



Public Health Epidemiology: Capacity at a Crossroads

Epidemiology is the science of detecting, investigating, and responding to health threats. The role of an epidemiologist is dramatized in movies such as “Outbreak” (1995) and books including “The Cobra Event” (Preston, 2000). In these illustrations, the hero is a “disease detective” who uses all available data to identify the source of an unknown illness and help prevent its spread. In reality, there are many publicized examples of epidemiology that impacts our lives; the nationwide E. coli outbreak linked to packaged spinach in October 2006 and the identification of mail as the source for anthrax in the fall of 2001 are both examples. Everyday, however, epidemiologists are quietly working nationwide (and worldwide) to detect health threats and prevent human disease. Right now, an epidemiologist in your area may be:

- Detecting multi-drug resistant tuberculosis
- Finding the source of “sick building syndrome”
- Investigating a cluster of childhood cancer
- Preparing emergency plans for terrorist disasters
- Quarantining an ill arriving airport passenger
- Preventing transmission of disease to newborns
- Investigating an outbreak of foodborne disease

A crossroads:

“we must invest in expansion to meet increasing public health demands or witness the erosion of data-driven foundations of United States health policy”

Daily work by public health epidemiologists keeps our population from becoming overwhelmed by unchecked infectious disease threats, environmental health hazards, and preventable injuries. Epidemiologic data, tracked locally and nationally, informs our legislators of health threats and aids in the allocation of funding. Use of epidemiologic data helps focus attention on areas of heightened concern, such as immunizations for children and pandemic influenza, while maintaining vigilance for diseases that are being controlled through concerted public health efforts, including syphilis and breast cancer.

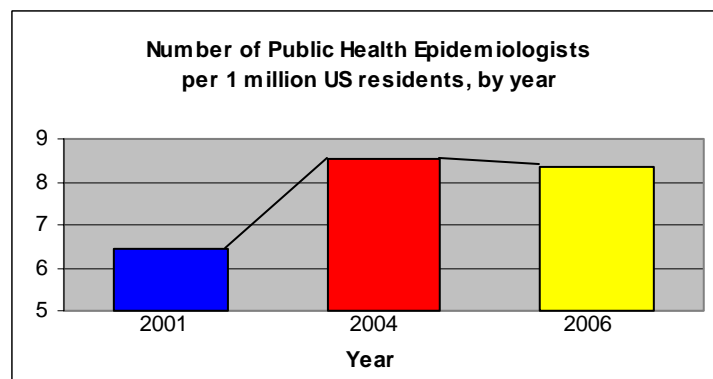


Epidemiology can be considered the central science of public health as it is essential for disease detection, control, and prevention. The Council of State and Territorial Epidemiologists (CSTE) recently assessed epidemiologic capacity and found serious gaps in personnel, training, and resources nationwide.

The 2006 Epidemiology Capacity Assessment (ECA) reveals a critical crossroad for our nations public health infrastructure: we must invest in expansion to meet increasing public health demands or witness the slow erosion of data-driven foundations of United States health policies.

SEVEN KEY FINDINGS OF THE 2006 EPIDEMIOLOGY CAPACITY ASSESSMENT

► **Despite the essential nature of epidemiologic services, the workforce in applied epidemiology has stagnated** since its rapid growth in 2001 (when



bioterrorism became more than a threat) resulting in a 34% gap between the total number of epidemiologists needed nationwide to perform the Essential Services of Public Health* and the current number employed.

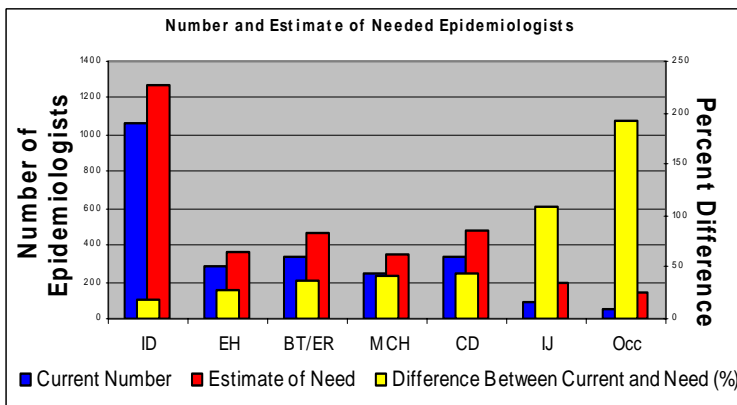
The Ten Essential Services of Public Health

