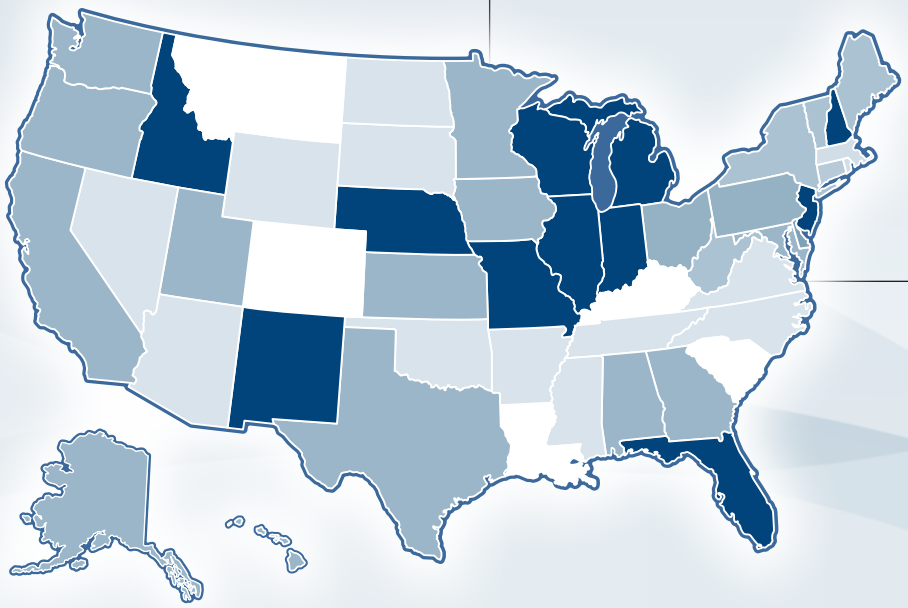
COUNCIL OF STATE AND TERRITORIAL EPIDEMIOLOGISTS

2009 NATIONAL ASSESSMENT OF EPIDEMIOLOGY CAPACITY



SUPPLEMENTAL REPORT:

Chronic Disease Epidemiology Capacity

Findings and Recommendations

CSTE
Council of State and Territorial Epidemiologists

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

The Council of State and Territorial Epidemiologists (CSTE) Chronic Disease ECA Workgroup completed this assessment in cooperation with state health departments. CSTE acknowledges the contribution of the CSTE Chronic Disease ECA Workgroup: Sara Huston, Renee Calanan, Sarah Lyon-Callo, Paul Siegel representing the Centers for Disease Control and Prevention (CDC) and Jillian Jacobellis representing the National Association of Chronic Disease Directors (NACDD). Contributing CSTE National Office Staff members are Edward Chao, Jennifer Lemmings, Lindsay Oweida, Lisa Ferland, and Patrick McConnon. The primary author is James Hadler, CSTE consultant.

For more than five decades, CSTE and CDC have worked together to improve the public's health by supporting the efforts of epidemiologists working at the state, territorial, tribal, and local levels by promoting the effective use of epidemiologic data to guide public health practice and improve health. CSTE and its members represent two of the basic components of public health—epidemiology and surveillance. Since its inception in the early 1990s, NACDD has collaborated with CSTE and CDC to build chronic disease epidemiology capacity across the states and territories.

This publication was supported by Cooperative Agreement Number 5U38HM000414 from CDC. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of CDC.

EXECUTIVE SUMMARY

Background

Chronic disease epidemiology has been an emerging subject matter area in public health since the 1980s, with the creation of the National Center for Chronic Disease Prevention and Health Promotion at the Centers for Disease Control and Prevention (CDC) in 1988. Shortly thereafter, federal funding from CDC began to be granted to support state-based prevention activities. Cooperative agreements now support surveillance and prevention activities related to heart disease and stroke, cancer, diabetes, asthma, arthritis, obesity, tobacco use, physical activity, nutrition, and others.

The number of chronic disease epidemiologists (CDEs) practicing in states has increased with the number of chronic disease programs and funded prevention activities over the past 20 years. In addition, since 1991, CDC has assisted many states through the State-Based Epidemiology for Public Health Program Support (STEPPS) by providing staff or salary support. Furthermore, the CDC Epidemic Intelligence Service and, more recently, the CDC/Council of State and Territorial Epidemiologists (CSTE) Applied Epidemiology Fellowship have provided states an opportunity to recruit epidemiologists into 2-year chronic disease epidemiology positions.

In 2000, CDC, CSTE, and the National Association of Chronic Disease Directors (NACDD) developed a strategic plan, "Developing Nationwide State-based Chronic Disease Epidemiology Capacity," with the primary objective of establishing in each state by 2004 a designated lead CDE who would be the point of contact with CDC for chronic disease. In 2003, CSTE conducted a national assessment of epidemiologic capacity for chronic disease at the state level. The major finding was that, despite efforts to develop capacity in all states, chronic disease epidemiology capacity was unevenly distributed and, based on a 10-point scale, 26% of the 47 responding jurisdictions (46 states and the District of Columbia) reported minimal to nonexistent capacity (score 0-3). Specific findings included the following: 43% of jurisdictions had no state CDE or lead CDE, 38% had no state funding for chronic disease epidemiology, 57% had fewer than five CDEs, and 55% did not have timely access to state mortality data. A number of specific recommendations were made toward improving specific aspects of chronic disease programs and urging further research to determine what factors foster a productive chronic disease epidemiology unit. Key capacity-related recommendations included the following: every state should have a designated chronic disease point of contact with CDC; a minimum of five full-time CDEs; at least one doctoral-level CDE; easy and timely access by CDEs to state mortality data; and an organizational structure to support coverage of the breadth of chronic diseases and their risk factors; and every state should provide easy access to a medical library and adequate clerical support. In addition, a list of measures of chronic disease epidemiology capacity was created as a future barometer for measuring capacity against that of 2003. The final recommendation was that CSTE should continue to improve the description and measurement of the chronic disease epidemiologic capacity of state health departments.

