

Availability and accessibility of evidence-based information resources provided by medical libraries in Australia

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Abstract

This article reports on the results of an exploratory survey of the availability and accessibility of evidence-based information resources provided by medical libraries in Australia. Although barriers impede access to evidence-based information for hospital clinicians, the survey revealed that Medline and Cinahl are available in over 90% of facilities. In most cases they are widely accessible via internal networks and the Internet. The Cochrane Library is available in 69% of cases. The Internet is widely accessible and most libraries provide access to some full-text, electronic journals. Strategies for overcoming restrictions and integrating information resources with clinical workflow are being pursued. State, regional and national public and private consortia are developing agreements utilising on-line technology. These could produce cost savings and more equitable access to a greater range of evidence-based resources.

Introduction

The ability to practise evidence-based medicine rests on the assumption that it is possible to find the best available evidence-based information and to apply this evidence to medical decision-making and teaching. Information technology, which in this context refers to the use of computerised databases and full-text resources transmitted via networks and on-line services, has promised increased availability and improved accessibility to a greater range of information resources. With the infiltration of the Internet into homes, offices and workplaces, the potential for clinicians to be able to locate the evidence is now greater than ever.

It is, however, unclear how widely available and accessible the basic evidence-based information resources are to clinicians. In 1995 it was reported that one quarter of a national random sample of Australian general practitioners had access to a computer with a modem but less than 10% had access to the Internet. In New South Wales a study of general practitioners' use of the Cochrane Library in 1997 indicated that only 4% of the sample had used the Cochrane Library, but 43% of general practitioners at that stage had access to the Internet. It was also stated that access to evidence databases was crucial to support the scientific paradigm now advocated in health care (Young & Ward 1999).

A number of issues related to the question of accessibility of information resources to end-users were highlighted in the correspondence which followed this study. Silagy et al. (1999) suggested that rather than focusing on usage figures for the Cochrane Library, it would be better to concentrate on interventions aimed at changing behaviour and structural factors. Dawson (1999) drew attention to the mediating role of the librarian or expert searcher suggesting that it was probably neither necessary nor cost-effective for doctors to acquire these skills when information specialists already have the expertise to perform this function.

In contrast to doctors in hospitals, general practitioners have not been well served with regard to access to information resources through medical libraries. The Internet may well offer increased accessibility to evidence-based information resources for those who do not have networked services in their workplaces, but constraints of insufficient time, financial considerations, deficits in technology and skills remain.

However, the issue of clinicians' use of information contained in the literature is complex, and is influenced by many factors. In the past decade, there have been many articles instructing clinicians on how to access, evaluate and interpret the medical literature. In a study comparing the effectiveness of computerised information retrieval systems for physicians, it was concluded that despite advanced searching features, the number of relevant articles retrieved was low, and further research and development were needed to improve the usefulness of these systems (Hersh & Hickam 1998). Evaluations of undergraduate courses and continuing medical education programs in hospitals have attempted to determine the effectiveness of different methods of teaching the skills of evidence-based medicine (Earl & Neutens 1999).

Hersh commented that few physicians had the complete set of skills needed for the evidence-based medicine process. In addition he noted that information retrieval systems are not yet well integrated with clinical practice. Their use disrupts workflow, the quantity and quality of the information retrieved are questionable, and slow access speeds can be problematic for a busy clinician. Hersh (1999) pointed to medical informatics and training for clinicians as possible solutions.

A two-year, hospital-based project in the United Kingdom aimed to assess the feasibility, the necessary infrastructure, and the benefits and barriers to evidence-based practice in a clinical setting (Donald 1998). The main findings were that evidence-based problem

solving was both possible and desirable, but integration with clinical workflow was identified as a major barrier. Donald noted that structural and logistical barriers which were impeding point-of-care access included deficiencies in facilities (inadequate access to databases of research and to full-text articles at the ward level) and lack of skills. Insufficient time and money for training clinicians were also seen to be barriers to the use of these information resources.

In a survey of the Australian health information scene, Reid (1999) focused largely on internal sources of patient data and research-based information, noting that health computer technology is comparatively unsophisticated and lacking in uniformity, and that the cultural and technical shift to knowledge management already experienced in other industries is relatively undeveloped in the health industry. More research-based data are needed to increase the knowledge base on which clinical, management and policy decisions are made. Reid concluded that it would be foolish to expect a technological solution to the problems associated with finding, appraising and applying evidence-based information. Rather, it is necessary to educate health care professionals in the knowledge, skills and attitudes that are necessary for implementing evidence-based decision-making in all areas of health care.

