2004 National Assessment of Epidemiologic Capacity: Findings and Recommendations

Council of State and Territorial Epidemiologists

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Acknowledgements

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Executive Summary

BACKGROUND

In 1988, and again in 2002, the Institute of Medicine recommended that every health department should regularly and systematically collect, assemble, analyze and make available information on the health of the community, including statistics on health status, community health needs, and epidemiologic and other studies of health problems. Given the recent interest in the threat of bioterrorism, the nation's public health system has a new set of challenges to address. These challenges call for a resilient public health system and a well-prepared workforce. The U.S. Department of Health and Human Services (DHHS) has emphasized the need for a closely linked nationwide public health network utilizing local, regional and state health resources. A strong public health infrastructure should also provide the capacity to prepare for and respond to both acute and chronic threats to the nation's health. Epidemiologists in state and territorial health departments play a central role in this response capacity.

In response to the need for baseline and monitoring information for the epidemiology workforce, CSTE developed an Epidemiology Capacity Assessment (ECA) in 2001 to assess core epidemiologic capacity in U.S. state and territorial health agencies. The ECA was revised in 2004 to focus on the infrastructure of public health surveillance programs, core epidemiology capacity, and training opportunities in health departments.

The purpose of the 2004 assessment was to measure the current status of core epidemiologic capacity and training needs in the United States and territories, and, whenever possible, to compare the data with baseline data collected prior to an increase of nearly $1 billion in distributed Federal bioterrorism funds.

METHODS

A survey was distributed to 50 states, eight territories and the District of Columbia and consisted of three sections: I) core capacity in epidemiology; II) capacity for training and recruitment of epidemiologists within the state health department; and III) program specific capacity within state and territorial health departments. After piloting in five states, the assessment was available online to all state and territorial health departments between May and September 2004. This report is a summary limited to the core capacity (I) and training and recruitment (II) sections of the assessment.

RESULTS AND DISCUSSION

In the previous ECA, we identified major gaps in epidemiologic capacity in state and territorial health departments. Because epidemiologists are needed for the

detection and control of both emerging and on-going public health problems, we expected that the increase of federal funds to state health departments in fiscal year 2002 would reduce these gaps.

Data collected from the 2003 ECA report, conducted in 2001/2002, indicated that on average, each state health department received 61% of their funding for epidemiology services from the federal government. Currently, 73% of state health department funding for epidemiology services is from the federal government. These findings indicate that states have increased their reliance on federal funds and a smaller proportion of their funding is provided by the state or other sources. Increased dependence on federal funding could result in less flexibility for states to address other state or regional public health problems while focusing on national terrorism goals and objectives. This concern also extends to the large state investment of epidemiologists assigned to terrorism preparedness work while the numbers of epidemiologists in other subject areas in state health departments are decreasing.

After the distribution of approximately $1 billion in federal funding to state health departments for terrorism and public health emergency preparedness, the respondents' perception is that bioterrorism epidemiology and surveillance capacity increased. However, with this increase, other program areas showed a decrease in epidemiology and surveillance capacity, even though the overall number of epidemiologists has increased since 2001/2002.

There are 2,580 epidemiologists currently working in state and territorial health departments, which is almost double the number of epidemiologists reported in the earlier assessment (1,366). When comparing the results from the District of Columbia and the 38 states that participated in both assessments, an increase of 343 epidemiologists is observed. Much of the increase in epidemiologists is in the area of bioterrorism preparedness, which increased from 115 epidemiologists in 2001/2002 to 234 epidemiologists, a 100% increase. Conversely, infectious disease epidemiology showed no growth in epidemiology personnel when compared to the previous assessment, 631 and 628 epidemiologists respectively. Other program areas such as environmental health (-2%), injury (-6%) and occupational health (-38%) experienced a decrease in the number of epidemiologists from 2001/2002. For two of these program areas, injury and occupational health, the perceived need was almost three times its current capacity. This combination of findings would strongly support the need to focus resources on further development of non-infectious epidemiology capacity.

Overall, there has been an increase in the number of epidemiologists, but many epidemiologists (48%) are still not academically trained in epidemiology. In 2003, CSTE recommended that epidemiologists with formal training should account for 80% of the epidemiology workforce.

Information generated by subject areas shows that the largest gap in academic epidemiology training is in infectious disease and injury epidemiology. Only 43% percent of epidemiologists in infectious disease and 42% of epidemiologists in injury have received a degree in epidemiology. In contrast, at least 60% of epidemiologists in bioterrorism/emergency response (63%), environmental health (60%) and occupational health (63%) have received a degree in epidemiology. This information is important and necessary to address training gaps within specific program areas. To address these training gaps, a national standard for competency-based, on-the-job training and/or a certificate program should be established to ensure appropriate training for epidemiologists.

State health departments have systemic barriers to training in their health departments. For essential training to occur, state health departments will need to alter their organizational culture to ensure that training becomes an integral component of the job. In addition to training barriers, there continue to be significant barriers to recruiting epidemiologists. Over 90% of state health department respondents indicated that there are barriers to recruiting epidemiologists to their health departments. Salary, geographic location and several internal personnel management issues are perceived to present obstacles to recruiting well-qualified epidemiologists.

The Ten Essential Public Health Services are DHHS departmental goals set for public health agencies. Of the 10 essential services, four services rely heavily on epidemiologic functions and were examined in this assessment. For two of these essential services, 1) monitoring health status to identify and solve community health problems and 2) diagnosing and investigating health problems and health hazards in the community, over 50% of respondents indicated substantial to full capacity. A greater percentage of respondents indicated full or almost full capacity for these two essential public health services than in the earlier assessment, which indicates general improvement in the ability of states to monitor health status and investigate health problems. In contrast, 22% of respondents indicated substantial to full capacity in evaluating effectiveness, accessibility and quality of personal and population-based health services, and 12% of respondents indicated substantial to full capacity in researching for new insights and innovative solutions to health. This indicates that states continue to have insufficient resources for evaluating population-based health services and conducting research.

In summary, the overall number of epidemiologists in state health departments has increased – primarily in bioterrorism and emergency response. However, the number of epidemiologists in several program areas decreased or remained constant, and perceived capacity decreased in critical program areas including infectious disease. Based on this information, several recommendations can be made or modified from the earlier ECA. These recommendations target epidemiology capacity, sources of capacity funding and workforce training needs.

RECOMMENDATIONS

Epidemiology Capacity

- The current number of epidemiologists is far below the perceived "estimate of need" to provide essential services of public health across epidemiology program areas. Special emphasis should be placed on increasing the number of trained epidemiologists in non-infectious program areas. CSTE recommends meeting this estimate of need by:
  - Increasing the pool of academically prepared graduates
  - Expanding internships and fellowship programs
  - Establishing national recruiting for state and local public health epidemiology positions
  - Developing standards through levels of required competencies and tying compensation comparability among states to these standards
  - Establishing incentives for choosing and maintaining a career in public health epidemiology
- This national assessment shows significant deficiencies in infectious disease and other areas of epidemiology infrastructure including chronic disease, injury, environmental health, occupational health, and maternal and child health. As such, there should be much greater advocacy and awareness of the essential role of epidemiology in the public health system as part of the overall strategy to increase the national investment in public health.
- Salary continues to be a limiting factor for recruiting epidemiologists to state health departments. A national examination of salary structure for epidemiologists working in state-based agencies is recommended.

Impact and Source of Funding for Epidemiology Capacity

- An increase in bioterrorism preparedness capacity for surveillance and response with a corresponding increase in the number of epidemiologists was observed. With this increase in bioterrorism capacity, there has been an increase in dependence on federal funds to support state health department epidemiology activities, together with state resources being leveraged to support terrorism preparedness functions. These observations raise concerns about the independence and flexibility of states to address priority state public health issues and the migration of scarce state resources to support a national priority in terrorism preparedness and response capacity.
- To address the public health issues around funding for terrorism preparedness and response capacity without leveraging state resources will require more flexibility in federal funding. CSTE recommends that:

- Dual use of emergency preparedness resources should be greatly expanded to realign state-funded infectious disease epidemiologists and to bolster expansion of non-infectious disease programs, specifically in environmental health, injury and occupational health epidemiology.
- Infectious disease capacity should be maintained and resources for infectious disease capacity or other program areas should not be diverted to support terrorism preparedness except for short term planning activities.

Training as a Workforce Issue

- There are a significant number of epidemiologists without academic training in epidemiology. Of those with no academic training, many have taken an epidemiology course or have received on-the-job training. The development of certification programs outside universities and other educational programs tied to competencies in epidemiology is recommended.
- Training resources for epidemiologists working in state health departments are made available by the state and federal government. However, barriers to obtaining training still exist for workers. Organizational commitment from states and training requirements for practicing epidemiologists who need additional skills in their area of work are required to improve training opportunities for epidemiologists.

Future Assessments

- Epidemiology capacity within state and territorial health departments should be assessed periodically to monitor the progress in building epidemiology capacity across the nation.
- The measurement of epidemiology capacity in state and territorial health agencies should include both objective and subjective tools that should remain relatively constant to detect trends over time.
- Epidemiology capacity assessments should be used to allocate resources in health departments and to develop priorities and policy for building and maintaining public health infrastructure at the state and federal level.
- An assessment of local epidemiology capacity should be developed, administered and analyzed periodically to further monitor the progress in building epidemiology capacity across the nation.

1. Background

In 1988, and again in 2002, the Institute of Medicine (IOM) recommended that every health department should regularly and systematically collect, assemble, analyze and make available information on the health of the community, including statistics on health status, community health needs, and epidemiologic and other studies of health problems[1,2]. Given the recent interest in the threat of bioterrorism, the nation's public health system has a new set of challenges to address. These challenges call for a resilient public health system and a well-prepared workforce. The U.S. Department of Health and Human Services (DHHS) has emphasized the need for a closely linked nationwide public health network utilizing local, regional and state health resources[3]. A strong public health infrastructure should also provide the capacity to prepare for and respond to both acute and chronic threats to the nation's health. Epidemiologists in state and territorial health departments play a central role in this response capacity.

BACKGROUND

With the recent increased awareness of the threat of bioterrorism (BT), the nation's public health system has a new set of challenges to address. These challenges call for a resilient public health system and a well-prepared workforce. DHHS has emphasized the need for a closely linked nationwide public health network utilizing local, regional and state health resources. DHHS stated that the network should possess the capability for detection and reporting of unusual disease patterns and should have substantial laboratory resources[3]. A strong public health infrastructure should also provide the capacity to prepare for and respond to both acute and chronic threats to the nation's health. Such an infrastructure serves as the foundation for planning, delivering and evaluating public health. The 2002 IOM report, "The Future of the Public's Health in the 21st Century," states that government public health agencies are in need of support and resources[2]. IOM established a committee and charged the group to describe a framework that would assure the future of America's health. The Committee on Assuring the Health of the Public in the 21st Century found that "the governmental public health infrastructure has been neglected, and an overhaul of its components is needed to ensure quality of services and optimal performance"[2].

As a response to these challenges, the Council of State and Territorial Epidemiologists (CSTE) Epidemiology Capacity Assessment (ECA) was originally developed in 1997 and piloted in 10 states for the purpose of self-assessment. In November 2001, CSTE conducted the first comprehensive nationwide assessment of core epidemiology capacity in state and territorial health departments. This effort was also designed to address Healthy People 2010 Objective 23-14, which calls for an "increase in the proportion of Tribal, State and local public health agencies that provide or assure comprehensive epidemiology services to support essential public health services"[4], including quickly detecting, investigating and responding to diseases to prevent unnecessary transmission.

The timing of the 2001/2002 assessment served as a benchmark for the status of epidemiologic capacity in the United States and its territories before the distribution of approximately $1 billion in federal funding to state health departments for terrorism and public health emergency preparedness. States reported that there were 1,366 epidemiologists employed in health departments and that, of these, 47.7% worked in infectious disease. The assessment also revealed that 42% of all epidemiologists had no academic training or coursework in epidemiology. CSTE presented its 2001/2002 findings and recommendations in 2003 in a technical report entitled the "National Assessment of Epidemiologic Capacity in Public Health: Findings and Recommendations" and published a MMWR summary of the results[5,6]. In response to the capacity assessment, CSTE undertook a major workforce effort, the Workforce Development Initiative, which addressed several of the recommendations of these reports, including periodically measuring epidemiological capacity and addressing identified gaps in training[7]. The ECA was revised in 2004 as an attempt to focus on the infrastructure of public health surveillance programs, core epidemiology capacity, and training opportunities for epidemiologists in health departments.

The purpose of the 2004 assessment was to measure the current status of core epidemiologic capacity and training needs in the United States and territories, and to compare this data with baseline data presented in the previous report, which was collected prior to the distribution of the major increase in federal bioterrorism funds.