Shortly thereafter in 2004, the CSTE Chronic Disease ECA Workgroup published a white paper on the essential functions of chronic disease epidemiology in state health departments, describing the role that CDEs play in supporting the 10 essential public health services and identifying the primary role they play in surveillance, communication, and consultation.

In 2007, CSTE passed a position statement on state-level chronic disease epidemiology capacity. This position statement defined the minimum recommended chronic disease epidemiology workforce as a) at least one senior CDE (doctoral degree with at least 5 years' experience in chronic disease epidemiology or master's degree with at least 10 years' experience in chronic disease epidemiology); b) at least one CDE who is responsible for coordinating/integrating activities across categorical programs; and c) at least five full-time CDEs, at least one of whom has a doctoral degree. Key steps recommended to monitor state chronic disease epidemiology capacity included developing a list of capacity indicators that correspond to the capacity domains described in the 2003 chronic disease epidemiology capacity assessment and developing and conducting an online rapid assessment tool to measure these key indicators every 2 years. In 2009, in follow-up to the position statement, CSTE conducted a second assessment of chronic disease capacity as a supplement to the overall Epidemiology Capacity Assessment (ECA). The results of both the supplement and data collected on chronic disease programs from the 2009 ECA core assessment are presented in this report. In addition, where comparable information was obtained, trends in chronic disease capacity from the 2001, 2004, and 2006 core ECAs and CSTE's 2003 National Assessment of Epidemiologic Capacity in Chronic Disease are described.

Methods

In September 2008, members of CSTE's Chronic Disease ECA Workgroup began developing the Chronic Disease Supplement of the 2009 ECA. The workgroup included members from CSTE, NACDD, CDC, and state health departments. The assessment was piloted in three states in March 2009 and modified on the basis of feedback from them. The Chronic Disease Supplement was sent with the 2009 ECA to the State Epidemiologist of each state and territory in April 2009 with the intention that it be forwarded to the state or lead CDE as needed for completion. Data were collected during April 1–June 30, 2009.

Data on the overall capacity of chronic disease epidemiology and surveillance and the number, training, and competencies of individual epidemiologists were obtained from the ECA core assessment for which methods are described elsewhere. Notably, data on epidemiologists working in program areas such as chronic disease came from individual work sheets distributed to each epidemiologist. More detailed data on chronic disease program organization, surveillance and prevention activities, and chronic disease–specific capacities were obtained from the Chronic Disease Supplement. Trends in overall capacity were examined by using data from previous core ECAs in 2001, 2004, and 2006. Trends in chronic disease–specific capacities were compared with data from CSTE's 2003 National Assessment of Epidemiologic Capacity in Chronic Disease.

Percentages were calculated with the number of jurisdictions or the number of CDEs as the denominator, depending on the question. Depending on the analysis, CDEs were counted as one epidemiologist even if they did not work full time on chronic disease epidemiology or as FTEs, adjusting for the percentage of time they reported working on chronic disease. Odds ratios were used as measures of association and p-values were calculated using the StatCalc function of EpiInfo version 6.

All 50 states and the District of Columbia completed both the core ECA and the Chronic Disease Supplement. A total of 1544 (70%) of 2193 individual epidemiologists completed individual work sheets, including 195 CDEs comprising 179 FTE positions. The response rate for CDEs is not known.

