Title

Assessing the effectiveness of medical therapies – finding the right research for each patient: Medical Evidence Matters

Presenter / author

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Abstract

The gap between how effective treatments for different medical conditions are seen to be and how effective they are proven to be remains tantalizing. Many information professionals and users perceive a need for information on the effectiveness of medical therapies that is supported by medical evidence from the research literature. This presentation describes the method used by Medical Evidence Matters, published by ProQuest, that enables researchers, clinicians, librarians, and decision-makers to assess therapy options by comparing outcomes from medical research. The presentation will explain how research data is extracted by the Medical Evidence Matters editorial team and presented in a set of templates that allow users to compare and contrast results from clinical trials and other research and to find the research that is relevant to specific patients.

Full-text

An important goal for many in the medical research community, medical practitioners, and those interested in evidence-based medicine is that the information, data, and outcomes held within the scholarly literature be analyzed more effectively, more systematically, and using more practical tools. One specific area where the ability to do this is important is the identification – and the validation – of the effectiveness of different therapies for specific medical conditions. This presentation is about how a web-based “evidence-based medicine search engine”, Medical Evidence Matters, supports researchers and practitioners in finding the evidence that validates the effectiveness of medical therapies – and how it does so in specific patient contexts and with special regard to the quality of evidence available.

Medical Evidence Matters (originally Evidence Matters) was a product created by Dr Ofer Avital and a team of medical doctors and librarians and now fully published by ProQuest.

What does Medical Evidence Matters achieve?

Medical Evidence Matters
• Helps the searcher to find the peer-reviewed research relevant to drug and other therapies

• Allows the searcher to compare therapy effectiveness for according to specific patient characteristics and relating to different potential outcomes

• Organizes relevant medical research into summaries, tables, and graphs so therapy options can be effectively assessed

• Enables the searcher to compare and contrast how effective different therapies are

*Medical Evidence Matters* search is based on PICO principles

In designing the Medical Evidence Matters interface, Dr Avital saw the opportunity to apply PICO principles to a web search interface. The creators of the PICO principles identified three essential factors – and one optional factor – to consider for when asking how research can support questions about medical therapies:

- **Patient** (and/or “problem”)
- **Intervention**
- **Comparison**
- **Outcome**

In Medical Evidence Matters, users create a search by specifying the disease state (the “patient / problem”) in question, the intervention, and the outcome being considered. In the search interface individual disease states, therapies, and outcomes are selected from drop-down and pop-up boxes.

For example, searchers can look to find:

• For **Diabetes Mellitus**, what is the effect of **Antidiabetic agents** compared by the outcome [levels of] **Plasma glucose**

  or

• For **Hypertension**, what is the effect of **ACE inhibitors**, based on the outcome **Systolic blood pressure**

And, where it is helpful, users can choose to compare the effectiveness of one therapy against another. For example:

• For **Breast cancer**, what is the effect of **Radiotherapy**, versus **Surgery**, compared by the outcome **Disease-free survival**
This is how the search on the effectiveness of antidiabetic agents for diabetes expressed by the outcome [levels of] plasma glucose looks:

Once a basic PICO search has been created, the user may apply additional advanced filters, such as: timing of outcome measurement, stage or classification of disease, sex, race, age range, blinding characteristics of the study etc. The advanced filters are context sensitive, so that for each clinical question the appropriate advance filters appear.

The advanced filters appear in this form (the specific template shown here being for treatments for breast cancer):

<table>
<thead>
<tr>
<th>Advanced Filters (optional):</th>
</tr>
</thead>
<tbody>
<tr>
<td>For best results, use only one advanced filter, and then further refine your search using the filters on the left margin of your results page.</td>
</tr>
</tbody>
</table>

### Timing of outcome measurement:
- 5 years

#### Patient Characteristics
- **Sex:** Female
- **Age range:** Older adults (40 to 60)
- **Race:** White or European or American or Caucasian

#### Disease Characteristics
- **Location of recurrence:** Local
- **Breast cancer TNM staging:** II
- **Menopausal status:** Pre-menopausal
- **Size of breast tumor / lesion:** T2

#### Study Characteristics
- **Type of research:** Randomized clinical trial
- **Name of countries in study:** USA
- **Declared interest by author(s) or pharmaceutical company:** Any
- **Blinding characteristics:** Double-blind

#### Article Characteristics
- **Year of publication:** Any
- **Publication Name:** Double-blind
  - Open-label
  - Single-blind
  - Unclear
Presentation of results

A Medical Evidence Matters results screen looks like this:

![Results Screen](image)

The results screen displays all results that meet the combination of disease state, therapy, outcome, and comparison selected. The screen displays the interventions applied, the study outcome, the number of participants, the timing of the outcome, and references. The results screen includes a link to an “article summary” (see below) and to a PubMed abstract for the article in question. Because the product is focused on comparing and contrasting the effects of different interventions, records are displayed for individual interventions, not for individual articles. Where more than one intervention is described in a research article, then more than one intervention will be included in the Medical Evidence Matters results.

