Electronic primary care guidelines with links to Cochrane reviews—EBM Guidelines

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In Finland, guidelines have been used in primary care since the late 1980s to bridge the gap between research evidence and practice. From the very beginning, the electronic format has been the primary source for EBM Guidelines (EBMG). Although also published on CD and in print, the guidelines are currently mostly used via the Internet. Keeping more than 1000 guidelines up to date is a great challenge to the editorial group, and several methods are used to guarantee the quality. The Cochrane Library has become the most important source of information for the guideline producers and all Cochrane reviews relevant to GPs are summarized and linked to the guidelines. In this article we present our experience of producing the electronic guidelines for GPs, the methodology used, and data on the clinical use of these guidelines and their Cochrane links. We also discuss the barriers and facilitators to our process and present ideas for future development.

Keywords. Clinical decision support, evidence chain, evidence summary, practice guidelines, systematic reviews.

Introduction

GPs need to update their knowledge in a wide variety of clinical problems to be able to offer their patients the best available care. Clinical practice guidelines have been introduced to bridge the gap between research and practice. The practice guidelines can be defined as an attempt to distil a large body of medical expertise into a convenient, readily usable format.\textsuperscript{1} There is evidence that guidelines are effective in changing the process and outcome of care,\textsuperscript{2–4} provided that the implementation of guidelines into daily practice is successful.\textsuperscript{5,6}

Systematic reviews are the best available source of evidence for guidelines. The largest and most frequently updated collection of systematic reviews is maintained by the Cochrane Collaboration.\textsuperscript{7} In Finland, guidelines for GPs have been produced since the late 1980s and electronic format was chosen because it is more user friendly and easier to update than most print sources. The producers of EBM Guidelines (EBMG) have followed the development of the Cochrane Collaboration and worked in close cooperation with the Cochrane Library.

The aim of this paper is to describe the Finnish experience of electronic guidelines and especially the role of Cochrane reviews in this work. The first section covers the methods and resources of the guideline authoring process. The second section describes user perspectives of our guidelines based on effectiveness studies and logbook files. In addition we discuss the barriers and facilitators to our process and present ideas for future development.

Methods

History and background

The idea of EBM Guidelines emerged in 1987 from the apparent need for an evidence-based data source relating to the diagnosis and treatment of the wide range of diseases and conditions encountered by the GP.\textsuperscript{8} Dr Ilkka Kunnamo set up the editorial process in 1988 with the help of the Finnish Medical Society Duodecim, the scientific society of Finnish physicians. The first experimental version comprising twenty short guidelines on various topics was published in 1989. Since then, the collection of guidelines has grown steadily and comprises currently more than 1000 guidelines. In the
year 2000 we translated the guidelines into English and since then we have updated the Finnish and English versions simultaneously.

**Editorial process**

The members of the editorial team are experienced physicians, most of whom have clinical research background, and training in the critical appraisal of medical literature. The team meets twice a month and works in close cooperation with about 20 specialist coordinators and 300 authors. Although the editors draw from the expertise of specialists, the guidelines are intended to be used for unselected patients in general practice and outpatient departments. The key sources of evidence in EBMG are presented in Table 1.

The guidelines have two approaches: the symptom-oriented guidelines take up a variety of symptoms encountered by GPs; and the disease-specific guidelines include both common and rare health problems. The epidemiology of various conditions has been taken into account, and the diagnostic strategies have been adapted to general practice, keeping cost-effectiveness in mind.

**Updating**

Since the first electronic version was published in 1989, the contents of the source database have been updated regularly and we use several methods to guarantee the quality (Table 2). Over the years the guidelines have been reviewed extensively and even rewritten several times to include mounting evidence from systematic reviews and clinical studies, comments by external referees, and feedback from clinicians who use the database in their daily practice. Clinical questions from the users and editors serve as an important starting point for the revising. The guidelines are updated jointly by the editors of EBMG and by the authors and specialist coordinators. All amendments in the text are marked in red for the benefit of the user.

At present, the articles in EBMG are circulated to a group of external referees from both English speaking and other countries. The editors continuously review the contents of the most important English language general medical journals (New England Journal of Medicine, Lancet, JAMA, BMJ), and the contents of a number of other journals are checked regularly.

**Cochrane reviews and other sources of evidence**

The editors of EBMG have followed the development of Cochrane Collaboration from its beginning and cooperated closely with the publishers of the Cochrane Library, first with Update Software, and from 2003 with John Wiley & Sons Ltd. The main sources of evidence for the guidelines, i.e. the Cochrane reviews and DARE abstracts, are evaluated as they are published, and if they bear relevance to topics in EBM Guidelines they are abstracted as evidence summaries.

The recommendations in the guidelines are checked whenever new information is added to the evidence summaries, and if necessary, the recommendations are amended accordingly. All evidence cannot be linked directly to recommendations in the guidelines. Statements describing such evidence are collected under the subheading Related evidence. During editing and the peer review process some statements from the ‘Related evidence’ sections are included in the guidelines.

