Developing Competencies for Applied Epidemiology: From Process to Product

Guthrie S. Birkhead, MD, MPH[a,b,c]
Jac Davies, MS, MPH[b]
Kathleen Miner, PhD, MPH[d]
Jennifer Lemmings, MPH[b]
Denise Koo, MD, MPH[e]

SYNOPSIS

Objectives. We developed competencies for applied epidemiologic practice by using a process that is based on existing competency frameworks, that engages professionals in academic and applied epidemiology at all governmental levels (local, state, and federal), and that provides ample opportunity for input from practicing epidemiologists throughout the U.S.

Methods. The model set of core public health competencies, consisting of eight core domains of public health practice, developed in 2001 by the Council on Linkages Between Academia and Public Health Practice, were adopted as the foundation of the Competencies for Applied Epidemiologists in Governmental Public Health Agencies (AECs). A panel of experts was convened and met over a period of 20 months to develop a draft set of AECs. Drafts were presented at the annual meetings of the Council of State and Territorial Epidemiologists (CSTE) and the American Public Health Association. Input and comments were also solicited from practicing epidemiologists and 14 national organizations representing epidemiology and public health.

Results. In all, we developed 149 competency statements across the eight domains of public health practice and four tiers of applied epidemiologic practice. In addition, sub- and sub-subcompetency statements were developed to increase the document's specificity. During the process, >800 comments from all governmental and academic levels and tiers of epidemiology practice were considered for the final statements.

Conclusions. The AECs are available for use in improving the training for and skill levels of practicing applied epidemiologists and should also be useful for educators, employers, and supervisors. Both CDC and CSTE plan to evaluate their implementation and usefulness in providing information for future competency development.

[a]Center for Community Health, New York State Department of Health, Albany, NY

[b]Council of State and Territorial Epidemiologists, Atlanta, GA

[c]School of Public Health, University at Albany, Albany, NY

[d]Rollins School of Public Health, Emory University, Atlanta, GA

[e]Centers for Disease Control and Prevention, Atlanta, GA

Address correspondence to: Guthrie S. Birkhead, MD, MPH, Center for Community Health, New York State Department of Health, Corning Tower, Room 1483, Albany, NY 12237-0658; tel. 518-402-5382; fax 518-486-1455; e-mail <gsb02@health.state.ny.us>.

©2008 Association of Schools of Public Health

Recent studies have demonstrated a substantial shortage of epidemiologists, particularly at local or state public health agencies.[1–3] In addition, up to one-third of epidemiologists practicing in state, local, or federal governmental public health agencies—referred to in this article as applied epidemiologists—may not have sufficient training to fully meet their responsibilities or to conduct more advanced work. For example, a 2004 survey by the Council of State and Territorial Epidemiologists (CSTE) reported that 29% of applied epidemiologists working in state health departments had no formal training or academic coursework in epidemiology.[1] The assessment indicated a need for additional training in certain key areas, particularly design of epidemiologic studies, design of data-collection tools, data management, evaluation of public health interventions, and leadership and management, depending on the respondents' current job description.

Development of educational and workforce competencies has a long history in the field of public health. In the early 1900s, the Flexner and Welch-Rose reports recognized public health as a discrete area of professional practice, with unique requirements.[4,5] From that time to the present, efforts have been made to define more specifically the precise content and skills within public health.[6] After the 1988 Institute of Medicine report, *The Future of Public Health*, which concluded that public health preparation and public health practice were disconnected, the subsequent *The Public Health Faculty/Agency Forum* recommended development of universal competencies for all public health professionals and specific competencies for those practicing as content area specialists (e.g., epidemiologists).[7,8] The resultant Council on Linkages Between Academia and Public Health Practice (COL) in 2001 adopted a model set of core public health competencies for all public health professionals that were organized across eight domains of practice.[9]

Rigorous definition of competencies for such a professional identity as epidemiology should result from an iterative process that involves representation of a broad spectrum of practitioners and academicians. The definition process includes identification of knowledge and skills associated with types of practice (e.g., entry level and advanced). The knowledge and skills are then formatted into competency statements that include both the content and proficiency level for each type of practice.[10,11]

In January 2004, the Centers for Disease Control and Prevention (CDC) and CSTE hosted a summit for leaders in epidemiology to address key workforce concerns affecting applied public health epidemiologists. Participants strongly supported the need to establish core competencies for these epidemiologists.[12] In October 2004, CDC and CSTE convened an expert panel to define Competencies for Applied Epidemiologists in Governmental Public Health Agencies (AECs) for local, state, and federal public health epidemiologists.

This article summarizes the approach to competency development for applied epidemiology—the first national effort to focus on competencies in the applied epidemiology field. Other efforts to date have focused broadly on public health or only on academic epidemiology.[9,13] Other key aspects of this effort included: (*1*) broad-based representation from state and local health agencies, schools of public health, private industry, and CDC; (*2*) integration of epidemiologic and workforce development expertise in the process; and (*3*) validation of the competencies by survey of practicing epidemiologists.

METHODS

Expert panel composition

An expert panel was assembled to develop the AECs. Every effort was made to make the group representative of government (federal, state, and local) and academia, and across subject areas of epidemiology (e.g., infectious disease, chronic disease, and maternal child health), educational backgrounds (e.g., physicians, veterinarians, doctoral epidemiologists, and nurses), and geographic location. Panel members were solicited from national organizations with an interest in public health education or applied public health, as well as national professional organizations in public health (e.g., the American Public Health Association [APHA], National Association of County and City Health Officials [NACCHO], Association of State and Territorial Health Officials [ASTHO], and the Association of Schools of Public Health [ASPH]).

Academicians as well as practitioners were included. The cochairs represented both applied epidemiology (one is a state health department-based epidemiologist) and academia/workforce development (one has a background in competency development). The final group had approximately 20 members, balancing the need for inclusiveness with having a group of practical size. Selected panel members were assigned additional responsibilities as reviewers and were remunerated for those additional efforts. An editor-writer with an extensive public health background was employed as a project consultant. The AECs expert panel first met in October 2004.

Definition of terms

Epidemiologist. A person who investigates the occurrence of disease, injury, or other health-related conditions or events among populations to describe the distribution of disease or risk factors for disease occurrence for population-based prevention and control.[12]

Applied epidemiologist. An epidemiologist who works in a governmental public health agency (i.e., an agency with a legal mandate to conduct public health activities).

Competency. The knowledge, skills, and abilities demonstrated by organization or system members needed to perform specific functions within organizations or professional practice.[14]

Competency domains. Eight competency areas contained in the Core Competencies for Public Health Professionals, developed by the COL (Figure 1), that apply to all public health professionals, including epidemiologists.[9]

Expert panel working group process

The panel conducted three in-person two-day meetings of the entire group in October 2004, March 2005, and May 2006. Multiple conference calls of the whole group and with selected subgroups were held between meetings, and report drafts were circulated for comment.

Before the panel's first meeting, the editor-writer consultant conducted a thorough review of the published literature, including a Web search, to identify any previously developed public health and epidemiology competencies. Existing sets of competencies in the public health field in English were summarized and arrayed in a matrix for ease of comparison. At the first meeting, the panel reviewed the background material and agreed to build the AECs within the framework of the COL competencies to facilitate consistency with the larger field of public health practice. Many of the AECs originated from the existing COL general competency set, but the panel modified them to reflect the particular needs of epidemiologic practice.

Figure 1. Competency domains of public health practice

Analytic/Assessment
Basic Public Health Sciences
Communication
Community Dimensions of Practice
Cultural Competency
Financial Planning and Management
Leadership and Systems Thinking
Policy Development/Program Planning

Source: Public Health Foundation. Council on Linkages Between Academia and Public Health Practice. Washington: Public Health Foundation; 2006. Also available from: URL: http://www.phf.org/Link.htm [cited 2006 May 31].

Also, at the initial meeting, the panel agreed on the definition of terms and acknowledged the need to define competencies for four tiers of applied epidemiology practice at local, state, and federal public health agencies: entry-, mid-, and senior-level epidemiologists—either supervisory or senior scientist (Figure 2). The group then focused on developing Tier 2 (mid-level practitioner) competency statements, which were revised after the panel solicited and received input. The Tier 2 competencies were then used as the basis for developing the Tier 1 (entry-level) and Tiers 3a and 3b (supervisory- and senior scientist-level) competencies.

Soliciting input on draft competencies

After creating the first draft of Tier 2 competencies, the panel developed a survey to collect feedback from the practice and academic communities on the appropriateness and validity of the proposed competency statements. The survey presented all of the high-level competency statements within each skill domain, and for each competency it asked: (*1*) Do you perform this task, and, if so, how often? and (*2*) Is this competency appropriate for a Tier 2 epidemiologist?

The survey also asked whether any competencies were missing in each of the eight skill domains and whether the respondent would suggest any changes. Respondents were asked to self-identify as a Tier 1, 2, 3a, or 3b epidemiologist and to identify their governmental level of practice (local, state, federal, or other).

The draft Tier 2 competencies were first presented and the survey administered at the June 2005 CSTE annual meeting. All 855 registered attendees were asked to complete the survey, and 259 people (30.3%) responded. We invited further input from the CSTE membership, CDC scientific staff, and 14 professional public health organizations, including ASTHO, NACCHO, American College of Epidemiology, Society for Epidemiologic Research, Association of American Medical Colleges, Association of Teachers of Preventive Medicine, ASPH, Association of Maternal and Child Health Programs, National Environmental Health Association, National Association of Local Boards of Health, Association of State and Territorial Directors of Nursing, State and Territorial Injury Prevention Directors Association, APHA, and National Association of Chronic Disease Directors. A Notice to Readers was also placed in CDC's *Morbidity and Mortality Weekly Report* (*MMWR*).[15] To facilitate responses from this broader

Figure 2. Four tiers of applied epidemiology practice

Tier level	*Examples of functional responsibility*	*Examples of educational and experiential criteria*
Tier 1: Entry-level or basic epidemiologist (Entry-level or basic epidemiologists include people who might not be titled an epidemiologist but who perform epidemiology functions, at least part-time.)	Performs simple data collection, analysis, and reporting in support of surveillance and epidemiologic investigations	• Newly graduated with master's degree and minimal experience but from a master's program with a focus on epidemiology or analysis and assessment; or • Bachelor's or other non-epidemiology professional degree or certification (e.g., RN, MD/DO, DDS/DMD, DVM, PhD, RS) without formal academic epidemiology training and with ≥2 years experience performing epidemiology work under the guidance of a Tier 2 or Tier 3 epidemiologist
Tier 2: Mid-level epidemiologist	Performs simple, more complex, and nonroutine data collection, analysis, and interpretation tasks and can work independently or can supervise a unit or serve as a project leader or surveillance coordinator	• Master's degree with a focus in epidemiology with ≥2 years' work experience in epidemiology in a public health agency; or • Doctoral-level epidemiologist; or • Other non-epidemiology professional degree or certification (e.g., RN, MD/DO, DDS/DMD, DVM, PhD, RS) with specific epidemiology training (e.g., MPH degree, CDC Epidemic Intelligence Service program) or ≥4 years' experience performing epidemiologic work under the guidance of a Tier 3 epidemiologist
Tiers 3a and 3b: Senior-level epidemiologist	3a: Supervisor or manager, director of a major section, program, or bureau in a public health agency 3b: Senior scientist/subject area expert in an epidemiologic focus area	Meets the description of a Tier 2 for education with additional experience

RN = registered nurse
MD = medical degree
DO = Doctor of Osteopathy
DDS = Doctor of Dental Surgery
DMD = Doctor of Dental Medicine
DVM = Doctor of Veterinary Medicine
PhD = Doctor of Philosophy
RS = registered sanitarian
CDC = Centers for Disease Control and Prevention
MPH = Master of Public Health

audience, the survey was placed on the CSTE website, resulting in 121 additional responses. The draft Tier 2 competencies were also presented at the December 2005 APHA annual conference.

The panel analyzed input on the draft Tier 2 competencies and revised them. The Tier 2 competencies were then used to develop the Tier 1 and Tier 3 competencies. In certain cases, this involved changing the verb in the competency statement to reflect a more limited or more advanced level of competency (e.g., Tier 1: "identify a health problem" vs. Tier 3: "oversee implementation of a program to address a health problem"). In other cases, new competencies were added at the higher tier levels.

Following this activity, we sought input and validation of the process. In April 2006, the complete draft of all competency statements was posted on CSTE's website, along with a revised online survey that included separate sections for each tier. The survey instructions asked respondents to focus on the tier with which they self-identified and, if appropriate, to comment on other tiers for which they felt qualified, including tiers for epidemiologists that they supervised. The survey also collected respondents' basic demographic information and self-identified tier.

As during the first round, professional organizations were asked to encourage their members to respond to the survey, with the National Association of Health Data

Organizations and the American College of Preventive Medicine added to the list. Information on the survey was published in *MMWR*[16] and featured prominently on the CSTE website. There were 420 responses to this second survey, covering all four tiers.

Given the importance of informatics competencies for the practicing epidemiologist in the computer age, the CDC convener specifically sought feedback regarding key informatics competencies from public health informaticians and epidemiologists, especially from groups with representation from local, state, and federal practitioners actively engaged in developing the Public Health Information Network.[17]

Final competency development

For the final revision process, the consulting editor-writer, the CDC convener, and the cochairs reviewed comments from all survey respondents during the first round (Tier 2 only) and the second round (all tiers). The comments were categorized according to whether they proposed a new competency, recommended a reformulation or found a statement confusing, stated the competency was inappropriate, or provided a general comment.

For the first two categories of comments, the panel reviewed the proposed changes and determined whether to accept the change, accept the change with modifications, or reject the change. For the second two categories of comments, the panel identified major trends or concerns and addressed them either by changing the competency statements or by adding clarifications in the preface document, which accompanies and explains the competencies. The majority of the recommended changes focused on the tier definitions, and the panel reviewed and revised these as well.

In addition to analyzing the qualitative data (written comments), the panel reviewed the quantitative data from the surveys in terms of the proportion responding favorably or unfavorably to each competency stratified by the commenters' tier level and governmental level of practice. The panel discussed any competency statement for which overall agreement with the question, "Is this an appropriate competency?" declined below 75% and decided whether to retain or change the competency. Overall, the acceptance level for the draft competency statements was high, and only 7.4% (11/149) of the competency statements in the April 2006 survey declined below the 75% acceptance level. After final discussion, review, and editing, all panel members agreed that the AECs were final.

RESULTS

A summary of the primary AEC statements for Tier 2 epidemiologists is included in Figure 3. The full AECs are included in the Appendix.