2. Methods

In December 2003, an advisory group was organized under the charge of the CSTE Executive Committee to begin revision of the ECA tool. The ECA was reviewed by individuals from federal and national organizations such as the Centers for Disease Control and Prevention (CDC), the Association of State and Territorial Health Officials (ASTHO), and the National Association of County and City Health Officials (NACCHO). Also included in the review process were individuals from academia and state health departments. After feedback was received from the pilot state health departments in Florida, Michigan, New York, North Carolina and Tennessee, the assessment was finalized in May 2004.

The final assessment consists of three sections (Appendix C). Part I focuses on the health department's core capacity in epidemiology, part II addresses capacity for training and recruitment of epidemiologists within the state health department, and part III focuses on program specific capacity (Indicators, Occupational Health, Chronic Disease, Maternal and Child Health, Food Safety, Injury and Infectious Disease) within the state health department. This report is a summary limited to the core capacity (I) and training and recruitment (II) sections of the assessment.

The assessment was distributed to state epidemiologists in all state health departments, the District of Columbia and eight territorial health departments (including American Samoa, Federated States of Micronesia, Guam, Marshall Islands, Northern Mariana Islands, Palau, Puerto Rico and the Virgin Islands). Assessment respondents included the State Epidemiologist and/or delegate(s), as well as other health department epidemiologists when appropriate.

Each state or territory was asked to complete an assessment by September 2004. Respondents were directed to complete the assessment online and each state and territory was provided one unique user name and password. CSTE provided a

hard copy of the assessment when requested. For those states or territories that completed a paper version of the assessment, data were entered into the online database by CSTE staff. Follow-up telephone calls, postcards and e-mails were used for those states that did not respond to initial requests to complete the assessment. Once the assessments were returned, each respondent state was given the opportunity to view its results and complete or revise its online submission. The final results represent responses from 50 states, the District of Columbia and three territories (N=54).

Data were analyzed using SAS version 8 and MS Excel software and were tabulated for all responses nationally (including U.S. territories and the District of Columbia) as well as regionally when indicated. Locations were grouped into the following five regional categories:

> **Northeast** (n=9): CT, MA, ME, NH, NJ, NY, PA, RI, VT;
> **Midwest** (n=12): IA, IL, IN, KS, MI, MO, MN, ND, NE, OH, SD, WI;
> **South** (n=17): AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV;
> **West** (n=13): AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA , WY; and
> **Territories** (n=8): American Samoa (AS) , Northern Mariana Islands (MP), Federated States of Micronesia (FM), Guam (GU), Puerto Rico (PR), Palau (PW), Marshall Islands (MH), Virgin Islands (VI).

Additional Assessment Information and Instructions:

For all sections, questions referred to the state health department unless otherwise indicated as referring to the local health department. Previously, the ECA did not attempt to capture epidemiology capacity at the local level. Therefore, definitions of state and local health departments were added to the current version of the ECA:

> **Who should be counted as a STATE Health Department (HD) Epidemiologist?**
> Epidemiologists employed or contracted by the STATE HD. For example, epidemiologists who work at the LOCAL or STATE level that are employed or contracted by the state are considered STATE epidemiologists

Who should be counted as a LOCAL Health Department (HD) Epidemiologist?
Epidemiologists who work for the LOCAL HD and are employed or contracted by the LOCAL HD and are not employed or contracted by the STATE HD

In addition, the definition of an epidemiologist was unchanged from the previous version. However, a clarification of who should be counted as an epidemiologist was added to the current assessment.

What is an Epidemiologist?
According to Last (*A Dictionary of Epidemiology, 4th Ed., 2001*), an Epidemiologist is defined as "an investigator who studies the occurrence of disease or other health related conditions or events in defined populations. The control of disease in populations is often also considered to be a task for the epidemiologist." The discipline of Epidemiology is defined as the "study of the distribution and determinants of health related states or events in specified populations, and the application of this study to control of health problems." "Study" includes surveillance, observation, hypothesis testing, analytic research, and experiments. "Distribution" refers to analysis by time, place, and classes of persons affected. "Determinants" are all the physical, biological, social, cultural, and behavioral factors that influence health. "Health related states and events" include diseases, causes of death, behaviors such as use of tobacco, reactions to preventative regimens, and provisions and use of health services. "Specified populations" are those with identifiable characteristics such as precisely defined numbers. "Applications to control…" makes explicit the aims of epidemiology—"to promote, protect, and restore health."

Who should be counted as an Epidemiologist?
Epidemiologists in state and territorial health departments are any person(s) who perform functions consistent with the above definition. When considering who should be counted as an epidemiologist, focus on the functions performed by the individual rather than the job title.

When indicated, the following six-point scale was used.

Not at all, None: None of the activity, knowledge or resources described within
the question are met.
Minimally: Less than 25 percent (but greater than 0 percent) of the activity,
knowledge or resources described within the question are met.
Partially: 25 percent or greater (but less than 50 percent) of the activity,

knowledge or resources described within the question are met.
Substantially: 50 percent or greater (but less than 75 percent) of the activity,
knowledge or resources described within the question are met.
Almost Fully: 75 percent or greater (but less than 100 percent) of the activity,
knowledge or resources described within the question are met.
Full: 100 percent of the activity, knowledge or resources described within the
question are met.

Previously, the scale consisted of only four points. Therefore, to maintain consistency in comparing data collected in the previous ECA, the above scale is combined into four categories (Not at all or minimally, partially, substantially, or full or almost fully) when indicated.

Additional instructions included:

- Enter additional text to explain answers when indicated.
- Select only one response unless otherwise indicated.
- Describe half-time employees as ½ (i.e., 0.5).
- Enter '0' if your response to a question is 0 (Zero) – Please do not leave the field blank.

3. Results

Epidemiology and Surveillance Capacity

Respondents indicated that the extent of epidemiology and surveillance capacity (on a six point scale ranging from none to full capacity) varies dramatically by program area. The majority (79%) of respondents indicated that epidemiology and surveillance capacity for bioterrorism/emergency response is substantial to full. In addition, 89% of respondents indicated that epidemiology and surveillance capacity for infectious disease is substantial to full. In contrast, fewer than 25% of respondents indicated that capacity is substantial to full in injury (18.6%), occupational health (9.4%) and oral health (7.6%).

TABLE 1. EPIDEMIOLOGY AND SURVEILLANCE CAPACITY.

Program Area	None n (%)	Minimal n (%)	Partial n (%)	Substantial n (%)	Almost Full n (%)	Full n (%)
Bioterrorism/ Emergency Response	1 (1.9)	2 (3.7)	8 (14.8)	22 (40.7)	17 (31.5)	4 (7.4)
Chronic Disease	1 (1.9)	7 (13.5)	19 (36.5)	18 (34.6)	7 (13.5)	0 (0)
Environmental Health	7 (13.0)	16 (29.6)	16 (9.6)	11 (20.4)	4 (7.4)	0 (0)
Infectious Disease	0 (0)	1 (1.9)	5 (9.4)	19 (35.8)	21 (39.6)	7 (13.2)
Injury	9 (16.7)	18 (33.3)	17 (31.5)	5 (9.3)	4 (7.4)	1 (1.9)
Maternal and Child Health	4 (7.7)	9 (17.3)	17 (32.7)	17 (32.7)	4 (7.7)	1 (1.9)
Occupational Health	24 (45.3)	17 (32.1)	7 (13.2)	4 (7.5)	1 (1.9)	0 (0)
Oral Health	20 (37.7)	20 (37.7)	9 (17.0)	1 (1.9)	2 (3.8)	1 (1.9)

As a follow-up, respondents were asked if there was a plan to implement epidemiology and surveillance capacity if their perceived capacity was none. Of those who responded for injury, occupational health and oral health (n=8[1], n=24, n=20 respectively), 75% or greater indicated that there was no plan to implement epidemiology and surveillance capacity within those program areas.

[1] Eight of nine respondents answered this sub-question

Epidemiology Capacity for Addressing Essential Public Health Services

The Ten Essential Public Health Services are DHHS departmental goals set for public health agencies. Of these 10 essential services, four rely heavily on epidemiologic functions and were examined in this assessment. For two of these essential services, 1) monitoring health status to identify and solve community health problems and 2) diagnosing and investigating health problems and health hazards in the community, over 50% of respondents indicated substantial to full capacity. In contrast, 22% of respondents indicated substantial to full capacity in evaluating effectiveness, accessibility and quality of personal and population-based health services, and 12% of respondents indicated substantial to full capacity in researching for new insights and innovative solutions to health.

TABLE 2. EPIDEMIOLOGIC CAPACITY TO PERFORM PUBLIC HEALTH SERVICES.

Essential Public Health Services	None n (%)	Minimal n (%)	Partial n (%)	Substantial n (%)	Almost Fully n (%)	Full n (%)
Monitoring Health Status to identify and solve community health problems	0 (0)	4 (8)	15 (30)	21 (42)	8 (16)	2 (4)
Diagnosing and investigating health problems and health hazards in the community	0 (0)	1 (2)	20 (40)	20 (40)	6 (12)	3 (6)
Evaluating effectiveness, accessibility, and quality of personal and population-based health services	1 (2)	9 (18)	29 (58)	9 (18)	2 (4)	0 (0)
Researching for new insights and innovative solutions to health problems	2 (4)	25 (50)	17 (34)	2 (4)	3 (6)	1 (2)

Epidemiologists Working by Degree and Program Area

There are 2,580 epidemiologists working in U.S. state health departments, including the District of Columbia and U.S. territories. Master's degree-level epidemiologists (41.8%) were more prevalent in the epidemiology workforce than epidemiologists with any other degree. Physicians and PhD-level epidemiologists made up 21.9% (565) of the workforce, 9.8% (253) and 12.1% (312),

respectively. Bachelor's degree-level epidemiologists accounted for 23.2% (599), those with associate or no post-high school degree for 5% (130), and other doctoral level (DVM and DDS) epidemiologists combined for 3.7% (95) of the epidemiologists employed in state and territorial health departments.

TABLE 3. NUMBER OF INDIVIDUALS WORKING AS EPIDEMIOLOGISTS, BY DEGREE. (N=53)

Degree	Total		Total	
	Current	%	Est. of need	%
MD, DO	253	9.8	406	10.7
DDS	18	0.7	44	1.2
DVM	77	3.0	123	3.2
PhD, DrPH, other doctoral	312	12.1	586	15.5
MPH, MSPH, other master	1078	41.8	1682	44.4
BA, BS, BSN, other bachelor	599	23.2	784	20.7
Associate or no post high school degree	130	5.0	167	4.4
TOTAL	**2580***		**3790**	

* Includes Other Epidemiologists (113) in the total.

Respondents were asked to estimate the number of epidemiologists needed in their health department to address the Essential Functions of Public Health related to epidemiology. Overall, the total *estimate* of need of epidemiologists in state health departments is 3,790, which is 1,200 epidemiologists more than current capacity.

The following table shows the distribution of current epidemiologists in the public health workforce with the corresponding estimates of need. Infectious disease and bioterrorism/emergency response programs accounted for the majority of epidemiologists, 926 (36%) and 424 (16%) respectively. Occupational and oral health reported having the least capacity, with 51 (2%) and 39 (2%) epidemiologists, respectively.

TABLE 4A. NUMBER OF INDIVIDUALS WORKING AS EPIDEMIOLOGISTS*, BY PROGRAM AREA. (N=53)

Degree	Bioterrorism/ Emergency Preparedness	Chronic Disease	Environmental Health	Infectious Diseases
MD, DO	61	33	15	108
DDS	2	2	0	0
DVM	14	2	10	47
PhD, DrPH, other doctoral	47	84	56	57
MPH, MSPH, other master	167	180	147	388
BA, BS, BSN, other bachelor	108	84	75	265
Associate or no post high school degree	25	5	21	61
TOTAL	**424**	**390**	**324**	**926**

Degree	Injury	Maternal and Child Health	Occupational Health	Oral Health
MD, DO	2	28	6	0
DDS	1	1	0	12
DVM	0	3	0	1
PhD, DrPH, other doctoral	14	46	7	1
MPH, MSPH, other master	49	109	23	15
BA, BS, BSN, other bachelor	8	43	10	6
Associate or no post high school degree	0	9	5	4
TOTAL	**74**	**239**	**51**	**39**

* 113 Epidemiologists assigned as "Other" were not categorized by degree.

