Meeting the information needs of an evidence-based world

BETH REID

Beth Reid is Professor of Health Information Management, Faculty of Health Sciences, The University of Sydney.

Abstract

There are many new and exciting health information developments in Australia today. However, there are also many gaps and problems in the information available to support evidence-based decision-making. For example, computerisation in health lags behind other industries. However, these problems should not prevent us using the available data to manage individual care and the health care system more effectively. It is fruitless to wait for a technological solution to all our problems. Educational and staff changes are needed to prepare health professionals and patients to use information to make evidence-based decisions and bring health care into the information age.

Introduction

The last decades of the twentieth century have seen the evolution of evidence-based health care. Under this approach, decisions about the health of individuals or populations must be based on a systematic appraisal of the best evidence available (Gray 1997, p 1). Evidence-based clinical practice exists where clinicians, in conjunction with their patients/clients, use the best available evidence to decide on the options to be pursued. Moreover, it is not sufficient to confine this approach to the clinical practice domain. The same principles should be applied to all decisions in the health care sector, a development that Gray (1997, p 157) labelled 'evidence-based everything'. It should be noted that evidence-based medicine is not uncontroversial. Those with a post-modernist perspective might regard it as the last hurrah of the empiricists.

The best available evidence is based on research. This should help overcome the problem of a failure to implement policy and clinical practice changes with a strong research foundation. The strength of the evidence-based approach is that it provides a methodology to systematise the search, appraisal, storage and retrieval of research findings. This approach simplifies the problem of keeping up to date with the vast quantity of published research findings by focusing on systematic reviews rather than

on individual studies (Gray 1997). Modern tools such as databases and registers available on the Internet are used to source the information, and formal search and appraisal strategies are used to evaluate it.

It is axiomatic that information is integral to an evidence-based approach to clinical practice and to managing the health care system. Different data and systems are needed to meet the different information needs in the practice, management and policy-making arenas. We need information that will allow us to manage individual patients/clients; manage health care programs and facilities; manage and coordinate care across traditional sector boundaries; understand the outcomes of care; educate health care professionals; and develop health policy. To do this we need to use patient-based information to manage care for individuals and to aggregate and summarise these data to allow meaningful benchmarking and scrutiny of outcomes. Research can create new data and use existing routinely collected data. Evidence-based everything implies that we can make much better use of treatment and management data as a foundation for future decision-making.

It is most fortunate that the evidence-based movement is happening now when we are entering the information age. In the information age the computing paradigm has changed from a focus on the speed of data processing and improving personal productivity to knowledge management (Armitage 1999). The information revolution is widely perceived as a major development rivalling the industrial revolution in importance.

It is not the purpose of this paper to argue for adopting an evidence-based approach. Rather, the aim is to consider whether we can meet the information needs of this approach. After a brief survey of the contemporary health information scene, this paper examines the information needs of an evidence-based health care system, and the educational developments and staff changes needed to support such a system.

Health information today

It is difficult to provide a contemporary overview of the systems and uses of health information because there is little uniformity in the adoption of most developments. While there have been many technical advances and improvements in how information is used to support decision-making in the health care sector, in many cases these developments are not widespread and do not achieve the level of technological sophistication that is seen in other industries. Certainly we have seen considerable developments over the last few decades.

Data from hospital separations systems have never been more timely and, at least in some States, are now incorporated into information systems designed to support decision-making, such as FlowInfo. Within the States these hospital data are reasonably readily available to those within the system through on-line access in systems such as the Inpatient Statistics Collection On-line System (ISCOS) in New South Wales.

The National Health Information Knowledgebase (1999) provides Internet access to information about data, including data definitions, related types of data and the nature of the relationship, data collections available, and who collects that kind of data. Many issues have been addressed relating to the coding of data, such as the need for standards and the development of new systems more appropriate for Australia (for example, the ICD-10-AM) and for specific sectors such as community health (Roberts, Innes & Walker 1998; National Centre for Classification in Health 1999).

At last there appears to be real progress towards an electronic paperless medical record in Europe, the United States and Australia. However, the progress is sporadic and many of the systems are evolutionary steps towards a paperless record rather than fully developed systems. Some examples illustrate this point. The OACIS system is a computer-based record which will supply limited data (demographic details, laboratory results, radiology reports, and outpatient appointments) across Adelaide's four major metropolitan hospitals (South Australian Health Commission 1998). At St Vincent's Private Hospital the de Lacey system replaces part of the medical record and includes 4000 clinical pathways (Lewis & Mitchell 1998, p 33). Two electronic record systems are in use at the New Children's Hospital in Sydney: one which integrates monitoring data for patients in critical care units; and the Open Clinical Foundation (OCF)/Powerchart system which is a clinical record system (Lewis & Mitchell 1998). In the United States electronic patient records are expected to be implemented between 2005 and 2025 (Medical Record Institute 1996) and widespread use is unlikely until towards the end of that period.

