

Information overload: what's behind it, what's beyond it?

Paul P Glasziou

Literature alert services, good evidence-based resources and real-time decision support can all help to reduce information overload

If all disease was caused by the four humours; if our only treatments were blood-letting, purging or cold baths; and if all research was forbidden, medicine would be much easier. But medicine has changed, and is changing, more than most practitioners recognise. While no organisation keeps a precise count of the number of diseases, the expert system DiagnosisPro (<http://www.diagnosispro.com>) claims to assist with the diagnosis of over 11 000 diseases. Thus, diligent generalists such as general practitioners and physicians who updated their learning on one disease every day would take over 30 years to examine current knowledge just once. But medical knowledge is not static: MEDLINE now adds over 12 000 articles to its database *per week*, including more than 300 reports of randomised trials. For generalists, and those who help with continuing medical education of generalists, there is a clear need to make good use of what we know and to develop parsimonious strategies to cope with the growth of medical knowledge, with a clear focus on what will improve patient care.

So what can the GP do? Addressing our information overload involves balancing two processes: information “pull” (seeking information to answer specific questions) and “push” (receiving information unsolicited).¹ Both modes are important. Information “pushed” to us should focus on the clinical conditions we commonly see in practice, and particularly on important new research on those topics. For the GP, this might be the 50 conditions most commonly seen in a month. For example, one study suggested that roughly half of new complaints could be attributed to 36 presenting problems.²

GPs should consciously restrict their paper and electronic browsing to essential literature alerts about new research likely to improve clinical decision making. Several alert services, such as the In other journals section of the *Medical Journal of Australia* and *Journal Watch* (<http://www.jwatch.org>), attempt to alert clinicians to important breakthroughs and new developments. Among the most rigorous processes is that carried out by staff of the journal *Evidence-Based Medicine*, who hand-search about 60 000 articles from 140 journals annually, including the five highest-rating general medical journals and a variety of other specialty journals.³ Each year, around 3400 of the 60 000 articles (about 1 in 18) pass the basic validity checks (eg, a treatment article requires a randomised trial with at least 80% follow-up, whereas a prognosis study requires an inception cohort). Hence the “number needed to read” to find one valid study is about 18 articles.⁴ The clinical relevance of valid articles is rated by 4–12 clinicians from various disciplines. Each bimonthly issue of 20 articles is a distillation of roughly 10 000 articles from 140 journals — a 500-fold “noise” reduction.

But no matter how well we “browse”, there will still be a long tail of uncommon clinical problems for which we will need to hunt for specific information. Such information “pull” requires reference sources based on good evidence that give us rapid and valid answers to clinical questions, preferably within the time frame of the consultation or ward round. Ideally, these would be readily digestible resources covering all possible clinical topics and giving up-to-date summaries of the best available research. This is a desirable but near impossible task. Two complementary

Alice with the Red Queen



Illustration by John Tenniel from the 1871 edition of *Through the looking glass*.⁹

approaches to the problem have been the attempts by the Cochrane Collaboration to synthesise all available randomised trials (and recently other types of study as well) and the efforts of a network of guideline developers to produce best-practice guidance. In the 15 years since the founding of the Collaboration, great strides have been made, but less than half the treatment questions that might require a systematic review have been completed,⁵ and more trials are added to MEDLINE each day than are incorporated into systematic reviews. While no single resource is likely to solve the problem, several systems, such as TRIP (Turning Research into Practice) (<http://www.tripdatabase.com/index.html>) and Quick-Clinical (<http://www.chi.unsw.edu.au/CHIweb.nsf/page/Quick-Clinical>), are designed to search several sources simultaneously. But, no matter how well designed a system may be, its value ultimately depends on how frequently it is used. A study of QuickClinical in general practice over a 12-month period⁶ showed an initial high usage (9–10 searches per GP per month), but this dropped to 1–2 searches per month by the end of the study — a level well below the one question per five patients observed to arise in a recent study of 3500 GP consultations.⁷

Literature alert services, reference sources based on good evidence, and real-time decision support are all important parts of our personal “solution” to information overload. In workshops run by the Centre for Evidence-Based Medicine in Oxford, United Kingdom, we ask clinicians to audit their current push-pull processes and balance, and to work out the best way to use their precious learning time. Medical curricula, both undergraduate and postgraduate, must recognise that such learning management skills are at least as important as skills in other areas of medical practice.⁸ Professional development in evidence-based medicine and reflective learning need a clear place in the curriculum alongside skills in physical examination and communication. In addition, the “basic sciences”, such as information

management and clinical epidemiology, need a place alongside anatomy and physiology.

Furthermore, managing the information flood requires not just basic skills, but also regular practice. As the Red Queen said to Alice: “it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!”⁹ But keeping up with the flood of information doesn't mean working twice as hard. It can at least become manageable if we develop information skills, share the work within the team, and have ready access to reference sources based on good evidence.

Competing interests

I am a co-editor of the journal *Evidence-Based Medicine*.

Author details

Paul P Glasziou, FRACGP, PhD, Director
 Centre for Evidence-Based Medicine, University of Oxford, Oxford, UK.
 Correspondence: paul.glasziou@dphpc.ox.ac.uk

References

- 1 Glasziou P. Managing the evidence flood. *Surg Clin North Am* 2006; 86: 193-199, xi.
- 2 Fleischer AB Jr, Gardner EF, Feldman SR. Are patients' chief complaints generally specific to one organ system? *Am J Manag Care* 2001; 7: 299-305.
- 3 Eady A, Glasziou P, Haynes B. Less is more: where do the abstracts in the EBM journal come from? *Evid Based Med* 2008; 13: 3.
- 4 McKibbin KA, Wilczynski NL, Haynes RB. What do evidence-based secondary journals tell us about the publication of clinically important articles in primary healthcare journals? *BMC Med* 2004; 2: 33.
- 5 Mallett S, Clarke M. How many Cochrane reviews are needed to cover existing evidence on the effects of health care interventions? *ACP J Club* 2003; 139: A11.
- 6 Magrabi F, Westbrook JI, Kidd MR, et al. Long-term patterns of online evidence retrieval use in general practice: a 12-month study. *J Med Internet Res* 2008; 10 (1): e6.
- 7 González-González AI, Dawes M, Sánchez-Mateos J, et al. Information needs and information-seeking behavior of primary care physicians. *Ann Fam Med* 2007; 5: 345-352.
- 8 Dawes M, Summerskill W, Glasziou P, et al. Sicily statement on evidence-based practice. *BMC Med Educ* 2005; 5: 1.
- 9 Carroll L. *Through the looking glass, and what Alice found there*. London: Macmillan, 1871. □