Feasibility of an evidence-based literature search service for general practitioners

Chris B Del Mar, Chris A Silagy, Paul P Glasziou, David Weller, Anneliese B Spinks, Vivienne Bernath, Jeremy N Anderson, Debbie J Hilton and Sharon L Sanders

ABSTRACT

Objective: To test the feasibility of an evidence-based clinical literature search service to help answer general practitioners' (GPs') clinical questions.

Design: Two search services supplied GPs who submitted questions with the best available empirical evidence to answer these questions. The GPs provided feedback on the value of the service, and concordance of answers from the two search services was assessed.

Setting: Two literature search services (Queensland and Victoria), operating for nine months from February 1999.

Main outcome measures: Use of the service; time taken to locate answers; availability of evidence; value of the service to GPs; and consistency of answers from the two services.

Results: 58 GPs asked 160 questions (29 asked one, 11 asked five or more). The questions concerned treatment (65%), aetiology (17%), prognosis (13%), and diagnosis (5%). Answering a question took a mean of 3 hours 32 minutes of personnel time (95% CI, 2.67–3.97); nine questions took longer than 10 hours each to answer, the longest taking 23 hours 30 minutes. Evidence of suitable quality to provide a sound answer was available for 126 (79%) questions. Feedback data for 84 (53%) questions, provided by 42 GPs, showed that they appreciated the service, and asking the questions changed clinical care. There were many minor differences between the answers from the two centres, and substantial differences in the evidence found for 4/14 questions. However, conclusions reached were largely similar, with no or only minor differences for all questions.

Conclusions: It is feasible to provide a literature search service, but further assessment is needed to establish its cost effectiveness.

MJA 2001; 175: 134–137

University of Queensland, Brisbane, QLD.
Chris B Del Mar, MD, FRACGP, FAFPHM, Professor of General Practice, and Director, Centre for General Practice.
Anneliese B Spinks, BSc, Research Assistant, Centre for General Practice.
Debbie J Hilton, BPhty, GradDipPH, MPH, Research Assistant, Centre for General Practice.
Sharon L Sanders, BSc(Pod), Research Assistant, Centre for General Practice.
Paul P Glasziou, PhD, FAFPHM, Professor of General Practice, and Director, Centre for Evidence Based Health.
Monash Institute of Public Health, Monash University, Melbourne, VIC.
Chris A Silagy, PhD, FRACGP, FAFPHM, Professor of Public Health, and Director.
Vivienne Bernath, BSc, GradDipLIS, Information Officer, Centre for Clinical Effectiveness.
Jeremy N Anderson, MSc(Epid), MD, FRANZCP, Associate Professor of Public Health, and Director, Centre for Clinical Effectiveness.
University of Edinburgh, Edinburgh, Scotland.
David Weller, PhD, FRACGP, FAFPHM, Head, Department of General Practice.
Reprints will not be available from the authors. Correspondence: Professor C B Del Mar, Centre for General Practice, University of Queensland, Herston Road, Herston, QLD 4006.
c.delmar@cgp.uq.edu.au

IN THE PAST DECADE there has been growing interest in the implications for general practice (eg, improved health outcomes and cost efficiency) of helping general practitioners access the best empirical research evidence.[1,2] The undifferentiated nature of clinical presentations in general practice, and the system constraints of this environment (eg, lack of time, literature-searching skills and resources), hinder the adoption of an evidence-based medicine (EBM) approach.[3-7] Nevertheless, there is good evidence on which to base most of the clinical decisions in general practice.[8]

To overcome some of these barriers, we operated a literature search service for GPs. GPs could submit clinical questions and request searches to support their clinical decisions in the same way as they order diagnostic interventions. A pilot study conducted in Adelaide, South Australia, over one month attracted 20 clinical inquiries from nine GPs.[5] The service reported here continued for nine months, from February 1999, in two geographically distinct locations. We sought qualitative feedback on the perceived utility and relevance of the answers, and assessed consistency of answers from the two sites for a sample of clinical questions.

