Electronic decision support systems at point of care: trusting the *deus ex machina*

Australia needs a coherent long-term strategy for implementing these systems

Electronic Decision Support Systems (EDSS) have been defined as "access to knowledge stored electronically to aid patients, carers and service providers in making decisions on health care".[1] These systems provide relevant evidence-based information to both patients and health care providers at the time of making a decision about clinical management. More sophisticated systems provide a clinical decision based on information from a range of knowledge bases. EDSS are currently espoused as one of the keys to good quality and safe health care.[2] With the current explosion of medical knowledge, most of which is stored electronically, both clinicians and consumers will increasingly require EDSS to assimilate and summarise information. Yet for most clinicians, there is a gulf between this ideal (see Box 1) and reality.

Here, we look specifically at general practice, and we argue for the creation of a guiding body — a *deus ex machina* — to provide a comprehensive framework to remove all the constraints on achieving the full potential of EDSS. General practice cannot be considered in isolation, and EDSS will be used across the whole health care system. For this to happen, certain "clinical knowledge processes", as identified by the National Electronic Decision Support Taskforce (NEDST), need to occur (Box 2).[1] The NEDST was established under the ministerial National Health Information Management Advisory Council (NHIMAC) to address significant issues in the health sector's information requirements for implementing electronic decision support .

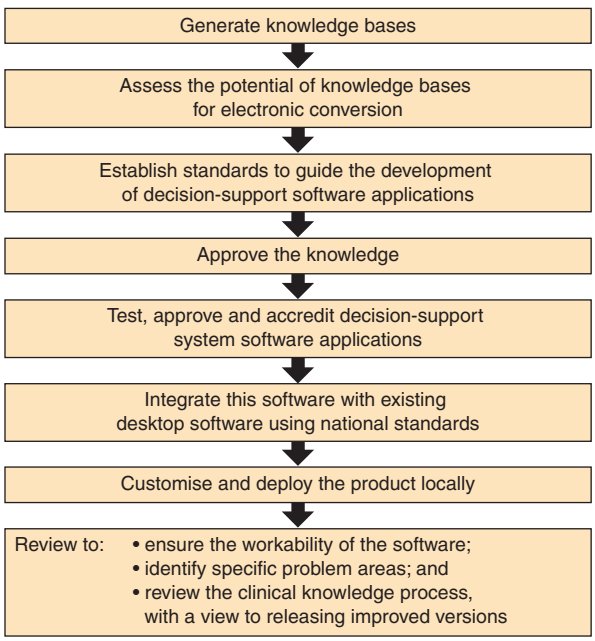
1 Electronic decision support systems (EDSS) case study: the ideal

A 44-year-old man presents to his general practitoner with newly diagnosed hypertension. The GP reviews his blood pressure and prepares to assess his cardiovascular risk using the EDSS. The EDSS directly integrates all his electronic medical record information (lipid levels, smoking status, family history, age, sex, and weight) to calculate his risk score.

This provides a comprehensive profile that contains all relevant information which can be quickly updated on subsequent visits. The GP opens the software, selects the patient from the practice database and begins to work through the tool, entering the clinical information directly into the EDSS. As he goes, he shows the patient how he calculates his risk of cardiovascular disease and how the patient can alter the level of risk. This visual demonstration helps the patient realise that he must change his behaviours.

They discuss the options available. To educate the patient on how to moderate his risk and adopt healthy behaviours, the doctor shows him the embedded resources and video on hypertension, exercise and salt intake. The GP chooses the best evidence-based management plan and prescribes new medication. The management plan is instantly updated in his notes. The EDSS automatically places the patient on the practice-based cardiovascular disease register. The patient feels reassured and informed. Details of his clinical management will now form part of the GP's quality improvement audit.

2 The "clinical knowledge process", from building the evidence to implementing a decision support "product"



Identified by the National Electronic Decision Support Taskforce.[1]

Australia has already done much to foster the uptake of EDSS (Box 3). In particular, the development of a vocabulary, data model and core data set for general practice within the Standards Work Plan by the General Practice Computing Group (Box 3) would allow seamless communication between different clinical software packages. These are important steps that should not be stalled because of political imperatives. While this progress has been important, significant developmental gaps still exist, and the entire "clinical knowledge process" must be embraced in a coordinated manner.

