

Evidence-Based Practice

One in a series of curriculum statements produced by
the Royal College of General Practitioners:

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[ACKNOWLEDGEMENTS]

This curriculum statement draws on national guidelines and policies, current research evidence and the clinical experience of practising general practitioners.

The Royal College of General Practitioners would like to express its thanks to these individuals.

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Editors:	Professor Steve Field & Dr Mike Deighan
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Created:	December 2004
Date of this update:	February 2009
Version number:	1.1
Previous versions:	1.0 issued January 2006, corrected and re-issued February 2007

Key messages

- Evidence-based health care means using scientific rigour to appraise evidence from a wide range of sources to best benefit the patient or delivery of health care.
- General practitioners must be able to provide each patient with information appropriate to them and their individual circumstances in order to help their decision-making.
- Knowledge of where and how to search for 'best evidence', the ability to appraise this evidence critically and decide whether it is applicable and if so, when, where and to whom.
- The skills learnt are applicable to the whole curriculum and should be integrated into all areas of clinical and managerial practice.

[INTRODUCTION]

Evidence-based medicine has been defined as 'the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients'.¹

Since it was brought to prominence by Sackett and colleagues in the early 1990s, evidence-based medicine has developed through all parts of health care. The term evidence-based medicine changed to evidence-based health care in the 1990s to reflect the importance of all types of research rather than just the quantitative research methodologies that the original term evidence-based medicine implied. The term evidence-based practice has now come into use to recognise the relevance of the discipline in clinical and managerial healthcare professions.

Rationale for this curriculum statement

International studies have shown that effective and informed primary care delivered by highly trained family doctors delivers care that is more cost-effective and more clinically effective than systems with a lower emphasis on primary care.²

GPs need to make efficient use of available resources for any user of the healthcare system, and therefore need to know how to find and apply best scientific knowledge that is relevant to that patient at the time they present in primary care. GPs need to be able to commission care and to understand how best to practise in their local healthcare system, so as to make the most efficient use of resources available.

Evidence-based health care as a discipline requires GPs to find the best evidence, subject it to critical appraisal, understand its relevance and application in specific circumstances, and then to communicate this knowledge appropriately and effectively both to individual patients as well as the wider healthcare team. In the pursuit of accurate decision-making, evidence should be taken from all sources: scientific papers (qualitative and quantitative), as well as narrative and clinical experience, appraised for its relevance, and then applied to patients, carers and doctors.³

The Sicily statement⁴ states that curricula delivering the principles of evidence-based practice (EBP) should incorporate the necessary knowledge, skills and attitudes of EBP into training and registration requirements and follow the 'five step model' (see Appendix 1).

1. Translation of uncertainty into an answerable question.
2. Systematic retrieval of best evidence available.
3. Critical appraisal of evidence for validity, clinical relevance and applicability.
4. Application of results in practice.
5. Evaluation of performance. (Some authors will take this step as a next stage, so that performance of not only the individual but the organization can be evaluated. i.e. four steps plus evaluation).

UK health priorities

General practice has always had a strong focus on individual care yet there is also a tradition of participation in national programmes for immunisation and screening. ~~Recently, frameworks for the care of chronic diseases have switched the emphasis from personalised care towards a more scientific approach.~~ have included a scientific rationale, aimed at enhancing the personalised care provided by the health service. Guidance from the National Institute for Health and Clinical Excellence (NICE), also includes an economic evaluation, often controversial, but as an attempt to provide best evidence for best available practice

[LEARNING OUTCOMES]

The following learning objectives relate specifically to the area of evidence-based practice and are applicable wherever the GP practises and wherever the specialty registrar (GP) trains in the United Kingdom.

This RCGP curriculum statement should also be used in conjunction with the *core* curriculum statement 1, *Being a General Practitioner*, and the other RCGP curriculum statements, particularly those in the section on *Personal and Professional Responsibilities*.

Core evidence-based practice competences

All GPs should be able to:

- Ask the 'right questions' following a consultation or query from a patient, to enable an efficient search to:
- Find the appropriate literature from the widest available sources
- Apply rigour in appraising the literature
- Place the answers in the appropriate context
- Demonstrate a knowledge of leadership, communication and management skills so as to instigate change in practice effectively
- Show an ability to design and initiate appropriate evaluation through research or audit.