METHODS

Two service sites were set up — one in Queensland (Queensland University's Evidence Search Trial, QUEST), and the other in Victoria (All Questions Answered, AQUA), staffed by one research assistant at each site. Each site followed a similar service model with some local variation. We exchanged forms between sites to encourage uniformity.

Obtaining questions

AQUA was available to GPs in two Divisions of General Practice after a voluntary information session and multiple advertisements in the divisional newsletters.

1: Databases and search engines used by the evidence-based literature search service to answer GPs' clinical questions, and where the evidence was found

	Number (%) of times evidence found		
	QUEST (n=116)	AQUA (n=44)	Total (n=160)
PubMed Clinical Queries <http://www ncbi nlm nih gov:80/entrez/query/static/clinical html>	92 (79%)	35 (80%)	127 (79%)
MEDLINE <http://www giant netconnect com au/AIR/medline htm>	52 (33%)	37 (84%)	89 (56%)
The Cochrane Library <http://www cochranelibrary com/clibhome/clib htm> or Cochrane library on CD. Cochrane Collaboration, Update Software, 1996-	41 (35%)	23 (52%)	64 (40%)
SmartSearch/SUMSearch <http://SUMSearch UTHSCSA edu/cgi-bin/SUMSearch exe>	44 (38%)	13 (30%)	57 (36%)
Best Evidence BMJ	3 (3%)	5 (11%)	8 (5%)
InfoRetriever <http://www infopoems com/>	2 (2%)	—	2 (1%)
CATbank <http://cebm jr2 ox ac uk/docs/catbank html>	4 (3%)	—	4 (3%)
Bandolier <http://www jr2 ox ac uk:80/Bandolier/>	—	4 (9%)	4 (3%)

■ QUEST was offered only to GPs who attended workshops (n=71) designed to develop familiarity with EBM and the processes involved in finding the best available evidence.

At both sites, use of the service was free. GPs were encouraged to identify clinical questions (from problems encountered in individual patients) for which they required the best available evidence. Request forms were designed to resemble those of pathology or radiology services, eliciting the patient's name, sex, date of birth and other relevant clinical information (as with any other investigation service confidentiality was maintained). Forms could be sent in to either service by fax, email or, in the case of QUEST, pathology courier, who then faxed the request to the service site.

Finding the best evidence

On receipt of the question, we undertook the search, obtained and critically appraised the relevant abstracts and/or articles, and prepared a report that was returned to the referring GP within one week (urgent requests were returned more quickly). Sometimes the question required clarification from the requesting doctor.

We searched medical literature databases (Box 1) using relevant search terms, including medical subject headings generated from the original question. As it was not possible to replicate a full systematic review for each question, a modified, pragmatic version of Cochrane systematic review methods was used. We used a hierarchical approach — as soon as evidence at a certain level was located, we stopped searching, seeking no further evidence at a lower level. Thus, for therapeutics, having found a well conducted meta-analysis or systematic review, no further attempt was made to locate individual clinical trials. If, however, there was inadequate evidence at a particular level, searching was conducted at the next evidence level down. This approach enabled us to find the best available evidence without conducting a full systematic review. The hierarchy of evidence used was different depending on the type of question (eg, prognosis, diagnosis).[8]

Returning answers

For each answer, we provided a short comment on the evidence, how well it applied to the particular clinical problem, and the quality of the evidence found. Some of us acted as "EBM consultants", which took an additional half hour to hour per question. The search terms and databases searched were clearly presented so that the process was transparent and repeatable, and could later be modified or refined by the recipient doctor. Reports were returned the same way that they were received, according to GP preferences.

Process evaluation

GPs' feedback: When the service ended, GPs were asked to complete an evaluation questionnaire for each question submitted, to provide qualitative information about their experiences of the service.

