5. Reading journals and monitoring the published work

Jeremy C Wyatt DM FRCP

J R Soc Med 2000;**93**:423.423–427

The problem-based learning process described in the previous article—in which unresolved clinical questions generate searches for information as they arise—should help keep us ahead of the tidal wave of new data. However, ours would be a dull profession if we did not wish to broaden our knowledge beyond the current case mix. Moreover, patients can reasonably expect us to be well informed: the public takes a close interest in new clinical developments—in some parts of the United States half the people arriving for outpatient appointments carry an Internet print-out. Many journals now include news pages to help doctors keep up with information of this sort.

KEEPING UP

With what?

No one can keep up with the full ramifications of a single specialty, let alone the whole of medicine. Our goal should be to keep abreast of the knowledge most relevant to our responsibilities—clinical, teaching, research and administrative. The average general practitioner can get by with only a modest acquaintance with molecular biology, a clinical director of surgery with scant knowledge of dermatology. Laine suggests that we should each develop a personal mission statement embodying our professional goals, scope, and future plans, what we need to know and what we are happy to look up[1]. A mission statement must be realistic: start modestly and build from a successful base rather than risk disheartenment from the outset. An example for a radiologist with a special interest might be:

> 'My knowledge needs to be current in neuroradiology; I must be aware of general advances in radiology, other imaging methods and neurosurgery and know where to find more detail; I should have heard of other major medical developments'.

How?

Previous articles in this series have discussed how to select and use books, multimedia, practice guidelines and continuing education methods; the last article discussed the need to look up answers to *ad-hoc* clinical questions as part of lifelong learning. Each of these methods can provide a window on current knowledge. Here I deal specifically with regular journal-reading and the monitoring of publications by database-searching.

READING JOURNALS

Regular reading

There are over 40 000 biomedical journals and the number doubles every 20 years[2]; we cannot hope to browse, let alone read, more than a tiny fraction. How should those few be selected?

The specialist primary biomedical journals are designed for researchers—scientist-to-scientist—not practising doctors[3]. The jobbing clinician should not take their content too seriously since they may well contain misleading pathophysiological insights or early clinical promises that will not be fulfilled. In many of the general medical and clinical specialty journals the editors take pains to select and publish material relevant to practising clinicians and give articles labels such as 'early report' and 'hypothesis' to make clear they differ from clinical articles and reviews. In choosing your journals, one criterion might be that the content should be peer-reviewed; but this is an elastic term and offers no guarantee against poor material. A good policy is to avoid journals that commission every article published and those that depend wholly on advertisements for their income. Journal supplements sponsored by drug companies are commonly of low quality, and, if you are tempted to rely on journal articles and other materials distributed by drug or equipment companies, do not expect them to be unbiased[4]. To be indexed on Medline a journal must surmount various hurdles, so the quality is reasonable; at present there are 4000 of these.

In boiling the choice down to five or so, some journals are obvious. Most doctors will benefit from scanning one or more of the 'big four' general journals (*Lancet*, *BMJ*, *NEJM*, *JAMA*) plus a couple of major journals in their specialty such as *Gut* or the *British Journal of Surgery*. For the others, the choice may be determined by factors such as relevance of the articles to your work and the rigour with which they are presented[5]. But even if you subscribe to a journal, important articles are easily missed. This hazard is reduced by current awareness services. At local level, someone can

School of Public Policy, University College London, 29/30 Tavistock Square, London WC1H 9EZ, UK
E-mail: uctqjwy@ucl.ac.uk

photocopy and circulate the contents pages of journals most likely to interest colleagues and, more widely, a subscription to *Current Contents* can serve a similar purpose; some journals, such as the *BMJ* (www.bmj.com), will regularly e-mail their contents pages free of charge. Of course, tables of contents will give you only the titles of articles. More informative are the secondary or abstracting journals such as *Evidence Based Medicine*, *Evidence Based Mental Health* or *ACP Journal Club*. For each of these, a panel of clinicians scans hundreds of journals for articles with potential clinical impact which are then critically appraised. Even though coverage is restricted to clinical journals, the harvest is only 2–3% of all articles screened—a sobering comment on clinical research. Abstracts of the articles that survive the process are then reproduced or rewritten and an expert commentary is commissioned. As well as highlighting rigorous, clinically relevant results, these secondary journals often include useful editorials on methods for searching Medline or appraising articles, and a glossary of statistical methods and terms. They are thus an attractive way for working clinicians to obtain a distillate from a much wider range of journals than they could screen by themselves.

