uptake will be promoted by the availability of user friendly software systems that are useful to the clinician, patient and carer. These applications and systems must be robust and provide timely responses, support privacy and security, support quality and safety, integrate with workflow, allow interoperability and seamless information transfer and provide flexible decision support. The databases of computerised guidelines that underpin EDS systems must be independent of the desktop software, eg. prescribing systems. This independence will allow electronic guidelines to be developed and maintained by credible learned bodies while desktop software developers can focus on making their systems easy to use and supportive of the clinical workflow. This modular approach requires an overarching information model, interoperability standards and a common terminology to ensure that the various modules can communicate in a standard and consistent manner.

Organisational support and effective change management is critical. A nationally coordinated training and support program is essential. Capacity and expertise is required at two levels:

1) specialist health informatics professionals who do the 'research and development' and provide support, and
2) capable users of the technology.

A nationally coordinated approach is essential[15] to facilitate the development and implementation of interoperability standards, a unique patient identifier and a common reference terminology. Software accreditation is an important mechanism to ensure the safety and quality of EDS. It will require a partnership of government, the profession, software industry and consumers to enable the delivery of safe and effective EDS. The rules for this partnership must be developed as a matter of urgency.

Research and evaluation must be conducted to understand the context in which the EDS may operate effectively and safely, eg. the amount and type of information available and integration of other nonelectronic decision support mechanisms and information sources. However, the methodology must be relevant and appropriate.

A more comprehensive use of computers for clinical information management, over and above electronic prescribing, will require training, education and advocacy.[7,10,21] Good software, incentives, accreditation, training and informed patients are the main strategies to encourage a culture where clinicians will value their data for clinical decision making. We

Table 2. Strategies to increase the uptake of EDS

- Nationally coordinated research and development on EDS standards, knowledge bases and systems
- Coherent government policy and strategy to engage the software industry and profession in EDS development and use
- Involvement of representative bodies (government, professional, IT industry and consumer) to develop multifaceted and flexible strategies for GP engagement in EDS
- Advocacy, training and support for GP uptake of EDS, based on behaviour change strategies of known effectiveness
- Nationally coordinated capacity building programs to train health informatics professionals to develop, implement, support and evaluate informatics programs

need to bite the bullet on EDS (Table 2).

Conflict of interest: none declared.

References

1. Health Insurance Commission (HIC). Practice Incentives Payments Program Statistics. http://www.hic.gov.au/providers/health_statistics/statistical_reporting.htm.
2. Hunt D, Haynes R, Hanna S, Smith K. Effects of computer based clinical decision support systems on physician performance and patient outcomes. A systematic review. JAMA 1998; (280):1339–1346.
3. Delaney B, Fitzmaurice D, Riaz A, Hobbs R. Can computerised decision support systems deliver improved quality in primary care? BMJ 1999; (319):1–3.
4. Montgomery A, Fahey T. A systematic review of the use of computers in the management of hypertension. J Epidemiol Community Health 1998; (52):520–525.
5. Warren J, Noone J, Smith B, et al. Automated attention flags in chronic disease care planning. Med J Aust 2001; (175):308–312.
6. Shea S, DuMouchel W, Bahamonde L. Meta-analysis of 16 RCTs to evaluate computer based clinical reminder systems for preventive care in ambulatory settings. JAMA 1996; 3:399–406.
7. Kidd M, Mazza D. Clinical practice guidelines and the computer on your desk. Med J Aust 2000; (173):373–375.
8. Benson T. Why general practitioners use computers and hospital doctors do not. Part 2: Scalability. BMJ 2002; (325):1090–1093.
9. National Institute of Clinical Studies. Report of the electronic decision support governance workshop. Melbourne: National Institute of Clinical Studies, November 2001.
10. National Electronic Decision Support Taskforce. Report to Health Ministers: Electronic Decision support in Australia. Canberra: National Health Information Management Advisory Committee, November 2002.
11. Deveny E, Liaw S T. Enhancing the quality of doctor-patient-computer relationships: Can understanding prescribing decisions help? In: HIC2002, 10th Annual Conference of the Health Informatics Society of Australia. Melbourne: August 2002.
12. Liaw S T, Pearce C, Krouskos D. Computer assistance and decision support in general practice. In: Parliamentary Inquiry into Information Management and Telecommunication. Canberra: AGPS, 1996.
13. Department of Human Services Victoria. Clinicians Health Channel. www.clinicians.vic.gov.au. Accessed 10 June 2003.
14. Sowerby Centre for Health Informatics at Newcastle. PRODIGY. www. prodigy.nhs.uk/. Accessed 24 January 2003.
15. Commonwealth Department of Health and Ageing. MediConnect (Better Medication Management System). http://www.gpcg.org/publications/externaldocs.html (see links to Better Medication Management System). Accessed 3 March 2003.
16. Eccles M, McColl E, Steen N, Rousseau N, et al. Effect of computerised evidence based guidelines on management of asthma and angina in adults in primary care: cluster randomised controlled trial. BMJ 2002; (325):941–944.
17. Rousseau N, McColl E, Newton J, Grimshaw J, Eccles M. Practice based, longitudinal, qualitative interview study of computerised evidence based guidelines in primary care. BMJ 2003; (326):314–321.
18. Ahearn M, Kerr S. General practitioner perceptions of the pharmaceutical decision support tools in their prescribing software. In: 45th Annual Scientific Convention, Royal Australian College of General Practitioners. Perth, Western Australia: 5–9 October, 2002.
19. Sharma N, Kerr S, Whicker S. Quality of drug interaction prompts in prescribing software packages for Australian general practice. In: The Australian Health and Medical Research Congress. Melbourne: November 24–29, 2002.
20. Liaw S T. Commentary: Computerised evidence based guidelines may not improve asthma or angina management in primary care. Evidence based Healthcare 2003; (7):81–82.
21. Coiera E, Dowton S. Reinventing ourselves. Med J Aust 2000; (173):343–344.

AFP

Correspondence

Email: t.liaw@unimelb.edu.au