Because of concerns that questions would be too esoteric and specific to be generally clinically relevant (our "ideal" question would have an answer that might change many GPs' management), we also asked 30 GPs (at subsequent educational sessions about EBM) to rank 20 questions randomly selected from the QUEST set according to how relevant the question was to general practice (on a scale of 1–7). They were asked to consider how common the clinical problem was and how great the potential for the answer to alter patient management, keeping in mind cost-effectiveness, medicolegal issues and patient acceptability.

Agreement between answers: A random selection of 14 questions was answered separately at the two sites, and the concordance of the reports was rated (evidence identified, restructuring of questions, report content, descriptions of the identified evidence, and the reports' overall conclusions). An independent rater with EBM experience classified each report as "no substantial differences", "minor differences", or "substantial differences".

Display of answers

Websites developed for both AQUA[9] and QUEST[10] enabled users to search through all the questions and answers for each site.

RESULTS

Service utilisation: During the nine months of the service, 58 GPs asked 160 questions (41 GPs asked 116 questions

2: Feedback from 42 GPs using the evidence-based literature search service (84 questions asked)

Question	Proportion of GPs replying "Yes" QUEST (63 questions)	AQUA (21 questions)
Have you actually searched for an answer to this question yourself?	44%	19%
Did you have any difficulties in formulating the question?	37%	19%
When evidence was available and an answer was supplied		
Did the answer supplied by our service actually answer the question?	83%	78%
Was the summary report helpful?	92%	67%
Did you read the abstracts?	87%	52%
Did you request any full journal articles?	11%	0
How often in your clinical practice would you have had a question that could be answered by the literature search service?		
1 or more times a day	59%	8%
1 or more times a week	26%	50%
1 or more times a month	15%	42%
Did the answer actually change your management of the patient?	49%	33%

and 17 GPs asked 44 questions at QUEST and AQUA, respectively). Half the GPs (29) asked one question, while 11 submitted five or more. Two-thirds of the questions (65%) concerned treatments, compared with aetiology (17%), prognosis (13%) and diagnosis (5%).

Method of communication: Faxing was the method most often used for communication between GPs and the services (68 [59%] and 33 [75%] at QUEST and AQUA, respectively). Email was used more often at AQUA than at QUEST (11 [25%] v 10 [9%], respectively). Courier transport at the QUEST site was seldom used (five times in total). Questions were submitted by other methods (eg, post, phone, in person) for 24 (21%) QUEST questions.

Time to answer questions: The average total time spent answering questions was 3 hours 32 minutes (95% CI, 2.67–3.97). The minimum amount of time spent was 20 minutes. Nine questions took longer than 10 hours to answer and the maximum amount of time spent on one question was 23 hours 30 minutes.

Evidence to provide a response: We found evidence to provide a response to 126 (79%) submitted questions (85 [73%] questions submitted to QUEST and 37 [84%] of those submitted to AQUA).

Databases and search engines used: Of the medical databases and search engines used to locate evidence, PubMed Clinical Queries was successfully used most often and located at least some useful evidence for 127 (79%) questions for both sites (92 [79%] and 35 [80%] at QUEST and AQUA, respectively). Other versions of MEDLINE, SUMSearch and the Cochrane Library were also frequently used successfully (89 [56%], 57 [36%] and 64 [40%] times, respectively, for both sites) (Box 1).

Feedback from GPs using the service: Evaluation surveys were returned by 29/40 GPs (73%) for 63 questions (QUEST) and 13/17 GPs (76%) for 21 questions (AQUA) (Box 2). The overall response to the service was positive. GPs found the services reliable, prompt, easy to use and influential in their practice. Negative comments concerned the tardiness of the services and the difficulties experienced by busy clinicians actually using the service during routine work.

Twenty-six GPs using the QUEST service gave detailed information about the subsequent clinical management:[11-16] 15 said that it directly changed treatment; 10 that it supported their management, increasing their confidence; six that decision-making with the patient was promoted; and five that patient attitudes were influenced.

Relevance of questions: Six questions were ranked as highly relevant (mean score, >5.5), 13 moderately (2.5–5.5), and one as not relevant (<2.5) (Box 3).