**Key services reliant on epidemiology*

1. **Monitor health status to identify and solve community health problems.*
2. **Diagnose and investigate health problems and health hazards in the community.*
3. Inform, educate, and empower people about health issues.
4. Mobilize community partnerships and action to identify and solve health problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
8. Assure competent public and personal health care workforce.
9. **Evaluate effectiveness, accessibility, and quality of personal and population-based health services.*
10. **Research for new insights and innovative solutions to health problems.*

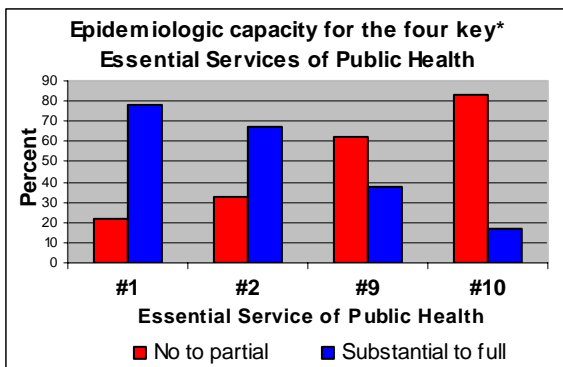
From the American Public Health Association (APHA) Public Health Functions Steering Committee, 1994.

States estimated that 3,361 epidemiologists are needed to provide full epidemiologic capacity, however only 2,502 are currently employed. This 34%



gap in epidemiologists working in public health is not evenly distributed among public health programs. For example, injury and occupational health are currently at less than half capacity.

► **Strong capacity exists nationwide for two of the four Key Essential Services of Public Health***, specifically: 1) monitoring health status, and 2) diagnosing and investigating health problems. By contrast, most public health departments have limited ability to: 9) evaluate effectiveness, accessibility, and quality of health services; and 10) research for new insights and innovative solutions to health problems. Without effective assessment of health service programs, states do not have a method to ensure that funding is appropriate. *Additionally, to develop progressive disease prevention strategies, research is essential—but less than 20% of states have capacity to perform applied research.*



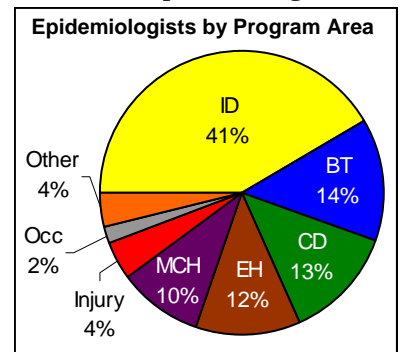
but less than 20% of states have capacity to perform applied research.

Abbreviations for all figures

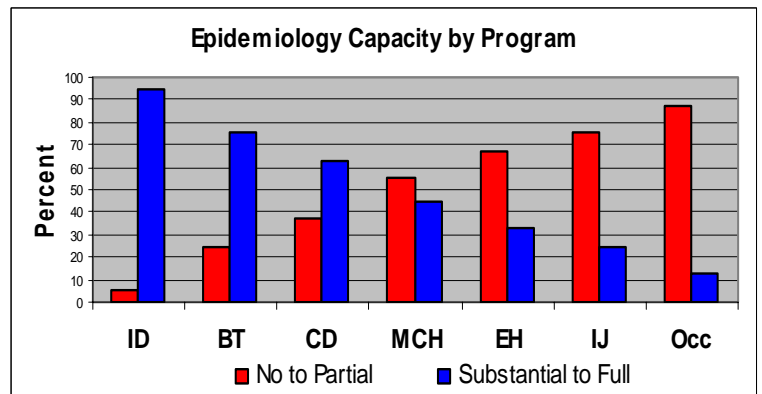
ID: infectious disease; BT: bioterrorism/emergency response; CD: chronic diseases; EH: environmental health; MCH: maternal and child health; Occ: occupational health; Other: public health epidemiologists in other programs

