Evidence-based health care

What is Evidence-Based Medicine?

The primary purpose of the English NHS is “… to secure, through resources available, the greatest possible improvement in the physical and mental health of the (population)”. To achieve this, decisions about the delivery and provision of healthcare are increasingly being driven by evidence of clinical and cost-effectiveness as well as systematic assessment of actual health outcomes.

Evidence-Based Medicine (EBM) is the process of systematically reviewing, appraising and using clinical research findings to aid the delivery of optimum clinical care to patients. Increasingly, purchasers are looking to the strength of scientific evidence on clinical practice and cost-effectiveness when allocating resources. They are using this information to encourage GPs and NHS trusts to adopt more clinically effective and cost-effective practices.

EBM forms part of the multifaceted process of assuring clinical effectiveness, the main elements of which are:

- Production of evidence through research and scientific review.
- Production and dissemination of evidence-based clinical guidelines.
- Implementation of evidence-based, cost-effective practice through education and management of change.
- Evaluation of compliance with agreed practice guidance and patient outcomes – this process includes clinical audit.

The logic behind EBM

To make EBM more acceptable to clinicians and to encourage its use it is best to turn a specified problem into answerable questions by examining the following issues:

- Person or population in question.
- Intervention given.
- Comparison (if appropriate).
- Outcomes considered.

For example: Is an elderly man given nicotine patches more likely to stop smoking than a similar man who is not?

Analysing information

In using the evidence it is necessary to:

- Search for and locate it.
- Appraise it.
- Store and retrieve it.
- Ensure it is updated.
- Communicate and use it.

Every clinician strives to provide the best possible care for patients. However, given the multitude of research information available, it is not always possible to keep abreast of current developments or to translate them into clinical practice. One must also rely on published papers, which are not always tailored to meet the clinician’s needs.

Forms of evidence

Evidence is presented in many forms, and it is important to understand the basis on which it is stated. The value of evidence can be ranked according to the following classification in descending order of credibility:

I. Strong evidence from at least one systematic review of multiple well-designed randomised
controlled trials.

II. Strong evidence from at least one properly designed randomised controlled trial of appropriate size.

III. Evidence from well-designed trials such as non-randomised trials, cohort studies, time series or matched case-controlled studies.

IV. Evidence from well-designed non-experimental studies from more than one centre or research group.

V. Opinions of respected authorities, based on clinical evidence, descriptive studies or reports of expert committees.

Critical appraisal

For any clinician, the real key to assessing the usefulness of a clinical study and interpreting the results to an area of work is through the process of critical appraisal. This is a method of assessing and interpreting the evidence by systematically considering its validity, results and relevance to the area of work considered.

The Critical Appraisal Skills Programme, based at the Oxford Institute of Health Services, helps health service professionals and decision-makers develop skills in appraising evidence about clinical effectiveness. Its process uses three broad issues that should be considered when appraising a review article:

- Are the results of the review valid?
- What are the results?
- Will the results help locally?

Meta-analyses

Sometimes research findings may contradict each other and obscure the true picture – this is particularly the case with small trials. However, by pooling together all the results of various research studies, the sample size can, in effect, be increased. This is known as meta-analysis.

Although pooling together the results of a number of trials will provide a greater weight of evidence, it is still important to examine meta-analyses critically:

- Was a broad enough search strategy used? MEDLINE, for instance, covers only about a quarter of the world’s biomedical journals.
- Do the results all or mostly point in the same direction? A meta-analysis should not be used to produce a positive result by averaging the results of, say, five trials with negative and ten trials with positive findings.
- Are the trials in the meta-analysis all small trials? If so, be very cautious.

Practical examples of EBM

EBM is not a purely academic or financial exercise – its implementation has major clinical implications that can save lives.

1. Deep vein thrombosis and pulmonary embolism

Deep vein thrombosis (DVT) of the lower limb and pulmonary embolism are major causes of death and disability; clinically recognised DVT and/or pulmonary embolism occurs in about 2/1,000 persons each year. It is estimated that postsurgical DVT and pulmonary embolism cost the NHS in excess of £200m each year. Despite the fact that the major risk factors for DVT (age, immobility and certain forms of surgery) are well known, only 46% of high-risk patients receive any form of perioperative prophylaxis.

Subcutaneous heparin has, in recent years, become the prophylactic treatment of choice for surgical procedures, based in part on the findings of a systematic review of the evidence. By comparing results from over 70 clinical trials of heparin, the authors were able to demonstrate a substantial benefit in patients undergoing general, orthopaedic and urological surgery. Based on this calibre of evidence, the Thromboembolic Risk Factors (THRIFT) Consensus Group recommends the following measures for prophylaxis:

All hospital inpatients: should be assessed for clinical risk factors and overall risk of thromboembolism; should receive prophylaxis according to degree of risk before discharge.

Low-risk patients: should be mobilised early.