Rating of concordance of answers: For the 14 questions answered by both services, there were many differences in the reports provided by each of the services. Some of the difference was because only the service originally receiving the question could clarify it with the referring GP and refine the search. Furthermore, the time delay between the first and second searches sometimes allowed more recent evidence to be identified in the second search.

There were substantial intersite differences in the evidence sections of four of the 14 reports, and minor differences for another four. However, substantial differences were not found in other sections, including the "bottom line" conclusions (ie, the sites sometimes used different evidence to reach similar conclusions). The independent rater concluded that the reliability exercise showed a need for standardised search-request templates, and education of GPs in formulating questions.

DISCUSSION

We found that it was feasible to provide an evidence-based literature search service for GPs. The service was used by GPs in clinical practice, who found it useful. Subjectively at least, GPs found that it influenced their clinical decisions.

The length of time taken to answer questions is clearly central to the ultimate cost of such a service, but we were not able to estimate the "production costs" to provide the service to large numbers of GPs. However, as indicated by the shorter time spent as we became familiar with searching, a large-scale operation would increase efficiency.

Initially, we were concerned that the service might be inundated with requests, and were cautious in advertising it. To our surprise, GPs were sparing in their use of the service. This probably reflects the novelty of the idea, the lack of experience incorporating it into practice routine, and the lack of time to send in requests. Few GPs thought the service unhelpful or irrelevant. The difference in recruitment rates between QUEST and AQUA suggests that engaging GPs in workshops may increase their participation.

We were able to answer a substantial proportion of the questions submitted by GPs, indicating that their questions are mostly suitable for this type of service. Rating by independent GPs

3: Relevance of questions submitted to QUEST, ranked by a sample of 30 independent GPs (score range, 1–7)

Question	Mean score
Should lower urinary tract symptoms in men including obstructive, irritative symptoms be investigated or left alone?	5 94
What is the best treatment for osteoporosis/recurrent fractures in women over 80? Is hormone replacement therapy the answer?	5 70
Is there any benefit in treatment of dysfunctional uterine bleeding with Primolut?	5 69
How do operative v non-operative (eg nasal spray, time) methods of treatment affect outcomes of chronic glue ear?	5 63
Are there any new treatments other than anti-viral therapy for genital herpes?	5 62
What is the risk of asthma developing in children when there is a family history of asthma and bronchitis?	5 53
How efficacious are the following recommendations in reducing fracture rate and improving bone mineral density in postmenopausal women with osteoporosis: (1) exercise in gym 2–3 times per week, (2) natural progesterone (Progest cream); (3) boron, (4) cod liver oil, (5) not to take calcium carbonate but chelated calcium supplement instead (6) no tea?	5 23
Is prednisolone beneficial in the treatment of Bell's palsy? Are traditional treatments of any value (strapping cheek, galvanic stimulation)?	5 19
Is dexamphetamine addictive when used to treat attention deficit hyperactivity disorder?	5 19
How do ultrasonographic heel measurements compare with dual-energy x-ray absorptiometry scan in predicting osteoporosis and/or hip fractures?	5 09
What treatments are there for formication (creepy-crawly skin sensation) associated with menopause?	4 66
Is there an association between urticaria and hyperuricaemia? At what levels should asymptomatic hyperuricaemia be treated?	4 62
What is the evidence supporting the use of Diabex (metformin) for polycystic ovaries?	4 58
Are there any detrimental effects of living close to radioactive nuclear waste (eg thyroid or lung disease)?	4 13
Is there any evidence to suggest a benefit of dong quai for lowering cholesterol?	4 09
Is any treatment required for gallbladder mucosal polyps?	3 94
What is the treatment for nausea associated with tumours of the head and neck?	3 88
What are the side effects and cure rates of using Neo-mercazole and radiotherapy to cure or suppress Plummer's disease (hyperthyroidism)?	3 75
Does bromocriptine reduce daytime somnolence in patients with brain injury?	3 26
Are there any investigations to confirm Norrie's disease and what is the appropriate management?	1 65

showed the answers to be relevant to general practice.

