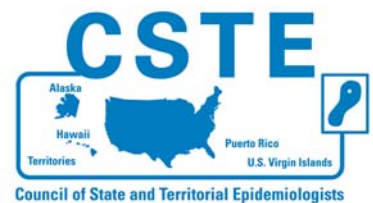


CDC/CSTE Applied Epidemiology Competencies

Preface Document and Tier 2 Competencies

Draft for Comment

May 23, 2005



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CDC/CSTE Applied Epidemiology Competencies

Preface

Introduction

Epidemiology, a key core science of public health, is the study of the distribution of diseases and health in populations. Public health epidemiologists who work in local, state, and federal health agencies are critical for the detection, control and prevention of major health problems in the community. Epidemiologists are responsible for elucidating and communicating risks, and recommending actions to prevent and control a host of serious threats to public health from acute and chronic diseases and medical conditions. These threats include factors affecting health at different life stages: e.g. maternal, child, adolescent, and adult health; injuries; and environmental and occupational factors, among others.

Although epidemiology is a critical tool for public health, most public health agencies have insufficient numbers of epidemiologists. A 2004 assessment of epidemiology capacity in state and territorial health departments, conducted by the Council of State and Territorial Epidemiologists (CSTE), found that there were 2,580 full time equivalent epidemiologists working in state and territorial health departments¹. However, the estimate of need of epidemiologists is 1,200 more than the current workforce level and the estimate of need for injury, occupational health, and oral health programs was nearly three times the current level. A survey by the Association of State and Territorial Health Officials (ASTHO) in 2004 found that 15 of 37 reporting states had a shortage of epidemiologists². Similarly, a 2005 report on the status of the public health workforce by the Bureau of Health Professions in the Health Research and Services Administration (HRSA) noted shortages and recruitment difficulties for epidemiologists in five of the six states studied³.

Another critical gap is that epidemiologists practicing in public health agencies often do not have sufficient training to carry out their responsibilities. The 2004 CSTE Epidemiology Capacity Assessment found that 29% of these epidemiologists had no formal training or academic coursework in epidemiology¹. Even though most respondents (94%) reported that their health department had supported training or education in the past twelve months to enhance the competence of epidemiologists in performing essential public health services, respondents indicated that additional training is needed in several key areas, particularly:

- Designing and Evaluating Surveillance Systems
- Designing Epidemiologic Studies
- Designing Data Collection Tools to Address a Health Problem
- Managing and Cleaning Data
- Analyzing and Characterizing Epidemiologic Data with Statistical Software

¹ Council of State and Territorial Epidemiologists. 2004. "2004 National Assessment of Epidemiologic Capacity: Findings and Recommendations."
<http://www.cste.org//Assessment/ECA/pdffiles/ECAfinal05.pdf>

² Association of State and Territorial Health Officials. 2004. "State Public Health Employee Worker Shortage Report: A Civil Service Recruitment and Retention Crisis".
<http://www.astho.org/pubs/Workforce-Survey-Report-2.pdf>.

³ Bureau of Health Professions, HRSA. 2005. "Public Health Workforce Study"
<http://bhpr.hrsa.gov/healthworkforce/reports/publichealth/default.htm>

- Evaluating Public Health Interventions
- Leadership and Management Training

Background for Competency Development

The Centers for Disease Control and Prevention (CDC) along with CSTE recognize the critical role of epidemiologists at all levels of public health practice. In January 2004, CDC and CSTE hosted a workforce summit to address workforce issues affecting public health epidemiologists. Leaders in applied epidemiology were invited to discuss the key workforce issues in this field. Participants strongly supported the need for establishing core competencies for applied epidemiologists. The stated purposes for developing these competencies are 1) to more clearly define the field of applied epidemiology and provide guidance to practitioners regarding expected competencies; 2) inform supervisory and personnel systems in governmental public health agencies of expected competencies for staff hiring and aid establishing civil service job titles and in the development of “career ladders” for advancement for epidemiologists; and 3) inform educators and academic institutions of the expected competencies. This competency development process has since been identified as a priority for CDC and CSTE.

