

Dealing with information overload: application of evidence at point of care

In this article, the authors describe how to identify, filter, evaluate, use and apply new information to enhance patient care

Picture the scene: it is 5pm on a Friday afternoon. You are about to go home and you are looking forward to a relaxing weekend. The telephone rings — a GP has been handed a large wad of paper downloaded from the internet by a patient, which discusses a recent trial describing the benefits of finasteride in preventing prostate cancer. The GP requests your professional opinion — the patient is with her and waiting.

This is probably a scene that resonates with many, be they community pharmacists, hospital pharmacists, prescribing advisers, nurse practitioners or medical clinicians. Traditionally, pharmacists, doctors and nurses have been perceived as the fount of all knowledge when it comes to health care. But times have changed.

Health care professionals must accept and feel comfortable with the fact that there is no way that they can keep pace with the information explosion. From daytime television to pharmaceutical sales representative, from the latest professional journals to the evening news, health care professionals (and the public) are constantly being bombarded by new information about health.

To avoid being swept away by this torrent of information, health care professionals must develop effective ways of identifying, filtering, evaluating, using and, most importantly, applying new information to enhance patient care.

With time so pressing, the danger still persists in an over-reliance on recommendations from colleagues or “experts” or one’s own clinical experience, rather than the judicious use of up-to-date, relevant and critically appraised evidence-based resources.

This article aims to give a guide to dealing with “information overload”.

Consider relevance first, validity second

Clinicians from all disciplines and specialties require up-to-date information in order to deliver the best possible care to their patients. However, with around 20,000 biomedical journals in print and limited time for reading, the ideal of large-scale critical appraisal

of papers by individual clinicians is unrealistic. In addition, evidence shows that during a consultation family doctors will on average look for information for less than two minutes,¹ hence valid and relevant information needs to be quickly at hand if it is to be useful.

Slawson and Shaughnessy² have developed the utility of evidence-based medicine (EBM) by defining the usefulness of information in terms of relevance (information that evaluates interventions that patients care about and that allow them to live better, healthier and symptom-free lives), validity (are the results robust and reliable and are they likely to tell the “truth?”) and convenience (how long does it take to find and interpret the information?).

$$\text{Usefulness} = \frac{\text{relevance} \times \text{validity}}{\text{time to locate and interpret information}}$$

If either the relevance or validity of any information is zero, then its usefulness is also zero. Concentrating on patient-oriented evidence (see later) will help ensure the information you choose to read is relevant. Similarly, well-designed randomised controlled trials that minimise bias are more likely to provide valid conclusions. Clearly, working too hard to establish relevance and validity will lower the usefulness of information. Conversely, some information, such as some provided by pharmaceutical representatives, may be easy to obtain, but consequently may have questionable relevance and validity.

Hence, the first filter to consider using when dealing with information is relevance, ie, is the information relevant to your own clinical practice? Only then do you need to assess its validity. In other words, while some information may be highly valid, it may occur so infrequently in one’s day-to-day practice that it may actually contribute to information overload and so may be selectively ignored (see Panel 1).

Panel 1: Quickly determining if information is relevant

Answering “yes” to the following three questions will help us identify information of relevance requiring validation:

1. Will this information have a direct bearing on the health of my patients, ie, is it something they care about?
2. Is the problem common in my practice?
3. If valid, will this information require me to change my current practice?

A simple strategy for filtering information for relevance is to concentrate on published studies that measure outcomes that matter to patients, ie, patient-oriented evidence that matters (POEMs). These studies measure outcomes that are tangible — will patients live longer, suffer less pain, etc? Readers may be surprised to learn that only 3 per cent of published studies constitute POEMs — the remaining 97 per cent of published studies use surrogate endpoints and give rise to disease-oriented evidence³ (DOEs). Although studies that report DOEs may be of academic interest, they will probably not impact on patient care yet and can, therefore, often be selectively ignored (see Panel 2).