A study at the Ottawa General Hospital indicated that accessibility was the key to the utility of evidence-based medicine (Michaud et al. 1996). It was suggested that a searching system should be available on a 24-hour basis, seven days a week; that numerous stations should be available at all times to accommodate multiple users; and that it was crucial that the physician be able to access references immediately.

In order to determine whether or not it was feasible to find and apply evidence during clinical rounds, the Nuffield Department of Clinical Medicine constructed an 'evidence cart', a trolley modified to carry a number of evidence-based medicine resources (Sackett & Straus 1998). The authors concluded that this approach increased the extent to which evidence was sought and incorporated into patient care decisions. It was also noted that when the evidence was not readily available, the clinicians rarely searched for it.

Method

The main objective of this research was to explore the availability and accessibility of basic evidence-based information resources (bibliographic databases, systematic reviews, quality-assessed abstracts of reviews and full-text journal articles) provided by medical libraries for clinicians in hospitals and health care facilities in Australia.

Availability was measured by the number of library subscriptions to basic evidence-based information resources (Medline, Cinahl, the Cochrane Library, Ovid's Evidence-Based Medicine Reviews, the Internet and full-text journals). Accessibility was assessed by categorising the means by which clinicians could gain access to these resources – whether the services were available only in the medical libraries or whether access points were more widely distributed and alternative modes of delivery were provided.

The survey was conducted during April and May 1999. A convenience sampling method was employed. The self-administered questionnaire was distributed by means of three email discussion lists for health and medical librarians. The results were analysed by means of descriptive statistics only.

Fifty-one questionnaires were returned from all States in Australia and were included in the analysis. Responses were received from 43 teaching facilities (this included those assigned 'affiliated' status) and eight non-teaching facilities. Of the 51 responses, 39 were from public hospitals and 12 were from privately-owned or managed hospitals (this included four hospitals which were originally said to be combined facilities; two privately-managed but publicly-owned hospitals were categorised 'private' and two public hospitals with some private beds were categorised 'public').

Table 1: Hospital/health care facility by State

| State | Teaching | Non-teaching | Total |
|-------------------|----------|--------------|-------|
| Victoria | 12 | 1 | 13 |
| New South Wales | 8 | 2 | 10 |
| Queensland | 8 | 2 | 10 |
| Western Australia | 8 | 1 | 9 |
| South Australia | 5 | 1 | 6 |
| Tasmania | 2 | 1 | 3 |
| Total | 43 | 8 | 51 |

Responses were received from hospitals covering approximately 22% of total hospital bed numbers in Australia, and 5.4% of all hospitals in Australia – 6.3% of public hospitals (Australian Institute of Health and Welfare 1998) and 3.7% of private hospitals (Australian Bureau of Statistics 1997). As not all hospitals have libraries, this sample does not attempt to be representative of the total hospital population.

In 1996, a survey was distributed to 268 public and private sector health care facilities with libraries (Saurine 1997). At the time of the survey, this represented 26% of the total population of public and private hospitals. Since then, the total number of public hospitals has fallen while private hospital numbers have remained fairly stable. Thus, it is likely that in this study the sample (51 respondents) covers more than 19% of the total population of health care facilities with libraries. The use of convenience sampling methodology means that the results can only be used to give an indication of the availability and accessibility of the basic evidence-based medicine information resources in these types of facilities.

Total bed numbers in the surveyed facilities ranged from eight to 1209 (mean 344); four facilities did not have any beds. At the time of the survey, more than 6000

consultants (mean 169) and more than 4000 interns, residents and registrars (mean 104) were eligible to use the information resources provided by the medical libraries. The libraries' full-time equivalent staffing numbers ranged from 0.10 to 9.4 (mean 2.5).

Results

Table 2 sets out the total number of subscriptions and percentage of libraries included in the survey which subscribe to the information resources. It also describes the accessibility to these resources.

Table 2: Medical library subscriptions to basic electronic evidence-based information resources

| | Percentage | | Percentage | |
|---------------------------------|------------|-------|------------|--------------|
| | Count | Cases | Count | Wide access* |
| Medline | 45 | 88.2 | 34 | 66.7 |
| Internet Medline accessible | 3 | 5.9 | | |
| Cinahl | 47 | 92.2 | 29 | 56.9 |
| The Cochrane Library | 35 | 68.6 | 21 | 41.2 |
| Evidence-Based Medicine Reviews | 18 | 35.3 | 18 | 35.3 |
| Other databases | 14 | 27.5 | | |
| Internet access | 47 | 92.2 | 41 | 80.4 |
| Electronic journals | 39 | 76.5 | 25 | 64.1 |
| 51 valid cases | | | | |

* Information resources could be accessed from more than five terminals within the main site as well as via the Internet from other remote sites

In 76% of cases, in addition to being accessible in the library, limited access (that is, access from less than five terminals) was also provided to Medline in wards or departments within the facility.