NB: information on how this can be taught is given in the section 'Promoting Learning about Evidence-Based Practice'.

Primary care management

GPs should have the ability to:

- Demonstrate that they base their treatment and referral decisions on best available evidence
- Apply rigour to scientific research to decide whether evidence is applicable to the primary care setting and appropriate to the individual
- Demonstrate sufficient knowledge of the breadth of scientific evidence in order to provide the best information for the individual and his or her illness
- Use their knowledge of the 'best possible evidence' to inform a patient of the 'best possible' way to navigate the healthcare system.

Person-centred care

The GP should have the ability to:

- Demonstrate the skills to offer patients health choices based on evidence: so that an informed discussion can take place taking into account the~~with prioritisation based on the~~ patient's values and motivation
- Demonstrate an understanding that the efficacy of evidence-based interventions depends on concordance with agreed therapeutic aims
- Demonstrate the skills needed to enhance both lifestyle and therapeutic concordance
- Demonstrate an understanding of the opportunities offered by continuity of care and how a long-term relationship can be used to enhance evidence-based interventions
- Demonstrate an understanding of the importance of communication in deciding which evidence-based interventions are most compatible with the patient's values and priorities

- Demonstrate an understanding of how the doctor–patient relationship can be used to reconcile the patient’s personal objectives (which are values driven) and solutions to medical problems (which **should be** value neutral)⁵
- Demonstrate an awareness of the scarcity of evidence derived from a patient’s perspective
- Demonstrate an awareness that most evidence used in primary care is produced from studies that don’t include quality of life measures.

Specific problem-solving skills

The GP should have the ability to:

- Demonstrate awareness that a combination of evidence-based treatments is not always evidence-based in itself. Interactions between single interventions may increase or decrease efficacy⁶
- Demonstrate the ability to communicate risks and benefits in a way that is meaningful to patients.

A comprehensive approach

The GP should have the ability to:

- Demonstrate an understanding of what the limitations of evidence are in patients with chronic disease **or the very elderly (who are often excluded from trials)** in primary care:
 - there are no agreed definitions for chronic disease (e.g. asthma, heart failure, hypercholesterolaemia, depression), which makes applying best practice complex especially as GPs frequently deal with mild disease **or diseases in the very early stages, unlike research evidence, which often uses patients where the disease is established** (e.g. ~~When does someone become asthmatic? With a story of night cough? With a once-in-a-lifetime salbutamol inhaler or with an exercise challenge? Where is the cut-off?~~)
- Demonstrate an understanding that ~~with where there are~~ no agreed definitions, there are implications for the collection of epidemiological data for audit
- Demonstrate an understanding that **trials looking at therapeutic interventions may come most of the evidence used comes** from studies that exclude patients with significant co-morbidity⁷ (co-morbidity is a common reason for exclusion from randomised controlled trials (RCTs) and exclusion is not always justified).⁶

Community orientation

The GP should have the ability to:

- Demonstrate awareness that poverty is a common cause of poor health and poor health of poverty
- Demonstrate understanding of the dangers of health inequalities in applying evidence to minorities
- Demonstrate awareness that the majority of evidence-based guidelines do not include ethnicity or socio-economic status as risk factors ~~(see Appendix 2, page 13)~~.
- **Include the cultural values of the patient and his circumstances in the discussion**

A holistic approach

The GP should have the ability to:

- Demonstrate an understanding of the limitations of separating the scientific and non-scientific:
 - the GP must understand and accept a patient’s wish to approach his or her health (and illness) in a non-scientific way ~~(as individuals, we are all a mixture of our~~

inclinations to know why things happen; in some cases these lead us to seek explanations through science and sometimes we also use the deep seated cultural, philosophical and spiritual parts of our being to understand the world)

- the reality for patients is that they make their own choices on the basis of their own values and not on the basis of clinical efficiency or resource implications.⁸

Contextual aspects

The GP should have the ability to:

- Demonstrate awareness that evidence-based practice is in its infancy and for many decisions there are more unknowns than certainties. not merely searching for randomized controlled trials, and needs the practitioner to understand that not all questions have a directly available answer. Evidence may come from an RCT or may be from qualitative research or a narrative based paper depending on the type of question asked i.e. the art of the science of EBP is to look for the best available evidence and to use this to inform the discussion with the patient