Which articles to read and act on

Your time is valuable, so, to decide which articles to read, why not apply basic critical appraisal methods? Start with relevance: if the study aim is either unclear or irrelevant to your mission, move on. A study is most likely to change your practice if it was conducted in a setting similar to your own, on a similar population, with endpoints you consider relevant. Next, consider whether the study results are likely to be correct. A basic criterion is whether the study design was appropriate to the question asked. It is not always true that 'evidence from randomised trials holds more weight than observational data'[1]: the best design for a study will depend on the question being asked[6]. For example, even a single case report may be highly convincing if it describes a rare but dangerous side-effect which disappeared when the drug was stopped and reappeared when treatment resumed. Finally, if the article is judged to describe the appropriate kind of study, is it free from the common biases that might threaten its validity? Checklists and explanations of these for various study types, and details of the critical appraisal process, are contained in Sackett's short and readable book[7] and in *JAMA*'s 'Reader's Guides' series.

Similar considerations apply to the electronic preprint articles found on servers such as PubMed Central or Netprints (www.clinmed.netprints.org). The idea is that a copy of a paper is made available on the web before peer review[8]. Advantages of such preprints over their competitor, conference abstracts, are that they contain the full results, are more widely and rapidly accessible than conference proceedings, and allow feedback from readers. They may also allow negative studies to be reported and found more readily—for example, by people writing systematic reviews. However, since they are screened only for libel and breaches of patient confidentiality, not for quality or clinical relevance, clinicians should treat them with caution or await journal publication.

Doctors are rightly reluctant to act on a single small study and often wait for a review before changing their practice[1]. However, review articles of the traditional kind ('expert reviews') tend to use unspecified methods[9] which can be biased, and their conclusions lag many years behind primary studies[10]. A systematic review provides more reliable insights on a specific subject, such as the effectiveness of recombinant insulin in diabetes[7]. However, to guide a broader clinical decision such as which therapy to select for diabetes or how to keep up to date with the general management of diabetes, an expert review based on a systematic analysis of several large rigorous studies may be the best option.

How much to read

With time so short, there is a temptation to confine our scanning to abstracts or even article titles, but we should be very wary of this. Many titles promise much more than the study delivers, while some hide gems behind an inscrutable headline. Abstracts—especially structured abstracts—should tell us much more; however, when Pitkin compared the statements made in 264 structured abstracts in six major medical journals with the corresponding article, 20% of abstracts contained statements that were not substantiated in the article and 28% contained statements which disagreed with those in the article[11].

Rather than save time by reading abstracts alone, we need to schedule one or two hours a week to trace and obtain reading material. Once obtained it can be read later in odd gaps[1]. If we can identify where these gaps occur—between patients in the clinic, on the train to meetings, even *during* meetings—we can keep the reading material handy to fill them. However, we are more likely actually to read the material if it is relevant (which it will be if we follow the critical appraisal process) and if we have incentives. Incentives are again largely in our own hands. If we really want to read and keep up but need some external pressure to help us, we can arrange to give teaching sessions, promise patients that we will discuss a new therapy with them next time, or participate in a journal club.

SEARCHING THE PUBLISHED WORK

As well as browsing general and secondary journals and conducting searches to answer questions that arise in practice (article 4), we can keep up by searching databases

regularly. One suggestion is to develop a search strategy for a bibliographic database that coincides with your mission statement[1], perhaps adapting the published strategy from a relevant Cochrane systematic review. Your strategy may take a while to develop and refine, even with a librarian to help. However, once developed it can be stored and re-run monthly to yield all new material in minutes. Even with the best search strategy, some articles will prove irrelevant; one way to filter them out is to review abstracts on screen before ordering the full text.

Which bibliographic database?

There are at least ten commonly used bibliographic databases or routes to them, with differing characteristics. In addition, several of the secondary journals are available electronically (Table 1); for definitions of terms see Ref. 12. Most clinicians start with Medline, but HealthStar (quality improvement), Psychlit (mental health) and Cancerlit (cancer) are others that may be useful.

Should I do it myself, ask a librarian or adapt an existing strategy?

