

data analysis — are combined with that of the practicing community, access to large numbers of patients being treated under “real world” conditions.⁴

The responsibility, the opportunity, and the challenge

The hallmark of any health care profession is the pursuit of excellence. Inherent in that ideal is the process of measuring results using the best science available and continually striving to advance the state of clinical practice. Outcomes assessment has become an important tool in that process and thus should be viewed as a fundamental responsibility of our specialty. Active participation in outcomes assessments not only provides the opportunity to evaluate and improve clinical practices, but also can facilitate assessment and improvement of nonclinical factors, such as patient compliance and health plan design, which can

have a significant impact on health. Our challenge is to find a way to utilize the resources of both our academic and practicing communities in a collaborative manner to support our joint professional goals. Practice-based networks represent a promising approach toward that end.

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“Scientific Inquiry”—A new course in evidence-based practice

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As editor of the *Journal of Dental Research*, Colin Dawes asks, “Should dentists be doing what dentists do?” The answer, of course, depends upon evidence that what we do is beneficial. If basic science knowledge, theory, or chair-side experience points the way to a therapy, and if clinical research substantiates the utility of that therapy when measured in health outcomes, then evidence supports the clinician. After all, patients and dentists alike seek to maximize their interaction by doing what is best in terms of health and satisfaction at an appropriate expenditure of time and money.

What is the status of evidence-based practice in dentistry? Health services researcher Jim Bader reviewed variability in dentists’ clinical decision-making and summarized the current status with the observation, “Information which a lay observer might assume to be the very bedrock of the dental profession all too often resembles quicksand.”¹

While dentistry, as a healing profession, is internally obligated to assure that its treatments are valid, external “drivers” of health system change, particularly third-party payers, increasingly require health care professionals to substantiate the value of their treatments. This is the status of our profession as its newest students join our ranks. This status, coupled with a commitment to teaching students how to become lifelong learners, promoted the development of “Scientific Inquiry”, a Harvard School of Dental Medicine course in evidence-based practice for first-year students.

The overarching course goal is to teach a systematic, methodological approach to evaluation of dental knowledge that seeks rationality, objectivity, and validity. The course prepares students for careers in den-

tistry that incorporate self examination and continuous professional development for the advancement of patient care.

“Scientific Inquiry” seeks to help students:

1. Understand the dual bases of dentistry: the art, or clinical experience base, and the science, or evidence base
2. Learn how to raise and formulate research questions that can validate or challenge clinical standards
3. Develop facility at using the scientific literature to evaluate existing knowledge
4. Understand the nature of associations (causality, bias, confounding and chance), and
5. Recognize common approaches to dental research as well as clinical reporting.

The course is divided into sections on clinical decision theory, scientific sources of information for clinicians, causality, ethics in research and practice, and clinical guidelines. Students complete two library projects involving extensive literature manipulation and interpretation to investigate the evidence behind common clinical practices.

“Scientific Inquiry” seeks to raise student awareness that the highest standards of professional practice arise from the most critical evaluation of what we clinicians do each day at the chair. By better understanding the evidence base of our professional ministrations and by learning to use evaluative skills to constantly assess that base, we encourage today’s students to become tomorrow’s thoughtful clinicians. We also recognize that the more our clinical treatments are evidence-based, the more we will be able to meet the challenges of health system change with information to substantiate the value of our work.

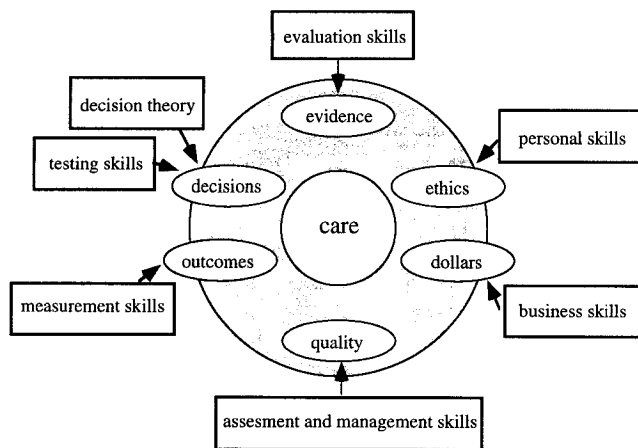


Figure. Map of six input components of dental care shown in the gray circle. These input components are supported by the skill and knowledge disciplines shown in rectangles.

A map (Figure) was developed to demonstrate input components of dental care arising from a variety of skills and knowledge disciplines. Students are encouraged to consider how the care they deliver to patients is impacted by six input components:

1. "Evidence" supported by evaluation and literature search skills
2. "Ethics" supported by personal/moral skills
3. "Financial considerations (dollars)" supported by business skills
4. "Quality considerations" supported by assessment and management skills
5. "Outcomes of care" supported by measurement skills
6. "Clinical decisions" supported by decision theory and testing skills.

Students are further encouraged to seek "life-long learning" in these underlying skills as they continuously improve the quality of care delivery to patients.

While the map provides a context for long-term skill

development, the course focuses short term on developing library skills necessary for evaluation of clinical evidence. Two projects actualize this goal. In one project students complete a qualitative exercise in which they identify a clinical dental procedure and use Medline search protocols to identify and retrieve at least one article from the refereed dental literature in each of the following categories: case report, laboratory experiment, clinical trial, epidemiologic study, guideline or protocol paper, and literature review, or meta analysis. Based on this cursory review, the student writes a statement summarizing the evidence associated with the topic and makes a recommendation to dental practitioners regarding the degree to which the literature objectively supports the procedure. Students also complete a quantitative exercise in which they construct a decision matrix based on data from a refereed journal. These 2-by-2 tables compare clinical diagnostic findings against gold standard diagnostic measures in order to identify false positive and false negative rates of the clinical test. Based on these tables, students calculate sensitivities, specificities, predictive values, and accuracy measures and develop written advisories to practitioners on the test's clinical utility.

These exercises provide learning experiences through which the abstract concept of evidence-based practice is translated into concrete activities of direct clinical relevance. It is our institutional goal that such activities will encourage students to actively incorporate objectivity into their current learning and future careers.

In sum, "Scientific Inquiry" is an attempt to heed G.V. Black's advice to dental practitioners. He stated clearly, "Professional life is an exhibit of helpfulness. This can be best accomplished by giving judicious and careful advice."

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The scientific basis for treatment and the Texas Medicaid experience

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This story begins on Sunday morning, October 1, 1995, when the front page of the *Houston Chronicle* was devoted to the first of a series of articles about the Medicaid system in Texas. The focus of the articles was the practice patterns of Texas pediatric dentists who were Medicaid providers. Large color photographs of two children who had died as a result of treatment by pediatric dentists were the lead-off for a story charging abuse, fraud, and lack of oversight in the Texas Medicaid system. A 3 1/2-year-old died as a result of sedation complications, and a 13-

month-old died during a general anesthetic in the hospital. The article claimed that the main perpetrators of the alleged fraud were pediatric dentists who were greedy and overused stainless steel crowns and behavior management codes. Pediatric dentists also were accused of using dangerous sedation and general anesthesia for their convenience. The reporter stated that authorities believe pediatric dentists "sedate children with potentially life-threatening drugs so that they can complete their work more quickly" and "put children in the hospital, under always-risky general anesthesia,