The implementation of casemix in Australia was the catalyst for many improvements in health information and hospital information systems. For example, systems such as Trendstar, that are primarily concerned with identifying the costs of care, are being implemented widely in large hospitals. Increasingly hospitals are implementing clinical information systems such as Cerner and the Patient Information Management System (PiMS). Clinical information systems are expensive but cost-benefits can be calculated and included in the business case to justify the large outlay. Deloittes estimated a $500 000 saving for Box Hill Hospital to be achieved from the implementation of the Cerner OCF/Powerchart and Care Net Documentation software and hardware upgrades (Raza 1999). The greatest savings came from the potential to reduce adverse drug events, the unnecessary dispensing of drugs, and improved utilisation of resources. We await the post-implementation evidence that these savings have been realised.

However, there are still many information gaps to be filled and difficulties to overcome. Information about treatment contacts between providers and patients is characterised by fragmentation of data by funding source or service type. The Coordinated Care Trials represent a significant advance in overcoming this problem but the trials are still relatively limited. Generally, the health care system and the information flow around it are poorly coordinated. Data quality remains a concern for hospital discharge data (Coopers & Lybrand 1997). The availability of data on patient contacts outside the hospital system is variable and marked by ad hoc rather than systematic collections. Data

from general practice are an exception, with general practice research units and the projects conducted as part of the general practice evaluation program generating much useful research (Britt, Angelis & Harris 1998).

Computerisation in the health services lags behind other industries and it is not possible in this brief paper to discuss the many reasons why. An evolutionary approach to the implementation of computer systems has led to a patchy take-up of technological advances. Different parts of the health care system are at different stages of development, mainly because the resources to computerise are not distributed uniformly. For example, the long-term care sector is undercapitalised when compared with the acute care sector.

Many new technologies are now used in the health sector but as yet some of these, such as telemedicine/telehealth and smart cards, have only a limited application. The Internet is being used to make health information accessible to the members of the public with computer access, but there are problems in monitoring the quality of the information on display. Important for evidence-based decision-making is the HCNet Library, which includes access to the Cochrane Library, databases such as Medline, education packages for clinical pathway training and a daily health news service (Lewis & Mitchell 1998).

To summarise, developments are occurring along several dimensions simultaneously. Each of these dimensions is a continuum and facilities are at different points along the developmental pathway (see Figure 1). The goal is a paperless record which can cope with any media and meet many purposes, across several providers and sites. This record will provide a lifelong view of the patient and include both illness and comprehensive health data.
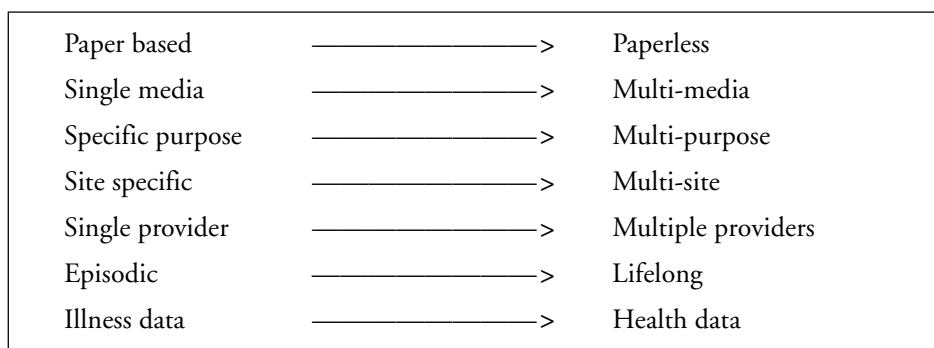
Paper based	—————————>	Paperless
Single media	—————————>	Multi-media
Specific purpose	—————————>	Multi-purpose
Site specific	—————————>	Multi-site
Single provider	—————————>	Multiple providers
Episodic	—————————>	Lifelong
Illness data	—————————>	Health data

Figure 1: The health information development continuum

The health industry can learn from the experience of other industries in dealing with the knowledge management revolution. A knowledge management approach places prime importance on the capture and use of the knowledge and intellectual capital of a company and its staff (Montgomery 1998). While the technical elements are quite daunting, knowledge management is a cultural shift, not a techno-centric concept, and the main obstacle to success has been establishing and promoting a culture of information-sharing (Henry 1998). We need to understand the corporate and organisational structure of health care organisations much better than we do before this approach can be applied to health care organisations.