Results

- Overall, 53% of jurisdictions reported at least substantial (≥50% of ideal) chronic disease epidemiology and surveillance capacity. This measure of capacity has not substantially changed since 2001. However, the percentage of jurisdictions with minimal-to-no (<25% of ideal) capacity increased progressively: 8% in 2001, 15% in 2004 and 2006, and 18% in 2009.
- Having at least substantial chronic disease epidemiology and surveillance capacity was strongly associated with publishing and presenting data, having program work include seven major chronic disease risk factors (cancer screening, high cholesterol, hypertension, nutrition, obesity, physical activity, and tobacco use), and having CDEs collaborate with epidemiologists in three other major program areas that have overlapping interests (injury, maternal and child health [MCH], and environmental health).
- Having a coordinating/lead CDE and having at least five CDEs were both strongly associated with having at least substantial chronic disease epidemiology and surveillance capacity. Having a doctoral-level epidemiologist was strongly associated with collaborating with epidemiologists in other program areas, including injury, MCH, environmental health, mental health, substance abuse, and occupational health.
- CDEs assessed their competency in 30 competency areas. Competency level increased markedly with higher-level responsibilities; for no competency did at least 75% of entry-level epidemiologists deem themselves competent, whereas at least 90% of senior scientist epidemiologists deemed themselves competent in 63% of the competencies. An average of 26% of epidemiologists felt they needed additional training in each competency area, and needs for training in use of informatics and information systems and fiscal issues were most prominent.
- Positive trends since the 2003 chronic disease assessment include the following:
  - The percentage of jurisdictions with a coordinating/lead CDE increased from 57% to 80%.
  - The percentage of jurisdictions involved in most major chronic disease program areas increased, with the largest program area increases in asthma (78% to 92%), hypertension (75% to 92%), and high cholesterol (55% to 72%).
  - The percentage of jurisdictions in which CDEs have unfettered access to data sets of importance increased substantially for several data sets: hospital discharge data (68% to 83%), emergency department data (19% to 43%), and emergency medical service data (19% to 32%).
  - Timeliness of availability of key data sets to CDEs increased substantially. The percentage of jurisdictions in which CDEs with unfettered access were able to have timely access to a database increased for the Behavioral Risk Factor Surveillance System (BRFSS) (78% to 88%), cancer registry (74% to 82%), and hospital discharge (44% to 64%) data sets.
  - The percentage of jurisdictions needing SAS software that had access to it increased from 86% to 100%.
  - The percentage of jurisdictions in which CDEs conducted standard and more sophisticated data analyses increased (e.g., calculating confidence intervals on mortality rates [60%–75%], calculating rates for sub-state areas [83%–98%], and commonly providing comparison rates [e.g., national rate] for mortality (death) rates [85%–96%]).
  - The percentage of jurisdictions in which CDEs were more readily able to share information increased substantially: shared data online through queriable systems (36% to 49%), published reports of data (85% to 94%), and presented at state or national meetings (70% to 81%).

- Important gaps and negative trends include:
  - In 31% of jurisdictions, chronic disease epidemiology programs still lack ready access to geographic information system (GIS) software.
  - CDEs calculate confidence intervals (a basic analysis) for BRFSS prevalence estimates in only 80% of jurisdictions and for death rates in only 75% of jurisdictions.
  - The percentage of jurisdictions in which CDEs have direct access to several potentially important data sets has decreased since 2003: state mortality data (81% to 75%) and Medicare data (19% to 6%). In addition, the timeliness of availability of state mortality data decreased (55% to 43%).
  - Many jurisdictions reported inadequate support services: 55% lack adequate clerical support, an increase of nearly 15 percentage points since 2003; 35% lack ready access to medical journals; and 25% lack adequate information technology (IT) services.
  - In most jurisdictions, CDEs have little-to-no collaboration with substance abuse (69%) or mental health epidemiologists (72%), and few jurisdictions work on alcohol (39%) or other drug abuse (29%) issues as part of their chronic disease epidemiology efforts.

Conclusions

- Several measures of state-level chronic disease epidemiology capacity have increased substantially since 2003, with more jurisdictions having a lead CDE, involvement in the seven major chronic disease program areas, and unfettered and more timely access to key data sets and conducting more sophisticated data analyses.
- Jurisdictions that have a coordinating/lead CDE and jurisdictions that have at least five full-time CDEs have higher levels of chronic disease epidemiology capacity than do jurisdictions without them.
- Despite the advances since 2003, the epidemiology capacity glass is only half full and shows signs of leaking: Self-assessed overall chronic disease epidemiology capacity has not changed because while more quality work is being done, it is being done with the same or fewer epidemiologists; nearly half of all jurisdictions lack even substantial capacity (a percentage that has not changed since 2001); and a growing percentage (now nearly one in five jurisdictions) have minimal-to-no chronic disease epidemiology capacity. Furthermore, the total number of epidemiologists at state health departments has decreased in the past five years (a finding from the 2009 core ECA), and the economic downturn is likely to result in decreased state funding to chronic disease prevention efforts.

Recommendations

Overall

- Chronic disease epidemiology and related technology capacity should be a specific part of the national dialogue about addressing the erosion of overall state-based epidemiology capacity identified in the core ECA and ensuring that jurisdictions have the capacity needed to provide essential data for public health action.
- Improving capacity in jurisdictions that currently have minimal-to-no chronic disease epidemiology capacity should be a priority. At a minimum, every state should have a lead CDE to oversee and coordinate data gathering, analysis, interpretation, and translation to public health practice.
- Continued monitoring and identification of gaps in chronic disease epidemiology capacity are critical, particularly as needs increase because of increasing life expectancy, a shift toward a higher percentage of the population in older age groups, and increasing chronic disease prevalence in younger age groups in the United States.

- CSTE should continue to routinely assess state health departments about chronic disease epidemiology capacity, ideally every 2 years, and further clarify elements that are most likely to be useful for ongoing surveillance.
- CSTE should build upon the findings of the 2009 ECA and Chronic Disease Supplement to develop/modify the list of chronic disease epidemiology capacity indicators that correspond to the capacity domains described in the 2004 white paper on essential functions of chronic disease epidemiology.

