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This special *Public Health Reports* supplement presents articles and commentaries on the theme of competency-based epidemiologic training in public health practice. Much of the epidemiology literature is focused on scientific, epidemiologic questions and their answers and, especially in applied literature, interventions based on science. Just as we epidemiologists strive to be rigorous in our science, so too should we be systematic and rigorous in our approach to ensuring a competent epidemiologic workforce. The articles in this issue of *Public Health Reports* underscore the importance of clearly defined competencies for workforce education and training, and the usefulness of competencies for facilitating dialogue between academic and practice communities.

The majority of this supplement pivots around a precedent-setting effort to define competencies for applied epidemiologists working in governmental public health agencies: Competencies for Applied Epidemiologists in Governmental Public Health Agencies (AECs). The article by Birkhead et al.<sup>1</sup> relates a competency-definition process that was systematic, representative, inclusive, and comprehensive. This process acknowledged the importance for the epidemiologic practitioner of stipulating competencies in multiple areas of public health practice, not just data collection and analysis, which are the heart of epidemiologic practice. This rigorous, thoughtful competency development effort is critical not only for the field of applied epidemiology, but also for the field of public health workforce development. In recognition of this, workforce development professionals participated as equal partners on the competency workgroup, as discussed in the article by Birkhead et al.

## USEFULNESS OF AECs IN PRACTICE

Moehrle, a local health officer in Idaho, comments on the importance of epidemiology and epidemiologists in the local public health workforce and the difficulties in recruiting and training these practitioners.<sup>2</sup> The Tier 1 epidemiologist, as defined in the AECs, matches well to the expected background and skills of a local epidemiologist, and Moehrle proposes that the AECs

are helpful for documenting the status of the workforce capacity and for providing a road map for training.

Thoroughman<sup>3</sup> and Crutcher<sup>4</sup> provide viewpoints from two state health departments—one as a Centers for Disease Control and Prevention (CDC)-assigned practitioner and one as a state health officer. Thoroughman comments on how well the AECs reflect the needs of applied public health, thus serving as a useful tool for discussions with academic partners who conduct training. Crutcher agrees; he particularly notes the importance of defining management competencies for epidemiologists for their career progression. He cautions, however, that the AECs should not be used as barriers to hiring; rather, he believes they are a key reminder and tool for health officers, given their own obligation to the development of their workforce.

The Patel<sup>5</sup> and Lichtveld<sup>6</sup> articles demonstrate the usefulness of the AECs for epidemiologic capacity assessment within an individual state and across the nation, respectively. Both describe how the AECs facilitated identification of baseline skill levels, as well as gaps.

Boulton et al.<sup>7</sup> map the AECs to their preventive medicine residency, one that is designed to develop public health physicians with a strong epidemiology background. They identify gaps in their Master of Public Health (MPH) training, particularly in the experiential or non-epidemiologic domains, underscoring the contribution of their practicum year to the education provided by the MPH during their program.

## IMPORTANCE OF COMPETENCIES FOR TRAINING

McNutt et al.<sup>8</sup> describe the efforts of the Association of Schools of Public Health (ASPH) to map the AECs to curricula in schools of public health (SPHs). They report, not surprisingly, that the AECs—with the in-depth definition of epidemiologic competencies—complement rather than duplicate the ASPH effort to define general competencies for all MPH graduates. They also note that the AECs map to domains other than just epidemiology and also to activities and experiences outside the academic environment. We anticipate that the AECs and the effort to map them to curricula will facilitate increased collaboration among SPHs and local and state health departments.

Ragan et al.<sup>9</sup> also emphasize the need for such

on-the-job learning programs as the CDC Epidemic Intelligence Service (EIS) (<http://www.cdc.gov/eis>); they describe their own Florida EIS, closely modeled after the CDC EIS. They state, however, that their program is intended to develop leaders, but they do not explicitly list any leadership competencies for the program. They mention the importance of demonstrating (for funders, especially) the impact of workforce development programs.

Traicoff et al.<sup>10</sup> emphasize the importance and utility of using a systematic process to design training. They believe a standard, rigorously developed curriculum is a useful starting point for international field epidemiology programs in different countries. However, Traicoff et al. emphasize, as does Maylahn et al.,<sup>11</sup> the importance of adapting training to local needs.

### IMPORTANCE OF EPIDEMIOLOGY TO NON-EPIDEMIOLOGISTS

The articles by Maylahn et al.,<sup>11</sup> Baseman et al.,<sup>12</sup> and Reid et al.<sup>13</sup> underscore the importance of epidemiology skills and defined competencies even for the non-epidemiologist. Maylahn et al. demonstrate how critical epidemiologic skills are to the non-epidemiologist in teaching evidence-based public health.<sup>11</sup> The University of Washington Northwest Center for Public Health Practice (NWCPHP) determined that its own epidemiologic competencies for non-epidemiologists are helpful in targeting training, especially when clients do not know what training they need.<sup>12</sup> Reid et al. built upon NWCPHP's competencies to target preparedness training, again largely for non-epidemiologists. Moser et al.<sup>14</sup> describe the process used by ASPH to define epidemiologic competencies for all MPH graduates, also emphasizing the importance of epidemiology for all public health students.

### SO WHAT?

Gelletlie's thoughtful commentary agrees with the importance of competencies for accountability and for defining professional standards.<sup>15</sup> However, she cautions against treating competencies as ends in themselves, rather than just means. She challenges us to avoid measuring achievement of individual competencies alone; rather, she urges us to examine and measure more holistically the achievement of complex competencies, including those that are behavioral.

Finally, Thacker and Brownson<sup>16</sup> laud the importance of these cutting-edge and critical efforts to systematize definitions of competency and of training outcomes. They underscore that the key impact of

competencies, however, will be in improvements in worker abilities. Do these competencies and associated trainings make a difference? We need to develop improved methods to evaluate whether we move from competencies to competence.

This exciting *Public Health Reports* supplement highlights critical strategic approaches to developing the applied epidemiologic workforce. Given the increased emphasis on performance measurement and accountability, these efforts to define workforce needs and to design workforce training and education offer important contributions to the field, not only for epidemiologists, but also for those who hire them, work alongside them, and train them. We hope that these efforts are used by others, that their utility is rigorously evaluated, and that the products are modified on the basis of evaluations or changes to practice. They should also be useful for any discussions of workforce certification and credentialing. Most importantly, however, we hope that these discussions provide a road map for improved competence of the epidemiologic workforce.

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