TABLE 4B. ESTIMATE OF NEED OF INDIVIDUALS WORKING AS EPIDEMIOLOGISTS, BY PROGRAM AREA. (N=53)				
Degree	**Bioterrorism/ Emergency Preparedness**	**Chronic Disease**	**Environmental Health**	**Infectious Disease**
MD, DO	95	57	36	139
DDS	4	6	0	1
DVM	31	3	17	70
PhD, DrPH, other doctoral	80	141	94	103
MPH, MSPH, other master	236	259	226	537
BA, BS, BSN, other bachelor	138	96	91	334
Associate or no post high school degree	32	11	24	67
TOTAL	**616**	**573**	**488**	**1251**
Degree	**Injury**	**Maternal and Child Health**	**Occupational Health**	**Oral Health**
MD, DO	16	43	19	1
DDS	2	3	0	28
DVM	0	2	0	0
PhD, DrPH, other doctoral	44	84	26	14
MPH, MSPH, other master	118	183	78	45
BA, BS, BSN, other bachelor	18	68	23	16
Associate or no post high school degree	7	11	7	6
TOTAL	**205**	**394**	**153**	**110**

The number of epidemiologists estimated per 100,000 in the U.S. and the District of Columbia is 0.9. The Northeast region had the highest rate, 1.2, followed by the West, with 1.1, the South, with 0.8, and the Midwest, with 0.7 epidemiologists.

TABLE 5. EPIDEMIOLOGIC CAPACITY PER 100,000 PEOPLE, BY REGION. (N=51)			
Region	**Estimated number of epidemiologists**	**Population estimate[+]**	**Rate**
National	2507[++]	281,421,906	0.9
Northeast	643	53,594,378	1.2
Midwest	447	59,699,760	0.8
South	744	100,236,820	0.7
West	673	63,197,200	1.1

[+] Based on 2000 U.S. Census data.

[++] Total does not include territories.

EIS Placement

Nationally, there are an estimated 171 EIS officers or graduates assigned/employed in state, territorial and local health departments, 151 of whom are in state or territorial health departments.

TABLE 6. 2004 STATE HD EIS PLACEMENT.

	n	Mean	Median	Min	Max	National Sum
EIS Officers in training assigned to your state HD	47	0.7	1.0	0	2.0	34
EIS Graduates employed in your state HD	46	2.0	1.0	0	16.0	93
EIS Graduates assigned to your state by CDC	45	0.6	0	0	4.0	25

TABLE 7. 2004 LOCAL HD EIS PLACEMENT.

	n	Mean	Median	Min	Max	National Sum
EIS Officers in training assigned to local HD in your state	44	0.1	0	0	3	6
EIS Graduates employed in local HDs within your state	42	0.3	0	0	3	14

Epidemiology Funding Sources

Participating states and territories indicated that they receive state (98%) and federal (100%) monies to fund epidemiology activities within the state health department. Two respondents (4%) indicated they also receive funding from non-federal and non-state funding sources. On average, each state or territorial health department received 73% of their funding to support their epidemiology services from the federal government and 27% of their funding from the state.

TABLE 8. FUNDING SOURCES FOR EPIDEMIOLOGY ACTIVITIES WITHIN STATE HDS. (N=49)

Funding Source	2004			
	Min (%)	Max (%)	Median (%)	Mean (%)
Federal funds	20	100	80	73
State funds	0	80	20	26.6
Other	16	16	16	0.3

Number of Epidemiologists Paid with Bioterrorism Funds

Of the 460 epidemiologists paid with bioterrorism funds, 53% (244) function within bioterrorism or emergency response program areas (Mean=5.3 epidemiologists per health department), and 33 % (153) function within infectious disease program areas. Other epidemiologists paid with bioterrorism funds are distributed among the other program areas.

There are a total of 390** individuals working in bioterrorism or emergency response. Of this group, 62% (243) are paid for by federal bioterrorism funds. Nearly one in five individuals working in infectious disease program areas are paid with bioterrorism funds, and nearly one in four individuals working in "Other" program areas are paid with bioterrorism funds. This finding indicates that a substantial number of epidemiologist positions (153) in infectious disease are paid with federal bioterrorism funding. Very few other epidemiologists fall in this "dual purpose" category.

TABLE 9. DISTRIBUTION OF INDIVIDUALS WORKING AS EPIDEMIOLOGISTS PAID WITH BIOTERRORISM FUNDS IN THE FOLLOWING PROGRAM AREAS.

Program Area	n	Mean	Median	Min	Max	National Sum	% Total
Bioterrorism/Emergency Response	46	5.3	2.6	0	23.0	244	53
Chronic Disease	40	0.1	0	0	3.0	6	1
Environmental Health	42	0.6	0	0	6.0	24	5
Infectious Disease	44	3.5	2.0	0	15.0	153	33
Injury	40	0.1	0	0	1.0	3	1
Maternal and Child Health	40	0.2	0	0	3.0	6	1
Occupational Health	39	0.1	0	0	1.0	3	1
Oral Health	38	0	0	0	0	0	0
Other	37	0.6	0	0	9.0	21	5

* Only state or territorial health departments that provided responses to both questions related to the number of epidemiologists working in a state and territorial health department and the number of epidemiologists paid for with bioterrorism funds were included in this analysis.

TABLE 10. EPIDEMIOLOGISTS BY PROGRAM AREA PAID WITH BIOTERRORISM FUNDS.*

Program Area	n	Epidemiologists currently working	Paid for by BT funds	%
Bioterrorism/Emergency Response	45	390	243	62
Chronic Disease	40	285	6	2
Environmental Health	42	218	24	11
Infectious Disease	44	815	153	19
Injury	39	57	3	5
Maternal and Child Health	39	204	6	3
Occupational Health	35	46	3	7
Oral Health	34	23	0	0
Other	33	87	21	24

* Only state or territorial health departments that provided responses to both questions related to the number of epidemiologists working in a state and territorial health department and the number of epidemiologists paid for with bioterrorism funds were included in this analysis.

Epidemiologists Who Have Academic Training in Epidemiology

The largest gap in academic epidemiology training is in infectious disease and injury epidemiology. Only 43% percent of epidemiologists in infectious disease and 42% of epidemiologists in injury have received a degree in epidemiology. In contrast, at least 60% of epidemiologists in bioterrorism/emergency response (63%), environmental health (60%) and occupational health (63%) have received a degree in epidemiology. The most common epidemiology degree was a MPH, MSPH or other master degree. Across all program areas, with the exception of oral health, over 90% of epidemiologists have received at least minimal training in epidemiology. Nearly one in four epidemiologists in oral health epidemiology have received no training in epidemiology.

TABLE 11. EPIDEMIOLOGISTS WITH FORMAL ACADEMIC TRAINING IN EPIDEMIOLOGY. (N=45)

Epidemiology Training	BT		CD		EH		ID		IJ	
	n	%	n	%	N	%	n	%	n	%
1. PhD, DrPh, other doctoral degree in *Epidemiology*	27	9%	36	12%	22	11%	18	2%	1	1%
2. Professional background (e.g. MD, DO, DVM, DDS, etc.) with a dual degree in *Epidemiology*	32	11%	19	6%	13	7%	66	9%	1	1%
3. MPH, MSPH, other master degree in *Epidemiology*	116	41%	116	37%	74	38%	224	31%	24	40%
4. BA, BS, other bachelor degree in *Epidemiology*	5	2%	11	4%	8	4%	6	1%	0	0%
5. Completed formal training program in *Epidemiology* (e.g. EIS)	11	4%	24	8%	7	4%	51	7%	1	2%
6. Completed some coursework in *Epidemiology*	35	12%	55	18%	15	8%	87	12%	18	31%
7. Received on the job training in *Epidemiology*	43	15%	42	13%	45	23%	265	36%	15	26%
Sub-Total	**268**	**95%**	**303**	**97%**	**183**	**95%**	**715**	**98%**	**59**	**100%**
8. No training in *Epidemiology (i.e. epidemiologist does not fit into any of the above categories)*	15	5%	10	3%	10	5%	17	2%	0	0%
Total	**283**		**313**		**193**		**732**		**59**	

Epidemiology Training	MCH		OcH		OrH		Other		Overall	
	n	%	n	%	N	%	n	%	Total	%
1. PhD, DrPh, other doctoral degree in *Epidemiology*	21	9%	6	12%	1	3%	3	19%	133	7%
2. Professional background (e.g. MD, DO, DVM, DDS, etc.) with a dual degree in *Epidemiology*	18	8%	5	11%	3	14%	0	0%	156	8%
3. MPH, MSPH, other master degree in *Epidemiology*	66	29%	17	38%	6	30%	5	31%	650	34%
4. BA, BS, other bachelor degree in *Epidemiology*	16	7%	1	2%	0	0%	0	0%	47	2%
5. Completed formal training program in *Epidemiology* (e.g. EIS)	6	3%	0	0%	1	5%	1	6%	103	5
6. Completed some coursework in *Epidemiology*	39	17%	12	27%	2	10%	3	19%	266	14%
7. Received on the job training in *Epidemiology*	41	18%	4	9%	3	14%	4	25%	464	25%
Sub-Total	**207**	**91%**	**45**	**100%**	**16**	**77%**	**16**	**100%**	**1820**	**96%**
8. No training in *Epidemiology (i.e. epidemiologist does not fit into any of the above categories)*	20	9%	0	0%	5	24%	0	0%	77	4%
Total	**227**		**45**		**21**		**16**		**1897**	

BT=Bioterrorism/Emergency Response; CD=Chronic Disease; EH=Environmental Health; ID=Infectious Disease; IJ=Injury; MCH=Maternal and Child Health; OcH=Occupational Health; OrH=Oral Health.

Availability, Need and Barriers of Training

Nearly all respondents (94%) reported that their state health department has supported training or education in the past twelve months to enhance the competence of epidemiologists in performing the essential public health services.

TABLE 12. HEALTH DEPARTMENT SUPPORT TO ENHANCE THE COMPETENCE OF EPIDEMIOLOGISTS IN PERFORMING THE ESSENTIAL PUBLIC HEALTH SERVICES.

Education	n	%
Yes	48	94.1
No	2	3.9
Don't Know	1	2.0

There are several training mechanisms utilized by state health departments. Of the respondents that indicated use of training or education to enhance the competence of epidemiologists, the majority of states and territories indicated use of on-site learning courses (94%), distance learning (93%) and off-site training (100%).

TABLE 13. MECHANISMS OF STATE HD SUPPORTED TRAINING OR EDUCATION.

State supported training or education	n	%
On site learning courses	44	93.6
Distance learning or internet/web-based courses (e.g. the *Public Health Training Network*)	42	93.3
Off-site workshops, conferences or seminars	48	100
Tuition reimbursement such as scholarships or loan repayment programs (i.e., for academic courses or courses leading to certification)	22	47.8
Self-directed learning	29	64.4
Other	4	25

The extent of participation in training showed that 70% of states provided training to more than half of their epidemiology staff during the year.

TABLE 14. PERCENTAGE OF STATE HD EPIDEMIOLOGISTS THAT PARTICIPATED IN TRAINING OR EDUCATION DURING CALENDAR YEAR 2003.

Participation	n	%
0-25% participated in training	4	9.1
26-50% participated in training	9	20.5
51-75% participated in training	14	31.8
76-100% participated in training	17	38.6

State health department respondents indicated that additional training is needed in several key areas. Over half indicated that additional training is needed in all of the training topics below. The areas where training is needed the most are designing and evaluating surveillance systems (79%), designing epidemiologic studies (82%), designing data collection tools (79%), data management and data cleaning (78%), analyzing and characterizing epidemiologic data with statistical software (80%), evaluating public health interventions (93%), and leadership and management training (80%).

TABLE 15. EPIDEMIOLOGY TRAINING: ADEQUACY VERSUS NEED.				
	Adequate training is available		Additional training is needed	
Epidemiology Training Topic	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Designing and evaluating surveillance systems	23 (46.9)	26 (53.1)	37 (78.7)	10 (21.3)
Interpretation of surveillance data	36 (73.5)	13 (26.5)	32 (68.1)	15 (31.9)
Disease screening methods	27 (56.3)	21 (43.8)	28 (60.9)	18 (39.1)
Case investigation methods	36 (75.0)	12 (25.0)	29 (64.4)	16 (35.6)
Outbreak investigation methods	38 (79.2)	10 (20.8)	28 (62.2)	17 (37.8)
Designing epidemiologic studies	25 (51.0)	24 (49.0)	39 (82.0)	8 (17.0)
Designing data collection tools to address a health problem (e.g. surveys, questionnaires)	28 (57.1)	21 (42.9)	37 (78.7)	10 (21.3)
Data collection methods (e.g. case interviews, medical records, vital statistics, laboratory findings, pathology reports, etc.)	30 (61.2)	19 (38.8)	34 (72.3)	13 (27.7)
Creating databases	34 (69.4)	15 (30.6)	34 (72.3)	13 (27.7)
Data management and data cleaning	26 (53.1)	23 (46.9)	36 (78.3)	10 (21.7)
Analyzing and characterizing epidemiologic data with statistical software	29 (60.4)	19 (39.6)	36 (80.0)	9 (20.0)
Writing field investigation reports	26 (54.2)	22 (45.8)	31 (67.4)	15 (32.6)
Communication of epidemiologic findings to the lay public	27 (55.1)	22 (44.9)	34 (73.9)	12 (26.1)
Recommending control measures, prevention programs, or other public health interventions based on epidemiologic findings	30 (62.5)	18 (37.5)	29 (65.9)	15 (34.1)
Evaluation of public health interventions	17 (34.7)	32 (65.3)	42 (93.3)	3 (6.7)
Leadership and management training	32 (65.3)	17 (35.7)	37 (80.4)	9 (19.6)

The two primary barriers to training are time (83%) and access to training (67%). States indicated that there is little time allotted to epidemiologists for training while on the job and that they do not have access to training. Of the 21 (40%) respondents that indicated "other," half indicated that travel is a barrier. This includes ability to travel out of state, approval of multi-person travel, state travel restrictions and expense of travel.