► **Personnel allocation to program areas revealed shortages.** In 2006 there were 2,502 epidemiologists

working at state and local health departments, as compared to 2,580 in 2004. Programs in infectious disease and bioterrorism/emergency response account for greater than half of all epidemiology personnel. Epidemiologist allocation to programs is related to federal funding priorities. *However, a substantial proportion of morbidity and mortality in the United States is caused by chronic disease, environmental exposures, and injuries which are relatively under-represented compared to infectious disease and bioterrorism.*

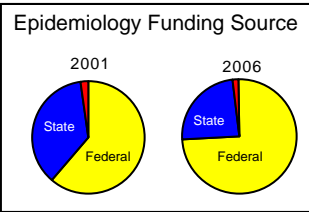


► **All program areas identified shortages in epidemiologic capacity** needed to sustain program activities and respond to public health threats. Infectious disease and bioterrorism report capacity greater than 70%. By contrast, programs in occupational health, injury, environmental health, and maternal and child health have



less than 50% capacity to meet current public health demands. *National attention on issues such as the obesity epidemic and prevention of type II diabetes support fortification in these program areas. Further, program growth should not be achieved by reducing funding to other areas—ultimately leading to overall reductions in capacity.*

► **Percentage of state funding for epidemiology programs has declined over the past five years.**



federally funded jobs in state health departments are “temporary” or contractual. The decline in state funding translates into fewer professionals working as State employees and earning the associated health

and retirement benefits. *Ultimately, reliance on federal funding produces instability in the public health epidemiology workforce as seasoned professionals leave the field for permanent employment opportunities.*

► **Nearly half of all public health epidemiologists have less than five years of experience in the field.**

The four greatest barriers to retaining qualified and trained state epidemiologists are:

1. Salary scale
2. Promotion opportunity
3. Restricted merit raises
4. Loss to private industry or federal sector

Additionally, recruitment of state epidemiologists has been hindered by the following barriers:

1. Salary scale/competitive pay
2. Lack of qualified candidates
3. Personnel policies
4. Promotion opportunities

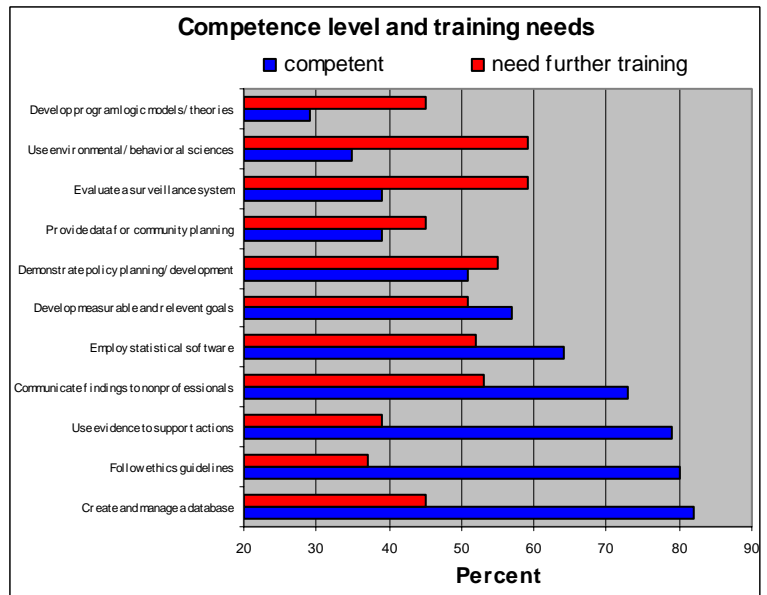
State salary structures and hiring practices are in critical need of reform so that qualified and experienced professionals are attracted to epidemiologic positions and develop long-term careers at state health departments.

Furthermore, a significant number of current epidemiologists reported that they plan to retire or change careers in the next five years, of particular concern is the loss of personnel with advanced educational degrees (MD, DO,

DDS, DVM). Despite the attrition of these leaders, only 25% of states report having an epidemiology leadership development plan. *Applied epidemiology training programs, including the Epidemiologic Intelligence Service (EIS) and the CDC/CSTE Applied Epidemiology Fellowship, must be expanded to meet the impending public health epidemiologist crisis.*

► **Formal applied epidemiology competencies were used to assess the workforce, identifying areas where further training is required.**

However many states identified their staff as competent in at least half of the assessed competencies. These Applied Epidemiology



Competencies provide value as specific training objectives can be set and measured based around each item. *Continued evaluation of the workforce using this set of competencies will ultimately standardize expected knowledge and expertise for epidemiologists nationwide.*

The seven key findings from the 2006 Epidemiology Capacity Assessment represent areas where investment in public health epidemiology can ensure that sound data drives our nations health agenda and vigilance in disease surveillance, prevention, and control can continue.