Program specific

- Many of the areas for which recommendations were made in the 2003 CSTE chronic disease epidemiologic capacity assessment and reaffirmed in the 2007 CSTE chronic disease capacity position statement need continued work. CDC and CSTE should develop a specific plan to increase the number of epidemiologists and the access and use of tools to support their work so that all state-level chronic disease epidemiology programs:
  - have a designated coordinating/lead CDE and a minimum of five full-time CDEs, one of whom should have doctoral-level training;
  - have unfettered timely access, ability, and technical support to analyze key data sets, including state mortality data, hospital discharge data, tumor registry data, BRFSS data, emergency department and EMS data, and Medicare data. Special attention should be given to access to mortality and Medicare data because both have recently been decreasing, as has the timeliness of availability of mortality data;
  - calculate confidence intervals for BRFSS prevalence estimates and death rates; and
  - have easy and ready access to medical journals and adequate IT and clerical support services.
- In addition, given technologic advances since 2003, all state chronic disease epidemiology programs should have access to GIS software and, as personnel capacity permits, use GIS software to analyze spatial aspects of chronic disease, including putting systems in place for routine geocoding of population-based chronic disease data that lends itself to geocoding beginning with birth and death data.
- State CDEs should build partnerships with substance abuse, mental health, and public health preparedness epidemiologists similar to those in many states with injury, environmental health, and MCH. In the absence of state-level substance abuse and/or mental health surveillance capacity, chronic disease programs should consider incorporating substance abuse and mental health surveillance into their surveillance activities. Chronic disease and mental health are major public health issues during times of natural and human-made disasters, and CDEs should be prepared in advance to assist in a public health emergency.
- State-level chronic disease programs should work to build partnerships to collaborate among state health agencies and with local academic agencies to efficiently and effectively use resources, conduct surveillance, and plan and implement evidence-based strategies for chronic disease prevention and health promotion.
- Organizations involved in training the public health workforce, including CDC and schools of public health, should be sure that training programs include training in competencies identified by practicing CDEs as needing additional training focus. The most prominent needs for training were in use of informatics and information systems and in fiscal issues.

BACKGROUND

BACKGROUND

Chronic diseases, including heart disease, cancer, stroke, chronic obstructive pulmonary disease, diabetes, obesity, substance abuse, and chronic kidney and liver conditions, cause a large burden of morbidity and mortality in the United States. Chronic disease epidemiology has been an emerging subject matter area in public health since the 1980s, as indicated by creation of the National Center for Chronic Disease Prevention and Health Promotion at the Centers for Disease Control and Prevention (CDC) in 1988. Shortly after the Center's formation, federal funding from CDC began to support state-based prevention activities. Cooperative agreements now support surveillance and prevention activities related to heart disease and stroke, cancer, diabetes, asthma, arthritis, obesity, tobacco use, physical activity, nutrition, and others.

The number of chronic disease epidemiologists (CDEs) practicing in states has increased with the number of chronic disease programs and funded prevention activities over the past 20 years. In addition, since 1991, CDC has assisted many states through the State-Based Epidemiology for Public Health Program Support (STEPPS) by providing staff or salary support (1). Furthermore, the CDC Epidemic Intelligence Service and, more recently, the CDC/Council of State and Territorial Epidemiologists (CSTE) Applied Epidemiology Fellowship have provided states an opportunity to recruit epidemiologists into 2-year chronic disease epidemiology positions.

In 2000, CDC, CSTE and the National Association of Chronic Disease Directors (NACDD) developed a strategic plan, "Developing State-based Chronic Disease Epidemiology Capacity Nationwide," with the primary objective of establishing in each state by 2004 a designated "State Chronic Disease Epidemiologist" (i.e., lead CDE who would be the point of contact with CDC for chronic disease) (2).

In 2003, CSTE conducted a national assessment of epidemiologic capacity for chronic disease at the state level (3). The objectives of the assessment were to describe the chronic disease epidemiology capacity of state and territorial health departments, including the number and training of CDEs, their topic assignments, interactions with program managers and academic centers, and their access to analysis and dissemination of data on specific chronic disease topics. The major finding was that, despite efforts to develop capacity in all states, chronic disease epidemiology capacity was unevenly distributed and, based on a 10-point scale, 26% of the 47 responding jurisdictions (46 states and the District of Columbia) reported minimal to nonexistent capacity (score 0-3). Specifically, 43% of jurisdictions had no state CDE, 38% of jurisdictions had no state investment in chronic disease epidemiology, 43% had fewer than five CDEs, and 55% did not have timely access to state mortality data.

A number of specific recommendations were made toward improving specific aspects of chronic disease programs and urging further research to determine what factors foster a productive chronic disease epidemiology unit. Key capacity-related recommendations included the following: every state should have a designated chronic disease point of contact with CDC; a minimum of five full-time CDEs; at least one doctoral-level CDE; easy and timely access by CDEs to state mortality data; and an organizational structure to support coverage of the breadth of chronic diseases and their risk factors; and every state should provide easy access to a medical library and adequate clerical support. In addition, a list of measures of chronic disease epidemiology capacity was created as a future barometer for measuring capacity against 2003. The final recommendation was that CSTE should continue to improve the description and measurement of the chronic disease epidemiology capacity of state health departments.

Shortly thereafter, in 2004, the CSTE Chronic Disease Epidemiology Capacity Assessment (ECA) Workgroup published a white paper on the essential functions of chronic disease epidemiology in state health departments, describing the role that CDEs play in supporting the 10 essential public health services and identifying the primary role they play in surveillance, communication, and consultation (4,5).

In 2007, CSTE passed a position statement on state-level chronic disease capacity (6). This position statement defined the minimum recommended chronic disease epidemiology workforce as a) at least one senior CDE (doctoral degree with at least five years' experience in chronic disease epidemiology or master's degree with at least 10 years' experience in chronic disease epidemiology); b) at least one CDE who is responsible for coordinating/integrating activities across categorical programs; and c) at least five full-time CDEs, including at least one with a doctoral degree. Key steps recommended to monitor state chronic disease capacity included developing a list of capacity indicators that correspond to the capacity domains described in the 2003 chronic disease epidemiology capacity assessment and developing and conducting an online rapid assessment tool to measure these key indicators every two years.