Twenty-six per cent of hospitals provided access to other evidence-based information resources. The most often mentioned databases were Embase, Psychlit, Psychinfo, Clinpsy, Aidsline, Cancerlit, HealthStar, Micromedex and Austhealth. It should be noted that there are many other evidence-based resources which are accessible via the Internet, but this was not the focus of the research.

Ninety-two per cent of hospitals provided Internet access to doctors in the library. In 80% of cases the Internet was also accessible in other locations in the hospitals. Electronic journals (full-text, generally in conjunction with a print subscription) were subscribed to by 76% of libraries, and in 64% of cases these were accessible to clinicians from locations remote from the library.

In almost all cases, all health professionals (medical, nursing and allied health) and other hospital staff also had access to all the information resources.

Discussion

There is a profusion of articles about the desirability and benefits of practising evidence-based medicine, and the enabling effect of information technology (and more particularly, the Internet) to achieve this. However, no study could be found which has been undertaken to describe the current availability and accessibility of basic evidence-based medicine information resources in Australian hospitals.

This study was undertaken in order to gain a clearer picture of what information resources are available and easily accessible at point-of-care in Australian hospitals and health care facilities. It is intended that this will help the proponents of evidence-based medicine to reduce the structural barriers which impede access to information resources and to design workable strategies to integrate these resources with clinical practice. A more accurate picture will also help to ensure that the promotion of the information resources and teaching of the information skills related to the practice of evidence-based medicine are relevant to clinicians' needs and that they are provided at convenient times and locations.

This research indicates that the possibility exists for hospital-based clinicians to gain access to basic evidence-based information resources as, in most facilities surveyed, the two main bibliographic databases which index and abstract the international medical, nursing and allied health literature – Medline and Cinahl – are available and widely distributed.

The Cochrane Library is the largest single information retrieval tool for accessing evidence-based information resources. Although 69% of libraries subscribed to the Cochrane Library this resource was available *only* in the library in 26% of cases, with only 41% of cases providing widely distributed access. It is somewhat surprising given the quality of this resource and the low cost of networked subscriptions that the Cochrane Library was not universally available and more widely accessible in all cases.

Only 35% of libraries subscribed to Evidence-Based Medicine Reviews. This is a comparatively new retrieval tool which has the advantage of being linked with Ovid's Medline, thus providing sophisticated literature-searching capabilities and immediate access to full-text journal articles. Evidence-Based Medicine Reviews includes the Cochrane Database of Systematic Reviews and the best evidence database, which contains the secondary journals *Evidence-Based Medicine* and *ACP Journal Club*.

Evidence-Based Medicine Reviews has some limitations. It does not include one of the main databases contained in the Cochrane Library (the Database of Abstracts of Reviews of Effectiveness). In an assessment of this resource, Booth (1999) pointed out that it does not include all the Forrest plots ('blobbograms') which are a very useful feature

of the Cochrane Library's systematic reviews. Booth suggested that Evidence-Based Medicine Reviews could be improved by including all the best evidence source journals in the Ovid Biomedical Collections as well as the full text of all the Cochrane Reviews' randomised controlled trials.

Comments by librarians surveyed indicated that they were very keen to provide access to these resources but were somewhat constrained due to technical difficulties (computer hardware and software deficits and telecommunication restrictions). In the case of electronic journals, the main problems appear to be licensing agreements with publishers, complicated password procedures and difficulties gaining Internet access.

In the past decade, the trend towards evidence-based medicine has coincided with the growth of Internet and intranet technologies. The increased demand for evidence-based information resources, together with the possibility of remote access to on-line databases and other locally produced information is paving the way for cooperative and consortial agreements among national and State-based public health facilities, as well as among individual sites in national private health care organisations. Cost savings and discounts for subscriptions to information resources, as well as sharing of licenses among members of consortia are associated with these agreements.

In three States (New South Wales, South Australia and Queensland) State-wide projects have been implemented to provide Internet or intranet access to information resources for eligible clinicians. The most comprehensive of these is the New South Wales Clinical Information Access Project. This was begun in 1997 and now provides a range of knowledge databases and full-text journals (access is protected by identification and password), as well as more generally accessible health-related information resources, communication facilities and links to other sites. In some areas, access to the Clinical Information Access Project has been limited by technical difficulties; however, all clinicians within the New South Wales public health system are eligible to use the information resources.

