Evidence-Based Medicine: Educating Physicians in the Science behind the Art

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Evidence-based medicine (EBM) is the rational and judicious use of current best evidence from clinical research to care for individual patients. The practice of evidence-based medicine is based on the integration of individual clinical expertise with methodologically sound, clinically relevant published research. The skills relevant to practicing evidence-based medicine include precisely defining a patient problem or clinical question, proficiently searching and critically appraising relevant medical literature to decide whether, and how, to apply this information to the resolution of the clinical question and to future clinical practice. The University of Hawaii John A. Burns School of Medicine has taken a proactive approach in preparing students to practice evidence-based medicine with a curriculum that spans the entire medical education experience.

In their first year of medical school, students are introduced to basic, clinically-relevant statistical concepts. Health care problems in their problem-based learning (PBL) tutorials offer opportunities to learn about issues such as sensitivity, specificity, and characteristics of effective screening tests. The PBL process itself is consistent with the practice of evidence-based medicine, as it relies on identifying focused patient-relevant questions, searching appropriate resources for the answer, and applying this new information to the case in study. This concept is reinforced continuously in the evidence-based medicine curriculum.

In their second year of training, all students participate in evidence-based medicine seminars. Students are required to search independently for medical literature relevant to a clinical problem of their choosing. They appraise the validity of their references based on rules of evidence that are taught in the seminars. Students are also introduced to more sophisticated, clinically-relevant evidence-based medicine concepts such as the principles of epidemiology and biostatistics illustrated by two-by-two tables, likelihood ratios, and number-needed-to-treat.

The third-year of medical education puts additional emphasis on patient care experiences and developing clinical synthesis skills. Students learn to apply directly the concepts of evidence-based medicine to the care of their patients. All students participate in the Evidence-Based Medicine Seminar Series, a weekly seven-session experience developed and implemented by the Department of Medicine. Students review critical appraisal skills, apply these skills to real-life clinical questions on the patients they care for, and learn to present critically-appraised information to others in the concise and timely manner required by busy ward and clinic services. Several seminar sessions are dedicated to practical, hands-on laboratories which review the evidence related to history and physical examination findings for selected clinical problems. Students completing the seminar series have reported that they were more likely to use medical literature to support their clinical decision-making, to critically-appraise the articles they read, and to search the primary literature available on their patients' problems. They also felt that evidence-based medicine was a natural extension of the PBL process into the clinical years of training, and that their use of evidence-based medicine increased their sense of involvement in the clinical decisions made on their patients. Throughout their clerkship, students also have the powerful modeling experience of seeing medical residents and faculty applying evidence-based medicine principles on the hospital wards, in the clinics and in educational conferences.

The fourth-year medical school curriculum accommodates the career-differentiation needs of individual students. As an example, students interested in careers in internal medicine may enroll in a year-long seminar series offered by the Department of Medicine in which evidence-based medicine principles are reinforced and applied over a wide range of topics and educational activities. Prior to graduation, all senior students participate in a workshop entitled “Evidence-Based Medicine Survival Skills for Internship.” Important concepts are reviewed and small group, discipline-specific, evidence-based discussions of significant medical literature are held.

The University of Hawaii residency training programs continue to emphasize the practice of evidence-based medicine into the postgraduate residency training experience. Effective, rigorous learning activities are integrated into the curricula of the many of the training programs, including those in internal medicine, pediatrics and family practice residency training. These activities include formal didactic sessions and workshops, ambulatory care morning reports, journal clubs, bedside teaching rounds, and independent research projects which require the thorough, systematic review of available medical literature.

Workshops for interested faculty and community physicians have been held to promote further integration of evidence-based medicine principles into educational activities throughout the community. Workshops for chief residents from the various local residency training programs have focused on the skills and concepts required to teach evidence-based medicine to others, serving as the nidus for extension into a wide range of educational experiences such as journal clubs, morning reports, case conferences and board review sessions.

Evidence-based medicine is a premise central to medical education at that the University of Hawaii John A. Burns School of Medicine. A wide spectrum of activities, each building upon earlier experiences and integrated throughout the four-year M.D. program curriculum, ensures that graduates will incorporate principles of evidence-based medicine into the future of practice of medicine in our community.