TABLE 16. BARRIERS TO TRAINING.		
Training barriers	**n**	**%**
Access to training	35	67.3
Time allotted to epidemiologists for training while on the job	43	82.7
State HD does not support training in the above areas	12	23.1
Other	21	40.3

Training Collaborations

Respondents (88%) indicated that state health departments collaborated with other organizations to provide training to state health department epidemiologists. The three primary training partners are the Centers for Disease Control and Prevention (68%), schools of public health (76%) and schools of medicine (50%). Respondents (80%) also indicated that the state health department provides training to epidemiologists and disease investigators at their local health departments.

TABLE 17. HD COLLABORATIONS TO PROVIDE TRAINING TO EPIDEMIOLOGISTS.		
Training Collaborations	**n**	**%**
Yes	44	88
No	6	12
Don't Know	0	0

TABLE 18. HD TRAINING PARTNERS. (N=44)		
Training partners	**n**	**%**
Centers for Disease Control and Prevention (CDC)	30	68.2
Schools of public health	35	75.6
Schools of medicine	22	50.0
Schools of veterinary medicine	5	11.4
Public safety/First responders	11	25.0
Other academic institutions	17	38.6
Other healthcare organizations	10	22.7
Other healthcare providers	8	18.2
Other Federal/government agencies	14	31.8
Other	8	18.2

TABLE 19. TRAINING TO EPIDEMIOLOGISTS AND DISEASE INVESTIGATORS AT THE LOCAL LEVEL.		
Training at local level	**n**	**%**
Yes	38	80.9
No	9	19.1

Recruitment

Over 90% of state health departments indicated that there are barriers to recruiting epidemiologists to their state health department. However, there was not one specific barrier that prevented state health departments from recruiting. Instead, states indicated that several barriers contribute to the recruiting failure. Examples of barriers to recruiting reported by state health departments are the inability to offer a competitive salary (20%) and a cumbersome hiring process (15%).

TABLE 20. RECRUITMENT BARRIERS.		
Barriers to recruitment	**n**	**%**
Yes	46	92
No	4	8

TABLE 21. TYPES OF RECRUITMENT BARRIERS. (N=46)		
Barrier Types	**n**	**%**
No nearby academic institutions (Universities/Schools of Public Health)	2	4.4
Cannot offer competitive salary	9	19.6
Cannot offer competitive benefits	3	6.5
Hiring process at the state HD is too cumbersome	7	15.2
Geographically undesirable location	6	13.0
Not aware of recruitment tools available to the state HD	1	2.2
Too time consuming	4	8.7
Other	7	15.2

Even though state health departments encounter barriers to recruitment, they indicated a number of successful recruiting methods. The most common method of recruitment is directly from universities and schools of public health (73%). Other common recruitment methods include professional organizations (52%),

federal programs (60%), state health department websites (60%) and word of mouth (67%).

TABLE 22. SUCCESSFUL RECRUITMENT METHODS. (N=52)		
Recruitment methods	**n**	**%**
Universities/schools of public health	38	73.1
Recruitment job fairs	8	15.4
Professional organizations (CSTE, APHA, ASPH, ACE, etc.)	27	51.9
Federal programs (EIS, PHPS, CEFO)	31	59.6
Other health agencies within the state	18	34.6
Local media	21	40.4
Epi Monitor or periodic epidemiology newsletter	14	26.9
State HD's employment website	31	59.6
Other websites (e.g. Public Health Employment Connection)	23	44.2
Word of mouth	35	67.3
Do not recruit	0	0.0
Other	6	11.5

Epidemiology Salary Ranges by Degree

MDs, DOs, and DDSs in the Midwest have the highest salary range for this group. Those in the Northeast with a DVM; PhD, DrPH, or other doctoral degree; MPH, MSPH, or other Master's degree; and Associate's or no post high school degree have the highest salary range for their degree groups. The salary range with a BA, BS, BN, or other Bachelor's degree is comparable among all regions. Tables specifying national and regional salary ranges by degree type are included in Appendix B: Table 1.

Epidemiology Salary Ranges by Title

Salary by job title was categorized into five groups, with the State Epidemiologist as the highest-level position for epidemiologists in the state health department. Nationally, the salary range for state epidemiologists was $85,454 to $129,702, and the range for entry-level epidemiologists was $36,798 to $51,902. With respect to the lower and upper limit values of the national average salary, mid-level epidemiologists made between 14% and 15% more than entry-level epidemiologists. On average, senior epidemiologists made between 34% and

41% more than entry-level epidemiologists. The degree level for each position was not captured in the assessment. Salary range by job level was also categorized by region.

TABLE 23. NATIONAL SALARY RANGES FOR EPIDEMIOLOGISTS.

State Epi	n		Lower Limit	Upper Limit	Deputy State Epi	n		Lower Limit	Upper Limit
Nationally	32	Mean	$85,454	$129,702	Nationally	16	Mean	$71,553	$98,944
		Median	$86,000	$125,000			Median	$73,500	$101,000
Midwest	10	Mean	$86,819	$149,618	Midwest	3	Mean	$64,000	$113,333
		Median	$92,500	$147,500			Median	$70,000	$125,000
Northeast	7	Mean	$89,359	$116,483	Northeast	4	Mean	$69,202	$88,232
		Median	$81,000	$122,000			Median	$67,000	$92,000
South	7	Mean	$87,568	$142,142	South	2	Mean	$85,500	$105,000
		Median	$96,000	$148,341			Median	$85,500	$105,000
West	8	Mean	$81,525	$110,759	West	6	Mean	$72,339	$96,863
		Median	$89,306	$118,630			Median	$78,052	$97,700
Territories	1	Mean	$65,000	$100,000	Territories	1	Mean	$71,000	$99,000
		Median	$65,000	$100,000			Median	$71,000	$99,000
Senior Level Epi	**n**		**Lower Limit**	**Upper Limit**	**Mid Level Epi**	**n**		**Lower Limit**	**Upper Limit**
Nationally	28	Mean	$49,190	$73,263	Nationally	27	Mean	$41,772	$59,574
		Median	$48,057	$70,500			Median	$40,000	$60,000
Midwest	9	Mean	$45,468	$73,650	Midwest	8	Mean	$39,029	$58,305
		Median	$48,000	$72,000			Median	$40,000	$61,000
Northeast	5	Mean	$58,004	$79,473	Northeast	5	Mean	$51,249	$68,659
		Median	$52,000	$81,000			Median	$44,938	$59,323
South	6	Mean	$45,363	$71,519	South	6	Mean	$40,294	$63,702
		Median	$43,986	$67,670			Median	$39,259	$62,273
West	7	Mean	$50,702	$70,290	West	7	Mean	$39,944	$52,364
		Median	$50,000	$63,000			Median	$37,500	$51,594
Territories	1	Mean	$51,000	$70,000	Territories	1	Mean	$38,000	$50,000
		Median	$51,000	$70,000			Median	$38,000	$50,000
Entry Level Epi	**n**		**Lower Limit**	**Upper Limit**	**Entry Level Epi**	**n**		**Lower Limit**	**Upper Limit**
Nationally	28	Mean	$36,798	$51,902	South	6	Mean	$34,843	$54,536
		Median	$35,000	$50,000			Median	$33,000	$57,350
Midwest	8	Mean	$35,382	$49,738	West	7	Mean	$32,012	$46,438
		Median	$35,000	$52,000			Median	$32,000	$49,300
Northeast	6	Mean	$46,522	$61,014	Territories	1	Mean	$35,000	$37,000
		Median	$41,399	$54,387			Median	$35,000	$37,000

Availability of Mentors and Student Trainees

Over 75% of respondents indicated that there are sufficient numbers of epidemiologists available to mentor students, trainees and new hires performing epidemiology work within infectious disease. In contrast, over 50% of respondents for five specific program areas (environmental health, injury, occupational health, oral health and birth defects) indicated there are not sufficient state health department epidemiologists available to mentor students, trainees and new hires. On average, there were 6.5 (median = 2.5) students and trainees rotating in each state health department during the past calendar year.

TABLE 24. SUFFICIENT EPIDEMIOLOGISTS TO MENTOR STUDENTS, TRAINEES AND NEW HIRES.

Program Area	Yes n (%)	No n (%)	Don't Know n (%)
Bioterrorism/Emergency Response	27 (55.1)	19 (38.8)	3 (6.1)
Chronic Disease	26 (54.2)	21 (43.8)	1 (2.1)
Environmental Health	12 (25.0)	33 (68.7)	3 (6.3)
Infectious Disease	38 (77.6)	10 (20.4)	1 (2.0)
Injury	13 (27.1)	33 (68.8)	2 (4.2)
Maternal and Child Health	24 (49.0)	24 (49.0)	1 (2.0)
Occupational Health	6 (12.8)	39 (83.0)	2 (4.2)
Oral Health	6 (12.8)	39 (83.0)	2 (4.2)
HIV/AIDS	25 (51.0)	23 (46.9)	1 (2.0)
Birth Defects and Developmental Disabilities	10 (21.3)	33 (70.2)	4 (8.5)

TABLE 25. STUDENT/TRAINEE ROTATIONS.

	n	Mean	Median	Min	Max
Student Rotations	44	6.5	2.5	0	50

Epidemiology Health Department Organization

Just under half of states and territories (48%) indicated that epidemiology in their health department is organized as a combination of epidemiologists located in separate bureaus, divisions, office sections or units and some epidemiologists located within program specific areas. For the states or territories that indicated a

combination organization, 40% of epidemiologists are located within specific program areas.

TABLE 26. EPIDEMIOLOGY ORGANIZATION WITHIN STATE HEALTH DEPARTMENTS.		
Epidemiology organization	**n**	**%**
Organized as a bureau, division, office, section, or unit	10	19
Within specific programs	18	33
A combination of the above choices	26	48

TABLE 27. PERCENTAGE OF EPIDEMIOLOGISTS LOCATED WITHIN:					
	n	Mean	Median	Max	Min
A bureau, division, office, section or unit (n=25)	25	60.5	60	95	10
Specific program area (n=25)	25	39.5	40	90	5

4. Discussion

DISCUSSION

In the ECA conducted in 2001/2002, major gaps were identified in epidemiologic capacity in state and territorial health departments. This assessment was completed prior to the distribution of bioterrorism funds (nearly $1 billion) to states by the CDC. Because epidemiologists are needed for the detection and control of both emerging and on-going public health problems, including bioterrorism, the increase of federal funds to state health departments in fiscal year 2002 was expected to reduce these gaps.

Data collected from the earlier ECA showed that on average, each state health department received 61% of their funding for epidemiology activities from the federal government (Appendix A: Table 1). After the distribution of approximately $1 billion in federal funding to state health departments for terrorism and public health emergency preparedness, 73% of state health department funding for epidemiology services is from the federal government. These findings indicate that states have increased their reliance on federal funds and a smaller proportion of their funding is provided by the state or other sources. Increased dependence on federal funding may decrease the flexibility of state health departments to ensure other state priorities are addressed along with national bioterrorism preparedness goals and objectives.

In the current assessment, perception is that bioterrorism epidemiology and surveillance capacity increased (Appendix A: Table 2). From data collected in 2001/2002, 44% of respondents indicated substantial to full capacity in this program area—compared to 79% currently. However, with this increase, other program areas showed a decrease in epidemiology and surveillance capacity, including capacity in infectious disease, for which fewer respondents indicated almost full to full capacity. Previously, 36% of states indicated environmental health capacity was at substantial to full capacity—in contrast to 27% currently.

The perception of capacity in chronic disease, injury and occupational health also decreased. Finally, while perceived capacity of substantial to full in maternal and child health increased, so did states that perceived their capacity as none or minimal.

Respondents reported 2,580 epidemiologists working in state and territorial health departments, which is almost double the number of epidemiologists (1,366) reported in the earlier assessment (Results: Table 3). This marked increase in the number of epidemiologists has two notable explanations. First, there was a 100% response rate from states and the District of Columbia in this assessment compared to an 80% response rate in 2001/2002. The additional responding states could account for a portion of the increase of 1,200 epidemiologists between the two assessments. Secondly, when comparing the results from the District of Columbia and the 38 states that participated in both assessments, an increase of 343 epidemiologists was observed (Appendix A: Table 3). This increase is not surprising and most likely is due to the infusion of bioterrorism funds in state health department programs.