Structure of competency statements

Within each competency domain defined by the COL is a primary competency statement, followed by subcompetency and, in certain cases, sub-subcompetency statements that detail the specific knowledge, skills, and abilities necessary to meet the required competency. The number of competency statements by each competency domain is displayed in the Table. Additional competencies have been added throughout all the skill domains to capture specific knowledge, skills, and abilities necessary for epidemiologists in public health agencies. The Analytic/Assessment and Basic Public Health Sciences skill domains are the most closely linked to applied epidemiologic practice and, therefore, received the greatest number of epidemiology-specific competencies.

An example of a competency and subcompetency statement illustrating the different mastery required by tier level, as well as the hierarchical nature of primary and subcompetencies, is listed in Figure 4. Each competency statement has been adapted to reflect the knowledge and skills necessary for each level of responsibility and experience—entry level (Tier 1), mid-level (Tier 2), or senior level (Tiers 3a and 3b). For certain competency statements in which the expert panel believed that all epidemiologists, regardless of level, needed a certain set of knowledge and skills, the language is identical across all tiers. Other competency statements are only present for the higher levels, when those skills or responsibilities might not be expected of entry-level epidemiologists.

DISCUSSION

Scope of competencies

The AECs define the discipline of applied epidemiology as practiced in governmental public health agencies. Given the scope and content of epidemiology, the competencies emphasize analytical and assessment knowledge and skills. However, by following the COL's framework for competencies for all public health workers, the competency set also covers all aspects of practice that are necessary to be an effective epidemiologist: communication, management and leadership, and cultural competency skills. In these non-epidemiologic competency areas, the focus is on what an epidemiologist should know. For example, regarding communication, epidemiologists should be able to communicate

Figure 3. Summary of the primary applied epidemiology competency statements for Tier 2 epidemiologists

Skill Domain: Analytic/Assessment
1. Identify public health problems pertinent to the population.
2. Conduct surveillance activities.
3. Investigate acute and chronic conditions or other adverse outcomes among the population.
4. Apply principles of good ethical and legal practice as they relate to study design and data collection, dissemination, and use.
5. Manage data from surveillance, investigations, or other sources.
6. Analyze data from an epidemiologic investigation or study.
7. Summarize results of the analysis and draw conclusions.
8. Recommend evidence-based interventions and control measures in response to epidemiologic findings.
9. Evaluate programs.

Skill Domain: Basic Public Health Sciences
1. Use current knowledge of causes of disease to guide epidemiologic practice.
2. Use laboratory resources to support epidemiologic activities.
3. Apply principles of informatics, including data collection, processing, and analysis, in support of epidemiologic practice.

Skill Domain: Communication
1. Prepare written and oral reports and presentations that communicate necessary information to professional audiences, policy makers, and the general public.
2. Demonstrate the basic principles of risk communication.
3. Incorporate interpersonal skills in communication with agency personnel, colleagues, and the public.
4. Use effective communication technologies.

Skill Domain: Community Dimensions of Practice
1. Provide epidemiologic input into epidemiologic studies, public health programs, and community public health planning processes at the state, local, or tribal level.
2. Participate in the development of community partnerships to support epidemiologic investigations.

Skill Domain: Cultural Competency
1. Describe the population by race/ethnicity; culture; societal, educational, and professional backgrounds; age; gender; religion; disability; and sexual orientation.
2. Establish relationships with groups of special concern (e.g., disadvantaged or minority groups, groups subject to health disparities, historically underrepresented groups).
3. Design surveillance systems to include groups subject to health disparities or other potentially underrepresented groups, using standard categories where available.
4. Conduct investigations by using languages and approaches tailored to the population under study.
5. Use standard population categories or subcategories when performing data analysis.
6. Use knowledge of specific sociocultural factors among the population to interpret findings.
7. Recommend public health actions that are relevant to the affected community.

Skill Domain: Financial Planning and Management (Operational Planning, Financial Planning, and Management Skills)
1. Conduct epidemiologic activities within the financial and operational plan of the agency.
2. Assist in developing a fiscally sound budget that will support the activities defined in the operational plan and that is consistent with the financial rules of the agency.
3. Implement operational and financial plans.
4. Assist in preparation of proposals for extramural funding.
5. Use management skills.
6. Use skills that foster collaborations, strong partnerships, and team building to accomplish epidemiology program objectives.

Skill Domain: Leadership and Systems Thinking
1. Support the epidemiologic perspective in the agency strategic planning process.
2. Promote the organization's vision in all programs and activities.
3. Use performance measures to evaluate and improve epidemiology program effectiveness.
4. Promote ethical conduct in epidemiologic practice.
5. Promote workforce development.
6. Prepare for emergency response.

Skill Domain: Policy Development/Program Planning
1. Bring epidemiologic perspective into the development and analysis of public health policies.

clearly the results of epidemiologic studies, including limitations of such studies.

Intended uses

The intended uses of the AECs vary by category of user. For practicing epidemiologists, the competencies can serve to define the scope and limits of their profession and, in so doing, define a career path and aid in assessing knowledge gaps that can lead to the development of a specific training plan to meet education gaps. For employers, the AECs can provide a guide for creating career ladders for epidemiologists, drafting position descriptions and job qualification statements, developing continuing education training plans, and assessing the organization's epidemiologic capacity. For educators, the AECs can assist in designing educational programs and curricula focused on applied epidemiology, both for primary epidemiologic education and for continuing education. Finally, the competencies can form the basis for future certification of epidemiologists.

Limitations

The process of competency development was limited in several ways. First, the AECs are the work of an expert committee and may suffer from the inconsistencies and compromises that such a process might entail. The expert panel had to make editorial decisions between sometimes conflicting comments, although such decisions were usually made after the panelists came to a general consensus. Also, the panel cast a very wide net in an attempt to include many points of view in epidemiology practice and education.

Second, people who provided input and comments on the document were self-selected and therefore may not be representative of all practicing applied epidemiologists. However, as described previously, the expert panel solicited participation in the review process via many relevant organizations and through *MMWR* in an attempt to include many points of view in epidemiology practice and education.

Applying the competency statements

The expert panel intentionally created broad competencies that cover the discipline of applied epidemiology, which itself is broad and diverse. CDC and CSTE intend that all people practicing applied epidemiology—including those who might not have the title of epidemiologist but whose job requires use of epidemiologic methods—gain minimal competency in all

Table. Number of competency and subcompetency statements by tier and competency domain

Competency domain		*Tier 1* N	*Tier 2* N	*Tier 3a* N	*Tier 3b* N
Domain 1: Analytic/Assessment	Competencies	9	9	9	9
	Subcompetencies	28	37	37	37
	Sub-subcompetencies	53	106	72	107
Domain 2: Basic Public Health Sciences	Competencies	3	3	4	4
	Subcompetencies	10	15	21	19
	Sub-subcompetencies	1	4	4	4
Domain 3: Communication	Competencies	4	4	4	4
	Subcompetencies	9	13	13	13
	Sub-subcompetencies	16	25	16	26
Domain 4: Community Dimensions of Practice	Competencies	2	2	2	2
	Subcompetencies	3	6	6	7
	Sub-subcompetencies	4	14	15	15
Domain 5: Cultural Competency	Competencies	6	7	7	7
	Subcompetencies	9	15	20	22
	Sub-subcompetencies	0	0	0	0
Domain 6: Financial Planning and Management	Competencies	4	6	6	5
	Subcompetencies	10	24	23	17
	Sub-subcompetencies	0	0	0	0
Domain 7: Leadership and Systems Thinking	Competencies	5	6	6	6
	Subcompetencies	8	13	13	10
	Sub-subcompetencies	11	35	38	29
Domain 8: Policy Development/ Program Planning	Competencies	1	1	1	1
	Subcompetencies	3	5	5	5
	Sub-subcompetencies	2	7	9	7

Figure 4. Example of primary and subcompetency statements in the Analytic/Assessment skill domain, by tier level

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. Recognize public health problems pertinent to the population	***A. Identify public health problems pertinent to the population***	***A. Ensure identification of public health problems pertinent to the population***	***A. Validate identification of public health problems pertinent to the population***
1. Recognize the existence of a public health problem	1. Use critical thinking to determine whether a public health problem exists	1. Ensure that critical thinking is used to determine whether a public health problem exists	1. Synthesize key findings from the critical thinking process to determine whether a public health problem exists
a. List relevant data and information sources within and outside of the public health system	a. Identify relevant data and information sources within and outside of the public health system	a. Validate the relevance of data and information sources within and outside of the public health system	a. Use relevant data and information sources within and outside of the public health system
b. Seek assistance synthesizing existing data and information into a determination of expected and observed numbers of cases or outcomes in a population	b. Synthesize existing data and information into a determination of expected and observed numbers of cases or outcomes in a population	b. Verify the accuracy of expected and observed numbers of cases or outcomes in a population	b. Synthesize existing data and information into a determination of expected and observed numbers of cases or outcomes among a population
c. Seek assistance in values determining threshold prevalence of values (e.g., baseline disease burden, prevalence of risk behaviors) for public health action	c. Determine threshold values (e.g., baseline disease burden, prevalence of risk behaviors) for public health action	c. Ensure the accuracy of determined threshold values (e.g., baseline disease burden, prevalence of risk behaviors) for public health action	c. Validate the calculated threshold (e.g., baseline disease burden, risk behaviors) for public health action
d. N/A	d. Conduct a thorough search of the scientific literature and public health databases by using search engines and methods relevant to specific problems	d. Verify the completeness and accuracy of searches of literature and public health databases	d. Synthesize results of searches of the scientific literature and public health databases
e. N/A	e. Quantify population-based health risks	e. Verify population-based health risks	e. Verify population-based health risks
f. N/A	f. N/A	f. Decide whether to obtain expertise outside the agency to assist in decision-making	f. Determine whether additional outside expertise is needed to assist in decision-making

N/A = not applicable

of the defined skill domains. However, every applied epidemiologist is not expected to be equally competent in all areas. Different content areas of applied epidemiology (e.g., infectious disease, chronic disease, environmental health) might emphasize different competency areas. In addition, job descriptions among public health agencies vary by the agency's needs and resources, the setting (e.g., rural or urban), and the scope of the agency's responsibilities (i.e., local, state, or federal), and may not always uniformly comply with stated competencies.

Guiding careers in applied epidemiology

The competencies represent a continuum of applied epidemiologic practice, not a single point in time in a person's career. In other words, a person might not start with knowledge and skills in all areas but is expected to gain knowledge within each tier and potentially move through tiers over time. The AECs provide a tool that epidemiologists can use to plan careers and chart professional growth.

Disseminating the AECs

CDC and CSTE are disseminating the AEC report broadly throughout the epidemiology and public health communities. The final competency set has been presented at multiple state, regional, national, and international public health and epidemiology meetings with a focus on educating the target audiences about the development and use of the AECs. The complete competency set, along with tools and documentation to support their use, is available on the CDC (http://www.cdc.gov/od/owcd/cdd/aec) and CSTE (http://www.cste.org/competencies.asp) websites.

CONCLUSION

CDC and CSTE anticipate the AECs will be used as the basis of instructional competencies for training government epidemiologists, and as the framework for developing position descriptions, work expectations, and job announcements for epidemiologists practicing in public health agencies. After public health agencies have used them for a sufficient period, CDC and CSTE will evaluate their utility and effectiveness as part of an ongoing process to update and improve them.

The authors thank the members of the Applied Epidemiology Competencies Expert Panel: Kaye Bender, RN, PhD, University of Mississippi Medical Center School of Nursing; Roger Bernier, PhD, MPH, Centers for Disease Control and Prevention (CDC); Mike Crutcher, MD, MPH, Oklahoma State Department of Health; Richard Dicker, MD, MSc, CDC; James Gale, MD, MS, School of Public Health and Community Medicine, University of Washington; Kristine Gebbie, DrPH, RN, Columbia University School of Nursing; Gail Hansen, DVM, MPH, Kansas Department of Health and Environment; Richard Hopkins, MD, MSPH, Florida Department of Health (formerly with CDC); Sara L. Huston, PhD, University of North Carolina at Chapel Hill; Maureen Lichtveld, MD, MPH, Tulane University School of Public Health and Tropical Medicine; Miriam Link-Mullison, MS, RD, Jackson County Health Department; Kristine Moore, MD, University of Minnesota; Hal Morgenstern, PhD, University of Michigan School of Public Health; Lloyd Novick, MD, MPH, Brody School of Medicine; Len Paulozzi, MD, MPH, CDC; Arthur Reingold, MD, University of California at Berkeley; William M. Sappenfield, MD, MPH, Florida Department of Health (formerly with CDC); Gregory Steele, DrPH, MPH, Indiana University School of Medicine; Lou Turner, DrPH, MPH, North Carolina Division of Public Health; and Mark E. White, MD, CDC.

The authors thank Matthew Boulton, MD, MPH, University of Michigan School of Public Health, who was one of the original conveners of the Applied Epidemiology Competencies project. They also thank Pat McConnon, MPH, and LaKesha Robinson, MPH, of the Council of State and Territorial Epidemiologists (CSTE) for their expert support of the competencies development process. In addition, they thank Jacqueline Silvia-Fink for assistance in preparing the article.

This work was supported by cooperative agreement #U60/CCU07277 from CDC to CSTE.

REFERENCES

1. Council of State and Territorial Epidemiologists. 2004 national assessment of epidemiologic capacity: findings and recommendations. Atlanta: CSTE; 2004. Also available from: URL: http://www.cste.org//Assessment/ECA/pdffiles/ECAfinal05.pdf [cited 2006 May 31].
2. Association of State and Territorial Health Officials. State public health employee worker shortage report: a civil service recruitment and retention crisis. Washington: ASTHO; 2004. Also available from: URL: http://www.astho.org/pubs/Workforce-Survey-Report-2.pdf [cited 2006 May 31].
3. Bureau of Health Professions, Health Resources and Services Administration (US). Public health workforce study. Rockville (MD): Department of Health and Human Services, HRSA (US); 2005. Also available from: URL: http://bhpr.hrsa.gov/healthworkforce/reports/publichealth/default.htm [cited 2006 May 31].
4. Flexner A. Medical education in the United States and Canada. New York: The Carnegie Foundation for the Advancement of Teaching; 1910.
5. Welch WH, Rose W. Institute of Hygiene. Rockefeller Foundation General Education Committee. New York: Rockefeller Foundation; 1915.
6. Sheps CG. Higher education for public health. New York: Milbank Memorial Fund; 1976.
7. Committee for the Study of the Future of Public Health. The future of public health. Washington: Institute of Medicine, National Academies Press; 1988. p. 19.
8. Sorensen AW, Bialek RG, editors. Public health faculty/agency forum: linking graduate education and practice—final report. Rockville (MD): Health Resources and Services Administration (US) and Centers for Disease Control and Prevention (US); 1991. p. 49-69.
9. Council on Linkages Between Academia and Public Health Practice. Core competencies for public health professionals [cited 2007 Jan 20]. Available from: URL: http://www.phf.org/competencies.htm
10. Burkes JC. Achieving accountability in higher education. San Francisco: Jossey-Bass; 2004. p. 143.
11. Voorhees RA. Measuring what matters: competency-based learning models in higher education: new directions for institutional research, No. 110. San Francisco: Jossey-Bass; 2001. p. 5-12.
12. Council of State and Territorial Epidemiologists. CSTE special report: workforce development initiative. Atlanta: CSTE; 2004.