Attitudinal aspects

The GP should have the ability to:

- Demonstrate understanding that patients frequently differ from their doctors in the value they attach to medical evidence. For example, for patients with atrial fibrillation, taking account of patients' preferences would lead to fewer prescriptions for warfarin than under published guideline recommendations⁹
- Demonstrate awareness of their own attitudes, values, professional capabilities and ethics, so that, through the process of reflective and critical appraisal, they are not overwhelmed by personal issues and gaps in knowledge.

Scientific aspects

The GP should have the ability to:

- Demonstrate understanding that evidence needs to be gathered from the most appropriate, rather than the most readily available source. GPs should be able to determine whether evidence presented to them is sufficient and rigorous enough to be analysed in the context of a patient.

[FURTHER READING]

Examples of relevant texts and resources

Architecture of health research

- Bowling A. *Research Methods in Health: investigating health and health services* Milton Keynes: Open University Press, 1998
- Creswell J. *Qualitative Enquiry and Research Design: choosing among five traditions* London: Sage, 1998
- Farmer R, Miller D, Lawrenson R. *Lecture Notes on Epidemiology and Public Health* Oxford: Blackwell Science, 1996
- Liamputtong Rice P and Ezzy D. *Qualitative Research Methods: a health focus* Milton Keynes: Open University Press, 1999
- Silverman D. *Qualitative Research Theory, Method and Practice* London: Sage, 1998

Critical reading

- Bland M and Peacock J. *Statistical Questions in Evidence-Based Medicine* Milton Keynes: Open University Press, 2001
- Clarke R and Croft P. *Critical Reading for the Reflective Practitioner* London: Butterworth Heinemann, 1998
- Critical Appraisal Skills Program. www.phru.nhs.uk/casp/casp.htm
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- Dawes M, Davies P, Gray A, Mant J, Seers K, Snowball R. *Evidence-Based Practice: a primer for healthcare professionals* London: Churchill Livingstone, 1998
- Glaziou P, Irwig L, Bain C, Colditz G. *Systematic Reviews in Health Care: a practical guide* Cambridge: Cambridge University Press, 2001
- Greenhalgh T. *How to Read a Paper* London: BMJ Books, 2001
- Kirkwood B. *Essentials of Medical Statistics* Oxford: Blackwell Science, 1998
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- Roberts R. *Information for Evidence Based Care* Oxford: Radcliffe Medical Press, 2001
- Strauss S, Richardson WS, Glaziou P, Haynes RB. *Evidence Based Medicine. How to teach and practice* London: Churchill Livingstone, 2005

Ethics and philosophy

- Beauchamp T and Childress J. *Principles of Biomedical Ethics (5th edn)* Milton Keynes: Open University Press, 2001
- Campbell A, Gillett G, Jones G. *Medical Ethics (3rd edn)* Milton Keynes: Open University Press, 2001
- Magee B. *The Story of Philosophy* London: Dorling Kindersley, 1998

Change management

- Department of Health. *Patient and Public Involvement: a brief overview, 4 November 2004*, www.dh.gov.uk/PolicyAndGuidance/OrganisationPolicy/PatientAndPublicInvolvement/InvolvingPatientsPublicHealthcare/InvolvingPatientsPublicHealthcareArticle/fs/en?CONTENT_ID=4000457&chk=V44bEb

- Leger AP and Walsworth-Bell JP. *Change Promoting Research for Health Services* Maidenhead: Open University Press, 1999
- Lofts Hills A, Harvey G, Rycroft-Malone J, *et al.* Getting evidence in practice: the role and function of facilitators *J Adv Nurs* 2002; 37(6) (March): 577-88
- Mittman BS, Tonesk X, Jacobsen PD. Implementing clinical practice guidelines: social influence strategies and practitioner behaviour change *QRB Qual Rev Bull* 1992; 18(12): 413-22
- Moulding N, Silagy C, Weller DP. A framework for effective management of change in clinical practice: dissemination and implementation of clinical practice guidelines *Qual Health Care* 1999; 8(3): 177-83
- Prochaska JO, Velicer WF, Rossi JS, *et al.* Stages of change and decisional balance for 12 problem behaviours *Health Psychol* 1994; 13(1): 39-46
- Rogers EM. *Diffusion of Innovations* London: Free Press, 1983