In 2009, in follow-up to the position statement, CSTE conducted a second assessment of chronic disease capacity as a supplement to the core ECA (7). The purpose of this report is to present the information about the findings related to chronic disease epidemiology capacity from the core ECA and the Chronic Disease Supplement. In addition, where comparable information was obtained, this report describes trends in chronic disease capacity from the 2001, 2004, and 2006 core ECAs and CSTE's 2003 National Assessment of Epidemiologic Capacity in Chronic Disease.

METHODS

METHODS

Development of the 2009 core ECA that collected data on all program areas including chronic disease has been described in the CSTE 2009 National Assessment of Epidemiology Capacity: Findings and Recommendations (6).

In September 2008, CSTE Chronic Disease ECA Workgroup members began developing the chronic disease module of the 2009 ECA. The workgroup included members from CSTE, NACDD, CDC, and state health departments. The survey was piloted in three states in March 2009 as part of the 2009 ECA and modified on the basis of feedback from them. The Chronic Disease Supplement was sent with the 2009 ECA to the State Epidemiologist of each state and territory in April 2009 with the expectation that it would be forwarded to the state or lead CDE as needed to complete. Data were collected during April 1–June 30, 2009.

The 2009 ECA contained questions about overall chronic disease surveillance and epidemiology capacity, academic and epidemiology-specific training, competencies of CDEs, and number of publications. The Chronic Disease Supplement contained questions about organization of chronic disease epidemiologic activities, spectrum of work performed by CDEs, access to data and consultants, nature of data analysis performed, activities to disseminate data, and collaborations with other state health department programs and with agencies outside the health department.

For this survey and past CSTE assessments, an epidemiologist was defined as any person who, regardless of job title, performed functions consistent with the definition of "epidemiologist" in A Dictionary of Epidemiology (8). Estimates of epidemiology and surveillance capacity were categorized as follows: full capacity = 100% of the activity, knowledge, or resources described within the question are met; almost full = 75%–99%; substantial = 50%–74%; partial = 25%–49%; minimal = 1%–<25%; and none = 0.

Trend data were determined in two ways. Questions in the 2009 ECA were compared with responses from the 2004 and 2006 ECAs (9,10), each of which had participation from all jurisdictions. Where comparable questions existed between the 2003 chronic disease assessment and the 2009 ECA and Chronic Disease Supplement, trends were determined from 2003 to 2009. For full comparability, only the 46 jurisdictions responding to the 2003 assessment were included in the 2003–2009 comparisons.

Percentages were calculated with the number of jurisdictions or the number of CDEs as the denominator, depending on the question. Depending on the analysis, CDEs were counted as one epidemiologist even if they did not work full time on chronic disease epidemiology or as FTEs, adjusting for the percentage of time they reported working on chronic disease. Odds ratios were used as measures of association and p-values were calculated using the StatCalc function of EpiInfo version 6.

All 50 states and DC completed both the core ECA and the chronic disease module. A total of 1544 (70%) of 2193 epidemiologists completed individual work sheets, including 195 CDEs representing 179 full-time equivalents (FTEs). The response rate for CDEs is not known.

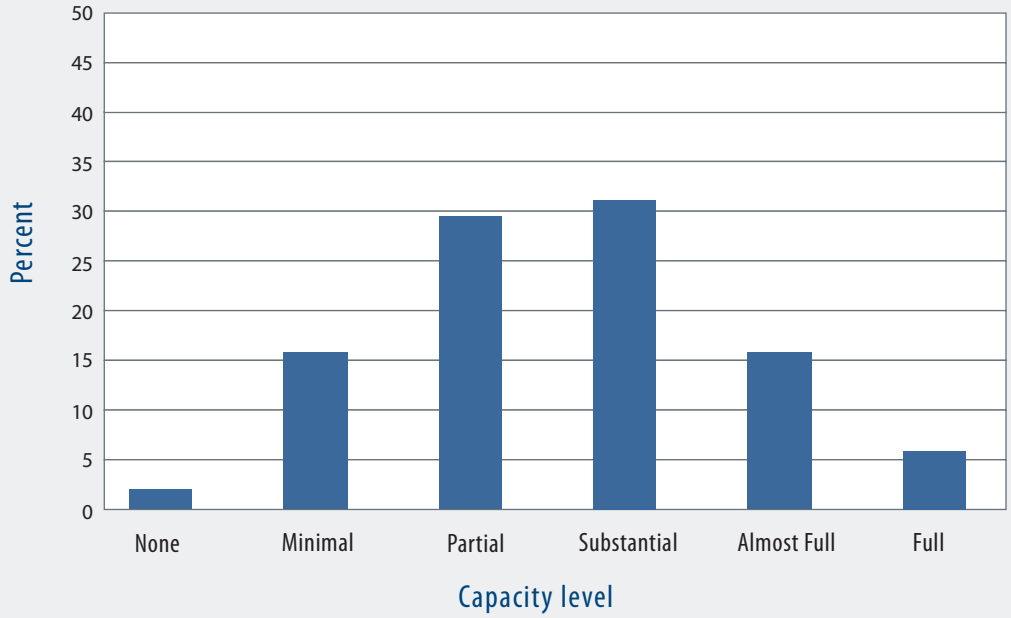
RESULTS

Following are results from responses relating specifically to chronic disease from both the 2009 Epidemiology Capacity Assessment (core ECA) and the Chronic Disease Supplement. Unless otherwise specified, the data are based on responses to the Chronic Disease Supplement. States and DC are referred to collectively as "jurisdictions."