**Evidence summaries**

The special feature of EBM Guidelines are concise summaries of scientific evidence that are attached to the individual guidelines. These summaries are based on

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**Table 1** Key sources of evidence that are summarized and linked to EBMG

<table>
<thead>
<tr>
<th>Source Type</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Cochrane Library</td>
<td><a href="http://www.cochrane.org">www.cochrane.org</a>, <a href="http://www.thecochranelibrary.com">www.thecochranelibrary.com</a></td>
</tr>
<tr>
<td></td>
<td>Approximately 2000 systematic reviews on the effects of health care interventions</td>
</tr>
<tr>
<td>The DARE reviews</td>
<td>agatha.york.ac.uk</td>
</tr>
<tr>
<td></td>
<td>Also covered in Cochrane Library: Database of Abstracts of Reviews of Effects, systematic reviews assessed by the Centre of Reviews and Dissemination at York</td>
</tr>
<tr>
<td>The HTA reviews</td>
<td>Also covered in Cochrane Library: Health Technology Assessment reports</td>
</tr>
<tr>
<td>Clinical evidence</td>
<td><a href="http://www.clinicalevidence.com">www.clinicalevidence.com</a> published by BMJ Publishing Group, draws on evidence from various sources</td>
</tr>
<tr>
<td>Other EBM sources</td>
<td>Original articles and systematic reviews in clinical journals and clinical guidelines that collect and describe evidence systematically</td>
</tr>
</tbody>
</table>

**Table 2** The methods to guarantee the quality of EBM guidelines

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer review</td>
<td>EBM Guidelines are peer reviewed when published</td>
</tr>
<tr>
<td>Feedback from users and log file recordings</td>
<td>Feedback from users via Internet is used to improve the guidelines</td>
</tr>
<tr>
<td>Regular scheduled updates</td>
<td>The database of guidelines is continuously updated by specialty. All guidelines are checked yearly</td>
</tr>
<tr>
<td>Use of clinical questions</td>
<td>Editors use questions arising from clinical practice to search new evidence for guidelines</td>
</tr>
<tr>
<td>Continuous scanning of new evidence from the best available sources</td>
<td>The best sources (Cochrane Library, Clinical Evidence, best journals) are scanned systematically for new evidence summaries</td>
</tr>
<tr>
<td>Specialized editorial software</td>
<td>Editors work with an XML-based tailored editorial software</td>
</tr>
<tr>
<td>Qualified editorial staff</td>
<td>The editors are trained in critical appraisal and participate in guidelines methodology development</td>
</tr>
</tbody>
</table>
**Table 3  Example of an EBMG evidence summary**

Antibiotics versus placebo for the common cold and acute purulent rhinitis

Evidence summaries  
8.6.2004

**Level of evidence = A**

**Antibiotics are of no significant benefit in the common cold.**

Nine trials involving 2249 patients aged between two months and 79 years were included in a Cochrane review (abstract i, review i). The overall quality of the included trials was variable. People receiving antibiotics did not do better in terms of lack of cure or persistence of symptoms than those on placebo (odds ratio 0.8, 95% confidence interval (95% CI) 0.59 to 1.08). Only one study Taylor et al. (1977) specifically reported persistence of clear rhinitis with a small benefit to those on antibiotics. Two studies found a significant benefit for antibiotics compared with placebo for runny nose (clear) odds ratio 0.42 (0.22-0.78). Two studies also found a significant benefit in patients with sore throat odds ratio 0.27, 95% CI (0.10-0.74). Only one study reported work time lost with 22% of those on antibiotic treatment and 25% of those on placebo but this was not significant. Adult patients treated with antibiotics had a significant increase in adverse effects (odds ratio 3.6, 95% CI 2.21 to 5.89) while there was no significant increase in children odds ratio 0.90, 95% CI (0.44-1.82).

**Bibliography**


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**Table 4  Classification of the level of evidence**

<table>
<thead>
<tr>
<th>Code</th>
<th>Strength of evidence</th>
<th>Definition</th>
</tr>
</thead>
</table>
| A    | High                  | Further research is very unlikely to change our confidence in the estimate of effect  
Several high-quality studies with consistent results  
In special cases: one large, high-quality multi-centre study |
| B    | Moderate              | Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate  
One high-quality study  
Several studies with some limitations |
| C    | Low                   | Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate  
One or more studies with severe limitations |
| D    | Very low              | Any estimate of effect is very uncertain  
Expert opinion  
No direct research evidence  
One or more studies with very severe limitations |

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**Clinical use of the guidelines and Cochrane links**

**Clinical use of EBMG**

During the 1990’s the Finnish version of EBMG became recognised nationally. Either the CD version or the Internet version is used in practically all Finnish primary health care centres. The health centres and districts subscribe to Duodecim’s health portal that covers EBMG and most of the resources for the editorial work comes from the subscriptions. The 1000 core guidelines have been published in book format every two years, and more than 30 000 handbooks have been sold since 1992.