Much of the increase in epidemiologists is in the area of bioterrorism preparedness, in which there was a 100% increase from data collected in 2001/2002 and 2004 (Appendix A: Table 3). In the earlier assessment, bioterrorism programs accounted for 9% of the total number of epidemiologists in state health departments. This year, BT programs account for 14% of the epidemiology workforce in state health departments. Chronic disease, maternal and child health, and oral health epidemiology also experienced a large increase in the number of epidemiologists. Additionally, infectious disease epidemiology showed no growth when compared to the previous assessment, and other program areas such as environmental health, injury and occupational health experienced a decrease in the number of epidemiologists from 2001/2002. For two of these program areas, injury and occupational health, the perceived need of epidemiologists is nearly three times its current capacity (Results: Tables 4A and

4B). This combination of findings would strongly support the need to focus resources on further development of non-infectious epidemiology capacity.

In the last assessment, there were 114 EIS officers or graduates assigned/employed in state health departments, compared to 151 EIS officers or graduates currently assigned/employed in state health departments (Appendix A: Table 4). Because the participation rate for the current analysis is higher, it is difficult to ascertain if there has been a true increase in state EIS placement. However, the mean number of EIS officers or graduates assigned or employed in state health departments increased for all three categories, indicating an increase in the number of EIS officers or graduates in state and territorial health departments.

Overall, though there has been an increase in the number of epidemiologists, many epidemiologists (48%) are not academically trained in epidemiology (Results: Table 11). This finding is consistent with the 2003 report, where CSTE reported that 42% of the epidemiologic workforce had insufficient formal training in epidemiology. In 2004, 45 states reported training information for 1,897 epidemiologists. The largest gap in academic epidemiology training is in infectious disease and injury epidemiology. Only 43% percent of epidemiologists in infectious disease and 42% of epidemiologists in injury have received a degree in epidemiology. In contrast, at least 60% of epidemiologists in bioterrorism/emergency response (63%), environmental health (60%) and occupational health (63%) have received a degree in epidemiology. However, 96% (1,820) of these 1,897 epidemiologists have received at least a minimum level of training in epidemiology. Minimal epidemiology training includes participation in a formal training program such as EIS (5%), course work in epidemiology (14%), or on the job training in epidemiology (25%). Four percent of all epidemiologists have received no training in epidemiology. This information is important and necessary to address training gaps within specific program areas. To help mitigate perceived training gaps, a national standard for

competency-based, on-the-job training and/or a certificate program should be established to ensure proper training of epidemiologists.

State health departments have systemic barriers to training in their organizations. Over 90% of respondents reported that their state health department has supported training or education in the past twelve months to enhance the competence of epidemiologists in performing the essential public health services (Results: Table 12). However, over 29% of state health department's indicated that 50% or fewer of epidemiologists in their health department participated in training or education during calendar year 2003 (Results: Table 14). In addition, state health departments indicated that additional training is needed in several key topic areas (Results: Table 15). These include designing and evaluating surveillance systems, designing epidemiologic studies, designing data collection tools, data management and data cleaning, analyzing and characterizing epidemiologic data with statistical software, evaluating public health interventions, and leadership and management training. Because epidemiologists need to perform many of these core functions on a daily basis, additional training is essential for successful job performance. Respondents indicated two primary barriers to training: time and access to training (Results: Table 16). For essential training to occur, state health departments will need to alter their organizational culture to ensure training becomes an integral component of the job.

Over half of respondents indicated there are not sufficient numbers of state health department epidemiologists available to mentor students, trainees and new hires within environmental health, injury, occupational health, oral health and birth defects epidemiology (Results: Table 24). Mentoring for these non-infectious disease program areas is generally perceived to be less than optimal, which is likely a reflection of the relatively small number of individuals trained in this area. Alternative mechanisms should be explored to provide guidance to potential health professionals in these areas.

In addition to training barriers, there continue to be significant barriers to recruiting epidemiologists. Over 90% of state health departments indicated that there are barriers to recruiting epidemiologists to employ in their state health departments (Results: Table 20). There was not a single, significant barrier that prevented state health departments from recruiting, but rather a mix of barriers that contribute to the recruiting failure some health departments face (Results: Table 21).

Salary seems to be one of many underlying factors in recruiting well-qualified epidemiologists. Nationally, salary ranges have changed little from the previous ECA (Appendix A: Table 5). However, the same does not hold true regionally. In the Northeast, the average DVM salary for the upper and lower limit mean increased 19% and 32% respectively from 2001/2002 to 2004. The upper limit of PhD, DrPH and other doctoral salaries also increased. In the Midwest, while the average lower and upper MD salaries increased at least 9% and 37% respectively, the average salary for DDSs decreased, as well as the lower limit for DVMs. In the West, the upper salary limit for those with a bachelor's degree decreased 18%. In addition to salary, geographic location and several internal personnel management issues present obstacles to recruiting well-qualified epidemiologists (Results: Table 21).

The Ten Essential Public Health Services are DHHS departmental goals set for public health agencies. Of the 10 essential services, four services rely heavily on epidemiologic functions and were examined in this assessment. For two of these essential services, 1) monitoring health status to identify and solve community health problems and 2) diagnosing and investigating health problems and health hazards in the community, over 50% of respondents indicated substantial to full capacity (Results: Table 2). A greater percentage of respondents indicated full or almost full capacity for these two essential public health services than in the earlier assessment, which indicates general improvement in the ability of states to monitor health status and investigative health problems (Appendix A: Table 6).

In contrast, 22% of respondents indicated substantial to full capacity in evaluating effectiveness, accessibility and quality of personal and population-based health services, and 12% of respondents indicated substantial to full capacity in researching for new insights and innovative solutions to health. This finding indicates that states give less priority and continue to have insufficient resources for evaluating population-based health services and conducting research.

In summary, the overall number of epidemiologists in state health departments has increased, primarily in bioterrorism and emergency response. However, the number of epidemiologists in several program areas decreased or remained constant and perceived capacity decreased in critical program areas including infectious disease. Based on this information, several recommendations can be made or modified from the earlier ECA. These recommendations target epidemiology capacity, sources of capacity funding and workforce training needs.

5. Recommendations

RECOMMENDATIONS

Epidemiology Capacity

- The current number of epidemiologists is far below the perceived "estimate of need" to provide essential services of public health across epidemiology program areas. Special emphasis should be placed on increasing the number of trained epidemiologists in non-infectious program areas. CSTE recommends meeting this estimate of need by:
  - Increasing the pool of academically prepared graduates
  - Expanding internships and fellowship programs
  - Establishing national recruiting for state and local public health epidemiology positions
  - Developing standards through levels of required competencies and tying compensation comparability among states to these standards
  - Establishing incentives for choosing and maintaining a career in public health epidemiology
- This national assessment shows significant deficiencies in infectious disease and other areas of epidemiology infrastructure including chronic diseases, injury, environmental health, occupational health, and maternal and child health. As such, there should be much greater advocacy and awareness of the essential role of epidemiology in the public health system as part of the overall strategy to increase the national investment in public health.
- Salary continues to be a limiting factor for recruiting epidemiologists to state health departments. A national examination of salary structure for epidemiologists working in state-based agencies is recommended.

Impact and Source of Funding for Epidemiology Capacity

- An increase in bioterrorism preparedness capacity for surveillance and response with a corresponding increase in the number of epidemiologists was observed. With this increase in bioterrorism capacity, there has been an increase in dependence on federal funds to support state health department epidemiology activities, together with state resources being leveraged to support terrorism preparedness functions. These observations raise concerns about the independence and flexibility of states to address priority state public health issues and the migration of scarce state resources to support a national priority in terrorism preparedness and response capacity.
- To address the public health issues around funding for terrorism preparedness and response capacity without leveraging state

resources will require more flexibility in federal funding. CSTE recommends that:

- Dual use of emergency preparedness resources should be greatly expanded to realign state-funded infectious disease epidemiologists and to bolster expansion of non-infectious disease programs, specifically in environmental health, injury and occupational health epidemiology.
- Infectious disease capacity should be maintained and resources for infectious disease capacity or other program areas should not be diverted to support terrorism preparedness except for short term planning activities.

Training as a Workforce Issue

- There are a significant number of epidemiologists without academic training in epidemiology. Of those with no academic training, many have taken an epidemiology course or have received on-the-job training. The development of certification programs outside universities and other educational programs tied to competencies in epidemiology is recommended.
- Training resources for epidemiologists working in state health departments are made available by the state and federal government. However, barriers to obtaining training still exist for workers. Organizational commitment from states and training requirements for practicing epidemiologists who need additional skills in their area of work are required to improve training opportunities for epidemiologists.

Future Assessments

- Epidemiology capacity within state and territorial health departments should be assessed periodically to monitor the progress in building epidemiology capacity across the nation.
- The measurement of epidemiology capacity in state and territorial health agencies should include both objective and subjective tools that should remain relatively constant to detect trends over time.
- Epidemiology capacity assessments should be used to allocate resources in health departments and to develop priorities and policy for building and maintaining public health infrastructure at the state and federal level.
- An assessment of local epidemiology capacity should be developed, administered and analyzed periodically to further monitor the progress in building epidemiology capacity across the nation.

6. References

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7. Appendix A-2001/2002 and 2004 ECA Comparisons

APPENDIX A

TABLE 1. FUNDING EPIDEMIOLOGY ACTIVITIES WITHIN THE STATE HD.		
Epidemiology funding	**2001/2002 Mean* (n=34)**	**2004 Mean (n=49)**
Federal funds	60.6	73
State funds	37.3	26.6
Other	2.1	0.3

*Numbers differ from previous published results. These numbers only reflect states or territories that provided input on federal, state and other funds and in which funding sources totaled 100%.

TABLE 2. EPIDEMIOLOGY AND SURVEILLANCE CAPACITY.					
Extent of epidemiology and surveillance capacity comparison	**N**	**None or Minimal (%)**	**Partial (%)**	**Substantial (%)**	**Almost Full or Full (%)**
Bioterrorism/Emergency Response	54	6	15	41	38
2001/2002	43	7	49	23	21
Difference		-1	-34	18	17
Chronic Disease	52	15	37	35	13
2001/2002	44	9	38	32	21
Difference		6	-1	3	-8
Environmental Health	54	43	30	20	7
2001/2002	42	28	36	24	12
Difference		15	-6	-4	-5
Infectious Disease	53	2	9	36	53
2001/2002	44	0	7	32	61
Difference		2	2	4	-8
Injury	54	50	31	9	9
2001/2002	41	20	56	17	7
Difference		30	-25	-8	2
Maternal and Child Health	52	25	33	33	10
2001/2002	42	7	57	31	5
Difference		18	-24	2	5
Occupational Health	53	77	13	8	2
2001/2002	41	54	24	17	5
Difference		23	-11	-9	-3
Oral Health	53	76	17	2	6
2001/2002	43	65	26	7	2
Difference		11	-9	-5	4

TABLE 3. INDIVIDUALS WORKING AS EPIDEMIOLOGISTS, BY PROGRAM AREA*.			
Program area	**2001/2002**	**2004**	**% Change**
Bioterrorism/Emergency Response	115	234	103%
Chronic Disease	162	257	58%
Environmental Health	166	162	-2%
Infectious Disease	631	628	0%
Injury	49	46	-6%
Maternal and Child Health	106	155	46%
Occupational Health	30	19	-38%
Oral Health	18	31	70%
Other	0	88	-
Total	**1277**	**1620**	**27%**

*Only the same 38 states and District of Columbia that provided information collected in 2001/2002 and 2004 are included in this analysis.