Chronic Disease Epidemiology Functional Capacity (Core ECA)

The core ECA asked states and DC to specify the extent of their epidemiology and surveillance capacity in each program area on the basis of the percentage of the activity, knowledge, or resources they had, with percentages separated into six categories ranging from none to full. Overall, 53% of jurisdictions had at least substantial (≥ 50%) capacity. Four (2%) jurisdictions had no capacity (Figure 1).

Figure 1. Percentage of jurisdictions with each level* of chronic disease epidemiology and surveillance capacity—2009 Epidemiology Capacity Assessment, 50 states and the District of Columbia



None = 0%, minimal = 1%–24%, partial = 25%–49%, substantial = 50%–74%, almost full = 75%–99%, full = 100%.

Chronic Disease Epidemiology Workforce and Organization

Previously, CSTE has specified that the minimum recommended chronic disease epidemiology workforce should consist of:

a) at least one CDE responsible for coordinating/integrating chronic disease epidemiology activities across categorical programs;

b) at least one senior CDE with doctoral-level training and 5 years' experience in chronic disease or master's-level training and at least 10 years' experience in chronic disease epidemiology; and

c) five or more full-time CDEs, at least one of whom has a doctoral degree (3,6). Given the limitation that ≤70% CDEs provided information necessary to answer items b and c, the following jurisdictions met these recommended workforce needs on the basis of the 2009 ECA: a) coordinating/lead CDE—41 (80%); b) one CDE with doctoral-level training (e.g., PhD, MD, DVM)—31 (61%); and c) at least five CDEs: 17 (33%).

Several questions asked about the organization and organizational location of the most CDEs. Responses of the State Epidemiologists in the core ECA indicated that most jurisdictions (80%) had a "lead" CDE. Responses of the person answering the Chronic Disease Supplement indicated that almost all lead epidemiologists also were responsible for coordinating or integrating chronic disease activities across categorical programs. However, no single organizational arrangement of CDEs dominated. While most (35, 68.6%) were located within the chronic disease program unit, they were either scattered across categorical areas (23 of 35) or located in a single unit (12 of 35). Another 16 (31.4%) of jurisdictions had other organizational arrangements, and most of these (11 of 16) located CDEs in a larger epidemiology or statistical unit that included epidemiologists from other programs (Table 1).

Table 1. **Organizational structure of chronic disease epidemiologists—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia**

STRUCTURE	YES NO. (%)	NO NO. (%)
Organization of CDEs*		
Have a lead CDE (core ECA)	41 (80.4)	10 (19.6)
Have ≥1 CDEs responsible for coordinating/integrating chronic disease activities across categorical programs	40 (78.4)	11 (21.6)
Location of majority of CDEs		
Individual epidemiologists located within separate categorical chronic disease program units	23 (45.1)	28 (54.9)
In a chronic disease epidemiology unit within a chronic disease program	12 (23.5)	39 (76.5)
In a chronic disease epidemiology unit within a larger epidemiology or health statistics unit	11 (21.6)	40 (78.4)
Other	5 (9.8)	46 (90.2)

** CDE = chronic disease epidemiologist*

Relationship of Chronic Disease Leadership and Organization to Epidemiology Capacity

In 2009, epidemiology and surveillance capacity was strongly associated with having a coordinating/lead epidemiologist (63% of jurisdictions with a coordinating/lead epidemiologist had at least substantial capacity vs. just 11% of jurisdictions without a coordinating/lead epidemiologist, $p<0.005$, chi square). There was also an association between having at least substantial epidemiology capacity and having at least five CDE on staff (59% of jurisdictions with 5 or more CDE had at least substantial capacity vs. just 4% of those with fewer than 5 CDEs, $p<0.0001$) (Table 2). Having at least substantial epidemiology capacity was not significantly associated with having a doctoral-level trained epidemiologist, and epidemiology capacity was not significantly associated with organizational structure.

Table 2. **Association of jurisdictions that reported having at least 50% of needed chronic disease epidemiology and surveillance capacity with selected chronic disease program features—2009 Epidemiology and Chronic Disease Epidemiology Capacity Assessments, 50 states and the District of Columbia.**

PROGRAM CHARACTERISTIC	≥50% CAPACITY, NO. JURISDICTIONS	0%–49% CAPACITY, NO. JURISDICTIONS	ODDS RATIO	P VALUE
Have lead CDE*				
Yes	26	15	13.87	0.005
No	1	8	Reference Value	
Have CDE with doctoral-level training				
Yes	18	9	1.69	0.37
No	9	11	Reference Value	
Have at least 5 CDEs				
Yes	16	1	33.45	<0.0001
No	11	23	Reference Value	
Have CDEs located				
Within separate categorical chronic disease program units				
Yes	14	9	1.79	0.31
No	13	15	Reference Value	
In either a chronic disease epidemiology unit or a larger epidemiology unit				
Yes	11	12	0.58	0.33
No	19	12	Reference Value	

** CDE = chronic disease epidemiologist.*

Publications

The capacity to disseminate information is another functional epidemiology capacity. The 2009 ECA Core section collected information about the number of publications of several types in 2008 by program area. Forty-three jurisdictions responded. Overall, 21 (49%) jurisdictions were involved in publishing 89 chronic disease–related articles in peer-reviewed journals; 31 (72%) had a total of 165 abstracts accepted at national-level conferences; and 30 (70%) published 366 "other" formal reports (i.e., those approved by a state process and published electronically or on paper and/or posted on a website for public use).