CDC and CSTE have convened an expert panel to define competencies for applied epidemiology for local, state and federal public health epidemiologists. This panel has representation from state and local health agencies, academia, private industry, and from across CDC. The panel, convened by Denise Koo, MD, MPH from the Office of Workforce and Career Development at CDC and Matt Boulton, MD, MPH from the School of Public Health at the University of Michigan, first met October 2004. Gus Birkhead, MD, MPH of the New York State Department of Health and Kathleen Miner, Ph.D., MPH, C.H.E.S. from the Rollins School of Public Health at Emory University co-chair the expert panel.

Competency Development

Competencies are defined as the knowledge, skills, and abilities demonstrated by organization or system members that are critical to the effective and efficient function of the organization or system.⁴ Competencies are:

- Actions that can be seen in practice
- Describable in behavioral terms
- Observable in the performance of system components
- Part of a continuous system/organization/individual performance improvement process

The panel began by examining and refining existing public health and epidemiologic competencies. The existing competencies were then mapped to the Core Competencies for Public Health Professionals, a competency framework that was developed by the *Council on Linkages Between Academia and Public Health Practice* (COL) through an extensive public

⁴ Nelson, J. Essien, J., Loudermilk, R. and Cohen, D. (2002). *The Public Health Competency Handbook: Optimizing Individual & Organization Performance for the Public's Health*. Atlanta, GA: Center for Public Health Practice of the Rollins School of Public Health.

process.⁵ This report presents competencies that reflect those needed for the effective practice of epidemiology in the governmental public health setting and are centered on eight skill domains:

1. Assessment and Analysis Skills
2. Basic Public Health Sciences Skills
3. Communication Skills
4. Community Dimensions of Practice Skills
5. Cultural Competency Skills
6. Financial and Operational Planning and Management Skills
7. Leadership and Systems Thinking Skills
8. Policy Development Skills

The expert panel determined that the general skills outlined in the COL core competencies should serve as a base of expectations for all epidemiologists and should be referenced by individuals and organizations as part of any career development activity.

While the COL core competencies were deemed appropriate for all epidemiologists, the expert panel recognized that the COL document did not adequately address the unique elements of epidemiology practice. Therefore, the panel focused most of its efforts on articulating the particular skills and knowledge required to carry out epidemiology activities.

In the resulting competency set, each skill domain includes multiple competency statements. For many of the competency statements, the expert panel added sub-competency statements and additional detail to clarify the intent and scope of the competency statement. The focus throughout the document is on the unique skills and knowledge that pertain to the practice of applied epidemiology in a governmental public health agency.

Intended Users

The applied epidemiology competency set was developed in three sections, with each section focused on epidemiologists with a different level of experience and responsibilities:

Tier 1 – Frontline epidemiologist:

- Newly graduated Master's degree with minimal experience, but from a Master's program with a focus on epidemiology and/or analysis and assessment, or
- Bachelor's or other professional degree such as nursing without formal, academic epidemiology training and at least two years experience performing epidemiologic work.

Tier 2 – Journey level (may supervise a unit or serve as a project leader or surveillance coordinator:

- Master's degree in epidemiology or public health with two to five years work experience in a public health agency
- PhD in epidemiology

⁵ Council on Linkages Between Academia and Public Health Practice
<http://www.trainingfinder.org/competencies/background.htm>

- Other non-epidemiology professional degree (e.g., MD, DVM, PhD in a social science field) with specific epidemiology training (e.g. MPH degree, CDC Epidemic Intelligence Service program)

Tier 3 – Senior level

- 3a: supervisor and/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

CDC and CSTE do not intend these tiers to be rigid categories for practicing epidemiologists, but rather to serve as guidance for epidemiologists and public health agencies to help them understand typical expectations for individuals who are performing the type of epidemiology duties described in each tier. Consequently, there has been no attempt made to define how an individual qualifies for any of the defined tiers.

However, it is the intention of CDC and CSTE to set the bar for minimal expectations for any individual practicing epidemiology in a governmental public health agency. The competencies defined for Tier 1 are considered to be the base level of knowledge, skills and abilities that should be expected from anyone practicing epidemiology in a Tier 1-type position. Similarly, the competencies defined for Tiers 2 and 3 are minimal expectations for individuals practicing epidemiology in positions consistent with the ones listed in those tiers.

The initial work of the expert panel focused on Tier 2 epidemiologists, with all language and competencies analyzed and modified to define expectations appropriate for individuals practicing at a Tier 2 level. The panel is currently editing the language, as well as adding or deleting competency statements as necessary, to create competencies that are appropriate for Tier 1 and Tier 3 epidemiologists. Particular attention is being paid to the verbs (the particular actions described) in the competency statements, as these help to define the expectations for each Tier level. The draft Tier 1 and Tier 3 language will be released in the summer of 2005.