Also available from: URL: http://www.cste.org/pdffiles/Workforcesummit.pdf [cited 2007 Feb 2].
13. Association of Schools of Public Health. ACE/ASPH workshop on doctoral education in epidemiology: workshop summary; 2002 Dec 9–11; Baltimore, MD [cited 2007 Jan 3]. Available from: URL: http://www.asph.org/document.cfm?page=798
14. Department of Education (US). Defining and assessing learning: exploring competency-based initiatives. Washington: Council of the National Postsecondary Education Cooperative; 2002. p. 5-10.
15. Notice to readers: applied epidemiology competency development. MMWR Morb Mortal Wkly Rep 2005;54(30):750.
16. Notice to readers: draft of applied epidemiology competencies. MMWR Morb Mortal Wkly Rep 2006;55(6):158.
17. Centers for Disease Control and Prevention (US). Public Health Information Network [cited 2007 Oct 10]. Available from: URL: http://www.cdc.gov/phin

Appendix. The complete CDC/CSTE Competencies for Applied Epidemiologists in Governmental Public Health Agencies document

I. Skill Domain—Assessment and Analysis

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. Recognize public health problems pertinent to the population	***A. Identify public health problems pertinent to the population***	***A. Ensure identification of public health problems pertinent to the population***	***A. Validate identification of public health problems pertinent to the population***
1. Recognize the existence of a public health problem	1. Use critical thinking to determine whether a public health problem exists	1. Ensure that critical thinking is used to determine whether a public health problem exists	1. Synthesize key findings from the critical thinking process to determine whether a public health problem exists
a. List relevant data and information sources within and outside the public health system b. Seek assistance synthesizing existing data and information into a determination of expected and observed numbers of cases or outcomes in a population c. Seek assistance in determining threshold values (e.g., baseline disease burden, prevalence of risk behaviors) for public health action d. N/A e. N/A f. N/A	a. Identify relevant data and information sources within and outside the public health system b. Synthesize existing data and information into a determination of expected and observed numbers of cases or outcomes in a population c. Determine threshold values (e.g., baseline disease burden, prevalence of risk behaviors) for public health action d. Conduct a thorough search of the scientific literature and public health databases using search engines and methods relevant to specific problems e. Quantify population-based health risks f. N/A	a. Validate the relevance of data and information sources within and outside the public health system b. Verify the accuracy of expected and observed numbers of cases or outcomes in a population c. Ensure the accuracy of determined threshold values (e.g., baseline disease burden, prevalence of risk behaviors) for public health action d. Verify the completeness and accuracy of searches of literature and public health databases e. Verify population-based health risks f. Decide whether to obtain expertise outside the agency to assist in decision-making	a. Use relevant data and information sources within and outside the public health system b. Synthesize existing data and information into a determination of expected and observed numbers of cases or outcomes in a population c. Validate the calculated threshold values (e.g., baseline disease burden, prevalence of risk behaviors) for public health action d. Synthesize results of searches of the scientific literature and public health databases e. Verify population-based health risks f. Determine whether additional outside expertise is needed to assist in decision-making
2. N/A	2. Articulate the need for further investigation or other public health action on the basis of results of literature review and assessment of current data	2. Decide whether to conduct further investigation or other public health action on the basis of results of literature review and assessment of current data	2. Evaluate need for further investigation or other public health action on the basis of results of literature review and assessment of current data
3. Collaborate with others inside and outside the agency to identify the problem	3. Collaborate with others inside and outside the agency to identify the problem and form recommendations	3. Lead collaborations with others inside and outside the agency to identify the problem and form recommendations	3. Lead collaborations with others inside and outside the agency to identify the problem and form recommendations

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
B. Conduct surveillance activities	***B. Conduct surveillance activities***	***B. Oversee surveillance activities***	***B. Organize surveillance***
1. N/A	1. Design surveillance for the particular public health issue under consideration	1. Approve surveillance for the particular public health issue under consideration	1. Evaluate validity of conducting surveillance for the particular public health issue under consideration
a. N/A b. N/A c. N/A d. N/A e. N/A	a. Identify types of surveillance methods for specific public health problems b. Identify information system(s) to support surveillance systems c. Recommend types of surveillance systems for specific public health problems d. N/A e. Identify additional burden to public health system and reporting entity anticipated to result from the proposed surveillance system	a. Examine potential surveillance methods for specific public health problems b. Approve information system(s) to support surveillance systems c. Decide on types of surveillance systems for specific public health problems d. Review anticipated cost/benefit of initiating a new surveillance system e. Decide whether to impose the additional burden to public health system and reporting entity that is anticipated to result from the proposed surveillance system	a. Examine types of surveillance methods for specific public health problems b. Recommend information system(s) to support surveillance systems c. Determine type of surveillance systems for specific public health problems d. N/A e. Evaluate additional burden to public health system and reporting entity anticipated to result from the proposed surveillance system
2. Identify surveillance data needs	2. Identify surveillance data needs	2. Decide on surveillance data needs	2. Evaluate surveillance data needs
a. Create case definition(s) based on person, place, and time b. N/A c. N/A d. N/A e. N/A f. N/A g. Recognize potential uses of data to inform surveillance system h. N/A	a. Create case definition(s) based on person, place, and time b. Describe sources, quality, and limitations of surveillance data c. Define the data elements to be collected or reported d. Identify mechanisms to transfer data from source to public health agency e. Define timeliness required for data collection f. Determine frequency of reporting g. Describe potential uses of data to inform surveillance system design h. Define the functional requirements of the supporting information system	a. Verify case definition(s) based on person, place, and time b. Decide on sources of surveillance data c. N/A d. Decide on mechanisms to transfer data from source to public health agency e. Decide on acceptable timeliness for data collection and frequency for reporting f. N/A g. Decide on surveillance system design h. Approve the functional requirements of the supporting information system	a. Evaluate case definition(s) based on person, place, and time b. Evaluate sources, quality, and limitations of surveillance data c. Assess the adequacy of the data elements to be collected or reported d. Assess mechanisms to transfer data from source to public health agency e. Evaluate timeliness requirements for data collection f. Assess frequency of reporting g. Create surveillance system design on the basis of potential uses of data h. Assess the functional requirements of the information system

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
3. Implement new or revise existing surveillance systems	3. Implement new or revise existing surveillance systems	3. Supervise or manage implementation of new or revision of existing surveillance systems	3. Implement new or revise existing surveillance systems
a. Define objectives and uses of surveillance system b. Test data collection, data storage, and analytical methods as directed c. Assist in creating working surveillance system d. Collect data for verification of the defined surveillance system parameters (e.g., timeliness, frequency) e. Classify potential cases according to whether they meet the case definition f. Interview people with illness to solicit necessary information g. Assist in monitoring data quality h. Maintain good working relationships with reporting entities i. Provide feedback to reporting entities and other organizations or individuals who need to know about the data or system	a. Define objectives and uses of surveillance system b. Test data collection, data storage, and analytical methods c. Create working surveillance system d. Verify that data collection occurs according to the defined surveillance system parameters (e.g., timeliness, frequency) e. Ensure correct classification of cases according to the case definition f. Interview people with illness to solicit necessary information g. Monitor data quality h. Create good working relationships with reporting entities i. Provide feedback to reporting entities and other organizations or individuals who need to know about the data or system	a. Approve objectives and uses of surveillance system b. Validate data collection, data storage, and analytical methods c. N/A d. Verify that data collection occurs according to the defined surveillance system parameters (e.g., timeliness, frequency) e. N/A f. N/A g. Ensure that data quality is monitored h. Ensure good working relationships with reporting entities i. Ensure provision of feedback to reporting entities and other organizations or individuals who need to know about the data or system	a. Develop guidelines for objectives and uses of surveillance systems b. Validate data collection, data storage, and analytical methods c. Create working surveillance system d. Assess performance of data collection systems against the defined surveillance system parameters (e.g., timeliness, frequency) e. N/A f. N/A g. Monitor data quality h. Create good working relationships with reporting entities i. Synthesize information about surveillance system for communicating to reporting entities and other organizations or individuals who need to know about the data or system

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
4. Report key findings from the surveillance system	4. Identify key findings from the surveillance system	4. Synthesize key findings from the surveillance system and other pertinent information for use by decision-makers	4. Synthesize key findings from the surveillance system and other pertinent information for use by decision-makers
a. Provide system's results to senior epidemiologists b. Recognize implications to public health programs c. Assist in developing conclusions from the surveillance data d. Communicate results to senior staff	a. Examine system's results in the context of current scientific knowledge b. Identify implications to public health programs c. Develop conclusions from the surveillance data d. Communicate results to agency managers and to reporters of surveillance data (see Communication competencies)	a. Interpret system's results in the context of current scientific knowledge and other available information b. Examine any implications to public health programs c. Determine relative priority of each conclusion from the surveillance data, before making recommendations to decision-makers d. Communicate synthesized information to decision-makers and the public	a. Interpret system's results in the context of current scientific knowledge b. Examine any implications to public health programs c. Determine relative priority of each conclusion from the surveillance data, before making recommendations to decision-makers d. Communicate synthesized information to decision-makers and the public
5. Support evaluation of surveillance systems	5. Conduct evaluation of surveillance systems	5. Ensure evaluation of surveillance systems	5. Design and conduct evaluation of surveillance systems
a. Collect data necessary for evaluation of surveillance systems using national guidance and methods (Centers for Disease Control and Prevention [US]. Updated guidelines for evaluating public health surveillance systems; recommendations from the Guidelines Working Group. MMWR Recomm Rep 2001;50[RR-13]:1-35) b. Assist in preparing recommendations for modifications to surveillance systems on the basis of evaluation c. N/A d. Assist in implementing changes to surveillance system on the basis of results of evaluation	a. Evaluate surveillance systems using national guidance and methods (Centers for Disease Control and Prevention [US]. Updated guidelines for evaluating public health surveillance systems; recommendations from the Guidelines Working Group. MMWR Recomm Rep 2001;50[RR-13]:1-35) b. Propose recommendations for modifications to surveillance systems on the basis of evaluation c. N/A d. Implement changes to surveillance system on the basis of results of evaluation	a. Ensure evaluation of surveillance systems using national guidance and methods (Centers for Disease Control and Prevention [US]. Updated guidelines for evaluating public health surveillance systems; recommendations from the Guidelines Working Group. MMWR Recomm Rep 2001;50[RR-13]:1-35) b. Appraise recommendations for modifications to surveillance systems on the basis of evaluation c. Decide whether to modify surveillance systems on the basis of recommendations d. Ensure that changes to surveillance system are implemented on the basis of results of evaluation	a. Evaluate surveillance systems using national guidance and methods (Centers for Disease Control and Prevention [US]. Updated guidelines for evaluating public health surveillance systems; recommendations from the Guidelines Working Group. MMWR Recomm Rep 2001;50[RR-13]:1-35) b. Develop and/or review recommendations for modifications to surveillance systems on the basis of evaluation c. Decide whether to modify surveillance systems on the basis of recommendations d. Ensure that changes to surveillance system are implemented on the basis of results of evaluation

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
C. Identify acute and chronic conditions or other adverse outcomes in the population	***C. Investigate acute and chronic conditions or other adverse outcomes in the population***	***C. Ensure investigation of acute and chronic conditions or other adverse outcomes in the population***	***C. Design investigation of acute and chronic conditions or other adverse outcomes in the population***
1. Assist in conducting a community health status assessment	1. Conduct a community health status assessment	1. Oversee a community health status assessment	1. Design a community health status assessment
2. N/A	2. Recommend priorities of potential public health problems to be addressed	2. Decide on priority of public health problems to be addressed	2. Recommend priorities of potential public health problems to be addressed
3. Characterize investigative processes	3. Select investigative processes	3. Approve selection of investigative processes	3. Determine investigative processes
a. Recognize different principles of investigation for endemic/ sporadic illness or disease clusters vs. acute outbreaks b. List the major epidemiologic study designs, including the strengths and weaknesses of each	a. Apply principles of investigation for endemic/sporadic illness or disease clusters vs. acute outbreaks b. Describe the major epidemiologic study designs, including the strengths and weaknesses of each	a. Determine whether to use investigative methods for endemic/sporadic illness or disease clusters vs. acute outbreaks b. Decide which epidemiologic study design to use for the public health problem to be investigated	a. Determine whether to use investigative methods for endemic/sporadic illness or disease clusters vs. acute outbreaks b. Integrate knowledge about epidemiologic study designs into study design for the public health problem to be investigated
4. Create hypotheses	4. Create hypotheses	4. Verify hypotheses	4. Verify hypotheses

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
5. Assist in design of investigation (e.g., disease investigations, studies, or screening programs)	5. Assist in design of investigation (e.g., disease investigations, studies, or screening programs)	5. Oversee design of investigations (e.g., disease investigations, studies, or screening programs)	5. Design investigations (e.g., disease investigations, studies, or screening programs)
a. Identify target population for investigation b. N/A c. N/A d. Create case definition(s) e. N/A f. N/A g. N/A h. N/A i. N/A j. N/A	a. Identify target population for investigation b. Perform power calculations if necessary c. Identify individuals or groups eligible to be in the study d. Create case definition(s) e. Identify time frame for investigation f. Select investigation design under existing constraints g. Identify possible sources of bias h. Identify methods to minimize potential sources of bias i. Identify potential confounders j. Design strategies to minimize or eliminate potential confounding	a. Validate selection of target population for investigation b. Approve power calculations c. Approve inclusion of individuals or groups in the study d. Approve case definition(s) e. Approve time frame for investigation f. Approve investigation design that will be most effective under existing constraints g. N/A h. Approve methods to minimize potential sources of bias i. N/A j. Approve strategies to minimize or eliminate potential confounding	a. Identify target population for investigation b. Evaluate results of power calculations c. Verify individuals or groups for inclusion in the study d. Create case definition(s) e. Verify time frame for investigation f. Justify investigation design under existing constraints g. Evaluate possible sources of bias h. Identify methods to minimize potential sources of bias i. Evaluate potential confounders j. Design strategies to minimize or eliminate potential confounding
6. Conduct investigation as directed	6. Use investigation techniques consistent with the public health problem	6. Ensure use of investigation techniques consistent with the public health problem	6. Design investigation techniques consistent with the public health problem
a. Respond in a time frame consistent with the public health problem being investigated b. N/A c. Contact data sources d. Use methods for finding cases or other subjects suitable to the investigation e. Use data collection instruments that have been constructed for the investigation f. Use identified sampling methods g. Support necessary coordination among all groups involved in investigation	a. Respond in a time frame consistent with the public health problem being investigated b. Apply methods and measures that are consistent with the particular type of investigation c. Identify sources of data for investigation d. Identify methods to find cases and other subjects suitable to the investigation e. Design data collection instruments using new or existing information systems f. Identify sampling methods given the context of the situation g. Organize necessary coordination among all groups involved in investigation	a. Ensure that response is in a time frame consistent with the public health problem being investigated b. Ensure that methods and measures are consistent with the particular type of investigation c. Approve data sources for investigation d. Approve methods to find cases and other subjects e. Approve data collection instruments and supporting information systems f. Approve sampling methods given the context of the situation g. Ensure coordination among all groups involved in investigation	a. Respond in a time frame consistent with the public health problem being investigated b. Recommend methods and measures that are consistent with the particular type of investigation c. Verify selection of data sources for investigation d. Verify selection of case finding methods e. Evaluate data collection instruments and supporting information systems f. Evaluate sampling methods given the context of the situation g. Organize necessary coordination among all groups involved in investigation