2006 EPIDEMIOLOGY CAPACITY ASSESSMENT RECOMMENDATIONS

- Increase the number of Epidemic Intelligence Service (EIS) Officers, Council of State and Territorial Epidemiologists (CSTE) Fellows, and state-based epidemiology training programs
- Develop and implement training modules for the “essential public health services” where critical shortages were identified
- Partner with schools of public health to meet unmet “Essential Services of Public Health”
- Sustain increased federal funding levels for all-hazard preparedness
- Increase federal and state grants to epidemiology program areas with identified shortages
- Reorganize state salary structures to competitive levels for qualified professionals
- Increase state funding for public health activities to promote long-term stability of the epidemiology workforce
- Implement competency based training standards for epidemiologists

CSTE Executive Committee:

President:

Robert Harrison, MD, MPH
Chief, Occupational Health Surveillance
and Evaluation Program
California

President-Elect:

Eddy A. Bresnitz, MD, MS
Deputy Commissioner and
State Epidemiologist
New Jersey

Vice President:

C. Mack Sewell, DrPH, MS
State Epidemiologist and Director
Epidemiology and Response Division
New Mexico

Secretary – Treasurer:

Perry F. Smith, MD
State Epidemiologist and
Director, Division of Epidemiology
New York State

Chronic Disease / MCH / Oral Health:

Mark Baptiste, PhD
Director, Division of Chronic Disease
Prevention and Adult Health
New York State

Environmental / Occupational / Injury:

David Johnson, MD, MS
Executive Medical Director, Division of
Environmental Health
Florida

Infectious Disease:

Ellen Mangione, MD, MPH
Deputy Chief Medical Officer
Colorado

Members-At-Large

Allen S. Craig, MD
State Epidemiologist and Director of Communica-
ble and Environmental Disease Services
Tennessee

Jo Hofmann, MD

State Epidemiologist for Communicable Disease
Washington

Melvin Kohn, MD, MPH

State Epidemiologist
Oregon

Executive Director:

Patrick J. McConnon, MPH



2006 Epidemiology Capacity Assessment Methods

Summary data presented in this brief was collected online from all 50 state health departments, the District of Columbia, and four United States jurisdictions and territories between May and July 2006 by the CSTE National Office. Comparisons were made to the Epidemiology Capacity Assessments (ECAs) from 2001 and 2004 for the states that provided full data in each assessment year.

Acknowledgements

The CSTE ECA Workgroup completed this assessment with cooperation from state and territorial health departments, CDC, and the Association of State and Territorial Health Officials. CSTE acknowledges the contributions of the CSTE ECA Working Group as well as Guthrie Birkhead, Matthew Boulton, and Dale Morse. Contributing CSTE National Office Staff members include Jennifer Lemmings, John Abellera, LaKesha Robinson, Pat McConnon, and Consultant, Rebecca Sandfort.

For more than five decades, CSTE and CDC have worked together in partnership to improve the public's health by supporting the efforts of epidemiologists working at the state and local level by promoting the effective use of epidemiologic data to guide public health practice and improve health. CSTE and its members represent two of the four basic components of public health – epidemiology and surveillance.

This report was made possible through funding from the Centers for Disease Control and Prevention Cooperative Agreement # U60/CCU07277 and the University of Michigan School of Public Health, Michigan Center for Public Health Preparedness (Centers for Disease Control and Prevention Cooperative Agreement # U90/CCU524243-02).



About CSTE:

Since 1951, CSTE has grown into a professional association of public health with epidemiologists representing all 50 states, 5 territories and Puerto Rico. CSTE has more than 1050 members with surveillance and epidemiology expertise in a broad range of areas including infectious diseases, immunizable diseases, environmental health, chronic diseases, occupational health, injury control, genomics, and maternal and child health and provides technical advice and assistance to the Association of State and Territorial Health Officials.