

# expert voices

Essays on Trends,  
Innovative Ideas and  
Cutting-Edge Research  
in Health Care

## Evidence-Based Medicine

A paradigm shift is underway in health care. It will change medical practice in the years ahead.

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In his classic work, *The Structure of Scientific Revolutions*, Thomas S. Kuhn introduced the concept of paradigm shifts: initially quiet, yet eventually monumental changes in thinking that forever change the practice of a particular science.<sup>1</sup> Copernicus — with his heliocentric model of the solar system, Watson and Crick — with their discovery of the double-stranded structure of DNA, and Harvey — with his discovery of the circulation of the blood — all changed the way we see the world and the way we live in it. For many reasons, and in many sciences, old frameworks for seeing and solving problems give way to new ones.

That kind of change is taking place in medicine. More and more, clinicians are moving from hand-me-down to evidence-based medicine; that is, from using time-honored but unproven practices in clinical decision-making to using the most valid and reliable scientific information available.

The key words here are *valid* and *reliable*. It's not that science *isn't* a part of everyday practice today; it is. But the science most physicians use has not

been subjected to the rigorous scrutiny demanded by evidence-based medicine. A clinician may use a particular treatment, and the patient may get better. However, that improvement could be the result of factors other than the treatment — such as the illness running its natural course or a patient's individual circumstances.

It is equally important to recognize that clinicians apply research to everyday decision-making differently depending on their education, training, experience and even personality. That is part of the "art" of medicine, and it is very important, but it is *not* the science.

Health care can and must do better. We need to know that cause (a specific treatment) and effect (improved outcome) are linked. And we need to know that we can consistently rely on this cause-effect link.

That this cause-effect link has been

missing in day-to-day practice is not the fault of clinicians. Until recently, solid scientific evidence for many treatments often just didn't exist. In fact, the principles governing such evidence didn't even emerge until 1948 when the first randomized controlled trial (RCT) was performed. An RCT uses various methods to ensure that results of medical research are as free from bias and confounding factors as possible. Other scientific methods have also emerged to test the effectiveness of various medical treatments.

### Six Principles of Evidence-Based Medicine

- **Demand high levels of evidence at all decision-making points.** Whether the evaluation of a treatment, a decision to cover it, or a decision to try it, all participants, including patients, must ask the same basic question: what is the level of evidence?
- **Question the validity, applicability of evidence to the circumstances.** What works in one case may not be relevant to another. Evidence-based medicine is an on-going assessment of what works, what doesn't work, when, where and why.
- **Understand that the lack of evidence that a treatment is effective is not the same as evidence that it is ineffective.** Just because the research hasn't been done does not mean that a service or treatment is not effective. Public and private resources are needed to develop this missing evidence, lest only those that consider themselves expert prevail.
- **Harness the power of information technology (IT).** Current emphasis on using IT for improving delivery of evidence-based medicine is important, but so is using it to improve collection, storage and retrieval of related data.
- **Borrow from successful industries.** Just-in-time inventory helps manufacturers quickly access parts without having to store them. Just-in-time medicine would give physicians immediate access to patient information.
- **Improve clinician-patient communication.** Physicians and patients must speak the same language. Having evidence that both parties understand works towards this goal.



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## Evidence-Based Care for America's Seniors \*

Median percentage of people (in populations identified) getting recommended evidence-based medical services and treatments. In an optimal system, all patients in the category should receive the same service unless they have a clinical reason to avoid it. In most instances almost all patients should get the service. Based on data from 50 states and the District of Columbia.

|   | MEDIAN | HIGH STATE | LOW STATE |
|---|--------|------------|-----------|
| Aspirin after heart attack within 24 hours  | 84%    | 97%        | 75%       |
| Beta blocker at discharge after hospitalization for heart attack  | 72%    | 93%        | 47%       |
| Warfarin (a blood thinning drug) prescribed for stroke victims who have atrial fibrillation (an irregular beating of the heart) | 55%    | 65%        | 42%       |
| Annual flu shot   | 66%    | 74%        | 54%       |
| Mammography at least every two years (women aged 52 to 69)  | 56%    | 66%        | 47%       |
| Eye exam at least every two years for people with diabetes  | 69%    | 80%        | 61%       |

\* All figures pertain to Americans aged 65 and over (Medicare beneficiaries). Data is based on a random sample of up to 800 fee-for-service (FFS) Medicare claims per diagnosis (heart attack, stroke, heart failure pneumonia, etc) in 1998–99 for each state plus District of Columbia and Puerto Rico. Mammography measure based on all Medicare claims, 1997–98, for women aged 52–69. Diabetes measure based on all FFS Medicare enrollees aged 18–75 with diagnoses of diabetes Jan–July 1998. Median percentage represents performance in the median state.