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
D. Apply principles of good ethical/ legal practice as they relate to study design and data collection, dissemination, and use	***D. Apply principles of good ethical/ legal practice as they relate to study design and data collection, dissemination, and use***	***D. Ensure study design and data collection, dissemination, and use follow ethical/legal principles***	***D. Synthesize principles of good ethical/legal practice for application to study design and data collection, dissemination, and use***
1. Follow ethics guidelines and principles when planning studies; conducting research; and collecting, disseminating, and using data	1. Follow ethics guidelines and principles when planning studies; conducting research; and collecting, disseminating, and using data	1. Examine ethics guidelines and principles when planning studies; conducting research; and collecting, disseminating, and using data	1. Integrate ethics guidelines and principles when planning studies; conducting research; and collecting, disseminating, and using data
a. Collect and use public health data, including individual identifiers, only with clearly identified justification b. Balance respect for people and individual privacy with the risk of the threat to the community c. Apply public health code of ethics to collection, management, dissemination, and use of data and information, including principles of justice, timeliness, and transparency of purpose (www.apha.org/codeofethics)	a. Collect and use public health data, including individual identifiers, only with clearly identified justification b. Balance respect for people and individual privacy with the risk of the threat to the community c. Apply public health code of ethics to collection, management, dissemination, and use of data and information, including principles of justice, timeliness, and transparency of purpose (www.apha.org/codeofethics)	a. Ensure that public health data, including individual identifiers, are collected and used only with clearly identified justification b. Balance respect for people and individual privacy with the risk of the threat to the community c. Ensure that public health code of ethics is applied to collection, management, dissemination, and use of data and information, including principles of justice, timeliness, and transparency of purpose (www.apha.org/codeofethics)	a. Collect and use public health data, including individual identifiers, only with clearly identified justification b. Balance respect for people and individual privacy with the risk of the threat to the community c. Apply public health code of ethics to collection, management, dissemination, and use of data and information, including principles of justice, timeliness, and transparency of purpose (www.apha.org/codeofethics)
2. Apply relevant laws to data collection, management, dissemination, and use of data and information	2. Apply relevant laws to data collection, management, dissemination, and use of data and information	2. Communicate to staff legal expectations, limitations, and implications of collection, management, dissemination, and use of data and information	2. Design data collection, management, and dissemination and use of data and information to comply with relevant laws
3. N/A	3. Describe differences between public health practice and public health research	3. Obtain decision on whether investigation involves public health practice or public health research	3. Verify conclusions that have been reached regarding distinction between public health practice and public health research
4. Describe human subjects research	4. Describe human subjects research	4. Ensure legal and ethical conduct of human subjects research	4. Ensure legal and ethical conduct of human subjects research
5. Apply Institutional Review Board processes as directed	5. Apply Institutional Review Board processes as necessary	5. Ensure application of necessary Institutional Review Board processes	5. Ensure application of Institutional Review Board processes

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
6. Bring potential conflicts of interest to attention of senior epidemiologists	6. Manage conflicts of interest as necessary	6. Ensure that conflicts of interest do not interfere with research or investigations	6. Ensure that conflicts of interest do not interfere with research or investigations
7. Apply knowledge of privacy laws to protect confidentiality, including Health Insurance Portability and Accountability Act and applicable state and local privacy laws	7. Apply knowledge of privacy laws to protect confidentiality, including Health Insurance Portability and Accountability Act and applicable state and local privacy laws	7. Ensure application of privacy laws to protect confidentiality, including Health Insurance Portability and Accountability Act and applicable state and local privacy laws	7. Incorporate privacy laws into study design to protect confidentiality, including Health Insurance Portability and Accountability Act and applicable state and local privacy laws
8. Know agency procedures for handling Freedom of Information Act requests	8. Know agency procedures for handling Freedom of Information Act requests	8. Know agency procedures for handling Freedom of Information Act requests	8. Know agency procedures for handling Freedom of Information Act requests
9. Bring potential violations of ethical principles in preparing and submitting publications to attention of senior epidemiologists	9. Apply ethical principles in preparing and submitting publications	9. Ensure application of ethical principles in preparing and submitting publications	9. Apply ethical principles in preparing and submitting publications

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
E. Organize data from surveillance, investigations, or other sources	***E. Manage data from surveillance, investigations, or other sources***	***E. Ensure management of data from surveillance, investigations, or other sources***	***E. Manage data from surveillance, investigations, or other sources***
1. Assist in definition of database requirements, if indicated	1. Define database requirements, if indicated	1. Approve database requirements	1. Define database requirements, if indicated
a. N/A b. Adhere to national standards for coding and variables as directed (e.g., assigning numeric codes to text response options for a variable) to ensure accuracy and ease of analysis c. Use data entry techniques that ensure accuracy and reliability d. Conduct data entry validation e. Perform data cleaning and error correction f. N/A g. N/A	a. Design database with or ensure that the database design includes the necessary variables and data dictionary b. Adhere to national standards for coding and variables (e.g., assigning numeric codes to text response options for a variable) to ensure accuracy and ease of analysis c. Design data entry techniques that ensure accuracy and reliability d. Conduct data entry validation e. Perform data cleaning and error correction f. Communicate results of data error correction to data providers g. Define the requirements for or design databases that support analysis using geographic information	a. N/A b. Verify use of variables and coding in databases c. Verify data entry techniques to ensure accuracy and reliability d. N/A e. Verify that valid data cleaning has occurred f. Communicate results of data error correction to data providers g. Ensure that database requirements or design support analysis using geographic information	a. Design database with, or ensure that the database design includes, the necessary variables and metadata b. Verify choice of coding and variables (e.g., assigning numeric codes to text response options for a variable) to ensure and balance accuracy and ease of analysis c. Evaluate accuracy and reliability of data entry techniques d. Approve data entry validation processes e. Approve data cleaning and error correction processes f. Communicate results of data error correction to data providers g. Define the requirements for or design databases that support analysis using geographic information

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
2. Maintain databases	2. Manage databases	2. Ensure database management	2. Manage databases
a. Maintain original data b. N/A c. Follow established procedures for creating new variables as necessary to support analysis of data d. N/A e. Follow established procedures for linking relational data and subsetting them into analysis-specific flat datasets f. N/A g. Document all changes to database h. Apply practices for secure (restricted access) and stable (routine backups, database redundancy) data storage	a. Maintain original data, but transform data as needed for specific analyses b. Use national standards where they exist when creating datasets for analysis c. Create new variables as necessary to support analysis of data d. Perform merging and splitting of databases e. Determine methods for linking relational data and subsetting them into analysis-specific flat datasets f. Change format of data from one software application to another if necessary (e.g., from ASCII to SAS) g. Document all data transformations h. Apply practices for secure (restricted access) and stable (routine backups, database redundancy) data storage	a. Ensure that data are maintained and transformed as needed for specific analyses b. Ensure that national standards are employed where they exist when datasets are created for analysis c. N/A d. N/A e. N/A f. N/A g. Ensure that all data transformations are documented h. Ensure secure (restricted access) and stable (routine backups, database redundancy) data storage	a. Maintain original data, but transform data as needed for specific analyses b. Recommend national standards to use when creating datasets for analysis c. Evaluate need for creation of new variables as necessary to support analysis of data d. Evaluate need for and perform merging and splitting of databases e. Recommend methods for linking relational data and subsetting them into analysis-specific flat datasets f. Provide technical expertise in changing format of data from one software application to another if necessary (e.g., from ASCII to SAS) g. Create processes for documenting data transformations h. Ensure secure (restricted access) and stable (routine backups, database redundancy) data storage

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
F. Analyze data from an epidemiologic investigation or study	***F. Analyze data from an epidemiologic investigation or study***	***F. Evaluate analysis of data from an epidemiologic investigation or study***	***F. Evaluate data from an epidemiologic investigation or study***
1. Use analysis plan for data	1. Create analysis plan for data	1. Approve analysis plan for data	1. Create analysis plan for data
a. N/A b. N/A c. N/A d. Recognize and describe the assumptions to be used in interpreting results e. N/A f. N/A g. N/A	a. Define analysis plan to ensure that public health objectives are met b. Identify valid statistical techniques given the data, study design, sample size, hypotheses, and other relevant factors c. Specify the parameters to estimate d. Specify the assumptions to be used in interpreting results e. Create datasets to be used in the analysis f. Select software for analyzing and managing data g. Analyze data using geospatial and graphical representations	a. Ensure that analysis plan will meet the public health objectives b. Validate the selected statistical techniques given the data, study design, sample size, hypotheses, and other relevant factors c. N/A d. N/A e. N/A f. N/A g. N/A	a. Formulate analysis plan to ensure that public health objectives are met b. Formulate valid statistical techniques given the data, study design, sample size, hypotheses, and other relevant factors c. Verify the parameters selected for estimation d. Verify the assumptions to be used in interpreting results e. Approve the selection of the datasets for the analysis f. Approve the selection of the software to be used for analyzing and managing data g. Recommend methods for analyzing the results including geospatial and other graphical representations

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
2. Conduct analysis of data	2. Conduct analysis of data	2. Approve data analysis	2. Evaluate data
a. Compute frequencies and descriptive statistics b. Perform analyses for rates and age adjustment as directed c. Compute sensitivity, specificity, positive predictive value, incidence, prevalence, and attributable fraction as directed d. N/A e. Perform analyses for measures of association (e.g., relative risks and odds ratios), confidence intervals, and p-values f. Interpret measures of association, confidence intervals, and p-values g. N/A h. N/A i. N/A j. N/A k. N/A l. Create standard epidemiology report and necessary components, including tables, graphs, and charts m. N/A	a. Compute frequencies and descriptive statistics b. Determine whether rates and age adjustments are needed and perform analyses as necessary c. Determine which standard epidemiologic measures are indicated (e.g., sensitivity, specificity, positive predictive value, incidence, prevalence, and attributable fraction), and compute as needed d. Perform trend analyses e. Determine measures of association (e.g., relative risks and odds ratios), confidence intervals, and p-values, and perform analysis as needed f. Interpret measures of association, confidence intervals, and p-values g. Assess need for multivariable analyses h. Perform multivariable and/or regression analyses as necessary i. N/A j. Assess the effect of potential confounders k. Assess whether effect modification is present l. Create standard epidemiology report and necessary components, including tables, graphs, and charts m. Review and approve resulting epidemiology reports	a. N/A b. N/A c. N/A d. N/A e. N/A f. N/A g. N/A h. N/A i. Verify results and interpretation of data analysis j. N/A k. N/A l. N/A m. Review and approve resulting epidemiology reports	a. Compute frequencies and descriptive statistics b. Determine whether rates and age adjustments are needed, and perform analyses as necessary c. Formulate a synopsis of the data using standard epidemiologic measures, including sensitivity, specificity, positive predictive value, incidence, prevalence, and attributable fraction d. Determine best methodology for and perform trend analyses e. Analyze using measures of association (e.g., relative risks and odds ratios), confidence intervals, and p-values f. Interpret measures of association, confidence intervals, and p-values g. Evaluate using multivariate and/or regression analyses as necessary h. Perform multivariable and/or regression analyses as necessary i. Verify results and interpretation of data analysis j. Assess the effect of potential confounders k. Assess whether effect modification is present l. Create standard epidemiology report and necessary components, including tables and graphs m. N/A

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
G. Summarize results of the analysis, and draw conclusions	***G. Summarize results of the analysis, and draw conclusions***	***G. Evaluate conclusions and interpretations from investigation***	***G. Evaluate results of the analysis, and interpret conclusions***
1. N/A	1. Apply knowledge of epidemiologic principles and methods to make recommendations regarding the validity of epidemiologic data	1. Assess the validity of the epidemiologic data, taking into consideration bias and other study limitations	1. Assess the validity of the epidemiologic data, taking into consideration bias and other study limitations
a. N/A b. N/A c. N/A d. N/A e. Distinguish between statistical association and causal effect f. N/A	a. Determine likely sources of bias b. Assess validity and reliability of data collection instruments and methods c. Determine other limitations in study design, sample selection, data collection, analysis, and other features d. Recognize the limitations of significance testing e. Make causal inferences on the basis of principles of causation (e.g., strength, consistency, biological plausibility, dose-response, and temporal relationship) f. Examine the influence of power and confidence limits on the interpretation of the study's data	a. N/A b. N/A c. N/A d. N/A e. Evaluate causal inferences on the basis of principles of causation (e.g., strength, consistency, biological plausibility, dose-response, and temporal relationship) f. N/A	a. Confirm likely sources of bias and likely effects on results b. Verify the selection of data collection instruments and methods on the basis of their validity and reliability c. Confirm other limitations in study design, sample selection, data collection, analysis, and other features d. Explain the limitations of significance testing e. Evaluate causal inferences on the basis of principles of causation (e.g., strength, consistency, biological plausibility, dose-response, and temporal relationship) f. Explain the influence of power and confidence limits on the interpretation of the study's data
2. N/A	2. Assess need for special analyses, including survival analyses, cost-effectiveness/cost benefit/cost utility analyses	2. Assess need for special analyses, including survival analyses, cost-effectiveness/cost benefit/cost utility analyses	2. Assess need for special analyses, including survival analyses, cost-effectiveness/cost benefit/cost utility analyses
a. N/A	a. N/A	a. N/A	a. Formulate special analyses as necessary, including survival analyses, cost-effectiveness/cost benefit/cost utility analyses