Summary

The Applied Epidemiology Competencies are a work in progress and will evolve over time. The current draft, which includes only the Tier 2 competencies, and later drafts with Tiers 1 and 3 will be vetted widely throughout the public health community. All input will be carefully considered and will help move the document toward a final document. That version will be used by CDC and CSTE in upcoming assessment and validation activities. Further, once the final document has been used by public health agencies for a period of time, CDC and CSTE will evaluate its utility and effectiveness as part an ongoing process to update and improve the competency set.

CDC and CSTE anticipate that the competencies will be used as the basis of instructional competencies for the training of governmental epidemiologists, and as the framework for developing position descriptions, work expectations, and job announcements for epidemiologists practicing in public health agencies.

CDC and CSTE sincerely appreciate the extensive effort put forward by the members of the expert panel in developing this first draft of an applied epidemiology competency set. We also greatly appreciate the interest of the public health and epidemiology communities across the country and look forward to their input.

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CDC/CSTE Applied Epidemiology Competencies

DRAFT

I. Skill Domain – Assessment and Analysis

1. Identify public health problems pertinent to the population

- i.*** Use critical thinking to determine whether a public health problem exists
 - 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 incidence, prevalence of risk behaviors, etc.) 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, to identify knowledge gaps.
 - e. Quantify population-based health risks
- ii.*** Articulate the need for further investigation or other public health action, based on results of literature review and assessment of current data.
- iii.*** Collaborate with others, inside and outside the agency, to identify the problem and develop recommendations

2. Conduct surveillance

- i.*** Determine whether to conduct surveillance for the particular public health issue under consideration
 - a. Identify types of surveillance methods for specific public health problems
 - b. Select types of surveillance systems suitable to specific public health problems
 - c. Identify additional burden to public health system and reporting entity anticipated to result from the proposed surveillance system
- ii.*** Identify surveillance data needs
 - a. Create case definition, based on person, place and time
 - b. Describe sources, quality and limitations of surveillance data

- c. Identify mechanisms to transfer data from source to public health agency
 - d. Define timeliness required for data collection
 - e. Define necessary frequency of reporting
 - f. Describe potential uses of data to inform surveillance system design
 - iii. Implement new or revise existing surveillance systems
 - a. Test data collection and analytical methods
 - b. Create working surveillance system
 - c. Verify that data collection occurs according to the defined surveillance system parameters (timeliness, frequency, etc)
 - d. Create good working relationships with reporting entities
 - e. Provide feedback to reporting entities and other organizations or individuals who need to know about the data or system
 - iv. Interpret key findings from the surveillance system
 - a. Interpret 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 (see Communication competencies)
 - v. Conduct evaluation of surveillance systems
 - a. Perform evaluation of surveillance systems using national guidance and methods (CDC. 2001. Updated Guidelines for Evaluating Public Health Surveillance Systems. MMWR 50(RR13):1-35)
 - b. Prepare recommendations for modifications to surveillance systems based on evaluation
- 3. *Investigate acute and chronic conditions in the population*
 - i. Conduct a community health status assessment
 - ii. Prioritize potential public health problems to be addressed
 - iii. Select investigative processes
 - a. Differentiate principles of investigation for acute versus chronic disease
 - b. Differentiate principles of investigation for disease clusters versus endemic conditions
 - c. Describe the major epidemiologic study designs, including the strengths and weaknesses of each

- iv.** Create hypotheses (see competencies from Skill Domain I.1.i and Basic Public Health Sciences)
 - v.** Assist in design of investigation (e.g. disease investigations, studies or screening programs)
 - a.** Identify target population for investigation
 - b.** Perform necessary power calculations
 - c.** Identify individuals or groups eligible to be in the study
 - d.** Create the case definitions by defining the outcomes of interest
 - e.** Identify optimal timeframe for investigation
 - f.** Select optimal investigation design under existing constraints
 - g.** Identify possible sources of bias
 - h.** Identify methods to minimize or estimate effects of possible sources of bias
 - i.** Identify potential confounders
 - j.** Design strategies to control potential confounders
 - vi.** Employ investigation techniques suitable to the public health problem
 - a.** Identify sources of data for investigation
 - b.** Identify case finding methods suitable to the investigation
 - c.** Construct data collection instruments
 - d.** Employ optimal sampling methods given the context of the situation
 - e.** Organize necessary coordination between all groups involved in investigation
- 4. Apply principles of good ethical/legal practice as they relate to study design and data collection, dissemination, and uses**
- i.** Follow 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 persons 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)