Nowadays most clinicians will perform their own free-form searches. However, in a study of 158 clinicians given a three-hour Medline training session, Medline novices were only able to locate 45% of relevant articles, and 70% of all the articles they identified were judged irrelevant[13]. Corresponding figures for Medline-experienced clinicians were 50% and 57% while for librarians they were 53% and 38%. Medline experience does substantially reduce the amount of irrelevant material retrieved but only slightly improves the percentage of relevant articles located.

For further improvement, we must combine a stored, tried and tested search strategy with a few keywords tailored to our needs. Thus, if your interest is in randomized trials of a named drug, the PubMed Clinical search filter (www.ncbi.nlm.nih.gov/PubMed) for therapy will find 99% of all trials and 74% of the articles it locates should prove relevant. If the 26% irrelevant articles trouble you, you can choose a search strategy with a 3% irrelevance rate (97% specific), but this retrieves only 57% of all the correct studies[14]. Similar search strategies are available to identify rigorous studies relevant to diagnosis, aetiology or prognosis.

The decision to devise your own searches, use PubMed's ready-made clinical queries or ask a librarian depends on whether your question is confined to therapy, diagnosis, aetiology or prognosis (favouring a PubMed clinical query), concerns other issues but is well formulated (a general PubMed query) or fuzzy (you may need a librarian to help you formulate the search). It also depends on how much time you have to browse the search results on screen and refine your search strategy accordingly. A useful method when the database's controlled vocabulary is patchy or variably applied by indexers—such as in medical informatics—is to start with a known target paper and discover how it has been indexed. Citation searches (looking for articles that refer to a known classic paper) can also help. A final option is to call or e-mail a question-answering service, in which you refine the question with a librarian or information scientist.

Organizing reprints

Once we identify a promising article, we need to obtain the full text. Conventional document delivery services charge up to £6 ($10) per article and take from three to ten days. Sometimes our local library will fax us a copy in an hour for free. If our institution has a licence to online full text of the right journal, or the article appeared in the handful of public-spirited journals such as the *BMJ* that allow full-text access to all, we can print out an electronic clone of the original.

Even in this electronic age, paper copies of articles are useful because they remind us to read them, can be browsed unobtrusively on the train or during meetings, can be annotated, can be filed as a reminder in relevant patients' notes, and can be read 40% faster than on screen. However, if we are ever to find them again, we need a system.

In view of the way most doctors work, any reprint filing system must be designed to make the filing and retrieval of articles trivially easy. Simplest perhaps is a row of open labelled magazine files, one per clinical topic, to which current articles are always added on the right hand side and so automatically kept in year order. Brightly coloured A4 cards can be added to each file to celebrate New Year and facilitate navigation. Alternative systems that require more upkeep include a hanging file for each detailed topic arranged alphabetically, and files containing numbered articles with a computer keyword index[15]. Scanning of each article into a computerized document management system is also possible but requires time, dedication and cash—and may even tempt some writers into plagiarism.

CONCLUSION

Keeping up is painful because it means learning new insights, relearning old insights and forgetting outdated insights[1]. Targeted reading of articles in paper journals and identifying new articles through bibliographic systems takes time and effort. As with other lifelong learning approaches, it may be worth collaborating with colleagues to share out the work and the resulting discoveries. However, although many doctors value the social pressure of regular meetings such as journal clubs, careful planning is needed to

Table 1 **Characteristics of some frequently used bibliographic databases and secondary electronic resources**

