Of studies, summaries, synopses, and systems: the “4S” evolution of services for finding current best evidence

Practical resources to support evidence-based healthcare decisions are rapidly evolving. New and better services are being created through the combined forces of increasing numbers of clinically important studies, increasingly robust evidence synthesis and synopsis services, and better information technology and systems. The need for these resources is being spurred by demands for higher quality at lower cost from health services, but the impact of better information resources is being blunted by noisy pretenders, promising “the earth” but yielding just the dirt. Providers and consumers of evidence-based health care can help themselves to current best evidence by recognising and using the most “evolved” information services for the topic areas of concern to them.

The figure provides a “4S” hierarchical structure, with original “studies” at the base, “syntheses” (systematic reviews) of evidence just atop the base, then “synopses” of studies and syntheses next up, and the most evolved evidence-based information “systems” at the top. Information seekers should begin looking at the highest level resource available for the problem that prompted their search.

**SYSTEMS**
A perfect evidence-based clinical information system would integrate and concisely summarise all relevant and important research evidence about a clinical problem and would automatically link, through an electronic medical record, a specific patient’s circumstances to the relevant information. The user would then consult the system—in fact, be reminded by the system—whenever the patient’s record was reviewed. The information contained in the system would be based on an explicit review process for finding and evaluating new evidence as it is published and then reliably updated whenever important new research evidence became available. Thus, clinicians and patients could always have the benefit of the current best evidence. The system would not tell decision makers what to do—those judgments would require integration of the system’s evidence with the patient’s circumstances and wishes, the skills of the nurse, and the resources available. Rather, the system would ensure that the cumulative research evidence about a patient’s problem was immediately at hand. Furthermore, to maximise speed of use, a short synopsis would be the user’s first point of interaction, although there would be links to summaries and then to original studies so that the user could delve as deeply as needed to verify the accuracy, currency, and details of the synopsis.

Current systems don’t reach this level of perfection as yet, but production models exist for parts of such systems. Electronic medical record systems with computerised decision support rules have been shown in randomised trials to improve the process, and sometimes the outcome, of care, but these cover a limited range of clinical problems, are not necessarily based on current best evidence, and are mainly “homebuilt” and thus not easily acquired in most practice settings.

Given that we have some way to go before current best evidence is integrated into electronic medical records, some excellent, but less developed systems are now readily available. For example, some electronic textbooks, such as UpToDate (http://www.uptodate.com), integrate evidence-based information about specific clinical problems and provide regular updating. Other services provide referencing, updating, and aggregated information services, such as WebMD (http://webmd.com), which is now connected to ACP Medicine (www.acpmedicine.com). Clinical Evidence (www.clinicalevidence.com) is another source with an explicit review process and integration of evidence about prevention and treatment for a broad and rapidly expanding array of clinical problems as diverse as changing smoking behaviour and treating venous leg ulcers and ear wax. It provides a model for the 4S approach to building information systems that are firmly based on underpinning studies, syntheses, and synopses. Clinical Evidence is also available on Ovid (http://www.ovid.com) as a separate title.

Although none of these systems are integrated with electronic medical records, they can be accessed through the same computers that run electronic records, so that one need not go to a remote location to find them. Unfortunately, connecting the right information to a specific patient’s problems requires that clinicians understand evidence-based care principles and that they apply some effort and skill in using the resources. Fortunately, emerging information systems reduce these burdens considerably.

**SYNOPSIS**
When no evidence-based information system exists for a clinical problem, then synopses of individual studies and reviews are the next best source. What busy practitioners have time to use evidence-based resources if the evidence is presented in its original form or even as detailed systematic reviews? Although these detailed articles and reviews are essential building blocks, they are often indigestible if consumed on the run. The perfect synopsis would provide...
A prototype for evidence synopsis for hand-held computers*

<table>
<thead>
<tr>
<th>Question</th>
<th>Study groups</th>
<th>Outcomes at 1–7 days (5 trials)</th>
<th>Weighted EER</th>
<th>Weighted CER</th>
<th>RBR (95% CI)</th>
<th>NNH</th>
</tr>
</thead>
<tbody>
<tr>
<td>In patients with acute respiratory tract infections, what is the efficacy and safety of antibiotics (compared with placebo) in curing infection and improving nasopharyngeal symptoms?</td>
<td>Experimental antibiotics (tetracycline, penicillin, ampicillin, amoxicillin, erythromycin, and cotrimoxazole) Control: placebo</td>
<td>General improvement</td>
<td>51.2%</td>
<td>52.5%</td>
<td>2% (–5 to 10)</td>
<td>NS</td>
</tr>
</tbody>
</table>

RRI (CI)

| Adverse effects | 9.7% | 3.6% | 82% (–25 to 340) | NS |

Conclusion: in patients with acute upper respiratory infection, antibiotics are no more beneficial in terms of general improvement than placebo and are associated with a non-significant increase in adverse effects.

*EER = experimental event rate, CER = control event rate, RBR = relative benefit reduction, RRI = relative risk increase, NS = not statistically significant; RBR, RRI, NNH, and CI calculated from data in article.
IS IT TIME TO CHANGE HOW YOU SEEK BEST EVIDENCE?

Compare the 4S approach with how you usually seek evidence-based information. Is it time to revise your tactics? If, for example, it surprises you that CINAHL and Medline are so low on the 4S list of resources for finding current best evidence, then this communication will have served a purpose: resources for finding evidence have evolved in the past few years, and searches can be much quicker and more satisfying for answering clinical questions if the features of your quest match those of one of the evolved services. This is in no way a knock against single databases such as CINAHL or Medline. They provide premier access routes to the studies and reviews that form the foundation for all of the other more specialised databases reviewed above. There are big rewards from becoming familiar with these new resources and using them whenever the right clinical question presents itself.

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Conflict of interest statement: Brian Haynes has direct or indirect connections with many of the evidence-based resources used as examples above, including ACP Journal Club (editor), Evidence-Based Medicine (co-editor), Cochrane Library (reviewer and former board member and Cochrane Centre director), Clinical Evidence (advisory board), and PubMed Clinical Queries (developer). These resources are used to illustrate the concepts in the paper; there are other, and perhaps better, examples.

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