Moderate- and high-risk patients: should receive specific prophylaxis; should be mobilised early.

Clinicians, units and hospitals: should develop written policies for prophylaxis; should include prophylaxis in clinical audit and patient care plans.

Efficacy of prophylactic methods: should be assessed in outpatients; more recently, studies have suggested that the use of low molecular weight heparin (LMWH) could be associated with an improved outcome, compared with unfractionated heparin. The higher unit cost of LMWH, however, means that healthcare purchasers have queried whether this benefit is real and its magnitude sufficiently great to warrant the additional investment.

A further systematic review has confirmed not only that LMWHs are effective prophylactic agents in postoperative thromboembolic disease but that they are significantly more effective in preventing DVTs than standard forms of heparin. Indeed, an economic evaluation of the use of one LMWH (enoxaparin) in elective hip replacement estimates that a net saving of £20 could be made for every patient treated prophylactically with the LMWH. This increased efficacy, combined with ease of administration on an outpatient basis, promises considerable savings in secondary care expenditure.

2. Influenza vaccination

Significant hospitalisation and 3–4,000 deaths are attributed to influenza each year in the UK. More than 85% of these deaths are people over 65 years, and in epidemic years the death toll is even higher. In addition, people with underlying chronic conditions are at higher risk of serious illness or death through influenza.

A comprehensive review, based on a comparison of 8,000 vaccinated and 20,000 unvaccinated patients, indicated that the influenza vaccine is highly effective and that cases of respiratory illness, pneumonia, hospitalisations and mortality were reduced by over 50% in institutionalised elderly people. It recommends that people over 65 should be considered for influenza vaccination and that, in particular, those with chronic disease and resident in nursing and residential homes should be targeted.

Sources of information

There are many sources of information to inform clinical practice, and a full reference pack has been produced by the NHS Executive. Some sources are listed here:

The Cochrane Collaboration

An international endeavour in which people from many different countries systematically find, appraise and review available evidence from randomised controlled trials (RCTs). There are two components of the Cochrane Collaboration: Cochrane Centres (currently ten worldwide) and Collaborative Review Groups. The UK Cochrane Centre issues four regularly updated databases on CD-ROM, available from BMJ Publishing; The Cochrane Database of Systematic Reviews.
priorities identified as part of the national advisory groups and implement the R&D regional office has a brief to set up the latest health technologies. Each group reports on the effectiveness of this group on Health Technology Assessment The NHS R&D Programme standing website.

Department of Health and on the DH NHS. Available to all through the A database of information about research and development projects relating to the National Research Register

– Effective Health Care bulletins, based on a series of systematic reviews and synthesis of research on clinical and cost-effectiveness.
– Effectiveness Matters bulletins, summarising the results of important systematic reviews of research on specific clinical topics.
– Systematic Reviews of Research Evidence – CRD reports.

The National Research Register A database of information about research and development projects relating to the NHS. Available to all through the Department of Health and on the DH website.

The NHS R&D Programme standing group on Health Technology Assessment This group reports on the effectiveness of the latest health technologies. Each regional office has a brief to set up advisory groups and implement the R&D priorities identified as part of the national programme.

The Centre for Evidence Based Medicine at the University of Oxford, the Clinical Effectiveness Group for Wales based in Cardiff and the Clinical Resources and Audit Group (CRAG) at the Scottish Office in Edinburgh provide advice on various effectiveness matters.

MEDLINE and EMBASE Electronic databases drawing data from key publications worldwide. Available at most medical libraries, on CD-Rom or via the internet.

An increasing range of journals and periodicals These include Bandolier, British Medical Journal, Journal of Evidence Based Medicine and Health Trends.

The National Primary Care Research and Development Centre Based in Manchester, this is a collaboration between the Universities of Manchester, Salford and York disseminating research on primary care policy and practice.

REFERENCES

New publications from the Observatory

Decentralization in health care
Edited by Richard Saltman, Vaida Bankauskaite, Karsten Vrangbaek
Open University Press, December 2006
352 pages
£25.99 Softback, £70.00 Hardback

This new book explores the capacity and impact of decentralisation within European health care systems. It examines both the theoretical underpinnings as well as recent practical experiences, and assesses the appropriateness of management processes within health systems for implementing a successful decentralisation strategy.

More information at http://www.euro.who.int/observatory/Publications/20070223_1

Mental health policy and practice across Europe
Edited by Martin Knapp, David McDaid, Elias Mossialos, Graham Thornicroft
Open University Press, December 2006
488 pages
£25.99 Softback, £70.00 Hardback

This new book maps the current state of policy, service provision and funding for mental health care across Europe, taking into account the differing historical contexts influencing the development of services and the ways in which they are delivered. A holistic approach is adopted, looking not only at mental health care services, but also at the influence of environmental factors such as housing, poverty, employment, social justice, and displacement on mental health.

More information at http://www.euro.who.int/observatory/Publications/20070209_1