There are numerous examples of problems that have arisen when results from disease-oriented evidence have been applied to clinical practice too early. For example, in the late 1980s, encainide and flecainide were used as anti-arrhythmic agents based on their ability to suppress ventricular arrhythmias. However, publication of the CAST study⁴ in 1991 showed mortality was higher in the treated group than in controls. This study emphasises the need to concentrate on results from trials that report outcomes that matter to patients, ie, do they live longer,

Panel 2: Patient-oriented and disease-oriented outcomes

Patient-oriented outcomes

Waking up in the night due to asthma
Fewer heart attacks and strokes
Fewer hip fractures

Disease-oriented outcomes

Reduction in FEV1
Reduction in blood pressure or cholesterol
Increase in bone mineral density

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rather than intermediate outcomes presented by disease-oriented evidence, ie, suppression of arrhythmias.

What about review articles?

When looking for biomedical information, reviews written by “experts” are often thought to be the most useful in providing an overview of a subject. Such information is often found on the internet or even from apparently reliable sources. However, there is a danger in relying on review articles to ensure application of best evidence. A study illustrating this fact was recently published in the *BMJ*.⁵

The UK Prospective Diabetes Study (UKPDS), the most important RCT in type 2 diabetes, started in 1977 and was designed to evaluate whether tight glycaemic control decreased diabetes-related complications and increased life expectancy.^{6,7} A second arm of the study also investigated the role of tighter control of blood pressure in patients with both diabetes and hypertension.⁸

Results from UKPDS were that tight control of blood pressure was the single most important intervention in the management of type 2 diabetes, producing a reduction in the number of heart attacks and strokes. Less importantly, intensive control of blood glucose produced some microvascular benefits, manifested largely by avoidance of retinal photocoagulation or retinopathy. When 35 expert reviews of UKPDS were systematically examined⁵, 17 did not mention the need for blood pressure control and only five mentioned that people with diabetes benefit more from blood pressure control than tight blood glucose control. Why could this be?

It is recognised that, on occasion, the greater the eminence of an author, the less objective may be their review, with a consequent greater use of selected “evidence” to support pre-conceived views.⁹ Valid POEMs may be rejected if they do not make sense or conflict with disease-oriented thinking. This is known as “the tomato effect” because, for centuries, tomatoes were thought by “experts” to be poisonous because they were related to the lethal plants belladonna and mandrake.¹⁰ We all know now that the converse is true. For examples of why expert opinion alone should not always be relied upon, see Panel 3.

This is not because experts are deliberately trying to mislead us. More likely their past experiences and inherent beliefs (their neuro-linguistic programming) took the emphasis away from what the evidence had actually demonstrated (that lowering blood pressure is the single most important thing one can do for someone with type-2 diabetes to achieve greatest benefit) to what they were more comfortable with (lowering the blood glucose). Most people consider diabetes as an endocrine disorder foremost, rather than a risk factor for cardiovascular disease. Maybe it is partly explained by a line from the song “The Boxer” written by Paul Simon: “Still a man



Personal digital assistants are ideal for accessing evidence at the point of care

hears what he wants to hear and disregards the rest.”¹¹

EBM at the point of care

Evidence-based medicine (EBM) is now largely accepted as being fundamental to the way all clinicians practise medicine, teach clinical skills and undertake research.¹¹ However, the reality is that few people have the time to refer to the myriad of reference books and papers when seeking an evidence-based answer to a clinical question. Hence, in practice, EBM often remains in books on shelves gathering dust rather than being accessible and used at the time when critical clinical decisions are being made for patients,

Evidence has shown that for every 10 clinical questions posed, clinicians only look for answers to four of them and will only find answers to three out of these four. Are the remaining seven questions answered by guesswork or is the nebulous “clinical experience” used?¹ It is also important to realise that practising evidence-based medicine should no longer always mean evaluating original research. Instead, it should mean using reputable sources that summarise relevant and valid evidence and, with the help of technology, make it accessible at the point of care — such is the philosophy of information mastery.

Sackett and Strauss showed the value of EBM by bringing an “evidence cart” to the bedsides of general medical inpatients.¹³ The “evidence cart” included computerised information on previously assessed evidence of relevance to a busy medical team, as well as Best Evidence, the Cochrane Library and other useful information. The study showed that while the cart was available, reference to, and therefore the application of, EBM increased dramatically. However, when the cart was removed, the perceived need for EBM

rose sharply, but in many cases no searching was undertaken, presumably due to the time and effort that seeking such information would take.