SOURCE: Stephen F. Jencks et al, "Quality of Medical Care Delivered to Medicare Beneficiaries: A Profile at State and National Levels," *Journal of the American Medical Association*, Vol. 284, No. 13. (October 4, 2000).

We are only beginning to accumulate evidence about the effectiveness of many treatments.

to the challenge. Many professional groups and private sector organizations are leaders in advocating evidence-based medicine and the Agency for Healthcare Research and Quality (AHRQ) is encouraging their work. AHRQ is building and disseminating evidence based research through its 12 Evidence-based Practice Centers; its seven Centers for Education and Research on Therapeutics; by producing technology assessments for government agencies; and through its National Guideline Clearinghouse.

But much greater involvement by the health care community is still needed. The basic principle behind evidence-based medicine — demanding a more valid and reliable basis for decision-making — applies to more than just clinical decision-making. We need the active participation of administrators, employers, insurers and policymakers as well as clinicians. We need to respect experience and expertise, but not accept the doctrines of those who would have physicians follow the lead of self-proclaimed experts and authorities, whose assertions often lack the strength of scientific evidence. We need to move away from "eminence-based" medicine, and toward evidence-based medicine.

Paradigm shifts aren't easy transitions to make. Ultimately, however, the winners will be the nation's health care and the public's health. We have a front row seat to a change in medical practice that will substantially improve the delivery of health care, but we all need to be advocates for that change.

## Notes

1. Kuhn TS. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1970.
2. Leviton, LC, Goldenberg, RL, Baker, CS, et al., "Methods to Encourage the Use of Antenatal Corticosteroid Therapy for Fetal Maturation," *Journal of the American Medical Association*, 1999;281:46-52.
3. "The Future of the Internet in Health Care," Institute for the Future, Conference Release, January 1999, p. 30.
4. Tanenbaum, SJ. Evidence and Expertise: The Challenge of the Outcomes Movement to Medical Professionalism. *Academic Medicine* 1999;74:757.

This brings us to a key point about evidence-based medicine. In establishing cause-effect linkages, there isn't always a "best" way. Therefore, we should remain open and creative about the research methodology we use and opt for the one that best suits the circumstances.

But why then has the concept of evidence-based medicine not made more headway into the medical mainstream?

First, we are only beginning to accumulate and assess solid scientific evidence about the outcomes and effectiveness of medical care. At any given time, there may be an abundance of research about a particular treatment, but direct comparisons with other treatments are still too rare and often non-existent.

Second, even once this evidence becomes available, it can take years for it to be used in everyday clinical practice. For example, even though studies had shown that use of corticosteroids reduced infant mortality and disabilities in pre-term babies, the drugs were underutilized. It wasn't until a study that our

agency sponsored found ways of promoting this research that usage actually increased.<sup>2</sup>

This time lag in applying what we know to what we do occurs primarily because clinicians don't have time to keep up with the accumulating research. According to one recent study, doctors in general medicine would have to read an average of 19 articles a day to keep pace with new developments in their field.<sup>3</sup> More practically, doctors need immediate access to evidence that pertains to their patients.

Finally, a principle fundamental to all transformations applies here as well: change is never easy. In the case of paradigm-shifting, that change is particularly formidable. Why alter the old ways of doing things when they seem to work? The shift to evidence-based medicine is demanding because it not only requires doctors to reassess what they've taken years to learn, it also requires that they learn it in new ways. As one expert recently put it, evidence-based medicine "challenges medicine as a profession by disputing what and how physicians know."<sup>4</sup>

The good news is that medicine is rising