- ii.* Apply appropriate laws to collection, management, dissemination, and use of data and information
 - iii.* Differentiate between public health practice and public health research
 - iv.* Describe human subjects research
 - v.* Apply Institutional Review Board processes as necessary
 - vi.* Manage conflict of interest as necessary
 - vii.* Apply knowledge of privacy laws to protect confidentiality, including Health Insurance Portability and Accountability Act (HIPAA) and applicable state and local privacy laws
 - viii.* Apply ethical principles in publication practices
5. *Manage data from surveillance, investigations, or other sources*
- i.* Create database, if indicated
 - a.* Design database with necessary variables and data dictionary
 - b.* Employ optimal coding for variables (e.g. assigning numeric codes to text response options for a variable) to ensure accuracy and ease of analysis
 - c.* Employ data entry techniques that ensure accuracy and reliability.
 - d.* Conduct data entry validation
 - e.* Perform data cleaning and error correction
 - f.* Evaluate data editing and communicate results to data providers
 - ii.* Manage databases
 - a.* Maintain original data, but transform data as needed for specific analyses
 - b.* Create new variables as necessary to support analysis of data
 - c.* Perform merging and splitting of databases
 - d.* Change format of data from one software application to another if necessary (e.g. from ASCII to SAS)
 - e.* Document all data transformations
 - f.* Insure secure (restricted access) and stable (routine back-ups, database redundancy) data storage
6. *Analyze data from an epidemiologic investigation.*
- i.* Create analysis plan for data
 - a.* Define analysis plan to insure that public health objectives are met

- b. Determine the optimal 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 table shells
 - f. Select software suitable for analyzing and managing data
- ii. Conduct analysis of data
 - a. Compute frequencies and descriptive statistics
 - b. Calculate rates and adjust for age as necessary
 - c. Compute standard epidemiologic measures, including sensitivity, specificity, positive predictive value, Type 1 and Type 2 errors, incidence, prevalence, and attributable fraction
 - d. Perform trend analyses
 - e. Apply 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. Assess need for multivariable analyses
 - h. Perform multivariable, and/or regression analyses
 - i. Assess the effect of potential confounders
 - j. Assess whether effect modification is present
 - k. Assess need for special analyses, including survival analyses, cost effectiveness/cost benefit/cost utility analyses
 - l. Create standard epidemiology reports including tables, graphs, and charts necessary to summarize findings
7. Summarize results of the analysis and draw conclusions
 - i. Apply knowledge of epidemiologic principles and methods to determine the validity of epidemiologic data
 - 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 based on principles of causation (e.g. strength, consistency, biological plausibility, dose-response, and temporal relationship)
 - ii. Assess the impact of the limitations on the study's results
 - a. Examine the influence of power and confidence limits on the interpretation of the study's data
 - b. Distinguish between a statistical association and a causal effect
 - c. Examine the likely influence of other study limitations on the results
 - iii. Identify key findings from the study
 - a. Interpret study's results in the context of current scientific knowledge
 - b. Estimate measures of effect and potential impact based on study's findings
 - c. Identify any implications to public health programs
 - d. Develop inference and conclusions from the study
 - e. Communicate results
- 8. *Recommend interventions and control measures in response to epidemiologic findings*
 - i. Establish cultural/social/political/economic framework for recommendations or interventions
 - a. Describe study data in a way that makes the rationale for the recommendations clear
 - 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)
 - ii. Utilize scientific evidence in preparing recommendations for action or interventions
 - a. Synthesize scientific evidence and knowledge for use in preparing recommendations
 - b. Identify the key types of intervention for problem from models of causation (e.g. host-agent-environment, ecological models, Haddon's strategies, etc).
 - 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 based on study findings
 - e. Prioritize potential public health interventions

- f. Link any recommended behavioral interventions with necessary risk communication and risk reduction methods

