

Evidence-Based Medicine: Ready for Prime Time?

Charles F. Willson, MD, and G. Hadley Callaway, MD

The authors elected to take separate viewpoints

New and Better

Charles F. Willson, MD

“Evidence-based medicine is most recently defined as the integration of the best research evidence with clinical experience and patient values.”¹ As a busy clinician for the past 25 years, I’ve become accustomed to the science of uncertainty and to making timely decisions based on incomplete evidence. But I’ve yearned for a way to know that my diagnostic and therapeutic approaches reflected state-of-the-art pediatric care at that moment in time. Most textbooks when published are already two years behind current knowledge. Continuing Medical Education (CME) courses certainly helped to update my knowledge base, but often left gaps in how to implement the best approach being described. Hospital or phone consultations with pediatric subspecialists were helpful, but the specialist I needed at that moment may not be available for hours or days. The movement toward a systemized analysis of the research evidence and development of practical care guidelines for common or more rare clinical problems (i.e., evidence-based medicine) has the potential to meet this significant need of busy primary care clinicians.

Under the old medical care paradigm, when an infant presented acutely to my office with a serious, but uncommon, diagnosis such as septic arthritis, I’d arrange admission to the hospital. Hectically trying to remember the teachings on septic arthritis of our pediatric infectious disease experts during my residency years, 1974 through 1980, I’d quickly consult a general textbook of pediatrics published about ten years earlier. I’d hurriedly write orders that included diagnostic studies prior to antibiotics, intravenous antibiotics, orthopedic consultation, and pediatric infectious disease consultation. If I were really uncertain about what to do, such as whether to have the orthopedist tap the

joint or have a radiologist tap it under ultrasound guidance, I’d call the consultant for a recommendation. This process might take 20–40 minutes. All the while patients continue to arrive for care at the rate of four to six per hour. As I entered the next exam room, I’d fret about the serious decisions I’d just launched and wondered if I had met “best-practice” standards.

But things are changing. Spurred by the national Institute of Medicine report, *To Err is Human*,² reporting that 98,000 deaths occur yearly in our hospitals due to preventable medical errors, our profession has been called to action. We must improve our systems of care. These mortality statistics don’t even address how many hospitalized patients might have received

“The practice of medicine is an art, based on science. Medicine is a science of uncertainty and an art of probability”

—Sir William Osler

substandard care. In the companion report, *Crossing the Quality Chasm*,³ the Institute of Medicine Recommendation Number 8 calls for the Secretary of the United States Department of Health and Human Services to be given “the responsibility and necessary resources to establish and maintain a comprehensive program aimed at making scientific evidence more useful and accessible to clinicians and patients.” Fortunately, the evolution of computer technology and the Internet will make such a massive effort feasible. Our medical school students and residents have also changed. They are computer literate and savvy. We medical school faculty are encouraging them to search the Internet for evidence-based articles relevant to their patients, and many now turn to the computer for help instead of the aging textbooks on the clinic shelf.

Charles F. Willson, MD, is Clinical Professor of Pediatrics at the Brody School of Medicine, East Carolina University. He can be reached at willsonc@mail.ecu.edu or Brody 3E139, 600 Moye Boulevard, Greenville, NC 27834. Telephone: 252-744-2535.

G. Hadley Callaway, MD, is an orthopedic surgeon in Raleigh, NC. He can be reached at HCallaway@raleighortho.com or Raleigh Orthopaedic Clinic, 3515 Glenwood Avenue, Raleigh, NC 27612. Telephone: 919-781-5600.

Not only will the computer software allow us to access the latest information about a particular clinical problem, I hope the Institute of Medicine will link these sites to a data warehouse that will allow the patient's admission data and eventual outcome to be recorded. That way, we would have an on-going study of the clinical effectiveness on all the patients we treat with a particular diagnosis. Although time-consuming, this feedback on outcomes could be the price we physicians pay for having evidence-based medicine at our fingertips. Of course, in all these activities, patient confidentiality must be maintained. Physician-specific information would be protected under peer-review laws.

Now, when I admit a patient to the hospital, I ask the resident on the pediatric ward to do a quick diagnosis-specific search to see what recent articles may answer our clinically relevant questions. Medication dosages are easily accessed on a personal digital assistant (PDA) linked to the ePocrates^{®4} web site. Evidence-based medicine is becoming a reality. I'm left with a few extra, precious minutes to practice the art of medicine, sitting with the parent, holding her hand, and answering her tearful questions.

But, there are bumps in the road. Dr. Onady who authored the chapter on evidence-based medicine in our textbook, *Pediatric Hospital Medicine*,¹ has testified in a malpractice trial where the defendant physician used an evidence-based approach to treat a patient who subsequently suffered a poor outcome.