TABLE 4. STATE EIS PLACEMENT.				
EIS Placement	**2001/2002 Mean**	**2001-2202 Sum**	**2004 Mean**	**2004 Sum**
EIS Officers in training assigned to your state HD	0.5	23.0	0.7	34.0
EIS Graduates employed in your state HD	1.8	76.5	2.0	92.8
EIS Graduates assigned to your state by CDC	0.4	15.1	0.6	25

*Total N varies by year and by category

TABLE 5. NATIONAL PERSPECTIVE OF SALARY RANGES FOR EPIDEMIOLOGISTS, BY REGION AND DEGREE.				
Salary Range by Degree: National (N=53)	**Range**	**2001/2002**	**2004**	
		Mean	**Mean**	**Median**
MD*, DO (n=38)	Lower Limit	$86,857	$85,809	$87,500
	Upper Limit	$123,500	$139,814	$130,637
DDS (n=15)	Lower Limit	$65,682	$65,997	$63,020
	Upper Limit	$94,105	$103,064	$103,000
DVM (n=29)	Lower Limit	$56,190	$55,814	$51,300
	Upper Limit	$78,525	$85,624	$84,960
PhD, DrPH, other doctoral (n=33)	Lower Limit	$53,254	$48,871	$48,114
	Upper Limit	$75,181	$79,046	$79,052
MPH, MSPH, other Master (n=38)	Lower Limit	$38,231	$39,164	$39,004
	Upper Limit	$58,831	$63,202	$60,000
BA, BS, BN, other Bachelor (n=27)	Lower Limit	$34,022	$35,252	$35,000
	Upper Limit	$55,156	$53,810	$54,000
Associate or no post high school degree (n=11)	Lower Limit		$24,386	$24,325
	Upper Limit		$37,057	$36,000

*2001/2002 MD only

Salary Range by Degree: Midwest (N=12)	Range	2001/2002	2004	
		Mean	Mean	Median
MD*, DO (n=9)	Lower Limit	$85,980	$93,688	$90,000
	Upper Limit	$119,643	$163,575	$150,000
DDS (n=6)	Lower Limit	$83,533	$70,611	$68,730
	Upper Limit	$115,588	$113,424	$113,000
DVM (n=8)	Lower Limit	$63,267	$52,027	$49,057
	Upper Limit	$84,303	$91,606	$92,393
PhD, DrPH, other doctoral (n=9)	Lower Limit	$56,748	$45,801	$45,000
	Upper Limit	$80,865	$84,316	$81,000
MPH, MSPH, other Master (n=10)	Lower Limit	$36,837	$39,123	$40,000
	Upper Limit	$57,265	$64,144	$60,000
BA, BS, BN, other Bachelor (n=9)	Lower Limit	$35,193	$35,673	$36,000
	Upper Limit	$53,488	$57,878	$44,000
Associate or no post high school degree (n=2)	Lower Limit		$20,000	$20,000
	Upper Limit		$35,000	$35,000

*2001/2002 MD only

Salary Range by Degree: Northeast (N=9)	Range	2001/2002	2004	
		Mean	Mean	Median
MD*, DO (n=7)	Lower Limit	$86,444	$85,594	$85,000
	Upper Limit	$116,193	$124,340	$122,000
DDS (n=1)	Lower Limit	$62,572	Not Enough Respondents	
	Upper Limit	$81,546		
DVM (n=4)	Lower Limit	$54,939	$65,500	$65,500
	Upper Limit	$74,719	$99,250	$96,500
PhD, DrPH, other doctoral (n=6)	Lower Limit	$56,262	$60,500	$57,000
	Upper Limit	$74,535	$88,500	$85,500
MPH, MSPH, other Master (n=7)	Lower Limit	$43,122	$44,953	$41,000
	Upper Limit	$66,450	$72,901	$72,000
BA, BS, BN, other Bachelor (n=5)	Lower Limit	$38,461	$36,205	$35,027
	Upper Limit	$59,684	$54,668	$56,000
Associate or no post high school degree (n=4)	Lower Limit		$30,750	$30,500
	Upper Limit		$47,000	$48,000

*2001/2002 MD only

Salary Range by Degree: South (N=17)	Range	2001/2002	2004	
		Mean	Mean	Median
MD*, DO (n=11)	Lower Limit	$85,343	$82,015	$85,000
	Upper Limit	$130,544	$154,719	$148,681
DDS (n=4)	Lower Limit	$46,547	$55,509	$54,409
	Upper Limit	$68,277	$101,791	$102,682
DVM (n=9)	Lower Limit	$53,117	$51,445	$45,000
	Upper Limit	$76,147	$85,137	$81,322
PhD, DrPH, other doctoral (n=9)	Lower Limit	$49,063	$45,728	$44,000
	Upper Limit	$74,407	$77,346	$81,000
MPH, MSPH, other Master (n=10)	Lower Limit	$35,353	$35,586	$36,500
	Upper Limit	$57,318	$66,181	$66,387
BA, BS, BN, other Bachelor (n=6)	Lower Limit	$29,519	$35,143	$34,330
	Upper Limit	$50,093	$54,091	$55,000
Associate or no post high school degree (n=1)	Lower Limit		$19,400	$19,400
	Upper Limit		$36,000	$36,000

*2001/2002 MD only

Salary Range by Degree: West (N=12)	Range	2001/2002	2004	
		Mean	Mean	Median
MD*, DO (n=10)	Lower Limit	$86,558	$86,623	$90,974
	Upper Limit	$119,188	$116,948	$116,130
DDS (n=4)	Lower Limit	$73,955	$65,562	$57,650
	Upper Limit	$109,799	$88,815	$86,500
DVM (n=8)	Lower Limit	$57,662	$59,674	$58,150
	Upper Limit	$85,313	$73,376	$69,000
PhD, DrPH, other doctoral (n=8)	Lower Limit	$52,854	$45,748	$47,500
	Upper Limit	$72,337	$68,070	$64,000
MPH, MSPH, other Master (n=9)	Lower Limit	$41,535	$39,051	$36,720
	Upper Limit	$57,535	$54,237	$53,904
BA, BS, BN, other Bachelor (n=7)	Lower Limit	$38,056	$34,122	$35,000
	Upper Limit	$58,006	$47,726	$50,000
Associate or no post high school degree (n=4)	Lower Limit		$21,461	$22,163
	Upper Limit		$28,408	$27,539

*2001/2002 MD only

Salary Range by Degree: Territories (N=2)	Range	2001/2002	2004	
		Mean	Mean	Median
MD*, DO (n=1)	Lower Limit		$50,000	$50,000
	Upper Limit		$99,000	$99,000
DDS (n=0)	Lower Limit		No Response	
	Upper Limit			
DVM (n=0)	Lower Limit	$50,000		
	Upper Limit	$76,000		
PhD, DrPH, other doctoral (n=1)	Lower Limit		$60,000	$60,000
	Upper Limit		$78,000	$78,000
MPH, MSPH, other Master (n=2)	Lower Limit		$37,500	$37,500
	Upper Limit		$50,000	$50,000
BA, BS, BN, other Bachelor (n=0)	Lower Limit		No Response	
	Upper Limit			
Associate or no post high school degree (n=0)	Lower Limit			
	Upper Limit			

*2001/2002 MD only

TABLE 6. ADEQUATE EPIDEMIOLOGIC CAPACITY.

Essential public health services		None or Minimal (%)	Partial (%)	Substantial (%)	Fully or Almost Fully (%)
Monitoring Health Status to identify and solve community health problems	2004	8	30	42	20
	2001/2002	2	52	36	9
Diagnosing and investigating health problems and health hazards in the community	2004	2	40	40	18
	2001/2002	2	37	53	7
Evaluating effectiveness, accessibility, and quality of personal and population-based health services	2004	20	58	18	4
	2001/2002	23	50	25	2
Researching for new insights and innovative solutions to health problems	2004	54	34	4	8
	2001/2002	50	43	5	2

8. Appendix B-Supplemental Frequencies

APPENDIX B

TABLE 1. NATIONAL PERSPECTIVE OF SALARY RANGE FOR EPIDEMIOLOGISTS, BY DEGREE AND REGION.

Salary Range by Degree: MD, DO	n		Lower Limit	Upper Limit
Nationally	38	Mean	$85,809	$139,814
		Median	$87,500	$130,637
Midwest	9	Mean	$93,688	$163,575
		Median	$90,000	$150,000
Northeast	7	Mean	$85,594	$124,340
		Median	$85,000	$122,000
South	11	Mean	$82,015	$154,719
		Median	$85,000	$148,681
West	10	Mean	$86,623	$116,948
		Median	$90,974	$116,130
Territories	1	Mean	$50,000	$99,000
		Median	$50,000	$99,000

Salary Range by Degree: DDS	n		Lower Limit	Upper Limit
Nationally	15	Mean	$65,997	$103,064
		Median	$63,020	$103,000
Midwest	6	Mean	$70,611	$113,424
		Median	$68,730	$113,000
Northeast	1	Mean	Not Enough Respondents	
		Median		
South	4	Mean	$55,509	$101,791
		Median	$54,409	$102,682
West	4	Mean	$65,562	$88,815
		Median	$57,650	$86,500
Territories	0	Mean	No Response	
		Median		

Salary Range by Degree: DVM	n		Lower Limit	Upper Limit
Nationally	29	Mean	$55,814	$85,624
		Median	$51,300	$84,960
Midwest	8	Mean	$52,026	$91,606
		Median	$49,057	$92,393
Northeast	4	Mean	$65,500	$99,250
		Median	$65,500	$96,500
South	9	Mean	$51,445	$85,137
		Median	$45,000	$81,322
West	8	Mean	$59,674	$73,376
		Median	$58,150	$69,000
Territories	0	Mean	No Response	
		Median		

Salary Range by Degree: PhD, DrPH, other doctoral	n		Lower Limit	Upper Limit
Nationally	33	Mean	$48,871	$79,046
		Median	$48,114	$79,052
Midwest	9	Mean	$45,801	$84,316
		Median	$45,000	$81,000
Northeast	6	Mean	$60,500	$88,500
		Median	$57,000	$85,500
South	9	Mean	$45,728	$77,346
		Median	$44,000	$81,000
West	8	Mean	$45,748	$68,070
		Median	$47,500	$64,000
Territories	1	Mean	$60,000	$78,000
		Median	$60,000	$78,000

Salary Range by Degree: MPH, MSPH, other Master	n		Lower Limit	Upper Limit
Nationally	38	Mean	$39,164	$63,202
		Median	$39,004	$60,000
Midwest	10	Mean	$39,123	$64,144
		Median	$40,000	$60,000
Northeast	7	Mean	$44,953	$72,901
		Median	$41,000	$72,000
South	10	Mean	$35,586	$66,181
		Median	$36,500	$66,387
West	9	Mean	$39,051	$54,237
		Median	$36,720	$53,904
Territories	2	Mean	$37,500	$50,000
		Median	$37,500	$50,000

Salary Range by Degree: BA, BS, BN, other Bachelor	n		Lower Limit	Upper Limit
Nationally	27	Mean	$35,252	$53,810
		Median	$35,000	$54,000
Midwest	9	Mean	$35,673	$57,878
		Median	$36,000	$44,000
Northeast	5	Mean	$36,205	$54,668
		Median	$35,027	$56,000
South	6	Mean	$35,143	$54,091
		Median	$34,330	$55,000
West	7	Mean	$34,122	$47,726
		Median	$35,000	$50,000
Territories	0	Mean	No Response	
		Median		

Salary Range by Degree: Associate or no post high school degree	n		Lower Limit	Upper Limit
Nationally	11	Mean	$24,386	$37,057
		Median	$24,325	$36,000
Midwest	2	Mean	$20,000	$35,000
		Median	$20,000	$35,000
Northeast	4	Mean	$30,750	$47,000
		Median	$30,500	$48,000
South	1	Mean	$19,400	$36,000
		Median	$19,400	$36,000
West	4	Mean	$21,461	$28,408
		Median	$22,163	$27,539
Territories	0	Mean	No Response	
		Median		

TABLE 2. STATE HD CONTRACTED EPIDEMIOLOGISTS. (N=46)

	Mean	Median	Min	Max
Contracted Epidemiologists	3.9	0.3	0	94

TABLE 3. EPIDEMIOLOGIST LENGTH OF EMPLOYMENT.

Length of employment	Mean	Median	Min	Max
0-2 years (n=45)	11.2	8	1	55
3-5 years (n=44)	9.7	6	0	38
6-10 years (n=45)	6.3	4	0	35
11+ years (n=42)	6.4	3	0	27

9. Appendix C-2004 Epidemiology Capacity Assessment

National Assessment of Epidemiologic Capacity in Public Health

2004

Council of State and Territorial Epidemiologists

BACKGROUND

The first national Epidemiology Capacity Assessment (ECA) was conducted between November 2001 and April 2002, and structured around the Ten Essential Services of Public Health. The purpose was to measure the baseline status of core epidemiologic capacity [prior to bioterrorism (BT) funding] in the United States. The findings were published in 2003 and may be downloaded at http://www.cste.org/pdffiles/ecacover1.pdf.

CSTE's continued effort to reassess the epidemiologic workforce capacity is prompted by the Healthy People 2010 Objective 23-14, which calls on CSTE to provide a broad snapshot of epidemiology capacity in states to perform essential public health services, including monitoring health status, diagnosing and investigating health problems and health hazards, and conducting evaluation and research.

The current ECA has three sections consisting of 1) a core epidemiology assessment, 2) training, retention, and recruiting, and 3) program specific modules. The data obtained from the report will allow comparative use of the data to measure differences between State Health Departments in salary ranges, training and recruitment methods, and number of epidemiologists. The current assessment will also allow comparative use of data within program specific areas in State Health Departments such as chronic disease, environmental health, food safety, infectious diseases, injury, maternal and child health, and occupational health.