9. *Evaluate programs*

- i.** Assist in development of measurable and program-relevant goals and objectives
- ii.** Assist in development of program logic models and theories of action
- iii.** Identify surveillance and other data for use in tracking program goals and objectives
- iv.** Track progress toward program goals and objectives
- v.** Communicate information on progress toward program goals and objectives to program managers and staff for use in program planning and modification

II. Skill Domain -- Basic Public Health Sciences

1. *Use knowledge of causes of disease to guide epidemiologic practice*
 - i. Relate basic etiologic processes for human diseases to subject matter areas of interest (e.g. infectious diseases, chronic diseases)
 - ii. Apply understanding of human and environmental biology to determine potential biological mechanisms of disease
 - iii. Explain how genetics and genomics affect disease processes and public health policy and practice
 - iv. Apply principles of the host/agent/environment model to disease causation, prevention and control
 - v. Describe the role and influence of socio-behavioral factors (including community, political, social, family, and individual behavioral factors) in health risks and health status
 - vi. Incorporate etiologic principles into development of disease prevention strategies
2. *Use laboratory resources to support epidemiologic activities*
 - i. Identify the roles and capabilities of public health laboratories and other laboratories, and how they are used in epidemiology investigations
 - ii. Coordinate laboratory and epidemiology activities including test selection, communication, and reporting results in the field
 - iii. Interpret laboratory data accounting for factors that influence the results of screening and diagnostic tests
 - iv. Implement necessary specimen collection, storage, and transportation measures
3. *Apply principles of informatics, including data collection, processing, and analysis, in support of epidemiologic investigations*
 - i. Use full range of information technologies and communication tools necessary to support epidemiologic investigations and surveillance
 - ii. Utilize software tools that adequately support on-line searching, public health data acquisition, entry, management, analysis, planning, mapping, and reporting.
 - iii. Apply all relevant procedures (policies) and technical means (security) to ensure the integrity and protection of confidential information in electronic files and computer systems
 - iv. Combine data and information from multiple sources, to create new information to support public health decision-making.
 - a. Determine whether new data collection is needed or existing data sets or systems can be mined.

- b. Participate in the development of new or enhancement of existing data bases to support epidemiologic investigations, surveillance, etc.
- c. Utilize (or ensure the utilization of) interoperable data standards for storage and transmission, and be able to find the relevant standards specification as needed.
- d. Maintain electronic documents (guidelines, data sets) including with documented versions, dissemination methods and relevant standards specifications.

III. Skill Domain – Communication

1. *Prepare written and oral reports and presentations that communicate epidemiologic findings to professional audiences, policy makers, and the general public*
 - i. Identify audience, methods and content for communication of epidemiologic findings
 - a. Identify target audience for communication
 - b. Identify relevant data to report
 - c. Identify optimal methods of communication for target audience
 - ii. Communicate epidemiologic findings to professional audiences through written reports and oral presentations
 - 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. Use modern audio-visual tools to maximize communication
 - e. Create charts, tables and figures that communicate to the targeted audience
 - iii. Communicate epidemiologic information to the general public, the press and/or to policy makers through giving oral presentations or developing or contributing to development of written documents
 - a. Participate in the development of press releases for the general public
 - b. Participate in the development of disease prevention materials for lay audiences
 - c. Communicate scientific findings in a language tailored to the need of decision-makers, the press and other target audiences
 - iv. Tailor surveillance information content and periodicity of dissemination for specific audiences and their uses
 - v. Respond to public queries about epidemiologic data or related issues
 - vi. Demonstrate ability to explain or teach basic epidemiologic principles to non-epidemiologists

2. *Demonstrate the basic principles of risk communication*
 - i. Participate in developing risk communication messages that adequately convey epidemiologic information relevant to particular public health problems
 - a. Provide content to the public information officer and other relevant agency staff
 - b. Review risk communication messages for scientific accuracy and clarity
 - ii. Use basic risk communication principles to communicate epidemiologic messages
 - a. Refer inquiries to the correct spokespersons for the agency
 - b. Respond to media inquiries as requested by the public health agency
 - c. Adhere to the agency risk communication strategy
3. *Incorporate interpersonal skills in communication with agency personnel, colleagues, and the public*
 - i. Demonstrate ability to listen effectively when epidemiologic findings are being presented or discussed
 - ii. Demonstrate interpersonal, interdisciplinary, transdisciplinary, and multidisciplinary communication
 - a. Lead discussions and participate in group settings
 - b. Demonstrate ability to respect 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
4. *Employ available and suitable communication technologies*
 - i. Participate in the design of Web-based communication
 - ii. Utilize policies that address security, privacy, and legal considerations when communicating epidemiologic information via email, health alert networks, or other potentially public documents.
 - iii. Utilize 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