The Queensland Health Information Network was set up at the end of 1997 and is available to all Queensland Health staff through the Department's intranet. In addition to documents and information, the site also contains links to a number of Internet sites, including Medline.

The South Australian Human Services Libraries recently developed a memorandum of understanding to formalise itself as an entity within the Department of Human Services. It specifies the intent to cooperate and collaborate on projects and issues of benefit to members. It has been signed by nine chief executive officers, and further signatories are expected. Commencing from 1 July 1999, membership is open to any library in an institution within the Department and any member may elect to participate in any project. At the end of 1998, several consortium members collaborated to purchase Medline, Cinahl and full-text journals (Austhealth and MIMS are soon to be added). The originally proposed delivery mechanism may change from WAN intranet to Internet-based services.

A number of comments in the survey indicated that the situation is changing in other States, with increased availability to a greater range of resources imminent. In Western Australia, Victoria and Tasmania cooperative arrangements in the public health sector are in the planning stages.

A health libraries project partnership has been formed in Western Australia under the banner of CHEK-UP: Clinical Health Evidence and Knowledge – Useful for Practitioners. All of the publicly-funded health libraries in the State are partners in the project. Some initial project funding to establish a project intranet-based web site has been obtained from a best practice quality management program. Ultimately this will also be made available on the Internet. A business case is being prepared to request funding for a central access point under CHEK-UP to commercially produced databases and full-text electronic information resources. The objective is to bring clinically useful, quality information to clinicians at the point of care.

Some of the larger private health care organisations in Australia have developed contracts with commercial health care information providers for multiple site access to on-line databases, full-text journals and other information products.

Cooperative arrangements between teaching hospitals and universities have been in place for many years, and in some hospitals which have university connections, those clinicians who hold university positions have access to a wider range of resources than the hospital-based doctors.

In conclusion it can be seen that increasing the practice of evidence-based medicine is a complex issue with structural, logistical and cultural factors involved. Any approach that encourages, supports and facilitates an evidence-based culture must first ensure accessibility to basic evidence-based medicine information resources. This survey has indicated that there is widely distributed access to most of the basic evidence-based resources and that despite technological restrictions, information professionals have the skills and knowledge to support their use. In addition to accessibility it has also been indicated that in order to maximise the effective use of these resources, training in the information skills related to critical appraisal and finding the evidence must be integrated with clinical practice and teaching.

Appendix

Hospital and health facilities library email questionnaire

The purpose of this questionnaire is to find out:

1. whether *basic* evidence-based information resources are available electronically to doctors in hospitals and health-care facilities, and
2. *where* doctors are able to access these resources.

Structural and logistical problems (i.e., convenient access to information resources) have been identified as one of the main barriers to the practice of evidence-based health care, so we hope to explore the current situation in hospitals. At this stage we are interested in availability, not actual use. Skills and other attitudinal variables will also play a part, and these could be a subject for further research.

We are sending this questionnaire to librarians as we believe that we will get a better response rate and more accurate information than by surveying doctors themselves. We would very much appreciate your speedy response to make the survey as comprehensive as possible. If you are aware of another hospital librarian who does not access these lists (ALIA Health or Medlib) could you please forward a copy of the survey, or notify us of their contact details.

Please note that, even if you have very limited information resources, we are still interested in your responses, as this will give us baseline data with which we can compare results of future surveys.

Please write your answer in the space provided or mark your response with an x; please make explanatory comments wherever you would like to.

The numbers in [square brackets] are for coding purposes.

Hospital and library information

1. What is the name of your hospital?
2. How many beds does the hospital have?
3. Is the hospital:
 - a teaching hospital ^[1]
 - a non-teaching hospital ^[2]
4. Is the hospital:
 - a public hospital ^[1]
 - a private hospital ^[2]
5. How many FTEs (full-time equivalents) do you have in your library?

Information resources

6. Which of the following does your library subscribe to?
- Medline ^[1]
 - Cinahl ^[2]
 - Cochrane Library ^[3]
 - Ovid's Evidence-Based Medicine Reviews ^[4]
 - other electronic resources containing evidence-based information (please specify) ^[5]

If you subscribe to any of the following in *either* single user or network licenses for disk, CD-ROM or on-line access please indicate *where* they are available to medical staff.