The use of EBMG has been studied. It has been shown that electronic guidelines can be retrieved rapidly enough to be used during primary care consultations, which is when they are most likely to influence treatment decisions. The users of guidelines reported finding the information they sought in over 85% of cases. Less experienced young physicians searched guidelines that dealt with common health problems while more experienced physicians searched information on rare but important conditions.

**Logbook data of the use of EBMG, evidence summaries and Cochrane reviews**

We monitor the log file recordings of used search terms and opened guidelines to meet the needs of the users. According to the log files, in October 2004, the guidelines in the Finnish version of EBMG were opened more than
150,000 times per month. There are approximately 17,500 practicing physicians in Finland of whom 4,000 are GPs. The GPs that use EBMG consult it, on average, three times per day.12

According to the log files, the largest number of searches are done on common primary care problems. The most used search terms in the first three months of 2004 include diabetes, asthma, hypertension, gout, UTI (urinary tract infection), diarrhea, fracture, anemia, chicken pox and migraine. The articles most often opened are listed in Table 5.

The evidence summaries have been placed in a separate database since June 2003. They are used to a lesser extent than guidelines but their use is steadily increasing (Fig. 1). In Finland, the Cochrane Library is provided to physicians by the same health portal as EBMG. We have monitored the physician use of the Cochrane Library in Finland since June 2003 and the use is increasing (Fig. 1).

**Table 5** The most popular opened articles in the Finnish version of EBMG from 1.1.2004 to 31.10.2004

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Number of openings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment of urinary tract infection</td>
<td>8224</td>
</tr>
<tr>
<td>Fractures of hand and wrist</td>
<td>7853</td>
</tr>
<tr>
<td>Lyme borreliosis</td>
<td>7752</td>
</tr>
<tr>
<td>Erysipelas</td>
<td>6377</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>5988</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>5912</td>
</tr>
<tr>
<td>Vertigo</td>
<td>5718</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>5624</td>
</tr>
<tr>
<td>Oral anticoagulation</td>
<td>5498</td>
</tr>
<tr>
<td>Vaginitis</td>
<td>5476</td>
</tr>
</tbody>
</table>

![Figure 1](image-url)  
**Figure 1** Number of evidence summaries and Cochrane reviews opened monthly via Internet in Finland from June 2003 to October 2004

**Discussion**

The logbook data proves that electronic guidelines are used by GPs in Finland probably more frequently than anywhere else in the world. According to user surveys the major reasons for this are that the guidelines cover a wide spectrum of problems, give practical advice, are easy to use and frequently updated. Easy and quick access are considered key elements for the usability of guidelines.14 The decision to link the guidelines to systematic reviews has guaranteed the quality of evidence and Cochrane reviews have become well known in our country because of the links and evidence summaries in EBMG.

Electronic information sources are more user friendly than print formats and are a suitable way to keep abreast of developments in medicine.15 The choice of electronic publishing format at the very beginning of the process was crucial for the editing of the Finnish guidelines. Physicians have problems with finding printed guidelines when needed,16 and the acceptance of guidelines via CDs and the Internet is high.17 The introduction of electronic guidelines was facilitated by the fact electronic patient records have been widely used since the 1980s.

There have been certain barriers and difficulties to producing this large collection of guidelines. Finland is a small linguistic area and writing guidelines for only approximately 4,000 GPs is economically onerous. The financial and collective support from the well respected Medical Society Duodecim has guaranteed the continuity of the work. Other facilitators include the high level of information technology in Finland and the uniform clinical culture, resulting from well-standardized medical education.

The editorial process has been built on enthusiasm and well-defined visions. The editors have mostly been practicing physicians with clear ideas of the information needs in clinical practice. There guideline collection is comprehensive enough to guarantee that relevant information is found at most searches, and that the guidelines give answers to specific questions, which is considered essential for the implementation of guidelines.18

We plan to index the evidence summaries on the basis of patient groups and diagnoses, interventions, and outcomes, so that each of these could be searched separately or in combinations in specific search fields. This will make the evidence summary database searchable for specific patient problems. The structuring of evidence summaries aims at facilitated or semi-automated updating from structured sources of evidence (such as the Cochrane Library), as well as flagging of new evidence from original studies.

Our vision of the ideal process of bridging the gap between research and practice is presented in Figure 2. We have started to build a decision support database that contains guidelines in computer-readable format. Reminders are created by a decision support engine, prompted by data from the electronic patient record. The reminders are
backed by the whole evidence chain, from guidelines to evidence summaries and further to Cochrane reviews.

The log files show that electronic guidelines are frequently used in Finland and that the reading rate of evidence summaries and Cochrane reviews is increasing. Whether this is accompanied by changes in clinical practice remains to be studied in further randomized controlled trials.

Declaration

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Conflicts of interest: all authors are editors of EBMG.

References