1. *Provide epidemiologic input into epidemiologic studies and community public health planning processes at the state or local level.*
 - i. Use information from the community and from health status assessments to aid in the design, interpretation, and conduct of epidemiologic studies
 - a. Utilize strategies for engaging communities in dialogue on health issues requiring study
 - b. Utilize strategies for reaching populations and individuals that 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, epidemiological data and evaluation
 - e. Maximize positive and mitigate negative aspects for communities of epidemiologic data collection, analysis and use
 - ii. Provide epidemiologic input into an assessment of the local public health system to aid in state and local public health planning
 - a. Map out the different levels of governmental public health (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 populations and special populations within the community or region that each public health program seeks to reach
 - e. Identify the epidemiology data collection and analysis needs of each program
 - f. Identify community themes and strengths
 - g. Map out the community medical care delivery system
 - h. Characterize relationships among public and private organizations within the community
 - i. Identify environmental, social and cultural factors that affect the community's health

- j. Examine changes that are occurring or are expected to occur that affect the community's health or the local public health system (i.e. a MAPP forces of change assessment)
 - k. Identify threats and opportunities that arise from these changes
- 2. *Participate in development of community partnerships to support epidemiologic investigations*
 - i. Identify partners and stakeholders appropriate to an epidemiologic investigation
 - ii. Develop community-specific participation strategies to engage the public in the planning, implementation, and evaluation of epidemiologic investigations when indicated
 - iii. Clarify the roles of partners and stakeholders in the epidemiologic investigation
 - iv. Demonstrate ability to develop and participate in and receive input into epidemiologic studies from task forces and other target audiences
- 3. *Engage the public in the public health work and decision making of the Health Department when needed using mechanisms suitable to the circumstances.*

V. Skill Domain – Cultural Competency

1. *Describe population by race, ethnicity, culture, socioeconomic, educational, and professional backgrounds, age, religion, 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)*
 - i. Study historical context of populations' history and past treatment by public health system.
 - ii. *Develop mechanisms to receive input from groups of special concern into the design and conduct of epidemiologic practice*
3. *Design surveillance systems to include groups subject to health disparities or other potentially under-represented groups. (using standard categories where available)*
 - i. Know standard used to define special populations
 - ii. Know historical, social, and political contexts of standard categories
 - iii. Know limitations of standard categories
 - iv. Working with community as necessary to develop new categories if standard categories are unavailable
 - v. Design data collection tools to capture information needed to assess health disparities
 - vi. Design sampling plan to ensure sample size large enough to provide stable estimates in populations of interest
 - vii. Avoid potential adverse impacts of data collection on special populations).
4. *Conduct investigations using languages and approaches tailored to population*
 - i. Identify primary language of the population under study
 - ii. Utilize knowledge of specific socio-cultural factors in the population
5. *Use standard population categories or subcategories when performing data analysis*
6. *Utilize knowledge of specific socio-cultural factors in the population to interpret findings*
7. *Recommend public health actions that would be meaningful to the affected community*
8. *Communicate findings to affected community using mechanisms that are tailored to that community/special population*

VI. Skill Domain – Financial and Operational Planning and Management

1. *Conduct epidemiologic activity in a manner that is aligned with financial and operational plan of the agency*
 - i. Describe personnel, staffing, travels, and other needs for epidemiologic activity
 - ii. Maintain accurate records
 - iii. Assist in preparation of proposals for extramural funding
 - a. Identify funding needs for epidemiology activity
 - b. Identify funding opportunities for epidemiology activity
 - c. Prepare proposals, in whole or in part, to obtain funding for epidemiology activity
 - iv. Adhere to financial rules of agency
 - a. Describe financial rules of agency
 - b. Follow financial rules of agency
 - v. Follow chain of command
2. *Use skills that foster collaborations, strong partnerships, and team building to accomplish epidemiology program objectives*
 - i. Build collaborative relationships with key personnel of other agencies relevant to the particular epidemiology activity
 - ii. Collaborate and cooperate with other epidemiology project team members of diverse backgrounds and education
3. *Clarify roles and responsibilities of all participants in epidemiologic activities*