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[PROMOTING LEARNING ABOUT EVIDENCE-BASED PRACTICE]

Promoting good practice

Core knowledge and skills should be used throughout the course, so that the discipline of understanding evidence is not seen as a dry academic subject, but as a central part of being a GP who understands the needs of the patient, society and the NHS. We suggest the use of a developed framework to answer questions derived as part of problem-based learning groups or to develop future GPs as they present subjects to their peer group, using an experiential learning cycle to develop good practice.

Learning could include:

- A core course to develop skills and explore areas of development
- Work-based learning in other clinical areas: using a strategy for facilitators to encourage critical questioning of clinical and management ideas, and their relevance to general practice
- Non-work-based learning in the development of portfolios, reflective learning and CPD strategies.
- Using a case-based journal group to look at the evidence and its applicability in context.

The following questions could be used as a way of working with evidence-based practice during training.

Proposed curriculum

1. The architecture of health research (and its application to family practice):

- What is research? How can it inform practice?
- Quantitative research: observational, controlled trials, cohort studies, case studies, etc.
- Qualitative research: case studies, phenomenology, grounded theory, ethnography, meta-ethnography, discourse analysis and narrative methodology
- Evaluation and action research: design and integration of multiple methodologies
- Research in the management of change: using evidence from within and outside health care.

2. What makes a good piece of research?

- Revision of basic statistics, defining narrative and systematic reviews
- Introduction to parametric and non-parametric statistics: a guide to why these are used. A look at diagnostic and screening statistics
- Relevance of research to practice: is the right question being answered? Is it relevant to the patient in front of you?
- Critical reading: developing a framework to assess and understand research papers efficiently. A look at critically assessing local guidelines.

3. Finding the research:

- How to ask the right questions

- Using multiple databases
- Evaluation of reviews (journal and web-based)
- Developing an individual database to underpin continuing professional development (CPD)
- What makes a good review or summary article on a subject?

4. Putting research into practice:

- Designing your own studies: understanding research ethics, application of appropriate statistics, appreciation of the importance of negative results
- Audits: using research to set standards and implement changes
- Evaluating your research: was it worth it and does it work?
- Understanding pharmaceutical marketing and the necessity for a critical review of the information
- Research ethics and the philosophy behind these and current UK best practice (Research Ethics Committees).

5. Change management:

- How can you integrate your findings so that they are most useful for the patient, his or her family and the team?
- Team dynamics and implementation: how to develop a change in practice and user-friendly guidelines, developing a team approach to implementation and policy
- How to implement changes outside the immediate organisation: looking at the wider NHS; good and less good examples; national strategies
- Budgeting for change management: time and financial considerations.

Curriculum ethos – promoting good practice

~~Core knowledge and skills should be used throughout the course, so that the discipline of understanding evidence is not seen as a dry academic subject, but as a central part of being a GP who understands the needs of the patient, society and the NHS. We recommend the use of a developed framework to answer questions derived as part of problem-based learning groups or to develop future GPs as they present subjects to their peer group, using an experiential learning cycle to develop good practice.~~

~~—Learning could then include:~~

- ~~• A core course to develop skills and explore areas of development~~
- ~~• Work-based learning in other clinical areas: using a strategy for facilitators to encourage critical questioning of clinical and management ideas, and their relevance to general practice~~
- ~~• Non-work-based learning in the development of portfolios, reflective learning and CPD strategies.~~

[APPENDIX 1]

The Sicily statement on evidence-based practice

This statement was conceived by the delegates at the second international conference of Evidence-Based Healthcare Teachers and Developers held in Sicily in September 2003 (Signposting the Future of EBHC). The proposed statement was developed at the conference, all delegates were sent a further questionnaire and the statement published in 2005. Eighteen professions allied to health from 18 countries were represented in the consensus document.