Generating and integrating knowledge

Development of computer-interpretable guidelines is not limited by clinical content, but by the clinical systems that exist today. To incorporate clinical concepts for use within an EDSS requires gathering specific clinical information and then incorporating it within the EDSS tool. The ideal EDSS knowledge base would seamlessly link these clinical concepts with standardised patient clinical records. Yet, it is unclear how this crucial linkage will be achieved when clinical computerised systems are presently imposed on general practice in an ad hoc and proprietary manner.

Currently, there is no apparent active engagement between software developers, government, clinicians and funding bodies to

3 Achievements in implementing Electronic Decision Support Systems (EDSS) in the Australian health sector to date

- Identification of six key areas for improvement by the National Electronic Decision Support Taskforce: (i) fostering research; (ii) development and best practice in the implementation of EDSS; (iii) enhancing the safety and quality of EDSS; (iv) establishing a national standards framework; (v) encouraging an evaluation culture; (vi) encouraging the use of EDSS and establishing a national governance model.[1]
- Creation of an evaluation framework for EDSS by the Australian Health Information Council.[3]
- Establishment of the National e-Health Transition Authority to accelerate the adoption of e-health by such measures as developing standards for the exchange of clinical information; enabling the unique identification of patients, providers, products and services; and integrating infrastructure.[4]
- Initiation of the Standards Work Plan by the General Practice Computing Group to develop a vocabulary, data model and core data set for general practice.[5]

establish a transparent and sustainable program of EDSS development in Australia. It is crucial that national bodies generate knowledge bases by developing clinical practice guidelines. Evidence points to the need for research on how guidelines may be implemented within EDSS to increase their acceptability in day-to-day practice.[6] Each national body that develops guidelines should be working within a framework that explicitly states the eventual role of EDSS in their implementation.

Clinical application

We currently lack a generic standards-based "middleware" that would sit outside all clinical desktop software systems and support the exchange of information with other clinical systems and clinical knowledge repositories. In Australia, no such standards exist, leaving EDSS development dependent on the whims of the software vendors. In the United Kingdom, although the National Health Service (NHS) has just agreed to allow greater choice among clinical desktop software packages, all clinical software must conform to minimum standards of interoperability within the NHS.[7]

Evaluation of efficacy

A recent systematic review of 100 randomised and non-randomised trials of EDSS that aimed to improve clinical performance and patient outcomes found that, of the 97 studies that measured practitioner performance, 62 (64%) showed improvement — four in diagnosis; 16 in reminder systems; 23 in disease management systems, and 19 in prescribing.[8] Of 51 studies examining patient outcomes, only 7 (13%) showed improvement (in blood pressure control, rates of urinary incontinence, outcomes with acute respiratory distress syndrome, asthma, anticoagulation management, and the care of people with acute myocardial infarction). The EDSS research agenda must begin to look more systematically at the influence of EDSS on patient outcomes and quality of care. One report argues that more multidisciplinary research is required to map and understand the "complex system" of day-to-day general practice, "in which technologies, people and organisational routines dynamically interact".[2] Other studies have identified similar concerns.[9] Multidisciplinary research teams involving psychologists, full-time GPs, practice staff and qualitative researchers must be adequately funded and supported over a number of years to realise this goal.[10] NEDST has called for rigorous evaluation of EDSS programs, but only after programs were well established within a workplace.[3]

Conclusion

There is clearly much to be done and, at the moment, there is no obvious coherent long-term strategy in Australia to drive the EDSS agenda forward. The solution may be to establish a national EDSS coordinating centre with substantial funding and expertise. A multidisciplinary framework will be required, which includes appropriate long-term funding and meaningful intellectual property arrangements with software vendors to promote open standards. This would be an excellent first step to move this agenda forward in a balanced, integrated and evidence-based framework linked to appropriate policies, legislation and standards development.

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