Your state's information is crucial to the success of this important national initiative, and will provide policymakers along with federal and state partners the information they need about the status of epidemiology capacity in the Nation's health departments. More specifically, the information submitted by your state will be used to sketch out regional and national trends in epidemiology capacity, and findings will be shared with all participating states. However, CSTE will not release state-specific information in any reports unless otherwise approved by the state(s).

INSTRUCTIONS

This assessment is comprised of three parts. Part I consists of 14 questions and focuses on the health department's (HD) core capacity in epidemiology. Part II consists of 8 questions and focuses on training and recruitment capacity within the State HD. Finally, Part III consists of 7 sections and focuses on program specific capacity within the State HD.

Assessment respondents may include the State Epidemiologist and/or delegate(s), in addition to other HD epidemiologists when appropriate (i.e. program specific questions as well as core questions 3, 4, 7, and 11).

Answer every question by checking off the choice that is the best match of your HD's situation. All questions refer to your **STATE** HD unless otherwise indicated. Please refer to the definitions/FAQs section of this assessment for **STATE** and **LOCAL** definitions or click **here**. When completing the assessment, please:

- Enter additional text to explain your answers when indicated (i.e. if you select "Other," please specify your response in the space provided).
- Select only one response UNLESS otherwise indicated.
- Describe half-time employees as ½ (i.e. 0.5).
- Enter '0' if your response to a question is 0 (Zero)--Please do not leave the field blank.

Primary respondent's contact information:	
First name	
Last name	
Degree(s)	
Title	
Health Department	
Address	
Address	
City	
State	
Zip	
Telephone	
Fax	
Email	

Please provide information on the primary respondent who will be completing the following program specific areas:

PARTS I and II - Core questionnaire/Training ***(include names and program titles of other contributing respondents below)***
Name/Title
Preferred Contact Information (phone or email)

PART III – Indicators ***(include names and program titles of contributing respondents below)***
Name/Title
Preferred Contact Information (phone or email)

PART III – Occupational Health ***(include names and program titles of contributing respondents below)***
Name/Title
Preferred Contact Information (phone or email)

PART III – Chronic Disease ***(include names and program titles of contributing respondents below)***
Name/Title
Preferred Contact Information (phone or email)

PART III – Maternal and Child Health ***(include names and program titles of contributing respondents below)***
Name/Title
Preferred Contact Information (phone or email)

PART III – Food Safety ***(include names and program titles of contributing respondents below)***
Name/Title
Preferred Contact Information (phone or email)

PART III – Infectious Disease ***(include names and program titles of contributing respondents below)***
Name/Title
Preferred Contact Information (phone or email)

DEFINITIONS/FAQs

Epidemiologist

According to Last (*A Dictionary of Epidemiology, 4th Ed., 2001*), an Epidemiologist is defined as "an investigator who studies the occurrence of disease or other health related conditions or events in defined populations. The control of disease in populations is often also considered to be a task for the epidemiologist." The discipline of Epidemiology is defined as the "study of the distribution and determinants of health related states or events in specified populations, and the application of this study to control of health problems." "Study" includes surveillance, observation, hypothesis testing, analytic research, and experiments. "Distribution" refers to analysis by time, place, and classes of persons affected. "Determinants" are all the physical, biological, social, cultural, and behavioral factors that influence health. "Health related states and events" include diseases, causes of death, behaviors such as use of tobacco, reactions to preventative regimens, and provisions and use of health services. "Specified populations" are those with identifiable characteristics such as precisely defined numbers. "Applications to control…" makes explicit the aims of epidemiology—to promote, protect, and restore health."

Who should be counted as an Epidemiologist?
Epidemiologists in state and territorial health departments are any person(s) who perform functions consistent with the above definition. When considering who should be counted as an epidemiologist, focus on the functions performed by the individual rather than the job title.

Who should be counted as a STATE Health Department (HD) Epidemiologist?
Epidemiologists employed or contracted by the STATE HD. For example, epidemiologists who work at the LOCAL or STATE level that are employed or contracted by the state are considered STATE epidemiologists

Who should be counted as a LOCAL Health Department (HD) Epidemiologist?
Epidemiologists who work for the LOCAL HD and are employed or contracted by the LOCAL HD and are not employed or contracted by the STATE HD

PART I – Core questionnaire - PRINT CLEARLY
Important – Please consult other HD program epidemiologists for questions pertaining to domains not under your area of responsibility. All questions refer to your STATE Health Department UNLESS otherwise indicated. STATE Health Department refers to employees of your STATE Health Department. Please click here for a definition of a STATE epidemiologist. If you have any questions, please contact John Abellera (jabellera@cste.org) or Jennifer Lemmings (jlemmings@cste.org).

1. **What are the funding sources for all epidemiology activities within the STATE HD?** (Check all that apply)

☐ Federal funds	Specify percentage?	_____ +
☐ State funds	Specify percentage?	_____ +
☐ Other ☐	Specify percentage?	_____ =
		100% (total should equal 100%)

2. How is Epidemiology organized within your STATE HD?

☐ Organized as a bureau, division, office, section or unit (i.e. all epidemiologists are located together in one organized epidemiology unit).

☐ Individual epidemiologists are located within specific programs (i.e. chronic disease epidemiologists are located within the chronic disease program area).

☐ A combination of the above choices (i.e. epidemiology has a separate unit, however, some epidemiologists are located within program specific areas). *If yes, please see question 2a*.

2a. If a combination organization was selected, what is the percentage of epidemiologists within each division?

☐% of epidemiologists located within the epidemiology bureau, division, office, section, or unit?

☐% of epidemiologists located within specific programs?

100% (total should equal 100%)

3. What is the extent of the epidemiology and surveillance capacity in the following program areas in your STATE HD? If needed, please seek the guidance of other State HD staff within program specific areas when completing this question. *See below for a definition of the scale used in the following question.*

Bioterrorism/ Emergency Response	Chronic Disease	Environmental Health	Infectious Disease
☐ None*	☐ None*	☐ None*	☐ None*
☐ Minimal	☐ Minimal	☐ Minimal	☐ Minimal
☐ Partial	☐ Partial	☐ Partial	☐ Partial
☐ Substantial	☐ Substantial	☐ Substantial	☐ Substantial
☐ Almost Fully	☐ Almost Fully	☐ Almost Fully	☐ Almost Fully
☐ Full	☐ Full	☐ Full	☐ Full
*If none, are you currently developing a program or have plans to implement one? ☐Yes ☐ No	*If none, are you currently developing a program or have plans to implement one? ☐Yes ☐ No	*If none, are you currently developing a program or have plans to implement one? ☐Yes ☐ No	*If none, are you currently developing a program or have plans to implement one? ☐Yes ☐ No
Injury	**Maternal and Child Health**	**Occupational Health**	**Oral Health**
☐ None*	☐ None*	☐ None*	☐ None*
☐ Minimal	☐ Minimal	☐ Minimal	☐ Minimal
☐ Partial	☐ Partial	☐ Partial	☐ Partial
☐ Substantial	☐ Substantial	☐ Substantial	☐ Substantial
☐ Almost Fully	☐ Almost Fully	☐ Almost Fully	☐ Almost Fully
☐ Full	☐ Full	☐ Full	☐ Full
*If none, are you currently developing a program or have plans to implement one? ☐Yes ☐ No	*If none, are you currently developing a program or have plans to implement one? ☐Yes ☐ No	*If none, are you currently developing a program or have plans to implement one? ☐Yes ☐ No	*If none, are you currently developing a program or have plans to implement one? ☐Yes ☐ No

Not at all, None	None of the activity, knowledge or resources described within the question are met.
Minimally	Less than 25 percent (but greater than 0 percent) of the activity, knowledge or resources described within the question are met.
Partially	25 percent or greater (but less than 50 percent) of the activity, knowledge or resources described within the question are met.
Substantially	50 percent or greater (but less than 75 percent) of the activity, knowledge or resources described within the question are met**.**
Almost Fully	75 percent or greater (but less than 100 percent) of the activity, knowledge or resources described within the question are met.
Full	100 percent of the activity, knowledge or resources described within the question are met.

4. Describe the number of individuals currently working as epidemiologists in the following areas in your STATE HD (in the left box) as well as your estimate of the TOTAL number of epidemiologists needed in each subject area to address essential public health services (in the right box). Please click here for a list of the essential public health services. If needed, please seek the guidance of other State HD staff within program specific areas when completing this question. *Questions 5-7 refer to the answers you provide below.*

Example:

- **If you currently had 10 MD epidemiologists working in Bioterrorism/Emergency Response, but needed an additional five to address essential public health services, the estimate of need would be 15:**

EXAMPLE	Bioterrorism / Emergency Response	
Degree	Current	• Estimate of Need
MD, DO	**10**	**15**

If an epidemiologist has responsibilities divided over more than one program area, please count the epidemiologist in the program specific area that the individual has **greatest responsibility** (i.e. spends most of his/her time). **Please click here to see who should be counted as an epidemiologist.**

• **Enter 0 for none** • **Describe half-time employees as ½** • **List by highest Degree**	**Bioterrorism / Emergency Response**		**Chronic disease** *Please click here to see who should be counted as a Chronic Disease Epidemiologist.*		**Environmental health**		**Infectious disease**	
Degree	Current	• Estimate of Need	Current	• Estimate of Need	Current	• Estimate of Need	Current	• Estimate of Need
MD, DO								
DDS								
DVM								
PhD, DrPH, other doctoral								
MPH, MSPH, other master								
BA, BS, BSN, other bachelor								
Associate or no post high school degree								

• Enter 0 for none • Describe half-time employees as ½ • List by highest Degree	Injury		Maternal and child health		Occupational health		Oral health	
Degree	Current	• Estimate of Need	Current	• Estimate of Need	Current	• Estimate of Need	Current	• Estimate of Need
MD, DO								
DDS								
DVM								
PhD, DrPH, other doctoral								
MPH, MSPH, other master								
BA, BS, BSN, other bachelor								
Associate or no post high school degree								

Number of current epidemiologists in other epidemiology and surveillance programs that are not listed in question 4? ☐

What program areas are these epidemiologists located? ☐ ***Please list all program areas that apply***

5. Referring to question 4, how many of the listed STATE HD epidemiologists are contract employees?
Enter 0 for none. Describe half-time employees as ½. ☐

6. Referring to question 4, how many of the listed STATE HD epidemiologists have been working in your health department for:

• Enter 0 for none • Describe half-time employees as ½ **Years Employed**	**Number of Epidemiologists**
0 – 2 years	
3 – 5 years	
6 – 10 years	
11 + years	

7. Referring to question 4, how many of the listed STATE HD epidemiologists *currently* employed have formal academic training in epidemiology? If needed, please seek the guidance of other State HD staff within program specific areas when completing this question.

Examples:

- An MD with a MPH or higher degree (e.g. DrPh) in epidemiology should be classified as **#2.**
- An MD with no MPH but some formal training in epidemiology should be classified as **#5**. However, if the individual has no background in epidemiology other than on the job training, the individual should be classified as **#7**.
- An individual with no degree and some coursework in epidemiology should be classified as **#6**.
- An individual with a MPH or higher degree in a public health field other than epidemiology (e.g. Maternal and Child Health, Biostatistics, etc.) should NOT be classified as **#3**.
- An individual with no coursework in epidemiology with on the job training in epidemiology should be classified as **#7**.
- An individual with no training in epidemiology should be classified as **#8**.