7. Medline is available (note this is a library *subscription*, not a free version):
- in the library only ^[1]
 - from one to five terminals in another location within the hospital ^[2]
 - from six or more terminals in another location within the hospital ^[3]
 - from terminals outside the hospital (a hospital subscription via the Internet) ^[4]
 - other (please specify) ^[5]
8. Cinahl is available:
- in the library only ^[1]
 - from one to five terminals in another location within the hospital ^[2]
 - from six or more terminals in another location within the hospital ^[3]
 - from terminals outside the hospital (a hospital subscription via the Internet) ^[4]
 - other (please specify) ^[5]
9. The Cochrane Library is available:
- in the library only ^[1]
 - from one to five terminals in another location within the hospital ^[2]
 - from six or more terminals in another location within the hospital ^[3]
 - from terminals outside the hospital (a hospital subscription via the Internet) ^[4]
 - other (please specify) ^[5]
10. Ovid's Evidence-Based Medicine Reviews is available:
- in the library only ^[1]
 - from one to five terminals in another location within the hospital ^[2]
 - from six or more terminals in another location within the hospital ^[3]

- from terminals outside the hospital (a hospital subscription via the Internet) ^[4]
- other (please specify) ^[5]

11. Does the library provide Internet access for medical staff in the library?

Yes ^[1]

No ^[2]

Comments:

12. Do medical staff have Internet access from the wards or other locations within the hospital (i.e. excluding in the library)?

Yes ^[1]

No ^[2]

Comments:

13. Does your library subscribe to any electronic journals, either made available as part of a print subscription, or as a separate electronic subscription?

Yes ^[1]

No ^[2]

If no, please go to question 16

14. Do medical staff have electronic access to full-text journals?

Yes ^[1]

No ^[2]

Comments:

15. Which of the following is true? Electronic access to full-text journals for medical staff is available:

- in the library only ^[1]
- from one to five terminals in another location within the hospital ^[2]
- from six or more terminals in another location within the hospital ^[3]
- from terminals outside the hospital (a hospital subscription via the Internet) ^[4]
- other (please specify) ^[5]

Medical staff

16. Approximately how many consultants are eligible to use the hospital's electronic information resources at the time of this survey?

17. Approximately how many interns, resident medical doctors and registrars are eligible to use the electronic information resources at the time of this survey?

18. Are any of these electronic information resources (Medline, Cinahl, The Cochrane Library, Ovid's Evidence-Based Medicine Reviews) available to other health professionals in the hospital (i.e. nurses and allied health staff)?

Yes ^[1]

No ^[2]

19. If yes, which resources are available to which groups of staff?

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References

Australian Bureau of Statistics 1997, *Private Hospitals Australia 1995–96*, Australian Bureau of Statistics, Canberra (catalogue no 4390.0).

Australian Institute of Health and Welfare 1998, *Australia's Health 1998: The Sixth Biennial Health Report of the Australian Institute of Health and Welfare*, Australian Institute of Health and Welfare, Canberra.

Booth A 1999, 'Ovid's classic urn(er) or incomplete pitcher?: A review of Evidence-Based Medicine Reviews – Internet version', *Health Information on the Internet*, pp 4–5.

Dawson C 1999, 'General practitioners' use of evidence databases' (letter), *Medical Journal of Australia*, vol 170, pp 393–4.

Donald A 1998, *The Front-Line Evidence-Based Medicine Project: Final Report*, National Health Service Executive, North Thames Regional Office Research and Development, <<http://www.doh.gov.uk/ntrd/stop.htm>>.

Earl MF & Neutens JA 1999, 'Evidence-based medicine training for residents and students at a teaching hospital: The library's role in turning evidence into action', *Bulletin of the Medical Library Association*, vol 87, pp 211–4.

Hersh WR 1999, 'A world of knowledge at your fingertips: The promise, reality, and the future directions of on-line information retrieval', *Academic Medicine*, vol 74, pp 240–3.

Hersh WR & Hickam DH 1998, 'How well do physicians use electronic information retrieval systems?: A framework of investigation and systematic review', *JAMA*, vol 280, pp 1347–52.

Michaud GC, McGowan JL, van der Jagt RH, Dugan AK & Tugwell P 1996, 'The introduction of evidence-based medicine as a component of daily practice', *Bulletin of the Medical Library Association*, vol 84, pp 478–81.

Reid B 1999, 'Meeting the information needs of an evidence-based world', *Australian Health Review*, vol 22, no 2, pp 122–9.

Sackett DL & Straus SE 1998, 'Finding and applying evidence during clinical rounds: The 'evidence cart'', *JAMA*, vol 280, pp 1336–8.

Silagy C, Weller DP, Middleton PF & Doust JA 1999, 'General practitioners' use of evidence databases' (letter), *Medical Journal of Australia*, vol 170, p 393.

Saurine K 1997, *Health Libraries: Challenges in the Commercial Environment*, Auslib Press, Adelaide.

Young JM & Ward JE 1999, 'General practitioners' use of evidence databases', *Medical Journal of Australia*, vol 170, pp 56–8.