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
3. Identify key findings from the study	3. Identify key findings from the study	3. Validate key findings from the study	3. Synthesize key findings from the study
a. Relate study findings to current scientific knowledge b. N/A c. N/A	a. Interpret study's results in the context of current scientific knowledge b. Identify any implications to public health programs c. Communicate results	a. N/A b. Determine the importance of implications to public health programs c. Synthesize results for communication to decision-makers and the public	a. Evaluate study's results in the context of current scientific knowledge b. Verify any implications to public health programs c. Synthesize results for communication to decision-makers and the public
H. Assist in developing recommended evidence-based interventions and control measures in response to epidemiologic findings	***H. Recommend evidence-based interventions and control measures in response to epidemiologic findings***	***H. Determine evidence-based interventions and control measures in response to epidemiologic findings***	***H. Formulate new interventions on the basis of evidence when available, and control measures in response to epidemiologic findings***
1. Define cultural/social/political framework for recommended interventions	1. Establish cultural/social/political framework for recommendations or interventions	1. Approve interventions on the basis of understanding of cultural/ social/political framework for consideration	1. Examine cultural/social/ political framework to develop recommendations or interventions
a. Describe study data in a way that makes clear the rationale for the recommendations b. N/A	a. Describe study data in a way that makes clear the rationale for the recommendations b. Relate study findings to existing policies, regulations, and laws, as well as environmental factors (e.g., societal, cultural, or other factors that may affect the recommendations or interventions)	a. N/A b. Interpret study findings in the context of existing policies, regulations, and laws, as well as environmental factors (e.g., societal, cultural, or other factors that may affect the recommendations or interventions)	a. Describe study data in a way that makes clear the rationale for the recommendations b. Evaluate study findings in relation to existing policies, regulations, and laws, as well as environmental factors (e.g., societal, cultural, or other factors that may affect the recommendations or interventions)

I. Skill Domain—Assessment and Analysis (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
2. N/A	2. Use scientific evidence in preparing recommendations for action or interventions	2. Ensure that scientific evidence is used in preparing recommendations for action or interventions	2. Design recommendations using scientific evidence or interventions
a. N/A b. N/A c. N/A d. N/A e. N/A f. N/A	a. Synthesize scientific evidence and knowledge for use in preparing recommendations b. Identify the key types of intervention for problem c. Develop assessment of the potential impact on the public's health from alternative interventions d. Propose new recommendations or modifications to existing interventions as necessary on the basis of study findings e. Prioritize potential public health interventions f. Link any recommended behavioral interventions with risk communication and risk reduction methods	a. N/A b. N/A c. Approve assessment of the potential impact on the public's health from alternative interventions d. Select new recommendations or modifications to existing interventions as necessary on the basis of study findings e. Approve prioritization of potential public health interventions f. Ensure that any recommended behavioral interventions are linked with risk communication and risk reduction methods	a. Synthesize scientific evidence and knowledge for use in preparing recommendations b. Evaluate the key types of intervention for problem c. Evaluate the potential impact on the public's health from alternative interventions d. Formulate new recommendations or modifications to existing interventions as necessary on the basis of study findings e. Prioritize potential public health interventions f. Link any recommended behavioral interventions with risk communication and risk reduction methods
I. Assist in evaluation of programs	***I. Evaluate programs***	***I. Ensure evaluation of programs***	***I. Evaluate programs***
1. N/A	1. Assist in development of measurable and program-relevant goals and objectives	1. Approve measurable and program-relevant goals and objectives	1. Develop measurable and program-relevant goals and objectives in collaboration with program staff
2. N/A	2. Assist in development of program logic models and theories of action	2. Decide on program logic models and theories of action	2. Develop program logic models and theories of action in collaboration with program staff
3. Collect surveillance and other data for use in tracking program objectives and outcomes	3. Identify surveillance and other data for use in tracking program objectives and outcomes	3. Approve surveillance and other data for use in tracking program objectives and outcomes	3. Synthesize surveillance and other data to allow tracking of program objectives and outcomes
4. Assist in tracking progress toward program objectives and outcomes	4. Record progress toward program objectives and outcomes	4. Monitor progress toward program objectives and outcomes	4. Critique progress toward program objectives and outcomes
5. Communicate information about progress toward program objectives and outcomes to program managers	5. Communicate information about progress toward program objectives and outcomes to program managers and staff for use in program planning and modification	5. Incorporate information about progress toward program objectives and outcomes in decisions on program planning and modification	5. Evaluate progress toward program objectives and outcomes for program managers and staff to aid in program planning and modification

II. Skill Domain—Basic Public Health Sciences

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. Know how causes of disease affect epidemiologic practice	***A. Use current knowledge of causes of disease to guide epidemiologic practice***	***A. Use current knowledge of causes of disease to guide epidemiologic practice***	***A. Use current knowledge of causes of disease to guide epidemiologic practice***
1. Relate basic etiologic processes for human diseases to subject matter areas of interest (e.g., infectious diseases, chronic diseases)	1. Relate basic etiologic processes for human diseases to subject matter areas of interest (e.g., infectious diseases, chronic diseases)	1. Ensure that basic etiologic processes for human diseases are related to subject matter areas of interest (e.g., infectious diseases, chronic diseases)	1. Ensure that basic etiologic processes for human diseases are related to subject matter areas of interest (e.g., infectious diseases, chronic diseases)
2. Apply understanding of human and environmental biology and behavioral sciences and principles to determine potential biological mechanisms of disease	2. Apply understanding of human and environmental biology and behavioral sciences and principles to determine potential biological mechanisms of disease	2. Ensure the application of understanding of human and environmental biology and behavioral sciences and principles to determine potential biological mechanisms of disease	2. Ensure the application of understanding of human and environmental biology and behavioral sciences and principles to determine potential biological mechanisms of disease
3. N/A	3. Explain how genetics and genomics affect disease processes and public health policy and practice	3. Ensure that the role of genetics and genomics on disease processes are considered when developing public health policy and practice	3. Synthesize knowledge about the effect of genetics and genomics on disease processes and public health policy and practice
4. Apply principles of the host/agent/ environment model to disease causation, prevention, and control	4. Apply principles of the host/agent/ environment model to disease causation, prevention, and control	4. Ensure the application of principles of the host/agent/environment model to disease causation, prevention, and control	4. Ensure the application of principles of the host/agent/environment model to disease causation, prevention, and control
5. Describe the role and influence of sociobehavioral factors (including community, political, social, family, and individual behavioral factors) in health risks and health status	5. Describe the role and influence of sociobehavioral factors (including community, political, social, family, and individual behavioral factors) in health risks and health status	5. Ensure that the role and influence of sociobehavioral factors (including community, political, social, family, and individual behavioral factors) are incorporated into understanding health risks and health status	5. Synthesize knowledge about the role and influence of sociobehavioral factors (including community, political, social, family, and individual behavioral factors) in health risks and health status
6. N/A	6. Incorporate etiologic principles into development of disease prevention and control strategies	6. Incorporate etiologic principles into development of disease prevention and control strategies	6. Incorporate etiologic principles into development of disease prevention and control strategies

II. Skill Domain—Basic Public Health Sciences (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
B. Identify the role of laboratory resources in epidemiologic activities	***B. Use laboratory resources to support epidemiologic activities***	***B. Ensure the use of laboratory resources to support epidemiologic activities***	***B. Develop processes for using laboratory resources to support epidemiologic activities***
1. Identify the roles and capabilities of public health laboratories and other laboratories and how they are used in epidemiologic investigations	1. Identify the roles and capabilities of public health laboratories and other laboratories and how they are used in epidemiologic investigations	1. Examine the roles and capabilities of public health laboratories and other laboratories and how they are used in epidemiologic investigations	1. Synthesize the roles and capabilities of public health laboratories in epidemiologic investigations
2. N/A	2. Coordinate laboratory and epidemiologic activities, including test selection, communication, and reporting results in the field	2. Ensure the coordination of laboratory and epidemiologic activities, including test selection, communication, and reporting results in the field	2. Determine laboratory and epidemiologic activities including test selection, communication, and reporting results in the field
3. N/A	3. Interpret laboratory data, accounting for factors that influence the results of screening and diagnostic tests	3. Evaluate the interpretation of laboratory data accounting for factors that influence the results of screening and diagnostic tests	3. Develop methods for the interpretation of laboratory data, accounting for factors that influence the results of screening and diagnostic tests
4. Use identified specimen collection, storage, and transportation measures	4. Implement necessary specimen collection, storage, and transportation measures	4. Oversee necessary specimen collection, storage, and transportation measures	4. Develop methods for specimen collection, storage, and transportation measures

II. Skill Domain—Basic Public Health Sciences (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
C. Use identified informatics tools in support of epidemiologic practice	***C. Apply principles of informatics, including data collection, processing, and analysis, in support of epidemiologic practice***	***C. Ensure application of principles of informatics, including data collection, processing, and analysis, in support of epidemiologic practice***	***C. Apply principles of informatics, including data collection, processing, and analysis, in support of epidemiologic practice***
1. Use information technologies and communication tools necessary to support epidemiologic investigations and surveillance	1. Use information technologies and communication tools necessary to support epidemiologic investigations and surveillance	1. Provide access to information technologies and communication tools necessary to support epidemiologic investigations and surveillance	1. Use information technologies and communication tools necessary to support epidemiologic investigations and surveillance
2. Use software tools that support public health data acquisition, entry, abstraction, analysis, and reporting	2. Use software tools that support online searching, public health data acquisition, entry, abstraction, management, analysis, planning, mapping, and reporting	2. Provide access to software tools that support online searching, public health data acquisition, entry, abstraction, management, analysis, planning, mapping, and reporting	2. Use software tools that support online searching, public health data acquisition, entry, abstraction, management, analysis, planning, mapping, and reporting
3. Apply procedures (policies) and technical means (security) to ensure the integrity and protection of confidential information in electronic files and computer systems	3. Apply procedures (policies) and technical means (security) to ensure the integrity and protection of confidential information in electronic files and computer systems	3. Assure that procedures (policies) and technical means (security) are used to ensure the integrity and protection of confidential information in electronic files and computer systems	3. Apply procedures (policies) and technical means (security) to ensure the integrity and protection of confidential information in electronic files and computer systems

II. Skill Domain—Basic Public Health Sciences (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
4. Combine data and information from multiple sources to create new information to support public health decision-making	4. Combine data and information from multiple sources to create new information to support public health decision-making	4. Use data and information from multiple sources to create new information to support public health decision-making	4. Synthesize data and information from multiple sources to create new information to support public health decision-making
a. Suggest limitations of current data collection that might determine the need for new data collection b. N/A c. N/A d. N/A	a. Determine whether new data collection is needed or existing datasets or systems can be mined b. Participate in the development of new or enhancement of existing databases to support epidemiologic investigations, surveillance, etc. c. Use interoperable data standards as needed for storage and transmission, and be able to find the relevant standards specifications as needed d. Maintain electronic documents (guidelines, datasets), including documented versions, dissemination methods, and relevant standards specifications	a. Decide whether to create new data collection systems or to mine existing datasets or systems b. Oversee the development of new or enhancement of existing databases to support epidemiologic investigations, surveillance, etc. c. Ensure the utilization of interoperable data standards for storage and transmission, and be able to find the relevant standards specifications as needed d. Maintain electronic documents (guidelines, datasets), including documented versions, dissemination methods, and relevant standards specifications	a. Decide whether to create new data collection systems or to mine existing datasets or systems b. Develop new or enhance existing databases to support epidemiologic investigations, surveillance, etc. c. Ensure the utilization of interoperable data standards for storage and transmission, and be able to find the relevant standards specifications as needed d. Create processes to maintain electronic documents (guidelines, datasets), including documented versions, dissemination methods, and relevant standards specifications
5. N/A	5. Participate in development of data models to ensure representation of epidemiologic needs in associated databases and information systems	5. Participate in development of data models to ensure representation of epidemiologic needs in associated databases and information systems	5. Participate in development of data models to ensure representation of epidemiologic needs in associated databases and information systems
D. N/A	***D. N/A***	***D. Develop and manage information systems to improve effectiveness of surveillance, investigation, and other epidemiologic practices***	***D. Develop and manage information systems to improve effectiveness of surveillance, investigation, and other epidemiologic practices***
1. N/A	1. N/A	1. Engage and consult with information technology professionals with necessary expertise for developing information systems to support epidemiology programs	1. N/A

II. Skill Domain—Basic Public Health Sciences (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
2. N/A	2. N/A	2. Articulate the needs of the epidemiology program to the information technology specialists	2. N/A
3. N/A	3. N/A	3. Ensure that all members of systems development teams, including epidemiologists and information technology specialists, fill roles consistent with their expertise	3. Compose and manage systems development teams in a manner that demonstrates recognition of the appropriate roles and domains for computer scientists, epidemiologists, policy makers, and programmers and other information technology specialists in information systems development
4. N/A	4. N/A	4. Lead the development of integrated, cost-effective public health information systems that are consistent with a larger (enterprise-level) information architecture	4. Lead and advocate for, or otherwise actively participate in, the development of integrated, cost-effective public health information systems within the public health enterprise, ensuring that new applications and information systems are built in conformance with a larger (enterprise-level) information architecture
5. N/A	5. N/A	5. Participate in development of confidentiality and privacy policies for the enterprise and security systems to support the implementation of those policies	5. Participate in development of confidentiality and privacy policies for the enterprise, and ensure the development of security systems to support the implementation of those policies
6. N/A	6. N/A	6. Ensure that information systems developed for epidemiology programs fully support the objectives, functions, and business processes of the public health system	6. Ensure that the information systems developed for epidemiology programs fully support the objectives, functions, and business processes of the public health system

III. Skill Domain—Communication

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. Prepare written and oral reports and presentations that communicate necessary information to agency staff	***A. Prepare written and oral reports and presentations that communicate necessary information to professional audiences, policy makers, and the general public***	***A. Ensure preparation of written and oral reports and presentations that communicate necessary information to professional audiences, policy makers, and the general public***	***A. Organize preparation of written and oral reports and presentations that communicate necessary information to professional audiences, policy makers, and the general public***
1. Identify methods and content for communication of epidemiologic findings	1. Identify audience, methods, and content for communication of epidemiologic findings	1. Approve selection of audience, methods, and content for communication of epidemiologic findings	1. Verify selection of audience, methods, and content for communication of epidemiologic findings
a. N/A b. Identify relevant data to report c. Assess needs and interests of target audience for materials that are used in communication d. Use communication methods that meet the needs of the target audience, as directed	a. Identify target audience for communication b. Identify relevant data to report c. Assess needs and interests of target audience for materials that are used in communication d. Identify communication methods that meet the needs of the target audience	a. N/A b. N/A c. N/A d. N/A	a. Decide on target audience for communication b. Determine relevance of data to report c. Review assessment of needs and interests of target audience for materials that are used in communication d. Verify methods of communication selected for target audience
2. Communicate epidemiologic work to agency staff through written reports and oral presentations	2. Communicate epidemiologic work to professional audiences and agency staff through written reports and oral presentations	2. Review written reports and oral presentations to ensure that content communicates epidemiologic work to professional audiences and agency staff	2. Create written reports and oral presentations that communicate epidemiologic work to professional audiences and agency staff
a. N/A b. N/A c. Prepare summary reports and memoranda for use within the agency d. N/A e. Use current audiovisual tools to maximize communication f. Create charts, tables, and figures that communicate to the target audience	a. Prepare abstracts either for publication or for presentation at scientific meetings b. Prepare manuscripts for scientific publication c. Prepare summary reports and memoranda for use within the agency d. N/A e. Use current audiovisual tools to maximize communication f. Create charts, tables, and figures that communicate to the target audience	a. N/A b. N/A c. N/A d. N/A e. N/A f. N/A	a. Prepare abstracts either for publication or for presentation at scientific meetings b. Prepare manuscripts for scientific publication c. Prepare summary reports and memoranda for use within the agency d. Critique reports, manuscripts, and other documents that have been prepared by others e. Use current audiovisual tools to maximize communication f. Create charts, tables, and figures that communicate to the target audience

