

Evidence-Based Medicine and the Cochrane Collaboration

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In the search for evidence supporting the daily decision-making process, a physician can access a range of sources: various textbooks, journals and a number of electronic databases. However, around 9 000 randomized controlled trials and over 2 million articles in more than 10 000 medical journals are published every year¹, illustrating the difficulty for even highly motivated physicians to keep up to date. An internist would have to read approximately 19 articles² every day in order stay informed with medical scientific progress.

Thus, it is not surprising that most clinical decision-making takes place on the basis of individual expertise³, which consequently has a negative influence on the transfer of new scientific findings into daily practice.

The term “evidence-based medicine” (EBM) was first used by Gordon Guyatt in the early nineties in the ACP (American College of Physicians) journal club. He was part of a group around David Sackett at the McMaster University in Hamilton, Canada. Recently a collection of tools to critically appraise medical literature for decision-making in clinical practice has been published⁴.

“Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence-based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.”³ This definition by Sackett describes explicitly that the concept of EBM relies on the combination of external information and personal expertise as well as the patient’s individual situation.

The application of evidence-based medicine takes place in 5 consecutive steps:

- 1.) Converting the need for information (e.g. about therapy) into an answerable question: Answerable means that it can be found in the established question-answer model and consequently makes literature retrieval possible.
- 2.) Tracking down the best evidence with which to answer that question: Sources include collections of systematic reviews and databases of original studies, such as Medline. The use of conventional textbooks will become less important, as their content rapidly becomes outdated⁵ and levels of evidence is often not critically assessed.
- 3.) Critically appraising that evidence for its validity (closeness to the truth), impact (size of the effect) and applicability (usefulness in our clinical practice): This is particularly crucial, when original studies are used. For example, it is necessary to assess whether the authors tried to minimize any bias (such as language or publication bias⁶). Different study designs, such as randomized controlled trials tend to be less biased.
- 4.) Integrating the critical appraisal with our clinical expertise and with our patient’s unique biology, values and circumstances.

- 5.) Evaluating our effectiveness and efficiency in executing steps 1-4 and seeking ways to improve them both for the next time: Self-evaluation can continuously improve the practice of EBM.

In reality, evidence-based medicine can be difficult to practice, as the retrieval and critical appraisal of original research is relatively time-consuming. For this reason, systematic reviews of original research are of importance; when applying the right methodology, systematic reviews summarize original studies, evaluate and analyze them for internal and external validity, ensuring a more complete interpretation of the results. Systematic reviews may or may not contain meta-analysis, a method to mathematically combine effect measures to increase the statistical power of the evaluated studies as a whole. As a result, existing medical knowledge is consolidated, and physicians can more quickly find a high quality overview to a specific clinical question.

In the field of systematic reviews, the international *Cochrane Collaboration* (CC) has become a major contributor. This non-profit organization, named after the British epidemiologist, Archibald Cochrane, consists of a network of physicians, statisticians, researchers and health professionals as well as patient groups. Fifty collaborative review groups coordinate the creation of systematic reviews in a variety of medical areas. All reviews can be found in the “Cochrane Library”⁷ on CD-ROM or online. The library, published quarterly, also contains methodological studies and a register of abstracts of more than 300 000 clinical trials.

The CC is coordinated by 13 Cochrane Centres around the world. The German Centre has been supported by the *Bundesministerium für Bildung und Forschung* (German Ministry of Research and Education) since 1998 and is the reference center for all German-speaking countries, as well as for Hungary and the Czech Republic.

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¹ I. Olkin, Statistical and Theoretical Considerations in Meta-Analysis, J Clin Epidemiol 1995:48, 133-146.

² Ellis J, Mulligan I, Rowe J, Sackett DL (1995) Inpatient general medicine is evidence based. Lancet 346:407-410

³ Sackett DL, Richardson WS, Rosenberg W, Haynes RB (1997) How to practise and teach EBM. Churchill Livingstone, New York.

⁴ G. Guyatt, D. Rennie (Hrsg.) Users' Guides to the Medical Literature. A Manual for Evidence-Based Clinical Practice (2002) AMA Press New York. Dies., Users' Guide to the Medical Literature. Essentials of Evidence-Based Clinical Practice (2002) AMA Press

⁵ D.L. Sackett, W.M.C. Rosenberg, J.A.M. Gray u.a., Evidence based Medicine: what it is and what it isn't. BMJ 1996;312, 71-72

⁶ Bias related to language selective retrieval or selective publication of trials reporting successful interventions.

⁷ Information on the Cochrane Library: www.update-software.com or Update Software Ltd, Summertown Pavilion, Middle Way, Oxford, OX2 7LG, United Kingdom, Tel. +44 1865 513902, Fax: +44 1865 516918, e-mail: info@update.co.uk.