The information needs of evidence-based health care

The best evidence available for clinician decision-making comes from systematic reviews of randomised clinical trials (Gray 1997). This means that clinicians can implement an evidence-based approach despite the gaps and problems in the available health information discussed above. However, this will be limited because randomised clinical trials cannot be conducted in every aspect of medicine because of ethical and other restraints. Furthermore, only limited evidence about the outcomes of management and policy actions is available to health services managers and health policy-makers. Indeed, decisions in these areas often appear to be taken in the absence of evidence (Palmer, Aisbett & Ho 1998). Thus an evidence-based environment will encourage the publication of further research about what works, and this research, in turn, will need better and more timely information than has been available previously.

Many of the data are already available to produce this information. However, if we are going to make decisions that take consumer needs and preferences into account, we must collect more data on the patient/client. Additional items that are not being collected routinely now include the client's assessment of their health/functional status, their description of their needs and preferences, and data on the incidence of specific diseases. Tercero (1999) listed these items as part of a description of the types of data needed by managed care organisations.

The managed care organisations in the United States have been identifying the kinds of information that they need to make decisions. The case management approach encompasses several processes that have different information requirements (Tercero 1999). These processes include disease management, wellness management, demand management and quality management. The objectives of managed care resemble closely those of local area health authorities in the public context in Australia, that is, responsibility for the overall health of a specified population. The main difference is that publicly provided health services have a broad unrestricted 'membership'. Information from the United States regarding how managed care organisations meet their information challenges is useful for establishing the information needs in an evidence-based environment.

It is unrealistic in an environment of resource constraint to expect a sudden change in the relatively slow evolutionary approach to developing information systems that has been evident until now. However, much can be achieved with the data and technology we have now. For example, disease management is the improvement in the disease status for a defined population (Cottrell 1999, p 29). Much of the data needed for disease management can be collected by widening the scope of existing systems such as the hospital discharge abstract, but the linking of data from the acute and non-acute sectors is a more challenging task (Cottrell 1999).

Information system developments must be evaluated with the same rigour as other decisions in the health sector. Given the complexity of the health system, it is tempting to hope for a technology solution similar to the *deus ex machina* device used to resolve

complex plots in opera and theatre, for example, that all our problems will be solved once we have the electronic patient record. Clayden and Croft (1997, p 284) proposed DEUS (decision utopian support systems), which would be smart and provide ready access to vast resources of data from a variety of contexts throughout the world. Not just user-friendly, these systems would respond to the skills, knowledge and requirements of the user and be able to take control of routine decisions automatically, with advice or monitoring when this was critical. While the development of such systems may be a worthwhile goal, it would be foolish to expect a technology solution to all our information problems.

Educational and staff changes needed to underpin evidence-based health care

Current information management and technology training has been criticised for concentrating on hands-on skills training in the ability to use the software (Clayden & Croft 1997, p 274). Rather, education is needed to teach people what to do with the tools and how to assess information critically for its appropriateness in addressing a particular issue. Thus it would be foolish to assume that the information needs of health care professionals and system managers can be met by introducing a computing unit in existing courses. Instead, we need to determine what skills, knowledge and attitudes these professionals need to become their own knowledge managers, and integrate these within their education.

Gray (1997) listed the evidence management skills needed by those working in the health system. In addition to skills in searching, appraising and storing evidence, decisions-makers also need to practise and improve their skills of implementing research findings if they are to change the organisation of a service and the patterns of clinical care (Gray 1997, p 199). The undergraduate education of health professionals must include opportunities for students to acquire these skills. Postgraduate and continuing education courses are needed to allow existing practitioners to refresh themselves and learn new techniques.

It is particularly important to develop critical appraisal skills. Formal programs are needed to give participants the key skills necessary to find and make sense of evidence to support decision-making. Gray (1997, p 244) identified three generic questions to be answered in appraising summaries of research. How trustworthy is the review? What are the results and how important are they? What is the relevance of the results for the local situation? With minor modifications, these questions can be used to appraise evidence in most situations.