III. Skill Domain—Communication (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
3. N/A	3. Communicate epidemiologic information to the general public, the news media, and/or to policy makers through giving oral presentations or contributing to development of written documents	3. Create processes to guide preparation of documents or oral presentations that communicate epidemiologic information to the general public, news media, and/or policy makers	3. Create documents (e.g., briefs, press releases, Web pages) that communicate epidemiologic information to the general public, press, and/or to policy makers
a. N/A b. N/A c. N/A	a. Contribute to press releases for the general public b. Participate in the development of disease prevention/health promotion materials for lay audiences c. Communicate scientific findings in a language tailored to the needs of decision-makers, news media, and other target audiences	a. Approve press releases on an as-needed basis b. N/A c. Create documents that communicate scientific findings in a language tailored to the needs of decision-makers, news media, and other target audiences	a. Contribute to or develop press releases for the general public b. Develop disease prevention/ health promotion materials for lay audiences c. Create documents that communicate scientific findings in a language tailored to the needs of decision-makers, news media, and other target audiences
4. N/A	4. Tailor surveillance information content and periodicity of dissemination for specific audiences and their uses	4. Approve surveillance information content and periodicity of dissemination for specific audiences and their uses	4. Determine content for surveillance information and periodicity of dissemination for specific audiences and their uses
5. Respond to public queries about epidemiologic data	5. Respond to public queries about epidemiologic data or related issues	5. Oversee responses to public queries about epidemiologic data or related issues	5. Create key messages for responding to public queries about epidemiologic data or related issues
6. N/A	6. Demonstrate ability to explain or teach basic epidemiologic principles to non-epidemiologists and lower-level epidemiologists	6. Demonstrate ability to explain or teach basic epidemiologic principles to non-epidemiologists and lower-level epidemiologists	6. Demonstrate ability to explain or teach basic and advanced epidemiologic principles to non-epidemiologists and lower-level epidemiologists

III. Skill Domain—Communication (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
B. Recognize the basic principles of risk communication	***B. Demonstrate the basic principles of risk communication***	***B. Ensure that the basic principles of risk communication are followed in all communication of epidemiologic findings***	***B. Create messages that follow the principles of risk communication***
1. Provide epidemiologic information to support the development of risk communication messages	1. Participate in developing risk communication messages that convey epidemiologic information to particular public health problems	1. Develop risk communication messages that convey epidemiologic information to particular public health problems	1. Develop risk communication messages that convey epidemiologic information to particular public health problems
a. N/A b. Provide content to the public information officer and other relevant agency staff c. N/A	a. Assist in developing content for risk communication messages b. Provide content to the public information officer and other relevant agency staff c. Review risk communication messages for scientific accuracy and clarity	a. Create content for risk communication messages b. Review the content provided to the public information officer and other relevant agency staff c. Review risk communication messages for scientific accuracy and clarity	a. Create content for risk communication messages b. Review and provide content to the public information officer and other relevant agency staff c. Review risk communication messages for scientific accuracy and clarity
2. Use basic risk communication principles to communicate epidemiologic messages to agency staff	2. Use basic risk communication principles to communicate epidemiologic messages	2. Oversee communication of epidemiologic messages	2. Model risk communication principles when communicating epidemiologic messages
a. Refer media inquiries to the correct spokesperson for the agency b. N/A c. N/A d. N/A e. Adhere to the agency risk communication strategy	a. Refer media inquiries to the correct spokesperson for the agency b. N/A c. Respond to media inquiries as requested by the public health agency d. N/A e. Adhere to the agency risk communication strategy	a. Ensure that staff refer media inquiries to the correct spokesperson for the agency b. Serve as agency spokesperson when necessary c. Respond to media inquiries d. Ensure that staff are using risk communication techniques suitable to the target audience e. Adhere to the agency risk communication strategy	a. Refer media inquiries to the correct spokesperson for the agency b. Serve as agency spokesperson when necessary c. Respond to media inquiries d. N/A e. Adhere to the agency risk communication strategy

III. Skill Domain—Communication (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
C. Incorporate interpersonal skills in communication with agency personnel, colleagues, and the public	***C. Incorporate interpersonal skills in communication with agency personnel, colleagues, and the public***	***C. Model interpersonal skills in communication with agency personnel, colleagues, and the public***	***C. Model interpersonal skills in communication with agency personnel, colleagues, and the public***
1. Demonstrate ability to listen effectively when epidemiologic findings are presented or discussed	1. Demonstrate ability to listen effectively when epidemiologic findings are presented or discussed	1. Demonstrate ability to listen effectively when epidemiologic findings are presented or discussed	1. Demonstrate ability to listen effectively when epidemiologic findings are presented or discussed
2. Demonstrate professional interpersonal, interdisciplinary, transdisciplinary, and multidisciplinary communication	2. Demonstrate professional interpersonal, interdisciplinary, transdisciplinary, and multidisciplinary communication	2. Model professional interpersonal, interdisciplinary, transdisciplinary, and multidisciplinary communication	2. Model professional interpersonal, interdisciplinary, transdisciplinary, and multidisciplinary communication
a. Participate in discussions and in group settings b. Show respect for others and promote diverse opinions c. Demonstrate ability to solicit input from individuals and groups d. Demonstrate ability to communicate epidemiologic findings, methodology, and principles when part of a multidisciplinary team e. Demonstrate ability to interview individuals associated with disease investigations f. Use communication skills to help resolve conflict g. Support communication of findings to affected individuals or communities using mechanisms tailored to that individual or community/special population	a. Lead discussions and participate in group settings b. Show respect for others and promote diverse opinions c. Demonstrate ability to solicit input from individuals and groups d. Demonstrate ability to communicate epidemiologic findings, methodology, and principles when part of a multidisciplinary team e. Demonstrate ability to interview individuals associated with disease investigations f. Use communication skills to help resolve conflict g. Communicate findings to affected individuals or communities using mechanisms tailored to that individual or community/special population	a. Promote group discussions and lead such discussions when necessary b. Show respect for others and promote diverse opinions c. Solicit input from individuals and groups d. Create messages to communicate epidemiologic findings, methodology, and principles to multidisciplinary teams e. N/A f. Use communication skills to help resolve conflict g. Create messages that communicate findings to affected individuals or communities using mechanisms tailored to that individual or community/special population	a. Lead discussions and participate in group settings b. Show respect for others and promote diverse opinions c. Demonstrate ability to solicit input from individuals and groups d. Create messages to communicate epidemiologic findings, methodology, and principles to multidisciplinary teams e. N/A f. Use communication skills to help resolve conflict g. Create messages that communicate findings to affected individuals or communities using mechanisms tailored to that individual or community/special population

III. Skill Domain—Communication (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
D. Use effective communication technologies	***D. Use effective communication technologies***	***D. Ensure utilization of effective communication technologies***	***D. Use effective communication technologies***
1. Participate in the development of the design and content of Web-based communication	1. Participate in the development of the design and content of Web-based communication	1. Approve the design and content of Web-based communication	1. Create content for Web-based communication
2. Use policies that address security, privacy, and legal considerations when communicating epidemiologic information through e-mail, health alert networks, or other potentially public documents	2. Use policies that address security, privacy, and legal considerations when communicating epidemiologic information through e-mail, health alert networks, or other potentially public documents	2. Enforce policies that address security, privacy, and legal considerations when communicating epidemiologic information through e-mail, health alert networks, or other potentially public documents	2. Develop as-needed policies that address security, privacy, and legal considerations when communicating epidemiologic information through e-mail, health alert networks, or other potentially public documents
3. N/A	3. Use effective educational and behavioral techniques and technological tools to promote public health (e.g., through community education, behavior modification, collaborative policy development, issue advocacy, and community mobilization)	3. Use effective educational and behavioral techniques and technological tools to promote public health (e.g., through community education, behavior modification, collaborative policy development, issue advocacy, and community mobilization)	3. Use effective educational and behavioral techniques and technological tools to promote public health (e.g., through community education, behavior modification, collaborative policy development, issue advocacy, and community mobilization)

IV. Skill Domain—Community Dimensions of Practice

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. Provide epidemiologic input into epidemiologic studies, public health programs, and community public health planning processes at the state, local, or tribal level	***A. Provide epidemiologic input into epidemiologic studies, public health programs, and community public health planning processes at the state, local, or tribal level***	***A. Lead epidemiologic studies, public health programs, and community public health planning processes at the state, local, or tribal level***	***A. Lead epidemiologic studies, public health programs, and community public health planning processes at the state, local, or tribal level***
1. Supply information from health status assessments to aid in the design, interpretation, and conduct of epidemiologic studies	1. Use information from the community and from health status assessments to aid in the design, interpretation, and conduct of epidemiologic studies	1. Synthesize information from the community and from health status assessments to aid in the design, interpretation, and conduct of epidemiologic studies	1. Synthesize information from the community and from health status assessments to aid in the design, interpretation, and conduct of epidemiologic studies
a. N/A b. N/A c. Provide communities with data as directed to aid in identifying health priorities for study d. Provide technical assistance as directed to communities and outside partners with respect to surveillance, epidemiologic data, and evaluation	a. Use strategies for engaging communities in dialogue on health issues requiring study b. Use strategies for reaching populations and individuals who traditionally may not have had the opportunity to participate in priority-setting processes c. Assist communities in identifying health priorities for study d. Provide technical assistance to communities and outside partners with respect to surveillance, epidemiologic data, and evaluation	a. Engage communities in dialogue on health issues requiring study b. Ensure outreach to populations and individuals who traditionally may not have had the opportunity to participate in priority-setting processes c. Provide leadership to communities in identifying health priorities for study d. Provide technical assistance to communities and outside partners with respect to surveillance, epidemiologic data, and evaluation	a. Engage communities in dialogue on health issues requiring study b. Ensure outreach to populations and individuals who traditionally may not have had the opportunity to participate in priority-setting processes c. Provide leadership to communities in identifying health priorities for study d. Provide technical assistance to communities and outside partners with respect to surveillance, epidemiologic data, and evaluation

IV. Skill Domain—Community Dimensions of Practice (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
2. Assist in providing epidemiologic input into an assessment of the local public health system to aid in state, local, or tribal public health planning	2. Provide epidemiologic input into an assessment of the local public health system to aid in state, local, or tribal public health planning	2. Lead epidemiologic portion of assessment of the local public health system to aid in state, local, or tribal public health planning	2. Lead epidemiologic portion of assessment of the local public health system to aid in state, local, or tribal public health planning
a. N/A b. N/A c. N/A d. Assist in identifying the specific populations within the community or region that each public health program seeks to reach e. Assist in identifying the epidemiologic data collection and analysis needs of each program f. N/A g. N/A h. N/A i. N/A j. N/A k. N/A	a. Map the different levels of government public health (tribal, local, state, and federal) and their roles and responsibilities in the community b. Characterize the interactions between different levels of government in relation to community public health programs c. Assess the funding streams for public health and epidemiology programs that affect the community d. Identify the specific populations within the community or region that each public health program seeks to reach e. Identify the epidemiologic data collection and analysis needs of each program f. N/A g. Map the community medical-care delivery system, including financing and structure and major policy issues affecting medical care h. Characterize relationships among public and private organizations within the community i. Identify environmental, social, and cultural factors that affect the community's health	a. Ensure that the different levels of government public health (tribal, local, state, and federal) and their roles and responsibilities are mapped out in the community b. Ensure that the interactions between different levels of government in relation to community public health programs are characterized c. Assess the funding streams for public health and epidemiology programs that affect the community d. Ensure that the specific populations within the community or region that each public health program seeks to reach are identified e. Ensure that the epidemiologic data collection and analysis needs of each program are identified f. Identify community themes and strengths g. Ensure that the community medical-care delivery system is mapped out, including financing and structure and major policy issues affecting medical care h. Ensure that relationships among public and private organizations within the community are characterized	a. Map the different levels of government public health (tribal, local, state, and federal) and their roles and responsibilities in the community b. Characterize the interactions between different levels of government in relation to community public health programs c. Assess the funding streams for public health and epidemiology programs that affect the community d. Identify the specific populations within the community or region that each public health program seeks to reach e. Identify the epidemiologic data collection and analysis needs of each program f. Identify community themes and strengths g. Map the community medical-care delivery system, including financing and structure and major policy issues affecting medical care h. Characterize relationships among public and private organizations within the community i. Evaluate environmental, social, and cultural factors that affect the community's health

IV. Skill Domain—Community Dimensions of Practice (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
	2. Provide epidemiologic input into an assessment of the local public health system to aid in state, local, or tribal public health planning *(continued)*	2. Lead epidemiologic portion of assessment of the local public health system to aid in state, local, or tribal public health planning *(continued)*	2. Lead epidemiologic portion of assessment of the local public health system to aid in state, local, or tribal public health planning *(continued)*
	j. Document changes that are occurring or are expected to occur that affect the community's health or the local public health system (e.g., a Mobilizing for Action through Planning and Partnerships forces of change assessment) k. Identify threats and opportunities that arise from these changes	i. Ensure that environmental, social, and cultural factors that affect the community's health are analyzed j. Examine changes that are occurring or are expected to occur that affect the community's health or the local public health system (e.g., a Mobilizing for Action through Planning and Partnerships forces of change assessment) k. Evaluate threats and opportunities that arise from these changes	j. Examine changes that are occurring or are expected to occur that affect the community's health or the local public health system (e.g., a Mobilizing for Action through Planning and Partnerships forces of change assessment) k. Evaluate threats and opportunities that arise from these changes
B. Participate in development of community partnerships to support epidemiologic investigations	***B. Participate in development of community partnerships to support epidemiologic investigations***	***B. Develop community partnerships to support epidemiologic investigations***	***B. Develop community partnerships to support epidemiologic investigations***
1. N/A	1. Identify partners and stakeholders necessary for epidemiologic investigation	1. Sustain relationships with partners and stakeholders necessary for epidemiologic investigation	1. Solicit partners and stakeholders necessary for epidemiologic investigation
2. Contribute to community-specific participation strategies to engage the public in the planning, implementation, and evaluation of epidemiologic investigations when indicated	2. Use community-specific participation strategies in the planning, implementation, and evaluation of epidemiologic investigations when indicated	2. Ensure the use of community-specific participation strategies in the planning, implementation, and evaluation of epidemiologic investigations when indicated	2. Develop community-specific participation strategies in the planning, implementation, and evaluation of epidemiologic investigations when indicated
3. N/A	3. Clarify the roles of partners and stakeholders in the epidemiologic investigation	3. Clarify the roles of partners and stakeholders in the epidemiologic investigation	3. Clarify the roles of partners and stakeholders in the epidemiologic investigation
4. N/A	4. Participate in the development of epidemiologic studies, including incorporating input from task forces and other target audiences	4. Lead the development of epidemiologic studies, including incorporating input from task forces and other target audiences	4. Lead the development of epidemiologic studies, including incorporating input from task forces and other target audiences