An important feature of the results screen is that results are grouped according to the type – and level – of research / trial that they were found in. Findings from randomized clinical trials are grouped together as the highest level of evidence. Where relevant
literature exists that represents a lesser level of evidence – other experimental designs, cohort studies, case-control studies, case series, and/or case reports, users can choose to include or exclude search results from these sources.

**Article summary screen**

In *Medical Evidence Matters*, article summary screens offer visual representations of the information held within the database. The article summary screens show in tabular format the nature of the therapies under trial and the results from the trial, as here:

![Article summary screen](image)

The nature and extent of the research, as here:
The population studied:

*Why Medical Evidence Matters?*
Because every research question is different, and because every patient’s needs and circumstances are different, one of the most important aspects of Medical Evidence Matters is that it allows users to find the main body of research that is equivalent to the study or patient in question. For example, you can refine a search to find only articles relating to clinical trial patients who were in a specific age group, only research relating to patients with disease at a specific stage, only articles relating to studies carried out in a specific country or region, only articles relating to specific types of clinical trial, and so on.

Using traditional bibliographic search methods, researchers or clinicians who want to assess the effectiveness of alternative medical therapies might create MEDLINE search queries that show up thousands of research articles. Even if they are able to refine this search down to hundreds or articles, they may still have to spend hundreds of hours reading the research – including discarding many sources either irrelevant or only indirectly relevant to a patient or patient population in question. Equally they may not be able to be confident that they have found the research articles that are relevant in these ways.

Even when a researcher has found a set of research articles directly relevant to their therapy-based question, the task of assimilating, comparing, and contrasting the data within the articles is demanding and difficult to achieve.

To effectively assess the evidence before them, the searcher will need to extract data from the articles and to do so in some form that allows it to be effectively compared with data from the other research.

Medical Evidence Matters supports researchers by allowing them quickly and easily to filter in or out of their search results articles that meet – or do not meet – their own criteria. Medical Evidence Matters allows searchers to quickly find the – possibly quite small – set of research articles that squarely match the characteristics they are looking for.

Writing in Journal of the Medical Library Association, Donna Timm described how the real value of Medical Evidence Matters lies more in the ability to effectively find answers to questions about medical evidence than in the ability to create a set of relevant references:

Medical Evidence Matters “has been described as a ‘new generation online database’, meaning there has been a progression from manually searching indexes (such as Index Medicus) to searching the next generation of electronic (linear) bibliographic databases (such as MEDLINE and CINAHL). The electronic databases allow the user to search by keyword and retrieve a list of references and, in some cases, the full text; however, the
clinician must then sort through the articles, read the pertinent ones, critically evaluate them, and apply the results or answers to their patients.

The third-generation database … is a clinical knowledge management system … to retrieve the latest peer-reviewed research. The results or answers from the articles are synthesized into article summaries, tables, and graphs with links to the original references. The database provides users with the answers first and references second, focusing on the effectiveness, safety, and costs of therapy options and utilizing an evidence-based approach to searching the medical literature.”

**How is Medical Evidence Matters created?**

In creating new modules for Medical Evidence Matters, the key first task is to build sets of standardized templates that allow different disease states, therapies, and medical outcomes to be compared and contrasted.

Once the template is established, the editors must then identify the scientific articles which are suitable for inclusion in the database. ProQuest follows a strict regimen to identify content/articles that are within the scope of the Medical Evidence Matters database. The regimen includes searches run on PubMed and manual review of premier journals in the specialisms covered. This is done regularly to ensure that article coverage in the existing disease states is both comprehensive and timely.

As new research is published – and as new disease states, therapies, or outcomes are added – data is added to the appropriate template for inclusion in the database. Of course the presentation of data is highly varied across the research literature – in terms of method, style, and quality. Experience is required to capture suitable data points.

**What needs does Medical Evidence Matters meet?**

Needs supported by Medical Evidence Matters include:

**Clinicians**

- To find and quickly assess evidence for a specific therapy
- To find research directly equivalent to the needs of a specific patient – and to quickly dismiss research that is not relevant, or that was carried out on a population or with research features not relevant to that patient
- To consider – with a patient – the efficacy of individual therapies based on outcomes that the patient is concerned about

**Researchers**

- To source the articles most directly relevant to their therapy-based research
• To compare and contrast data points on a like-for-like basis across the literature
• To assess the relevance of patient-specific variables, eg age, eg treatment combinations, eg stage of disease to effective treatment
• To assess the quality of evidence available
• To identify related therapies and their effectiveness
• To assess clinical study design for relevant research

Students

To learn

• to use medical evidence in a way that is directly actionable
• to practise critical assessment – including assessing the scope and quality of research articles
• to establish whether care options are demonstrably appropriate to a specific patient
• to plan for care for patients given their individual needs and circumstances – ensuring that patients’ values and preferences are accounted for in their treatment and its consequences.

Reference