The change in the name from EBM or EBHC to EBP was suggested to reflect the benefits of the discipline of entire healthcare teams and their organisations. The Sicily statement endorses the five steps of EBP; from the original statement in 1992 (for evidence-based medicine), most of the steps have now been subjected to trials of teaching effectiveness.⁴ The steps are:

1. Translation of uncertainty to an answerable question
2. Systematic retrieval of best evidence available
3. Critical appraisal of evidence for validity, clinical relevance and applicability
4. Application of results in practice
5. Evaluation of performance.

Many teachers in EBP will use this step as an additional section, thus promoting a more comprehensive evaluation of the effect of the change.

The statement goes further to suggest that:

'it is a minimum requirement that all practitioners understand the principles of EBP, implement evidence based policies, and have a critical attitude to their own practice and to evidence. Without these skills and attitudes healthcare professionals will find it difficult to provide best practice. Teachers, commissioners, and those in positions of leadership will require appraisal skills that come with higher training and continued use.'

The authors point out that the most difficult step ('step 0') is to get students and colleagues to recognise uncertainties.

[APPENDIX 2]

Sharing evidence: respect for autonomy and informed patient choice

Evidence-based practice must include the use of evidence in the discussion between practitioner and patient as well as the use of evidence in informing clinical judgment.

— One of the criticisms of evidence-based medicine in the primary care setting is that many of the data are from clinical trials based in secondary or tertiary care, carried out on highly selected patients according to strict exclusion criteria. Results from such trials may produce convincing evidence that is highly persuasive to both practitioners and patients making decisions about care. The impact of convincing results in controlled clinical trials may, however, be attenuated when the treatment or intervention is applied to a broader group of patients in a primary care setting, where multiple pathology may be common and adherence to treatment regimens is less than in a controlled trial. An honest assessment of how well the intervention will work in the reality of primary care will be more relevant to the patient considering treatment.

— The hierarchy of evidence currently used in evidence-based medicine may, cause further problems. Randomised controlled trials are seen as the gold standard for evidence in health care. Other research methods such as observational studies and qualitative research carry less weight when evidence is evaluated to inform individual practice or guidelines. Randomised controlled trials are often not appropriate, however, for answering research questions in primary care. The complexity of disease presentation and management interventions in primary care means that it may not be feasible to conduct a high quality RCT for many conditions. Most RCTs use outcome measures that have been designed to be easily quantifiable and amenable to statistical analysis. This is so even when more patient relevant outcome measures such as disability scales and quality of life measurements are used. Qualitative research that informs the development of RCTs or provides an alternative or complementary approach to answering the specific research question is becoming recognised as a valuable component of research in primary care.

— Presentation of headline results without interpretation, or provision of complex statistical information, can result in confusion or lack of understanding on the part of both practitioners and patients. The use of relative rather than absolute risk reductions in reporting research results may mislead patients if it is not placed in the context of their current level of risk. This will not enhance patient autonomy.

— Evidence-based medicine should contribute to patient centred care but not override it. If biomedical research evidence takes its place with other forms of evidence such as patient experience and clinical judgment, patient autonomy should be enhanced. There is a danger, however, that in their enthusiasm for evidence-based medicine clinicians may replace the paternalistic mantra of 'doctor knows best' with the paternalistic mantra of 'the evidence knows best'.

— We have so far assumed that the enhancement of patient autonomy by the appropriate use of evidence-based medicine in the provision of information to patients is a good thing. An interesting consequence of empowering patients to make their own health care decisions, or to actively share in the decision-making process, is that patients will then have some responsibility for the consequences of their decisions. All research findings have an element of uncertainty in terms of their application to individual patients. A success rate of 70% for a treatment means a failure rate of 30%. In making a decision to try a particular treatment one accepts that the treatment may fail and that there may be side effects. If patients expect and are expected to make these decisions, then the burden of responsibility for accepting the uncertainty will also fall on them. It is unclear whether the transfer of this uncertainty from clinician to patient will be of benefit or harm.

Equity

Medical research, particularly the 'gold standard' RCT, is much more common in the area of drug interventions. This is partly because the pharmaceutical industry is a major source of research funding. Other interventions, including the more complex interventions often required in primary care, are less likely to have received the attention of well funded research, and thus less likely to have robust evidence of clinical and cost effectiveness. If [Primary Care Organisations] prioritise allocation of resources to those interventions that are supported by good quality evidence, some groups of patients will be disadvantaged. Evidence based medicine would increase inequity between these groups.