V. Skill Domain—Cultural Competency

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. Describe population by race; ethnicity; culture; societal, educational, and professional backgrounds; age; gender; religion; disability; and sexual orientation	***A. Describe population by race; ethnicity; culture; societal, educational, and professional backgrounds; age; gender; religion; disability; and sexual orientation***	***A. Differentiate special populations by race; ethnicity; culture; societal, educational, and professional backgrounds; age; gender; religion; disability; and sexual orientation***	***A. Differentiate special populations by race; ethnicity; culture; societal, educational, and professional backgrounds; age; gender; religion; disability; and sexual orientation***
1. Identify special populations in the community that may be significant in addressing public health problems	1. Identify special populations in the community that may be significant in addressing public health problems	1. Ensure that each special population is characterized by size, location, and other factors that may be significant in addressing public health problems	1. Characterize each special population by size, location, and other factors that may be significant in addressing public health problems
B. Establish relationships with groups of special concern (e.g., disadvantaged or minority groups, groups subject to health disparities, historically underrepresented groups)	***B. Establish relationships with groups of special concern (e.g., disadvantaged or minority groups, groups subject to health disparities, historically underrepresented groups)***	***B. Establish relationships with groups of special concern (e.g., disadvantaged or minority groups, groups subject to health disparities, historically underrepresented groups)***	***B. Establish relationships with groups of special concern (e.g., disadvantaged or minority groups, groups subject to health disparities, historically underrepresented groups)***
1. N/A	1. Study populations' histories and past treatment by public health system	1. Evaluate populations' histories and past treatment by public health system	1. Evaluate historical context of populations' histories and past treatment by public health system
2. N/A	2. N/A	2. Formulate communication strategies for special populations on the basis of knowledge of historical treatment	2. Formulate communication strategies for special populations on the basis of knowledge of historical treatment
3. N/A	3. N/A	3. Organize outreach efforts to special populations	3. Organize outreach efforts to special populations
4. N/A	4. Develop mechanisms to receive input from groups of special concern into the design and conduct of epidemiologic practice	4. Ensure that input from groups of special concern is used in the design and conduct of epidemiologic practice	4. Ensure that input from groups of special concern is used in the design and conduct of epidemiologic practice

V. Skill Domain—Cultural Competency (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
C. Describe surveillance systems that include groups subject to health disparities or other potentially underrepresented groups (using standard categories where available)	***C. Design surveillance systems to include groups subject to health disparities or other potentially underrepresented groups (using standard categories where available)***	***C. Ensure that surveillance systems are designed to include groups subject to health disparities or other potentially underrepresented groups (using standard categories where available)***	***C. Ensure that surveillance systems are designed to include groups subject to health disparities or other potentially underrepresented groups (using standard categories where available)***
1. Identify standard categories used to define special populations	1. Use standard categories when defining special populations	1. Ensure that standard categories are used to define special populations, taking into account historical, social, and political contexts of standard categories	1. Select standard categories used to define special populations
2. Identify historical, social, and political contexts of standard categories	2. Identify historical, social, and political contexts of standard categories	2. N/A	2. Examine historical, social, and political contexts of standard categories
3. Identify limitations of standard categories	3. Identify limitations of standard categories	3. N/A	3. Explain limitations of standard categories
4. N/A	4. Work with community as necessary to develop new categories if standard categories are unavailable	4. Lead collaboration with community as necessary to develop new categories if standard categories are unavailable	4. Work with community as necessary to develop new categories if standard categories are unavailable
5. N/A	5. Design data collection tools to capture information needed to assess health disparities	5. Ensure that data collection tools and sampling plan capture information needed to assess health disparities and provide stable estimates in populations of interest	5. Verify that data collection tools will capture information needed to assess health disparities
6. N/A	6. Design sampling plan to ensure sample size large enough to provide stable estimates in populations of interest	6. N/A	6. Evaluate sampling plan to ensure sample size large enough to provide stable estimates in populations of interest
7. Avoid potential adverse impacts of data collection on special populations	7. Avoid potential adverse impacts of data collection on special populations	7. Ensure that data collection does not adversely impact special populations	7. Avoid potential adverse impacts of data collection on special populations

V. Skill Domain—Cultural Competency (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
D. Conduct investigations using languages and approaches tailored to population	***D. Conduct investigations using languages and approaches tailored to population***	***D. Ensure that investigations use languages and approaches tailored to population***	***D. Organize investigations that use languages and approaches tailored to population***
1. Identify primary language of population	1. Identify primary language of population	1. Identify primary language of population	1. Identify primary language of population
2. Use knowledge of specific sociocultural factors in the population	2. Use knowledge of specific sociocultural factors in the population	2. Use knowledge of specific sociocultural factors in the population	2. Use knowledge of specific sociocultural factors in the population
3. N/A	3. N/A	3. Identify mechanisms for contact and communication with population	3. Identify mechanisms for contact and communication with population
4. N/A	4. N/A	4. Ensure that investigative methods will accommodate special needs of the population	4. Identify investigative methods that will accommodate special needs of the population
5. N/A	5. N/A	5. Synthesize this knowledge into an investigation strategy	5. Synthesize this knowledge into an investigation strategy
6. N/A	6. N/A	6. Facilitate staff access to identified support or mechanisms needed to communicate with population	6. N/A
E. Use standard population categories or subcategories when performing data analysis	***E. Use standard population categories or subcategories when performing data analysis***	***E. Ensure that standard population categories or subcategories are used for data analysis***	***E. Ensure that standard population categories or subcategories are used for data analyses***
F. N/A	***F. Use knowledge of specific sociocultural factors in the population to interpret findings***	***F. Use knowledge of specific sociocultural factors in the population to interpret findings***	***F. Use knowledge of specific sociocultural factors in the population to interpret findings***
1. N/A	1. Identify cultural factors that may have influenced outcome of investigation	1. Evaluate cultural factors that may have influenced outcome of investigation	1. Evaluate cultural factors that may have influenced outcome of investigation
2. N/A	2. N/A	2. Assess impact of investigation findings on the population	2. Assess impact of investigation findings on the population

V. Skill Domain—Cultural Competency (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
G. Support public health actions that are relevant to the affected community	***G. Recommend public health actions that would be relevant to the affected community***	***G. Ensure that actions are relevant to the affected community***	***G. Recommend actions that will be relevant to the affected community***
1. Use alternative actions that have been shown to be effective in similar populations	1. Use alternative actions that have been shown to be effective in similar populations	1. Ensure use of alternative actions that have been shown to be effective in similar populations	1. Evaluate alternative actions that have been shown to be effective in similar populations
2. Use action strategies that will address the issues identified in the investigation while meeting the needs of the community	2. Use action strategies that will address the issues identified in the investigation while meeting the needs of the community	2. Create action strategies that will address the issues identified in the investigation while meeting the needs of the community	2. Create action strategies that will address the issues identified in the investigation while meeting the needs of the community
3. N/A	3. N/A	3. Validate the choice of action strategy through consultation with the affected community	3. Validate the choice of action strategy through consultation with the affected community

VI. Skill Domain—Financial and Operational Planning and Management (Operational Planning, Financial Planning, and Management Skills)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. Conduct epidemiologic activities within the financial and operational plan of the agency	***A. Conduct epidemiologic activities within the financial and operational plan of the agency***	***A. Create operational and financial plans for future epidemiologic activities***	***A. Conduct epidemiologic activities within the financial and operational plan of the agency***
1. N/A	1. Set goals and objectives for epidemiology program	1. Set goals and objectives for epidemiology program	1. Provide input into goals and objectives for epidemiology program
2. N/A	2. Formulate tasks to meet goals and objectives	2. Formulate tasks to meet goals and objectives	2. Formulate tasks to meet goals and objectives
3. Construct a timeline for carrying out the tasks	3. Construct a timeline for carrying out the tasks	3. Construct a timeline for carrying out the tasks	3. Construct a timeline for carrying out the tasks
4. Conduct epidemiologic activities, including travel, within specified budget	4. Describe personnel, staffing, travel, and other needs for epidemiologic activities	4. N/A	4. Describe personnel, staffing, travel, and other needs for epidemiologic activities
5. Maintain accurate records	5. Maintain accurate records	5. N/A	5. Maintain accurate records
B. Describe the financial planning and budgetary process of the epidemiology program	***B. Assist in developing a fiscally sound budget that will support the activities defined in the operational plan and is consistent with the financial rules of the agency***	***B. Formulate a fiscally sound budget that will support the activities defined in the operational plan and is consistent with the financial rules of the agency***	***B. Describe the financial planning and budgetary process of the agency***
1. N/A	1. Assess the financial rules of the agency and available resources to establish boundaries for the budget	1. Assess the financial rules of the agency and available resources to establish boundaries for the budget	1. Assess the financial rules of the agency and available resources to establish boundaries for the budget
2. List resources necessary to carry out tasks in the operational plan, including personnel, equipment, supplies, and travel costs	2. Estimate resources necessary to carry out tasks in the operational plan, including personnel, equipment, supplies, and travel costs	2. Justify resources necessary to carry out tasks in the operational plan, including personnel, equipment, supplies, and travel costs	2. Estimate resources necessary to carry out tasks in the operational plan, including personnel, equipment, supplies, and travel costs
3. N/A	3. Estimate expenditures that may arise from unexpected epidemiologic activities, such as rapid investigations and emergency response	3. Estimate expenditures that may arise from unexpected epidemiologic activities, such as rapid investigations and emergency response	3. N/A

VI. Skill Domain—Financial and Operational Planning and Management (Operational Planning, Financial Planning, and Management Skills) (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
C. Implement operational and financial plans	***C. Implement operational and financial plans***	***C. Oversee implementation of operational and financial plans***	***C. Implement operational and financial plans for assigned projects***
1. N/A	1. Assign tasks to staff members	1. Assign tasks to staff members	1. N/A
2. Compare progress to expectations established in plan	2. Compare progress to expectations established in plan	2. Compare progress to expectations established in plan	2. Compare progress to expectations established in plan
3. N/A	3. Track fiscal expenditures against financial plan	3. Evaluate fiscal expenditures against financial plan	3. Evaluate fiscal expenditures against financial plan
4. Adjust activities as necessary to stay within defined budget	4. Adjust activities as necessary to stay within defined budget	4. Adjust activities as necessary to stay within defined budget	4. Adjust activities as necessary to stay within defined budget
5. Seek additional resources as necessary to support unexpected activities	5. Seek additional resources as necessary to support unexpected activities	5. Seek additional resources as necessary to support unexpected activities	5. N/A
6. Follow chain of command	6. Follow chain of command	6. Follow chain of command and agency financial rules	6. Follow chain of command
D. N/A	***D. Assist in preparation of proposals for extramural funding***	***D. Develop requests for proposals for extramural funding to support additional epidemiologic activities and special projects***	***D. Prepare proposals for extramural funding for review and input from managers***
1. N/A	1. Identify funding needs for epidemiologic activities	1. Identify epidemiologic activities that need extramural funding	1. Identify funding needs for epidemiologic activities
2. N/A	2. Identify funding opportunities for epidemiologic activities	2. Evaluate funding opportunities to support epidemiologic activities	2. Identify funding opportunities for epidemiologic activities
3. N/A	3. Prepare proposals, in whole or in part, to obtain funding for epidemiologic activities	3. Create scientifically sound proposals that will support epidemiologic activities and meet the requirements of the funding agency	3. Prepare proposals, in whole or in part, to obtain funding for epidemiologic activities
E. N/A	***E. Use management skills***	***E. Use management skills***	***E. N/A***
1. N/A	1. Establish roles and responsibilities of all participants in epidemiologic activities	1. Establish roles and responsibilities of all participants in epidemiologic activities	1. N/A

VI. Skill Domain—Financial and Operational Planning and Management (Operational Planning, Financial Planning, and Management Skills) (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
2. N/A	2. Communicate role/responsibility expectations clearly to all team members	2. Communicate role/responsibility expectations clearly to all staff	2. N/A
3. N/A	3. Assess performance of team members as they carry out their responsibilities	3. Assess performance of team members as they carry out their responsibilities	3. N/A
4. N/A	4. Coach team members as needed in the performance of their responsibilities	4. Coach team members as needed in the performance of their responsibilities	4. N/A
5. N/A	5. N/A	5. Represent epidemiology program on the public health agency management team	5. N/A
F. Use skills that foster collaborations, strong partnerships, and team building to accomplish epidemiology program objectives	***F. Use skills that foster collaborations, strong partnerships, and team building to accomplish epidemiology program objectives***	***F. Promote collaborations, strong partnerships, and team building to accomplish epidemiology program objectives***	***F. Use skills that foster collaborations, strong partnerships, and team building to accomplish epidemiology program objectives***
1. Support collaborative relationships with key personnel of other agencies relevant to the particular epidemiologic activity	1. Build collaborative relationships with key personnel of other agencies relevant to the particular epidemiologic activity	1. Ensure development of collaborative relationships with key personnel of other programs and agencies relevant to the particular epidemiologic activity	1. Build collaborative relationships with key personnel of other agencies relevant to the particular epidemiologic activity
2. Work well with other epidemiology project team members of varied backgrounds and education	2. Work well with other epidemiology project team members of varied backgrounds and education	2. Lead epidemiology project team members of varied backgrounds and education in working collaboratively and effectively together	2. Work well with other epidemiology project team members of varied backgrounds and education
3. N/A	3. Clarify roles and responsibilities of all participants in epidemiologic activities	3. Oversee development of clear roles and responsibilities of all participants in epidemiologic activities	3. Clarify roles and responsibilities of all participants in epidemiologic activities