VII. Skill Domain – Leadership and Systems Thinking

1. Promote shared vision to drive action

i. Assist in strategic planning

- 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

ii. Implement change

- a. Demonstrate individual skills necessary to implement change, including ability to support change during times of chaos
- b. Demonstrate ability to function as member of a team during change processes
- c. Participate in monitoring and sustaining organizational change

2. Conduct performance driven work

i. Contribute to development, implementation and monitoring of organizational performance standards

- a. Demonstrate knowledge of performance standards
- b. Adopt and implement performance standards

ii. Take action to improve program performance

3. Promote ethical conduct

i. Demonstrate ethical conduct in personal behavior

ii. Promote ethical conduct in organization's policies and practices including emphasis on addressing health disparities

iii. Make expectations of ethical conduct clear to team members

iv. Monitor ethical conduct on the part of team members

4. Promote workforce development

i. Promote ongoing team learning

- a. Periodically assess the proficiency of team member's skills against standard competency sets

- b. Identify professional development opportunities for team members
 - c. Assure that team members take advantage of development opportunities
 - ii. Demonstrate knowledge of workforce, workplace and other issues that impact recruitment and retention
 - iii. Practice professional development
 - a. Assess own skills and abilities against current and projected future job needs
 - b. Obtain necessary education and training to meet required skills and abilities
- 5. *Prepare for emergency response (from Columbia University Bioterrorism and Emergency Readiness competencies – for Public Health Leaders and Public Health Professionals)*
 - i. Perform emergency response planning
 - a. Create epidemiology section of emergency response plan
 - b. Communicate epidemiology information, roles, capacities, and legal authority to all emergency response partners — such as other public health agencies, other health agencies, and other government agencies— during planning, drills and actual emergencies.
 - c. Maintain regular communication with emergency response partners.
 - d. Assure that the agency (or agency unit) has a written, regularly updated epidemiology section of emergency response plan for major categories of emergencies that provides for continuity of agency operations.
 - e. Participate in regular exercises of all parts of emergency response.
 - f. Participate in the evaluation of emergency response drill (or actual response) to identify needed internal and external improvements in epidemiologic preparedness and response capacity.
 - g. Assure that knowledge and skill gaps identified through emergency response planning, drills, and evaluation are addressed.
 - h. Participate in continuing education to maintain up-to-date knowledge in areas relevant to emergency response. (e.g., emerging infectious diseases, hazardous materials, and diagnostic tests.)

ii. Respond to public health emergencies

- a. Use community resources for emergency response
- b. Describe the epidemiology role in emergency response in a range of emergencies that might arise
- c. Describe the chain of command and management system (“incident command system” or similar protocol) for emergency response in the jurisdiction.
- d. Describe one’s own role within the jurisdiction’s chain of command and management structure
- e. Adhere to individual’s role in incident command and incident management
- f. Maintain regular communication with partner professionals in other agencies involved in emergency response.

VIII. Skill Domain – Policy Development

1. Participate in development of public health policies

- i.** Demonstrate understanding of how policy decisions are made at the local, state and national level
 - a.** Describe breadth and limitations of existing regulations and laws at agency, local, state and federal level that affect epidemiology activities
- ii.** Provide epidemiologic rationale for policy development
 - a.** Demonstrate to decision-makers the value of epidemiology and other evidence in developing policy
 - b.** 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
 - c.** Participate in creating decision memos that outline policy alternatives and facilitate scientifically-sound decision-making
- iii.** Participate in translation of public health policies into epidemiology roles in programs or plans
- iv.** Demonstrate ability to use designated channels to influence policy decisions made by entities other than the public health agency (such as dealing with elected officials or their staff)
- v.** Adhere to rules and laws applying to government employees and funding sources regarding lobbying

2. Participate as a team member in evaluating policies affecting epidemiology programs

- i.** Examine the impact of policies on achieving epidemiology program goals and objectives
 - a.** Develop an evaluation plan to assess program performance
- ii.** Provide epidemiologic information on program performance to inform public health policy
 - a.** Collect epidemiologic information to monitor the implementation of policies
 - b.** Develop the evidence base to allow assessment of policy effectiveness