Sackett and Strauss’s “evidence cart” emphasises the need for resources that can quickly and easily locate critical pieces of high quality information and present them in a concise, critically appraised format that is practical and “usable” at the point of care.

We suggest that personal digital assistants (PDAs/hand-held computers) are ideal for fulfilling this requirement, providing portable access to evidence. Searchable databases of EBM, such as InfoRetriever (www.infopeoms.com) and Clinical Evidence (www.clinicalevidence.com), are now available for PDA (Pocket PC and Palm OS) to ensure that within 30 seconds the best evidence is easily located and available to support clinical decision making at the point of care. These information resources are also available for download to desktop computer and via the internet, so increasing accessibility for office, clinic or high street-based users.

In the scenario given at the start of this article, a GP requested information to assist counselling a patient regarding the use of finasteride to help protect against the development of prostate cancer. In this case, the GP was informed by the pharmacist that the information that she had been presented with had originated from an article published in the *New England Journal of Medicine* in 2003.¹³ The paper had shown that finasteride 5mg daily reduced the overall risk of prostate cancer from 24.4 per cent to 18.4 per cent, but actually increased the risk of high-grade disease from 5.1 per cent to 6.4 per cent. The pharmacist explained that since the latter is the cancer that matters in terms of mortality, and because finasteride is associated with significant cost and adverse effects, the use of finasteride could not be recommended at present for the prevention of prostate cancer.¹³

How are we able to describe this scenario in such detail? The reason is because it was a situation that happened to one of us

Panel 3: Why we should not always rely on expert opinion

“The singer will have to go”

Eric Easton, new manager of the Rolling Stones, commenting on Mick Jagger in 1963

“You’d better learn secretarial work or else get married”

Director of the Blue Book Modelling Agency, to Marilyn Monroe, 1944

“That rainbow song is no good. Take it out”

Memo from MGM executive after the first screening of ‘The Wizard of Oz’ (1939)

“Heavier than air machines are impossible”

Lord Kelvin, President of the Royal Society, 1895.

(SP) a few months ago. The query was received (via bleep) and taken and answered in a single call, while speaking on a telephone in a hospital corridor, with reference to a searchable EBM database on a Sony Clie PDA. There is no reason why an experienced health care professional from any other discipline could not access the same information and use similar "POEMs" as a basis for their advice.

Final thoughts . . .

Undoubtedly the move towards evidence-based health care coupled with the explosion in sources of evidence has resulted in different ways of working for health care professionals. The principles of information mastery should help us all cope with this by ensuring the efficient and effective application of evidence to practice. We no longer expect travel agents to be able to tell us the times and costs of flights and accommodation without looking up the data on a computer — why should we find it difficult to accept that health care professionals should do the same for the complex therapeutic decisions we need to make everyday, provided of course, that it is available at the time we need it?

DECLARATION OF INTEREST Jonathan Underhill is involved in the organisation of two information mastery conferences being

run by the NPC in conjunction with the founders of information mastery and POEMs. Scott Pegler is the distributor for InfoPOEM Inc in the UK and Ireland.

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Resources

- National Electronic Library for Health (NeLH) (www.nelh.nhs.uk) gives access to Cochrane, Clinical Evidence, MeReC, Drug and Therapeutics Bulletin, Bandolier, etc
- An Introduction to Information Mastery (www.poems.msu.edu/InfoMastery)
- InfoPOEMS (www.infopeoms.com)
- National Prescribing Centre (www.npc.nhs.uk)
- Clinical Evidence (www.clinicalevidence.org)
- Effective Health Care Bulletin (www.york.ac.uk/inst/crd)
- Cochrane Collaboration (www.cochrane.co.uk)
- National Institute for Clinical Excellence (www.nice.org.uk)
- United Kingdom Medicines Information (www.ukmi.nhs.uk)
- Centre for Evidence Based Medicine (www.cebm.net)
- CASP (www.phru.nhs.uk/casp/casp.htm)

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