Relationship of Chronic Disease Epidemiology Capacity to Selected Other Capacities

Associations were examined between a state jurisdiction having at least substantial epidemiology and surveillance chronic disease capacity and a number of other measured program outcomes in the past year, such as publishing in journals, publishing technical reports, giving presentations at state or national meetings, having an active partnership with an academic institution, and being involved in chronic disease program areas beyond those for which federal funding is available to most states (Table 2a). Associations were significant ($p<0.05$) with publishing technical reports and "burden" reports on chronic disease, presenting chronic disease data at state or national meetings, having program work include seven major chronic disease risk factors, and having CDEs collaborate with epidemiologists in three other major program areas with overlapping interests (injury, maternal and child health (MCH) and environmental health). Associations with other areas examined—notably work on five major chronic disease categories for which federal funding is available to most jurisdictions (asthma, cancer, diabetes, heart disease, and stroke)—were weaker or nonexistent.

Table 2a. Association of jurisdictions that reported having at least 50% of needed chronic disease epidemiology and surveillance capacity with selected chronic disease program outcomes—2009 Epidemiology and Chronic Disease Epidemiology Capacity Assessments, 50 states and the District of Columbia

PROGRAM OUTCOME	≥50% CAPACITY, NO. JURISDICTIONS	0%–49% CAPACITY, NO. JURISDICTIONS	ODDS RATIO	P VALUE
Published formal technical report in past year				
Yes	18	12	5.00	0.03
No	3	10	Reference Value	
Published in peer-reviewed journal in past year				
Yes	12	9	1.93	0.29
No	9	13	Reference Value	
Published "burden" or "epidemiology" report in past year				
Yes	27	19	Undetermined	0.04
No	0	4	Reference Value	
Gave presentation at state or national meeting in past year				
Yes	26	14	13.00	0.009
No	1	7	Reference Value	
Shared data with public via a queriable online data system displaying chronic disease data				
Yes	17	9	2.83	0.07
No	10	15	Reference Value	
Collaborated with academic centers, gave lectures, worked with students				
Yes	23	18	2.56	0.19
No	3	6	Reference Value	
Worked in past year on asthma, cancer, diabetes, heart disease, AND stroke				
Yes	21	18	0.82	0.82
No	6	6	Reference Value	
Worked in past year on cancer screening, high cholesterol, hypertension, nutrition, obesity, physical activity, AND tobacco use				
Yes	20	11	3.38	0.04
No	7	13	Reference Value	
Had at least somewhat strong collaboration with injury, maternal and child health, AND environmental health epidemiologists in past year				
Yes	16	7	3.53	0.03
No	11	17	Reference Value	
Had at least somewhat strong collaboration with mental health, substance abuse, OR occupational health in past year				
Yes	15	9	2.08	0.20
No	12	15	Reference Value	

Association of Indices of Epidemiology Capacity with Outcomes Related to Having at Least Substantial Epidemiology and Surveillance Capacity

The association between three predetermined indicators of epidemiology capacity emphasized in the 2007 CSTE Chronic Disease Capacity position statement and outcomes associated with a jurisdiction having at least substantial epidemiology capacity (above) were examined (Tables 2b–d). Each indicator was associated with some of the outcomes associated with having at least substantial epidemiology capacity, and each provided an index of a somewhat different spectrum of capacities.

Having a lead/coordinating epidemiologist had statistically strong (odds ratio [OR]>3.0) and/or statistically significant associations with publishing technical reports; giving presentations at state or national meetings; working in major chronic disease program areas; and collaborating with injury, MCH, and environmental epidemiologists. This index had little association with having public access to an online queriable data system; collaborating with academic centers; or having at least somewhat strong collaboration with mental health, substance abuse, or occupational health epidemiologists (Table 2b).

Table 2b. **Association of jurisdictions that reported having a coordinating/lead chronic disease epidemiologist with selected chronic disease program outcomes—2009 Epidemiology and Chronic Disease Epidemiology Capacity Assessments, 50 states and the District of Columbia**

PROGRAM OUTCOME	HAVE COORDINATING/ LEAD EPIDEMIOLOGIST, NO. JURISDICTIONS	DO NOT HAVE COORDINATING/LEAD EPIDEMIOLOGIST, NO. JURISDICTIONS	ODDS RATIO	P VALUE
Published formal technical report in past year				
Yes	27	3	6.43	0.02
No	3	10	Reference Value	
Published "burden" or "epidemiology" report in past year				
Yes	38	8	4.75	0.12
No	2	2	Reference Value	
Gave presentation at state or national meeting in past year				
Yes	35	5	4.20	0.09
No	5	3	Reference Value	
Shared data with public via a queriable online data system displaying chronic disease data				
Yes	19	6	0.43	0.27
No	22	3	Reference Value	
Collaborated with academic centers, gave lectures, worked with students				
Yes	32	9	0.44	0.47
No	8	1	Reference Value	
Worked in past year on cancer screening, high cholesterol, hypertension, nutrition, obesity, physical activity, AND tobacco use				
Yes	28	3	5.03	0.03
No	13	7	Reference Value	