If literature-searching services are to be established, limited resources may prohibit full-scale systematic reviews and produce inaccurate conclusions. However, our limited service produced similar conclusions to the same questions at the two service sites, even when different evidence was located through the various search methods. A process that produces accurate reports most of the time can contribute greatly to an information-rich environment in general practice.

Further assessment of evidence-based literature search services is needed to establish their cost effectiveness. If the service either improves quality or reduces costs, and can be delivered efficiently on a large scale, then a case could be mounted for providing such a service for all GPs to enhance and support clinical decision making.

Finally, we are currently exploring other uses for such a service.

■ The service may be useful to general practice groups establishing a case-focused, evidence-based "journal" club. Questions arising from cases discussed at such meetings, but not answered, might be directed to the service for assistance both with the results and also the methods of searching.

■ Questions might be used to identify problems or gaps in current guidelines available to GPs. This would assist GPs and provide feedback and quality improvement for those developing evidence-based guidelines.

Competing interests: None. Funding was provided by the Commonwealth Government with a competitive grant.

REFERENCES

1 Sackett DL, Richardson WS, Rosenberg W, Haynes RB. Evidence-based medicine. London: Pearson Professional Publishing, 1997.

2 Davis D, O'Brien MA, Freemantle N, et al. Impact of formal continuing medical education: do conferences, workshops, rounds, and other traditional continuing education activities change physician behaviour or health care outcomes? *JAMA* 1999; 282: 867-874.

3 Muir Gray JA. Where's the chief knowledge officer? *BMJ* 1998; 317: 832.

4 Gill P, Dowell AC, Neal RD, et al. Evidence based general practice: a retrospective study of interventions in one training practice. *BMJ* 1996; 312: 819-821.

5 Hayward JA, Wearne SM, Middleton PF, et al. Providing evidence-based answers to clinical questions. A pilot information service for general practitioners. *Med J Aust* 1999; 171: 547-550.

6 Verhoeven AA, Boerma ES, Meyboom de Jong B. Which literature retrieval method is most effective for GPs? *Fam Pract* 2000; 17: 30-35.

7 McColl A, Smith H, White P, Field J. General practitioners' perceptions of the route to evidence based medicine: a questionnaire survey. *BMJ* 1998; 316: 361-365.

8 Bennett JW, Glasziou PP. Evidence-based practice: What does it really mean? *Dis Manage Health Outcomes* 1997; 1: 277-285.

9 The AQUA website: <http://www.med.monash.edu.au/healthservices/cce/research/gpep.html> (accessed July 2001).

10 The Quest website: <http://www.spmed.uq.edu.au/quest/> (accessed July 2001).

11 Del Mar CB, Glasziou PP, Spinks AB, Sanders SL. Does drinking carrot juice affect cancer of the prostate? *Med J Aust* 2001; 174: 197.

12 Del Mar CB, Glasziou PP, Spinks AB, Sanders SL. Is isopropyl alcohol swabbing before injection really necessary? *Med J Aust* 2001; 174: 306.

13 Del Mar CB, Glasziou PP, Spinks AB, Sanders SL. Is coenzyme Q_{10} helpful for patients with idiopathic cardiomyopathy? *Med J Aust* 2001; 174: 421.

14 Villanueva EV, Anderson JN, Gan ET. Does the location of deep venous thrombosis affect the risk of developing postphlebitic syndrome? *Med J Aust* 2001; 174: 101-102.

15 Anderson JN, Shaw S. What is the best emergency treatment for children who ingest warfarin rodenticide? *Med J Aust* 2001; 174: 147.

16 Clavisi O, Shaw S, Anderson JN. Does cleansing the birth canal at delivery reduce postnatal infection rates? *Med J Aust* 2000; 173: 550-551.

(Received 2 Mar, accepted 15 May, 2001)