• **Enter 0 for none** • **Describe half-time employees as ½** • **Please count each epidemiologist only once**	**Bioterrorism / Emergency Response**	**Chronic disease** *Please click here to see who should be counted as a Chronic Disease Epidemiologist.*	**Environmental health**	**Infectious disease**
	Number of Epidemiologists by Epidemiology Training			
1. PhD, DrPh, other doctoral degree in *Epidemiology*				
2. Professional background (e.g. MD, DO, DVM, DDS, etc.) with a dual degree in *Epidemiology*				
3. MPH, MSPH, other master degree in *Epidemiology*				
4. BA, BS, other bachelor degree in *Epidemiology*				
5. Completed formal training program in *Epidemiology* (e.g. EIS)				
6. Completed some coursework in *Epidemiology*				
7. Received on the job training in *Epidemiology*				
8. No formal training in *Epidemiology (i.e. epidemiologist does not fit into any of the above categories)*				

• Enter 0 for none • Describe half-time employees as ½ • Please count each epidemiologist only once	Injury	Maternal and child health *(MCH). Please click here to see who should be counted as a MCH Epidemiologist.*	Occupational health	Oral health	Other*
	Number of Epidemiologists by Epidemiology Training				
1. PhD, DrPh, other doctoral degree in *Epidemiology*					
2. Professional background (e.g. MD, DO, DVM, DDS, etc.) with a dual degree in *Epidemiology*					
3. MPH, MSPH, other master degree in *Epidemiology*					
4. BA, BS, other bachelor degree in *Epidemiology*					
5. Completed formal training program in *Epidemiology* (e.g. EIS)					
6. Completed some coursework in *Epidemiology*					
7. Received on the job training in *Epidemiology*					
8. No formal training in *Epidemiology (i.e. epidemiologist does not fit into any of the above categories)*					

*** Formal academic training in epidemiology of STATE HD epidemiologists *in other program specific areas not listed above*.**

8. Describe the official annual salary range for epidemiologists working in your STATE HD *by degree*.

Example:

- **If an entry level epidemiologist with an MD makes $75,000 to $100,000 and a senior level epidemiologist with an MD makes $125,000 to $150,000 the salary scale is:**
  From **$75,000** to **$150,000**

Training	Salary Scale
MD, DO	From $ ____ To $ ____
DDS	From $ ____ To $ ____
DVM	From $ ____ To $ ____
PhD, DrPH, other doctoral	From $ ____ To $ ____
MPH, MSPH, other Master	From $ ____ To $ ____
BA, BS, BSN, other bachelor	From $ ____ To $ ____
Associate or no post high school degree	From $ ____ To $ ____

9. If *applicable*, describe the annual STATE HD salary scale for the varying levels of epidemiologist positions listed below. *Please see the previous question for an example on how to complete the table below.*

Career Level	Salary Scale
State Epidemiologist	From $ ☐ To $ ☐
Deputy State Epidemiologist	From $ ☐ To $ ☐
Senior Level Epidemiologist	From $ ☐ To $ ☐
Mid Level Epidemiologist	From $ ☐ To $ ☐
Entry Level Epidemiologist	From $ ☐ To $ ☐

10. Does your STATE HD have adequate epidemiologic capacity to provide the following four essential public health services? Please click here for a list of the essential public health services. *See below for a definition of the scale used in the following question.*

Monitoring health status to identify and solve community health problems	Diagnosing and investigating health problems and health hazards in the community	Evaluating effectiveness, accessibility, and quality of personal and population-based health services	Researching for new insights and innovative solutions to health problems
☐ Not at all	☐ Not at all	☐ Not at all	☐ Not at all
☐ Minimally	☐ Minimally	☐ Minimally	☐ Minimally
☐ Partially	☐ Partially	☐ Partially	☐ Partially
☐ Substantially	☐ Substantially	☐ Substantially	☐ Substantially
☐ Almost Fully	☐ Almost Fully	☐ Almost Fully	☐ Almost Fully
☐ Full	☐ Full	☐ Full	☐ Full

Not at all, None	None of the activity, knowledge or resources described within the question are met.
Minimally	Less than 25 percent (but greater than 0 percent) of the activity, knowledge or resources described within the question are met.
Partially	25 percent or greater (but less than 50 percent) of the activity, knowledge or resources described within the question are met.
Substantially	50 percent or greater (but less than 75 percent) of the activity, knowledge or resources described within the question are met**.**
Almost Fully	75 percent or greater (but less than 100 percent) of the activity, knowledge or resources described within the question are met.
Full	100 percent of the activity, knowledge or resources described within the question are met

11. Describe the number of individuals currently working as epidemiologists in the following areas in your STATE HD *paid for with Bioterrorism funds*. If needed, please seek the guidance of other State HD staff within program specific areas when completing this question.

If an epidemiologist has responsibilities divided over more than one program area, please count the epidemiologist in the program specific area that the individual has **greatest responsibility** (i.e. spends most of his/her time). **Please click here to see who should be counted as an epidemiologist.**

• Enter 0 for none • Describe half-time employees as ½	Bioterrorism / Emergency Response	Chronic disease	Environmental health	Infectious disease
Total				
• Enter 0 for none • Describe half-time employees as ½	**Injury**	**Maternal and child health**	**Occupational health**	**Oral health**
Total				

Number of current epidemiologists in other epidemiology and surveillance programs paid for with bioterrorism funds that are not listed in question 11?

What program areas are these epidemiologists located? *Please list all program areas that apply*

12. Provide the number of the following:

• Enter 0 for none	Number
EIS **Officers** in ***training*** assigned to your **STATE** HD	
EIS **Graduates** employed in your **STATE** HD	
EIS **Graduates** assigned to your **STATE** by CDC	

Please note that questions 13 and 14 of this section request information of epidemiology at the *LOCAL* level.

Who should be counted as a LOCAL Health Department (HD) Epidemiologist?

- Epidemiologists who work for the LOCAL HD and are employed or contracted by the LOCAL HD and are not employed or contracted by the STATE HD
- Please refer to the definitions/FAQs section of this assessment for STATE and LOCAL definitions or click here.

13. Provide the number of the following:

• Enter 0 for none	Number
EIS **Officers** in ***training*** assigned to **LOCAL** HDs within your state	
EIS **Graduates** employed in **LOCAL** HDs within your state	

14. Describe the number of individuals working as epidemiologists at LOCAL HDs within your state. ***Do not count epidemiologists employed or contracted by the STATE HD.*** *Please refer to the definitions/FAQs section of this assessment for STATE and LOCAL definitions or click here.*

• Enter 0 for none • Describe half-time employees as ½ • List by highest degree	Number of Epidemiologists within the LOCAL HD
MD, DO	
DDS	
DVM	
PhD, DrPH, other doctoral	
MPH, MSPH, other master	
BA, BS, BSN, other bachelor	
Associate or no post high school degree	

PART II – Training & Recruitment - PRINT CLEARLY

Important – Please consult other HD program epidemiologists for questions pertaining to domains not under your area of responsibility. All questions refer to your STATE Health Department UNLESS otherwise indicated. STATE Health Department refers to employees of your STATE Health Department. Please click here for a definition of a STATE epidemiologist. If you have any questions, please contact John Abellera (jabellera@cste.org) or Jennifer Lemmings (jlemmings@cste.org).

1. In the past twelve months, has the STATE HD supported training or education to enhance the competence of epidemiologists in performing the essential public health services? Please click here for a list of the essential public health services.

☐ Yes
☐ No (If NO, please skip to question 2)
☐ Don't Know (If DON'T Know, please skip to question 2)

1a. If question 1 is YES, through what mechanism(s) have the STATE HD supported training or education to enhance the competence of epidemiologists in performing the essential public health services?

Education	Yes	No
On site learning courses?	☐ Yes	☐ No
Distance learning or internet/web-based courses (e.g. the *Public Health Training Network*)?	☐ Yes	☐ No
Off-site workshops, conferences or seminars?	☐ Yes	☐ No
Tuition reimbursement such as scholarships or loan repayment programs (i.e., for academic courses or courses leading to certification)?	☐ Yes	☐ No
Self-directed learning?	☐ Yes	☐ No
Other ☐	☐ Yes	☐ No

1b. If question 1 is YES, what percentage of all STATE HD epidemiologists participated in training or education to enhance the competence of epidemiologists in performing the essential public health services during Calendar year 2003?

☐ 0-25%
☐ 26-50%
☐ 51-75%
☐ 76-100%

2. Please choose the response that best describes the availability and need for training to STATE HD epidemiologists in the following areas:

Training in Epidemiology	Adequate training is available for our State Health Department epidemiology staff for this function		Additional training is needed by our State Health Department epidemiology staff for this function	
	YES	NO	YES	NO
Designing and evaluating surveillance systems	☐	☐	☐	☐
Interpretation of surveillance data	☐	☐	☐	☐
Disease screening methods	☐	☐	☐	☐
Case investigation methods	☐	☐	☐	☐
Outbreak investigation methods	☐	☐	☐	☐
Designing epidemiologic studies	☐	☐	☐	☐
Designing data collection tools to address a health problem (e.g. surveys, questionnaires)	☐	☐	☐	☐
Data collection methods (e.g. case interviews, medical records, vital statistics, laboratory findings, pathology reports, etc.)	☐	☐	☐	☐
Creating databases	☐	☐	☐	☐
Data management and data cleaning	☐	☐	☐	☐
Analyzing and characterizing epidemiologic data with statistical software	☐	☐	☐	☐
Writing field investigation reports	☐	☐	☐	☐
Communication of epidemiologic findings to the lay public	☐	☐	☐	☐
Recommending control measures, prevention programs, or other public health interventions based on epidemiologic findings	☐	☐	☐	☐
Evaluation of public health interventions	☐	☐	☐	☐
Leadership and management training	☐	☐	☐	☐

2a. What are the barriers epidemiologists face at your STATE HD to obtain training?
(Check all that apply)

☐ **Access to training**
☐ **Time allotted to epidemiologists for training while on the job**
☐ **STATE HD does not support training in the above areas**
☐ **Other:** ☐

3. Does your STATE HD collaborate with other organizations to provide training to HD epidemiologists?

- ☐ Yes
- ☐ No (If NO or DON'T KNOW, please skip to the next question)
- ☐ Don't Know (If NO or DON'T KNOW, please skip to the next question)

3a. If question 3 is YES, which partners does your STATE HD have formal agreements with to provide training to HD epidemiologists? (Check all that apply)

- ☐ Centers for Disease Control and Prevention (CDC)
- ☐ Schools of public health
- ☐ Schools of medicine
- ☐ Schools of veterinary medicine
- ☐ Public safety/First responders
- ☐ Other academic institutions
- ☐ Other healthcare organizations
- ☐ Other healthcare providers
- ☐ Other federal/government agencies
- ☐ Other ☐

4. Does your STATE HD provide training to epidemiologists and disease investigators at the LOCAL level?

- ☐ Yes
- ☐ No
- ☐ Don't Know

5. Describe the ways that epidemiologists have been recruited successfully in your STATE HD: (Check all that apply)

- ☐ Universities/schools of public health
- ☐ Recruitment job fairs
- ☐ Professional organizations (CSTE, APHA, ASPH, ACE, etc.)
- ☐ Federal programs (EIS, PHPS, CEFO)
- ☐ Other health agencies within the state
- ☐ Local media
- ☐ Epi Monitor or periodic epidemiology newsletter
- ☐ State HD's employment website
- ☐ Other websites (e.g. Public Health Employment Connection)
- ☐ Word of mouth
- ☐ Do not recruit
- ☐ Other ☐

6. Does your STATE HD have any barriers to recruitment?

☐ Yes
☐ No (If NO, please skip to question 7)
☐ Don't Know (If DON'T KNOW, please skip question 7)

6a. If question 6 is YES, what are these barriers? (Check all that apply)

☐ No nearby academic institutions (Universities/Schools of Public Health)
☐ Cannot offer competitive salary
☐ Cannot offer competitive benefits
☐ Hiring process at the STATE HD is too cumbersome
☐ Geographically undesirable location
☐ Not aware of recruitment tools available to the STATE HD
☐ Too time consuming
☐ Other ☐

7. Are sufficient STATE HD epidemiologists available to mentor students, trainees and new hires performing epidemiology work in the following program specific areas?

Program Specific Area	Yes or NO?	Program Specific Area	Yes or NO?
Bioterrorism/Emergency Response	☐ YES ☐ NO ☐ DON'T KNOW	Injury	☐ YES ☐ NO ☐ DON'T KNOW
Environmental health	☐ YES ☐ NO ☐ DON'T KNOW	Maternal and child health	☐ YES ☐ NO ☐ DON'T KNOW
Chronic disease	☐ YES ☐ NO ☐ DON'T KNOW	Occupational health	☐ YES ☐ NO ☐ DON'T KNOW
Infectious disease	☐ YES ☐ NO ☐ DON'T KNOW	Oral health	☐ YES ☐ NO ☐ DON'T KNOW
HIV/AIDS	☐ YES ☐ NO ☐ DON'T KNOW	Birth defects and developmental disabilities	☐ YES ☐ NO ☐ DON'T KNOW

8. How many students/trainees performing epidemiology functions have rotated through the STATE HD during the past calendar year? ☐ *Enter 0 for none*

Essential Public Health Services

The Essential Services framework was developed in 1994 as a method for better identifying and describing the core processes used in public health to promote health and prevent disease. All public health responsibilities (whether conducted by the local public health department or another organization within the community) can be categorized into one of the services.

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.

Thank you for completing this assessment. The information submitted by your state will be used to sketch out regional and national trends in epidemiology capacity, and findings will be shared with all participating agencies. However, CSTE will not release state-specific information in any reports unless otherwise approved by the state(s).

Please provide your comments in the following box. What topics should or should not be covered? Did you have difficulty estimating or understanding specific questions contained in this assessment? Any other suggestions?

If completing a paper version of this assessment, please return one fully completed questionnaire for your state or territory by email, fax, or regular mail to:

Jennifer Lemmings
Attn: ECA 2004
2872 Woodcock Boulevard, Suite 303
Atlanta, GA 30341-4015
Email: jlemmings@cste.org
Fax: 770-458-8516

If you have any questions, please contact John Abellera (jabellera@cste.org) or Jennifer Lemmings (jlemmings@cste.org) by email or phone (770-458-3811).

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