The plaintiff alleged that the physician's care deviated from the community standard and won. Progress is rarely painless.

The future for our physicians in training is truly exciting. Instead of trying to remember what Dr. Willson taught her about managing a 15-month old with fever and a swollen joint, the new physician will turn to her laptop computer. In seconds a pediatric web site will appear that outlines a recently updated algorithm for diagnostic work-up and management of septic arthritis in a child. Perhaps the data will even be age, sex, and ethnically specific. A comprehensive differential diagnosis list may provide much of the value of a specialty consultation. Within seconds, the pediatrician will have ordered a hospital admission, ultrasound-guided arthrocentesis, blood culture, complete blood count (CBC), and pathogen-specific antibiotics. OOPS! The computer screen flashes that the child is allergic to penicillin, and a substitute antibiotic is suggested. The physician then has time to answer the mother's questions and allay fears. The mother knows that her baby's doctor has used the latest medical information in developing the care plan. As the mother carries her child to the hospital, she'll stop first at the radiology suite for the joint tap and the orthopedist consulting will have the fluid analysis when he arrives on the ward to see her. The pediatrician goes into the next exam room with a mind uncluttered by doubts and questions about the crucial decisions she has just made.

Osler would be relieved and proud.

Approach with Caution

G. Hadley Callaway, MD

The new "evidence-based medicine" has a somewhat arrogant name, as though the rest of healthcare is "opinion-based." I would be careful not to throw out the baby with the bathwater.

I hesitate to throw out the "opinions" I was taught in medical school and orthopedic training. My teachers taught from all the evidence that was available, supplemented by their clinical experience. During training we used Medline and critically reviewed the literature. We had lots of evidence, but not randomized controlled studies for every treatment.

In my specialty of orthopedics, the "evidence-based medicine" is surprisingly limited. Very few surgical treatments have been evaluated in randomized controlled studies with comparison to sham surgery or to each other. As an example, consider the difficulty in randomizing a humpback child to scoliosis surgery or not.

If I only used "evidence-based medicine," my scope of practice would be tiny. My standard treatment for back or joint pain might be: "There is evidence that acetaminophen will reduce your pain score, but nothing else to offer." I have ePocrates[®], but that is no help in this situation.

I am also wary of sudden changes in the medical "evidence." Witness the Atkins[®] diet craze. Should my mom have been taking Premarin[®]? Within orthopedics there are a hundred "scientifically"

supported fads that come and go. Many published and unpublished studies are controlled by industry. This is why most doctors do not change their practice based on the newest journal reports.

Finally, most of my life is guided by firmly held opinions based on limited evidence. What to study, whom to marry, which religion, how to raise the children—all are determined by opinion. Why should medicine be so different?

So How Should We Deal with "Evidence-Based Medicine?"

First, tell the public that evidence-based medicine is not new. Physicians have always relied on scientific evaluation of treatment alternatives, but the quality of studies is constantly improving. We have been using computerized literature searches of Medline since the 1980s. We were taught in medical school to critically analyze the literature. Statistics were part of the pre-med and first year curriculum. Most of us update our practice according to monthly journal reports.

Second, let's change the name to "medicine with a constantly updated computer reference." The whole movement owes its existence to the Internet. Either the reference will pop up when I enter orders at the hospital, or I will need to carry it in my pocket. You cannot practice according to the voluminous and changing evidence-based guidelines without an Internet device.

Third, recognize that evidence-based medicine is just the

X-generation reviewing and rewriting the information base. Remember how crude and mistaken the medical evidence was before the baby boom rewrote it last generation? The term "evidence-based medicine" is inflammatory and misleading; it should be abandoned. I would suggest "medicine based on randomized trials," which acknowledges that the rest of medicine has a good foundation in evidence also.

Fourth, tell everyone that updating our information will take a long time. During the transition we must work with a blend of old and new information. Don't let Medicare or insurance companies deny or limit coverage for valuable treatments because they are not yet supported by randomized controlled studies which constitute the best "evidence." Misuse of guidelines by third-party

payers may harm more patients than the guidelines help.

Fifth, get familiar with the guidelines. Before they are accepted as dogma, they deserve scrutiny by practicing physicians. Guidelines that conflict with common sense should be reviewed. Areas that need study should be identified. As journal articles are published, their effect on guidelines should be considered. Over time, the guidelines will increasingly restrict our treatment options, so they had better be good. Whoever controls the guidelines will control medical practice.