The public also need to be educated to evaluate health information and to make optimal choices for themselves. There is a need to present the evidence in a form and language that can be readily understood by those without a background in health. This understanding can be facilitated by relating the explanations to the scientific principles learned in school. The evidence-based movement has arisen at a time when the use of

alternative health treatments is becoming more popular in western societies. People should be encouraged to apply the same standards for proof of efficacy to both conventional and alternative treatments. However, it should be recognised that scientific evidence will only be one element of the decisions that people make; belief systems and other factors will play a role.

Changes in the preparation of health care professionals will not be sufficient to ensure that organisations take full advantage of the management opportunities that arise from the investment in new information technologies. Health care organisations have invested heavily in computer software and hardware and in costly data collection efforts, only to find they do not have the staff to analyse this material (Fletcher 1999). New information workers are beginning to emerge. The information broker or research/ decision support analyst are new roles for staff with the skills to interpret data appropriately and accurately (Gray 1997; Fletcher 1999). These staff members will be able to use sophisticated database management tools to facilitate data warehousing, mining and modelling.

Conclusion

This is an exciting time in the evolution of health information, with much progress towards the kind of information and information systems needed in an evidence-based health care environment. However, there is still much to be done to bridge the gaps between different parts of the system, to gather better consumer data and data on outcomes. It is unwise to expect a technological solution to these problems, and much can be achieved with the data and computers we have now.

If we wish to achieve better health care and better health, we need to ensure that the information we have now is used towards achieving that goal. Educational changes are needed to help health care professionals and the public to use information effectively. Organisations need staff with specialised skills to help them cope with the information age. The evidence-based approach to care is not a solution to all the problems in the health care system. However, it offers the opportunity to embed into the culture of health care the concept that we can make much better use of information for decision-making. This would be a worthwhile achievement.

References

Armitage W 1999, 'Pervasive technology supporting people', *Proceedings of the Australian Financial Review Health Congress*, Sydney, February 24–26.

Britt H, Angelis M & Harris E 1998, 'The reliability and validity of doctor-recorded morbidity data in active data collection systems', *Scandinavian Journal of Primary Health Care*, vol 16, pp 50–55.

Clayden D & Croft M 1997, 'Future prospects: Issues, informatics and methodologies', *in* S Cropper & P Forte (eds) *Enhancing Health Services Management, The Role of Decision Support Systems,* Open University Press, Buckingham.

Coopers & Lybrand 1997, *Victorian Department of Human Services Coding Audit of Hospital Medical Records 1995/96 Separations Summarised, Final Report*, Coopers & Lybrand, Melbourne.

Cottrell C 1999, 'Measuring, managing, making a difference', *Journal of the American Health Information Management Association*, vol 70, no 4, pp 28–33.

Fletcher DM 1999, 'Research/decision support analyst: An evolving role', *Journal of the American Health Information Management Association*, vol 70, no 2, pp 42–4.

Gray JAM 1997, *Evidence-based Healthcare. How to Make Health Policy and Management Decisions,* Churchill Livingstone, New York.

Henry K 1998, 'Avoiding roadblocks on the path to knowledge', *Image & Data Manager*, July–August, pp 12–14, 58.

Lewis M & Mitchell J 1998, *Electronic Patient Records – A Resource Manual,* Health Information Management Association of Australia, North Ryde.

Medical Record Institute 1996, 'What is an electronic patient record?' cited in Lewis M & Mitchell J 1998, *Electronic Patient Records – A Resource Manual,* Health Information Management Association of Australia, North Ryde.

Montgomery P 1998, 'Heating up the KM cauldron', *Image & Data Manager*, July–August, pp 16, 18, 58.

National Centre for Classification in Health. Available: http://www.cchs.usyd.edu.au/NCCH/ncch.html [3/5/99].

National Health Information Knowledgebase. Available: http://www.aihw.gov.au/links/nhiklink/index.html [4/5/99].

Palmer GR, Aisbett C & Ho T 1998, 'Unresolved issues in casemix funding and evidence-based policy making', *Proceedings of the Tenth Casemix Conference in Australia*, Commonwealth Department of Health and Family Services, Canberra.

Raza JP 1999, 'Hospitals' IT network: Upgrade & reduce costs', *Proceedings of the Australian Financial Review Health Congress*, Sydney, February 24–26.

Roberts RF, Innes KC & Walker SM 1998, 'Introducing ICD-10-AM in Australian hospitals', *Medical Journal of Australia*, vol 169 (supplement), pp S32–S35.

South Australian Health Commission 1998, 'Information sharing in South Australia', *Hospital and Healthcare*, June 17.

Tercero W 1999, 'Managed care in the age of accountability', *Journal of the American Health Information Association*, vol 70, no 4, pp 20–24.