

## **Developing a methodology, for an evidence-based assessment of diagnostic options for the identification of illness and disease, for the Clinical Evidence publication**

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### Key words:

Evidence-based medicine; Diagnosis; Publishing

### Full text:

## **Introduction**

Clinical Evidence (CE) is a publication from the BMJ Publication Group, based in London, U.K. It presents summaries of the best available evidence on treatments for over 200 different clinical conditions. It starts with a clinical question and information specialists then search and appraise the literature for relevant evidence (which is usually systematic reviews and RCTs). Each summary is updated on an annual basis.

Whilst the choice of treatment for any illness is an obvious area of clinical decision making, it is not the only one. Making a diagnosis can be straightforward but often it presents difficulties. It can be useful to know: which is the best test to rule in, or rule out a specific diagnosis, or the accuracy and/or reliability of different tests. There can also be differences in how conditions are defined. Areas such as mental health often have different criteria available for diagnosis, so it can be important to know which is the most appropriate to use.

The team at Clinical Evidence decided to explore the possibility of devising a pragmatic system for finding and evaluating the evidence regarding diagnostic questions, in a similar way to that done for treatments. We were interested to see if we could develop a diagnostic equivalent to CE.

## **Search strategy**

Initial work began on determining a suitable search filter for finding diagnostic studies. The CE information specialist team looked at the search filters already available and also devised three of our own. (One designed to be very sensitive, one specific and one a balance between the two). Each search filter was then tested against each other using an example search on deep vein thrombosis (DVT). The 'gold standard' set of relevant references were derived from the studies cited in systematic reviews on DVT diagnosis. For each search strategy, the total number of hits produced and percentage of gold standard references found were recorded.

The results showed that our example search strategy C (balanced between sensitivity and specificity) was suitable for use as a pragmatic filter to find diagnostic studies, finding most of the gold standard references, whilst not generating the greatest number of total references. Full details of this work have been published. (1)

Having done this initial work over 2001-2003, we updated the assessment, comparing our strategy C with that of any new diagnostic search filters that had been developed. For this analysis we used onychomycosis (fungal nail infections) as the test subject and took the 'gold standard' set of relevant references from all the search results combined together. Again we felt that our preferred search strategy performed well and was suitable as a pragmatic search filter to find diagnostic studies.

Example of Medline CE diagnosis study search filter combined with onychomycosis MeSH terms (for OVID system):

1. exp "Sensitivity and Specificity"/
2. (sensitivity or specificity).tw.
3. (predictive adj3 value\$).tw.
4. exp Diagnostic Errors/
5. ((false adj positiv\$) or (false adj negativ\$)).tw.
6. (observer adj variation\$).tw.
7. (roc adj curve\$).tw.
8. (likelihood adj3 ratio\$).tw.
9. exp Likelihood Functions/
10. or/1-9
11. \*Onychomycosis/di
12. exp Onychomycosis/
13. 10 and 12
14. 11 or 13

The filter only works effectively, when it is combined with the relevant subject terms, so that only studies focused on diagnosis of the appropriate clinical condition are found. Just using lines 1 to 10 to find diagnosis studies in general will generate extensive hits, it is the combination with the disease/illness terms, particularly line 11, (specifying the MeSH subheading of diagnosis) that produces the manageable volume of hits to be assessed.

Having decided on a suitable search strategy to use, we then moved on to using it in practice.

### **Pilot diagnosis project**

Four sample topics were chosen which covered both adult and child conditions and physical and mental health disorders. Topics chosen were common, where diagnostic errors are common and for which correct diagnosis affects patient

outcomes. The conditions selected were: heart failure, deep vein thrombosis, depression and attention deficit/hyperactive disorder.

The main aim of this project was to assess how to present the results of an evidence-based summary of diagnostic questions. In order to minimise the amount of literature that would have to be analysed, it was decided just to write the draft diagnostic sections based on systematic reviews only.

The searches therefore involved use of our CE diagnosis search filter, our CE systematic review search filter and the appropriate subject terms for the condition.

The following resources were searched from inception, to find relevant systematic reviews:

Medline

Embase

Cinahl

Psycinfo (if appropriate e.g. mental health topic)

Cochrane Database of Systematic Reviews

Database of Reviews of Effects

HTA database

TRIP database

Canadian Coordinating Office for Health Technology Assessment

Medical Services Advisory Committee

Agency for Healthcare Research and Quality

Alberta Heritage Foundation for Medical Research

Monash University Evidence Centre Reports

National Institute for Health and Clinical Excellence

Scottish Intercollegiate Guideline Network

The results were then initially appraised by an information specialist to identify those that were relevant, before being passed on to the author for more detailed analysis.

### **Presenting evidence-based diagnostics**

The authors of the diagnostic topic, went through the systematic reviews identified and assessed them in more detail for their quality and relevance. They then proceed to write up the information in a test format, to see how the results could be presented for electronic publication.

As well as text, it was decided to try a graphical representation (rather like a flow diagram) to allow an overview of the potential diagnostic decisions that could be made. This is known as an algorithm.

The algorithm provides a clear visual representation of the diagnostic pathway, designed to help users confirm a diagnostic strategy (perhaps while seeing a patient). Although the algorithm depicted will be based on the evidence, it may not be the only path to an accurate diagnosis. For instance, the evidence may not always confirm which test to do first, a d-dimer or a clinical prediction rule for DVT. Often in practice, multiple diagnostic tests are done simultaneously. In creating an

algorithm, we will use the research and clinical experts to describe a common diagnostic path, and to represent the process as clearly and simply as possible. Online, the steps of the algorithm will allow links (back and forth) to greater depth about clinical information and the research evidence.

The textual information on diagnosis consists of a general introduction, giving details of the condition of interest and the main diagnostic questions that arise. There is information on each diagnostic test discussed, consisting of a key message, more information about the diagnostic test or procedure itself, a statement on the quality of the evidence and then further details of the studies used in the evaluation. It has been designed to be a readable summary of the evidence, in a similar style to that used by Clinical Evidence.

### **Future developments**

At the present time work on each of the four pilot topics is being completed and the example presentation format is being reviewed and analysed through work with focus groups and market research.

The results of this work and general evaluation of the whole process, will inform how an evidence-based diagnosis product could be produced by Clinical Evidence. In any final version, full searches, detailed appraisal and peer review, would all form additional components. The aim will be to produce a practical equivalent to CE for diagnosis.

### **References**

(1) Vincent S, Greenley S, Beaven O. Clinical Evidence diagnosis: developing a sensitive search strategy to retrieve diagnostic studies on deep vein thrombosis: a pragmatic approach. *Health Info Libr J.* 2003 Sep;20(3):150-9.