Finally, use the guidelines as a crutch. I have a hard time keeping up with journal reading. The Cochrane guidelines are like Cliff's (or Spark) Notes, although chapters covering most of my practice are still missing! **NCMJ**

REFERENCES

- 1 Pediatric Hospital Medicine, Lippincott Williams and Wilkins, 2003, p. 18.
- 2 Kohn LT, Corrigan JM, Donaldson MS (Editors). To Err is Human: Building a Safer Health System. Institute of Medicine, The National Academies, 2000. Washington, DC. p. 1.
- 3 Crossing the Quality Chasm: A New Health System for the 21st Century. Committee on Quality of Health Care in America. Institute of Medicine. National Academy Press. Washington, DC. 2001. p. 14.



is a grass-roots organization providing ...

SUPPORT

EDUCATION

ADVOCACY

... for the families and friends of people with serious mental illness,
and for persons with serious mental illness.

North Carolina's Voice on Mental Illness

Helpline 800-451-9682

Free information, referrals
and support for families
coping with mental illness

309 West Millbrook Road, Suite 121
Raleigh, North Carolina 27609
Telephone 919-788-0801
Facsimile 919-788-0906
<http://www.naminc.org>
mail@naminc.org

Evidence-Based Medicine: A Clinical Case Scenerio

Charles F. Willson, MD

The first patient of the morning

The young mother is clearly worried as she relates that her nine-month-old daughter, Kaylee, started running a fever last night. She gave an appropriate dose of Tylenol and checked on her throughout the night. The fever waned initially, but is now back with a vengeance: 104.4F. When she changed the diaper this morning, the child cried in pain as she moved the left leg. The left knee was swollen and warm. The Tylenol dose this morning did little to relieve the pain and fever.

As a pediatrician, I know the diagnosis of septic arthritis is fairly certain. But, it has been several years since I initiated care for a child with septic arthritis, and, over a practice lifetime (25 years), I'd probably made the initial diagnosis only a dozen or so times. Thinking back to my resident days, I try to recall the teachings of my honored mentors. ("What would Floyd Denny have done?") Clearly, I'll admit the child to the hospital, get someone to tap the joint for cell count and culture, and begin intravenous antibiotics. But questions begin crowding my thoughts. **Should I ask the orthopedist to tap the joint or should I have a radiologist tap it under ultrasound guidance?** In this era of immunization against Hemophilus influenza group B, **what antibiotics should I start, and at what doses?** I remember seeing an article from the Centers for Disease Control and Prevention in the *Journal of the American Medical Association* last month that talked about *Kingella kingae* as an emerging cause of septic arthritis in children. I'd never heard of *Kingella kingae* and meant to look it up. **Is it a new pathogen or one of the old ones now renamed?** I don't even know if it is a gram positive or gram negative bug. **What antibiotic would cover it? What are the chances that the baby will have a damaged hip, or make a full recovery?** As the questions come, so do the patients. I need to call the hospital and have the patient admitted. Fortunately, we have pediatric residents who can take over

and call radiology, orthopedics, and pediatrics infectious disease. (My colleagues in more rural practices don't have these resources.) I'd like to sound knowledgeable as I instruct the resident, but I don't know the current literature, and the next patient is waiting.

I take the mother's hand, explaining that her daughter has an infection of the knee that can be quite dangerous. Hospitalization, study of the joint fluid, and intravenous antibiotics for many days will be necessary. Tears begin rolling down her face. "We have wonderful specialists who will help us with Kaylee's care," I tried to reassure her, but I was certain that the worry on my face spoke louder. Her questions start to come. **How long will Kaylee need to stay in the hospital? Will her knee be ok? Is it dangerous to stick a needle in a baby's knee? Do the antibiotics have side effects? How did she get this infection?** I reassure her that I'll be over to the hospital at lunch time to answer all these good questions, but we needed to get Kaylee over to the hospital now to start treatment. As I enter the next exam room, I hope that I'll be finished with my morning patients in time to get over to the hospital to check on Kaylee.

I feel an irony that the vast fund of medical knowledge is inaccessible when a busy clinician needs it the most. When a baby presents with a septic arthritis or any other major infection, the clock is ticking. The opportunity for an optimal outcome is hanging in the balance. Evidence-based medicine with its guidelines, decision trees, and clinical care paths will bring the state-of-the-art, up-to-date information to the finger tips of the front-line practitioner, even in the remotest of setting.

Not only must we embrace evidence-based medicine, we must go the extra mile and ask that all physicians who use these tools report the outcomes of their patients. Precious information that would strengthen our knowledge base is being lost every day. Am I concerned about losing some autonomy as a practitioner? It's a small price to pay to benefit Kaylee.