

Practicing Epidemiology: How Competent Are We?

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At the end of the day, what is important in any line of work is the ability to do a job and do it well consistently. That is the basic ability we call competence. Formally, a competency is defined as a cluster of related knowledge, attitudes, and skills that affects the major part of one's job and can be measured against well-accepted standards and improved through training.¹ Competencies define a job, and the degree to which one can define those competencies also defines the ability to hire, train, and retain people in that position. Therein lies the rub; few jobs today readily lend themselves to clear, easily understood, and widely accepted measures of competence. The challenges are multiple, and the excellent efforts described in this issue of *Public Health Reports* to develop and use competencies in a single field of public health—applied epidemiology—are the early steps in a long process.

Epidemiology has been defined by one bard as “a public health science which claims to be different from all other forms of science by using the research model of (1) establishing a hypothesis, (2) testing that hypothesis, and (3) drawing a conclusion based on the result of the test of the hypothesis.”² The last sentence in the article by Birkhead et al.,³ which appears in this issue, begins to formulate the hypothesis “. . . will evaluate their [competencies'] utility and effectiveness as part of an ongoing process to update and improve them.” In addition, the early definition by Terris⁴ extended the definition of epidemiology to include not only etiologic research, but also surveillance, documentation of health disparities, and evaluation of health programs and policies. Our foundation of etiologic knowledge of causes has fostered “applied epidemiology,” which can be described on the basis of five core purposes that seek to (1) synthesize the results of etiologic studies to assess cause across a body of literature; (2) describe disease and risk factor patterns to set priorities; (3) evaluate public health programs, laws, and policies; (4) measure the patterns and outcomes of health care; and (5) communicate epidemiologic findings effectively to health professionals and the public.⁵

What is summarized in this issue resulted from vision, skepticism, initiative, dispute, persistence, and a passion for improving the health of the public. Persuading practitioners and teachers to focus on specific competencies and

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then agree on the priorities has been a challenge, but positive signs of concurrence are emerging. The article by Birkhead and his colleagues describes the results of that process,³ as does the development of core competencies for students completing a Master of Public Health degree, as described by Moser et al.⁶

Adopting principles that are effective (i.e., evidence-based practice) at the local, regional, state, national, and international levels also is a major endeavor. The majority of people working in public health practice have no formal training in public health. One of the main barriers to strengthening the epidemiologic workforce lies in the lack of available formal training, including continuing education, focused on core competencies.⁷ Efforts from New York in pursuing training in evidence-based public health emphasize the importance of focusing on local-level practitioners.⁸ The successful effort in Virginia to apply the competency model to the state and local workforce demonstrates the relevance of the competencies to public health practice.^{9,10} Obtaining agreement regarding competencies that were acceptable to epidemiologists at different tiers of training and practice was likewise a challenge.¹¹ Generalizability of competencies to multiple settings is crucial, and adaptability of the concept is demonstrated clearly in the development of a competency-based core curriculum for field epidemiology training programs in more than 30 countries.¹²

Given these groundbreaking efforts, the hardest part is yet to come: evaluating competency-based approaches. In other words, does it matter? Evidence indicates that health administration training programs using a competency-based approach are effective in increasing short-term knowledge and skills.¹³ However, more work is needed to evaluate the longer-term effects of competency-based training programs.

An important product of competency-based training is that it forces practitioners and teachers to think rigorously about what they do and what should be the measurable results of their efforts. Done well, such an evaluation effort facilitates employee development and improvement of training programs. This, in turn, enables one to know which people to hire, how to foster their growth and development after they are hired, and, in principle, how to assess job performance. In a flexible system, competencies will evolve as concerns change and technologies and knowledge are introduced. In short, competency-based training should ensure a competent, prepared, and sustainable workforce.

A major challenge to adopting competency-based learning and practice will be resistance by both universities and public health agencies to the changes

that will be required. Although this approach is logical, people will have to be convinced of the effort necessary to actualize these concepts, which includes deciding how these competencies will be taught, used, and measured. Then, training programs will have to deal with such realities as academic committees and accreditation. The Association of Schools of Public Health has recognized the need for competency-based education and for master's-level training that includes a meaningful practice experience. Similarly, public health agencies will have to deal with bureaucracies that include ever-evolving laws, rules, and regulations. Of course, everyone will deal with inertia and people who are too busy to change.

In the final analysis, however, the success of the effort to define and develop competencies in applied epidemiology will be measured by the degree to which practicing epidemiologists are competent, prepared, and able to succeed in their work.

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