Database name (publisher)	*Medium*	*Main contents*	*Source of data*	*Clinical specialty*	*First item*	*Update frequency*	*Size*	*Quality assurance*	*Coded fields*
Bandolier (Oxford NHS R&D Directorate)	Web and print	Commentaries on rigorous clinically relevant published SRs and 1° studies, articles on EBM	All types	All	1994	1 month	c. 400 articles		No
Best Evidence (ACP)	CD-ROM	Structured abstracts & commentaries on rigorous, clinically relevant SRs and 1° studies	All types, from ACP J Club (1991 on) and EBM J (1995 on)—scan 90 journals	All	1991	3 months	1100 abstracts, commentaries	All studies passed ACP critical appraisal criteria	No
CancerLit (NCI)	CD-ROM InterNet	Bibliographic	All types	Oncology	Some journals from 1963 rest 1976–	1 month	1.3 million	Medline+some other journal articles; some monographs, proceedings	MeSH, etc
Clinical Evidence (*BMJ*)	CD-ROM intranet	Systematic reviews	RCTs and epid studies	All		6 months	400 topics, growing	Own criteria+peer review	
Cochrane Database of Systematic Reviews (Cochrane)	CD-ROM (abstracts free on Web)	Cochrane systematic reviews	Published and unpublished RCTs	All	1994	3 months	550 SRs, growing	Cochrane SRs only	MeSH coded
EMBase (Elsevier)	CD-ROM intranet	Bibliographic; abstracts on 80%	All types	All—especially pharmaceutical info	1980	15 days	7 million documents from 4000 journals	Original journal articles; some monographs, letters, conference proceedings	c. 25
HealthStar (NLM)	Web	Bibliographic; abstracts	All types	Health services research, admin	1975	1 week	3 million	Original journal articles; some monographs, proceedings	MeSH coded, c. 25
Medline (Ovid, Silver Platter)	CD-ROM intranet	Bibliographic; abstracts on most	All types	All	1966	1–4 weeks	9 million documents from 4300 journals	Original journal articles, some monographs, proceedings	22
Medline (PubMed, NCBI)	Web	Bibliographic; abstracts on most	All types	All	1966	Daily for pre-Medline, weekly for rest	9 million documents from 4300 journals	Anything in journals, inc. letters; 'Clinical Queries' apply quality fillers	c 25
PsychLit (Am Psych Assoc; Ovid, Aries, etc.)	CD-ROM	Bibliographic; abstracts on most	All types	Psychology and mental health	1987	3 months	1.2 million from 1300 journals	Original articles; some monographs, proceedings	

ACP= American College of Physicians; NCI=National Cancer Institute; NLM=National Library of Medicine; NCBI=National Center for Biotechnology Information; EBM=evidence-based medicine; SR=systematic review; RCT=randomized controlled trial; MeSH=medical subject headings

determine the scope, who will do which searches, and which strategies should be used. The next article will discuss information for patients.

REFERENCES

1 Laine C, Wenberg DS. How can physicians keep up to date? *Annu Rev Med* 1999;**50**:99–110

2 Wyatt J. Use and sources of medical knowledge. *Lancet* 1991;**338**: 1368–73

3 Haynes RB. Loose connections between peer-reviewed clinical journals and clinical practice. *Ann Intern Med* 1990;**113**:724–8

4 Stryer D, Bero L. Characteristics of material distributed by drug companies. *J Gen Intern Med* 1996;**11**:575–83

5 Haynes RB, McKibbon KA, Fitzgerald D, Guyatt GH, Walker CJ, Sackett DL. How to keep up with the medical literature: deciding which journals to read regularly. *Ann Intern Med* 1986;**105**:309–12

6 Sackett DL, Wennberg JE. Choosing the best research design for each question. *BMJ* 1997;**315**:1636

7 Sackett D, Richardson WS, Rosenberg W, Haynes R. *Evidence Based Medicine.* London: Churchill Livingstone, 1997

8 Delamothe T, Smith R, Keller MA, Sack J, Witscher B. Netprints: the next phase in the evolution of biomedical publishing. *BMJ* 1999;**319**:1515–16

9 Bramwell VH, Williams CJ. Do authors of review articles use systematic methods to identify, assess and synthesise information? *Ann Oncol* 1997;**8**:1185–95

10 Antman EM, Lau J, Kupelnick B, Mosteller F, Chalmers TC. A comparison of results of meta-analyses of randomized control trials and recommendations of clinical experts. *JAMA* 1992;**268**:240–8

11 Pitkin RM, Branagan MA, Burmeister LF. Accuracy of data in abstracts of published research articles. *JAMA* 1999;**281**:1110–11

12 Wyatt JC, Vincent S. Selecting computer-based evidence sources. *Ann Oncol* 1999;**10**:267–73

13 McKibbon KA, Haynes RB, Walker Dilks CJ, *et al*. How good are clinical Medline searches? A comparative study of end-user and librarian searches. *Comp Biomed Res* 1990;**23**:583–93

14 Haynes RB, Wilczynski N, McKibbon KA, Walker CJ, Sinclair JC. Developing optimal search strategies for detecting clinically sound studies in MEDLINE. *J Am Med Informatics Assoc* 1994;**1**:447–58

15 Haynes RB, McKibbon KA, Fitzgerald D, Guyatt GH, Walker CJ, Sackett DL. How to keep up with the medical literature: how to store and retrieve articles worth keeping. *Ann Intern Med* 1986;**105**:978–84