VII. Skill Domain—Leadership and Systems Thinking

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. N/A	***A. Support the epidemiologic perspective in the agency strategic planning process***	***A. Promote the epidemiologic perspective in the agency strategic planning process***	***A. Promote the epidemiologic perspective in the agency strategic planning process***
B. Support the organization's vision in all programs and activities	***B. Promote the organization's vision in all programs and activities***	***B. Lead the creation of epidemiology program's vision in the context of the agency's plan***	***B. Promote the organization's vision in all programs and activities***
1. Support strategic plan	1. Assist in strategic planning	1. Develop strategic plan	1. Assist in strategic planning
a. N/A b. N/A c. N/A d. N/A e. N/A	a. Describe process for organizational strategic planning b. Identify internal and external issues that may impact delivery of essential public health services (competency from Council on Linkages) c. Facilitate collaboration with internal and external groups to ensure participation of key stakeholders (competency from Council on Linkages) d. Participate in the development of strategic priorities and associated action plans e. N/A	a. Develop process for epidemiologic strategic planning within agency vision b. Evaluate internal and external issues that may impact delivery of essential public health services c. Direct collaboration with internal and external groups to ensure participation of key stakeholders d. Develop strategic priorities and associated action plans e. Ensure that research agenda is consistent with budget resources and with strategic plan	a. Describe process for organizational strategic planning b. Identify internal and external issues that may impact delivery of essential public health services (competency from Council on Linkages) c. Facilitate collaboration with internal and external groups to ensure participation of key stakeholders (competency from Council on Linkages) d. Participate in the development of strategic priorities and associated action plans e. Create research agenda for program areas of responsibility for incorporation into strategic plan
2. Support change	2. Implement change	2. Implement change	2. Implement change
a. Demonstrate individual skills necessary to implement change, including ability to support change b. Demonstrate ability to function as member of a team during change processes c. N/A	a. Demonstrate individual skills necessary to implement change, including ability to support change b. Demonstrate ability to function as member of a team during change processes c. Participate in monitoring and sustaining organizational change	a. Demonstrate individual skills necessary to implement change, including ability to support change b. Demonstrate ability to lead teams during change processes c. Monitor and sustain organizational change	a. Demonstrate individual skills necessary to implement change, including ability to support change b. Demonstrate ability to function as member of a team during change processes c. Participate in monitoring and sustaining organizational change

VII. Skill Domain—Leadership and Systems Thinking (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
C. Use performance measures to improve epidemiology program effectiveness	***C. Use performance measures to evaluate and improve epidemiology program effectiveness***	***C. Use performance measures to evaluate and improve epidemiology program effectiveness***	***C. Use performance measures to evaluate and improve epidemiology program effectiveness***
1. Contribute to implementation and monitoring of organizational performance measures that demonstrate program effectiveness	1. Contribute to development, implementation, and monitoring of organizational performance measures that demonstrate program effectiveness	1. Develop, implement, and monitor organizational performance measures that demonstrate program effectiveness	1. Contribute to development, implementation, and monitoring of organizational performance measures that demonstrate program effectiveness
a. Demonstrate knowledge of performance measures b. N/A c. N/A d. Adopt and implement performance measures e. N/A f. Take action to improve program performance	a. Demonstrate knowledge of performance measures b. Lead process to develop new performance measures if necessary c. Assist in creating plan for implementing performance measures d. Adopt and implement performance measures e. Evaluate results of performance measures' implementation f. Take action to improve program performance	a. Systematize existing organizational performance measures b. Lead process to develop new performance measures if necessary c. Create plan for implementing performance measures d. Lead team in implementing performance measures e. Evaluate results of performance measures' implementation f. Take action to improve program performance	a. Demonstrate knowledge of performance measures b. N/A c. Assist in creating plan for implementing performance measures d. Adopt and implement performance measures e. N/A f. Take action to improve program performance
D. Promote ethical conduct in epidemiologic practice	***D. Promote ethical conduct in epidemiologic practice***	***D. Promote ethical conduct in epidemiologic practice***	***D. Promote ethical conduct in epidemiologic practice***
1. Demonstrate ethical conduct in personal behavior and epidemiologic practice	1. Demonstrate ethical conduct in personal behavior and epidemiologic practice	1. Demonstrate ethical conduct in personal behavior and epidemiologic practice	1. Demonstrate ethical conduct in personal behavior
2. Promote ethical conduct in organization's policies and practices, including emphasis on addressing health disparities	2. Promote ethical conduct in organization's policies and practices, including emphasis on addressing health disparities	2. Promote ethical conduct in organization's policies and practices, including emphasis on addressing health disparities	2. Promote ethical conduct in organization's policies and practices, including emphasis on addressing health disparities
3. N/A	3. Make expectations of ethical conduct clear to team members	3. Make expectations of ethical conduct clear to team members	3. Make expectations of ethical conduct clear to team members
4. Follow organization's policies and practices related to ethical conduct	4. Follow organization's policies and practices related to ethical conduct	4. Enforce organization's policies and practices related to ethical conduct	4. N/A

VII. Skill Domain—Leadership and Systems Thinking (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
E. Practice professional development	***E. Promote workforce development***	***E. Ensure professional development of epidemiology workforce***	***E. Promote workforce development***
1. N/A	1. Organize team with skills necessary to conduct high-level epidemiologic analyses	1. Assemble teams with necessary skills to conduct a range of epidemiologic functions	1. Organize team with skills necessary to conduct high-level epidemiologic analyses
a. N/A b. N/A c. N/A d. N/A e. N/A f. N/A g. N/A h. N/A	a. Assess skills and abilities needed to perform high-level epidemiologic analyses b. Evaluate current agency staff to determine whether individuals with needed skills and abilities are present c. N/A d. N/A e. Coordinate with agency management to recruit individuals with needed skills if necessary f. Collaborate with external organizations to obtain assistance with needed analytical support if necessary g. Ensure that teams with necessary skills to conduct a range of epidemiologic functions are incorporated into work plans and the workforce h. Provide coaching to staff performing epidemiologic analyses	a. Assess skills and abilities needed to perform high-level epidemiologic analyses b. Evaluate current agency staff to determine whether individuals with needed skills and abilities are present c. Assess workforce, workplace, and other issues that impact recruitment d. Develop recruitment plans that address identified issues e. Coordinate with agency management to recruit individuals with needed skills if necessary f. Collaborate with external organizations to obtain assistance with needed analytical support if necessary g. Ensure that teams with necessary skills to conduct a range of epidemiologic functions are incorporated into work plans and the workforce h. Provide coaching to staff performing epidemiologic analyses	a. Assess skills and abilities needed to perform high-level epidemiologic analyses b. Evaluate current agency staff to determine whether individuals with needed skills and abilities are present c. N/A d. N/A e. Coordinate with agency management to recruit individuals with needed skills if necessary f. Collaborate with external organizations to obtain assistance with needed analytical support if necessary g. N/A h. Provide coaching to staff performing epidemiologic analyses

VII. Skill Domain—Leadership and Systems Thinking (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
2. Participate in ongoing team learning	2. Promote ongoing team learning	2. Enable ongoing team learning	2. Promote ongoing team learning
a. N/A b. N/A c. N/A d. N/A e. Assess personal educational and training needs, and seek additional education and training as necessary	a. Assess the proficiency of team members' skills against standard competency sets b. Identify professional development opportunities for team members c. Adjust workload of team members as necessary to enable participation in professional development opportunities d. Encourage team members to take advantage of development opportunities e. Assess personal educational and training needs, and seek additional education and training as necessary	a. Assess the proficiency of team members' skills against standard competency sets b. Identify professional development opportunities for team members c. Adjust workload of team members as necessary to enable participation in professional development opportunities d. Provide resources for team members to take advantage of development opportunities e. Assess personal educational and training needs, and seek additional education and training as necessary	a. Assess the proficiency of team members' skills against standard competency sets b. Identify professional development opportunities for team members c. N/A d. Encourage team members to take advantage of development opportunities e. Assess personal educational and training needs, and seek additional education and training as necessary
3. N/A	3. Retain epidemiology staff	3. Retain epidemiology staff	3. N/A
a. N/A b. N/A c. N/A	a. Assess issues affecting workforce retention b. Evaluate strategies to improve workforce retention c. Develop strategies to retain staff consistent with agency human resource retention strategies	a. Assess issues affecting workforce retention b. Evaluate strategies to improve workforce retention c. Develop strategies to retain staff consistent with agency human resource retention strategies	a. N/A b. N/A c. N/A

VII. Skill Domain—Leadership and Systems Thinking (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
F. Prepare for emergency response	***F. Prepare for emergency response***	***F. Lead epidemiology unit in preparing for emergency response***	***F. Prepare for emergency response***
1. N/A	1. Present epidemiologic perspective in development of agency emergency response plan	1. Present epidemiologic perspective in development of agency emergency response plan	1. N/A
2. N/A	2. Participate in emergency response planning for epidemiology unit	2. Lead emergency response planning for epidemiology unit	2. Participate in emergency response planning for epidemiology unit
a. Be familiar with the epidemiology section of emergency response plan b. N/A c. N/A d. Participate in regular exercises and/or drills of all parts of emergency response e. N/A f. Obtain necessary continuing education to respond to emergencies	a. Participate in the development of a written epidemiology section in the agency's or agency unit's emergency response plan, including continuity of agency operations b. Communicate epidemiologic information, roles, capacities, and legal authority to all emergency response partners c. Maintain regular communication with emergency response partners d. Participate in regular exercises and/or drills of all parts of emergency response e. Participate in the evaluation of emergency response exercises and/or drills (or actual response) f. Ensure that staff receive necessary continuing education to respond to emergencies	a. Ensure that the agency (or agency unit) has a written epidemiology section in the agency's or agency unit's emergency response plan, including continuity of agency operations b. Ensure communication of epidemiologic information, roles, capacities, and legal authority to all emergency response partners c. Ensure regular communication with emergency response partners d. Lead epidemiology unit's participation in regular exercises and/or drills of all parts of emergency response e. Evaluate the participation of the epidemiology unit in emergency response exercises and/or drills (or actual response) f. Ensure that staff receive necessary continuing education to respond to emergencies	a. Participate in the development of a written epidemiology section in the agency's or agency unit's emergency response plan, including continuity of agency operations b. Communicate epidemiologic information, roles, capacities, and legal authority to all emergency response partners c. Maintain regular communication with emergency response partners d. Participate in regular exercises and/or drills of all parts of emergency response e. Participate in the evaluation of emergency response exercises and/or drills (or actual response) f. Obtain necessary continuing education to respond to emergencies
3. Respond to public health emergencies	3. Respond to public health emergencies	3. Lead epidemiologic response to public health emergencies	3. Respond to public health emergencies
a. Adhere to individual's role in incident command and incident management b. Maintain regular communication with partner professionals in other agencies involved in emergency response	a. Adhere to individual's role in incident command and incident management b. Maintain regular communication with partner professionals in other agencies involved in emergency response	a. Ensure that epidemiology staff adhere to their roles in incident command and incident management b. Ensure that regular communication is maintained with partner professionals in other agencies involved in emergency response	a. Adhere to individual's role in incident command and incident management b. Maintain regular communication with partner professionals in other agencies involved in emergency response

VIII. Skill Domain—Policy Development

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
A. Support the application of epidemiologic knowledge to the development and analysis of public health policies	***A. Bring epidemiologic perspective in the development and analysis of public health policies***	***A. Bring epidemiologic perspective in the development and analysis of public health policies***	***A. Bring epidemiologic perspective in the development and analysis of public health policies***
1. Describe how policy decisions are made within the agency	1. Demonstrate understanding of public health policies and policy development from an epidemiologic perspective	1. Evaluate public health policies and policy development from an epidemiologic perspective	1. Demonstrate understanding of public health policies and policy development from an epidemiologic perspective
a. N/A b. N/A c. Provide epidemiologic and evidence-based information and data in the development of new policies, including data that demonstrate the need for change in existing policies d. Assist in creating decision memos that outline policy alternatives and facilitate scientifically sound decision-making	a. Describe breadth and limitations of existing regulations and laws at agency, local, state, and federal levels that affect epidemiologic activities b. Demonstrate to decision-makers the value of epidemiology and other evidence-based information in developing policy c. Provide epidemiologic and evidence-based information and data in the development of new policies, including data that demonstrate the need for change in existing policies d. Participate in creating decision memos that outline policy alternatives and facilitate scientifically sound decision-making	a. Examine breadth and limitations of existing regulations and laws at agency, local, state, and federal levels that affect epidemiologic activities b. Justify the use of epidemiology and other evidence-based information in developing policy c. Synthesize epidemiologic and evidence-based information and data for presentation to policy makers d. Create decision memos that outline policy alternatives and facilitate scientifically sound decision-making	a. Describe breadth and limitations of existing regulations and laws at agency, local, state, and federal levels that affect epidemiologic activities b. Demonstrate to decision-makers the value of epidemiology and other evidence-based information in developing policy c. Provide epidemiologic and evidence-based information and data in the development of new policies, including data that demonstrate the need for change in existing policies d. Participate in creating decision memos that outline policy alternatives and facilitate scientifically sound decision-making

VIII. Skill Domain—Policy Development (continued)

Tier 1: Entry-Level or Basic Epidemiologist	Tier 2: Mid-Level Epidemiologist	Tier 3a: Senior-Level Epidemiologist: Supervisor and/or Manager	Tier 3b: Senior Scientist/ Subject Area Expert
2. N/A	2. Support development of policies relating to epidemiologic activities	2. Lead development of policies relating to epidemiologic activities	2. Support development of policies relating to epidemiologic activities
a. N/A b. N/A c. N/A d. N/A e. N/A	a. Provide input into the development of new policies b. N/A c. Advise in the development of draft policy language to support necessary epidemiologic actions and activities d. N/A e. Examine the impact of policies on achieving epidemiology program goals and objectives	a. Create opportunities for staff to provide input into the development of new policies b. Incorporate public input into development of epidemiologic policies c. Create draft policy language to support necessary epidemiologic actions and activities d. Follow agency procedures for adopting and implementing new policies e. Evaluate the impact of policies on achieving epidemiology program goals and objectives	a. Provide input into the development of new policies b. N/A c. Advise in the development of draft policy language to support necessary epidemiologic actions and activities d. N/A e. Examine the impact of policies on achieving epidemiology program goals and objectives
3. Support epidemiology roles in programs or plans that derive from public health policies	3. Participate in translation of public health policies into epidemiology roles in programs or plans	3. Translate public health policies into epidemiology roles in programs or plans	3. Participate in translation of public health policies into epidemiology roles in programs or plans
4. N/A	4. Demonstrate ability to use designated channels to influence policy decisions made by entities other than the public health agency (e.g., elected officials or their staffs)	4. Use designated channels to influence policy decisions made by entities other than the public health agency (e.g., elected officials or their staffs)	4. Demonstrate ability to use designated channels to influence policy decisions made by entities other than the public health agency (e.g., elected officials or their staffs)
5. Adhere to rules and laws applying to government employees and funding sources regarding lobbying	5. Adhere to rules and laws applying to government employees and funding sources regarding lobbying	5. Adhere to rules and laws applying to government employees and funding sources regarding lobbying	5. Adhere to rules and laws applying to government employees and funding sources regarding lobbying

CDC = Centers for Disease Control and Prevention

CSTE = Council of State and Territorial Epidemiologists

N/A = not applicable