— Implementation of evidence based medicine is aimed at individual clinical decision making or service provision at a population level for specific diseases. It does not address inequities in health status resulting from factors other than disease, such as ethnicity and social class. It is possible that inequity could be increased by implementation of evidence based medicine if these more complex determinants of health are not considered. Mortality rates for heart disease are greater in some ethnic minorities and social groups, but the evidence based guidelines for the primary prevention of coronary heart disease do not include ethnicity or socioeconomic status as risk factors. Applying the guidelines across the whole population may lead to greater inequity between these groups. Primary care [organisations] are expected to deliver health care sensitive to the needs of their local population, and reducing inequity is regarded as an important goal. This may not be consistent with decisions based only on evidence of effectiveness and efficiency.

Source: Slowther et al.⁷ (edited). A, Ford S, Schofield T. Ethics of evidence based medicine in the primary care setting J Med Ethics 2004; 30(2): 151-7.7 Reproduced with the kind permission of BMJ Publishing Group.

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[APPENDIX 23]

Types of evidence: POEM AND DOE

A study addressing quality-of-life issues, mortality and morbidity is called a POEM, for *patient-oriented evidence that matters*. Studies classified as POEMs deal with patient *outcomes* and may lead physicians to alter their patterns of practice.

A study addressing factors such as organ function or biochemical levels in the blood deals with *disease-oriented evidence* and is called a DOE. Our knowledge and understanding of aetiology, prevalence and pathophysiology is enhanced by the DOE study.

'Is this article a POEM or a DOE?'

Asking the question: 'Is this article a POEM or a DOE?' is fundamental. A great deal of the medical literature focuses on DOE studies. An example of a DOE study (one that deals with changes in organ systems, blood levels or investigative procedures) can be drawn from the cholesterol debate, which also illustrates the fundamental difference in the approach to patients used by family physicians and specialists.

The *cardiologist* focuses on the effect of cholesterol-lowering agents and their impact on the LDL or serum cholesterol, and the reduction of cardiac event rates. These changes are DOE, although one could argue that a reduction of cardiac event rates falls between a POEM and a DOE. In contrast, the *GP* is focused on longevity and quality of life and, in jargon, 'all-cause mortality' (POEM).

The table provides a series of examples of POEM outcomes, outcomes of studies that would be intermediate between a POEM and a DOE, and study outcomes on the same topic that would be DOE.

	DOE	Intermediate	POEM
<i>Cholesterol lowering</i>	Lower serum cholesterol	Reduced cardiac events	Improved all-cause mortality
<i>Consuming a low-fat diet</i>	Lower serum cholesterol	Improved self-esteem	Improved life expectancy
<i>Hormone replacement therapy</i>	Increased bone density	Reduced risk of fractures	Improved life expectancy and quality

Source: Rosser and Shafir.¹⁰

POEMs have to meet three criteria

1. They address a question that we face as physicians.
2. They measure outcomes that we and our patients care about: symptoms, morbidity, quality of life and mortality.
3. They have the potential to change the way we practice.

The POEM concept was developed by Professors David Slawson and Allen Shaughnessy, educators in family practice in the United States.¹¹

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- ⁶ Van Weel C and Knottnerus JA. Evidence-based interventions and comprehensive treatment *Lancet* 1999; 353(9156): 916
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- ⁸ Lockwood S. 'Evidence of me' in evidence based medicine? *BMJ* 2004; 329(7473): 1033-5
- ⁹ Protheroe J, Fahey T, Montgomery AA, Peters TJ, Smeeth L. The impact of patients' preferences on the treatment of atrial fibrillation: observational study of patient based decision analysis commentary: patients, preferences, and evidence *BMJ* 2000; 320(7246): 1380-4
- ¹⁰ Rosser W and Shafir M. *Evidence-Based Family Medicine* Hamilton: BC Decker, 1998
- ¹¹ Shaughnessy AF, Slawson DC, Bennett JH. Becoming an information master: a guidebook to the medical information jungle *J Fam Pract* 1994; 39(5): 489-99

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