Table 2b. *Continued* Association of jurisdictions that reported having a coordinating/lead chronic disease epidemiologist with selected chronic disease program outcomes—2009 Epidemiology and Chronic Disease Epidemiology Capacity Assessments, 50 states and the District of Columbia

PROGRAM OUTCOME	HAVE COORDINATING/ LEAD EPIDEMIOLOGIST, NO. JURISDICTIONS	DO NOT HAVE COORDINATING/LEAD EPIDEMIOLOGIST, NO. JURISDICTIONS	ODDS RATIO	P VALUE
Had at least somewhat strong collaboration with injury, maternal and child health, AND environmental health epidemiologists in past year				
Yes	21	2	4.20	0.08
No	11	17	Reference Value	
Had at least somewhat strong collaboration with mental health, substance abuse, OR occupational health in past year				
Yes	21	3	2.45	0.23
No	20	7	Reference Value	

Having a doctoral-level CDE had statistically strong (OR>3.0) and/or statistically significant associations with publishing a "burden" or "epidemiology" report in the past year and with having at least somewhat strong collaboration with mental health, substance abuse, or occupational health epidemiologists. This index had little association with publishing technical reports, giving presentations at state or national meetings, having public access to an online queriable data system, collaborating with academic centers, or doing work in basic chronic disease program areas (Table 2c).

Table 2c. Association of jurisdictions that reported having a doctoral-level chronic disease epidemiologist with selected chronic disease program outcomes—2009 Epidemiology and Chronic Disease Epidemiology Capacity Assessments, 50 states and the District of Columbia

PROGRAM OUTCOME	HAVE DOCTORAL-LEVEL EPIDEMIOLOGIST, NO. JURISDICTIONS	DO NOT HAVE DOCTORAL-LEVEL EPIDEMIOLOGIST, NO. JURISDICTIONS	ODDS RATIO	P VALUE
Published formal technical report in past year				
Yes	19	11	2.02	0.30
No	6	7	Reference Value	
Published "burden" or "epidemiology" report in past year				
Yes	30	16	5.63	0.11
No	1	3	Reference Value	
Gave presentation at state or national meeting in past year				
Yes	23	17	0.45	0.36
No	6	2	Reference Value	

Table 2c. *Continued*

Association of jurisdictions that reported having a doctoral-level chronic disease epidemiologist with selected chronic disease program outcomes—2009 Epidemiology and Chronic Disease Epidemiology Capacity Assessments, 50 states and the District of Columbia

PROGRAM OUTCOME	HAVE DOCTORAL-LEVEL EPIDEMIOLOGIST, NO. JURISDICTIONS	DO NOT HAVE DOCTORAL-LEVEL EPIDEMIOLOGIST, NO. JURISDICTIONS	ODDS RATIO	P VALUE
Shared data with public via a queriable online data system displaying chronic disease data				
Yes	16	10	1.07	0.91
No	15	10	Reference Value	
Collaborated with academic centers, gave lectures, worked with students				
Yes	25	16	0.78	0.75
No	6	3	Reference Value	
Worked in past year on cancer screening, high cholesterol, hypertension, nutrition, obesity, physical activity, AND tobacco use				
Yes	20	11	1.49	0.50
No	11	9	Reference Value	
Had at least somewhat strong collaboration with injury, maternal and child health, AND environmental health epidemiologists in past year				
Yes	17	6	2.83	0.08
No	14	14	Reference Value	
Had at least somewhat strong collaboration with either mental health, substance abuse, OR occupational health in past year				
Yes	18	6	3.23	0.05
No	13	14	Reference Value	

Having at least five CDEs had statistically strong (OR>3.0) and/or statistically significant associations with publishing formal technical reports, publishing "burden" or epidemiology reports, presenting at state and national meetings, and having public access to an online queriable data system. By contrast with having a doctoral-level epidemiologist, there was no association with having at least somewhat strong collaboration with mental health, substance abuse, or occupational health epidemiologists (Table 2d).

Table 2d. Association of jurisdictions that reported having at least five CDEs with selected chronic disease program outcomes—2009 Epidemiology and Chronic Disease Epidemiology Capacity Assessments, 50 states and the District of Columbia

PROGRAM OUTCOME	HAVE ≥5 CDES, NO. JURISDICTIONS	HAVE <5 CDES, NO. JURISDICTIONS	ODDS RATIO	P VALUE
Published formal technical report in past year				
Yes	11	19	3.18	0.17
No	2	11	Reference Value	
Published "burden" or "epidemiology" report in past year				
Yes	17	29	Undetermined	0.14
No	0	4	Reference Value	
Gave presentation at state or national meeting in past year				
Yes	17	23	Undetermined	0.02
No	0	8	Reference Value	
Shared data with public via a queriable online data system displaying chronic disease data				
Yes	13	13	5.25	0.01
No	4	20	Reference Value	
Collaborated with academic centers, gave lectures, worked with students				
Yes	14	27	1.81	0.49
No	2	7	Reference Value	
Worked in past year on cancer screening, high cholesterol, hypertension, nutrition, obesity, physical activity, AND tobacco use				
Yes	13	18	2.89	0.11
No	4	16	Reference Value	
Had at least somewhat strong collaboration with injury, maternal and child health, AND environmental health epidemiologists in past year				
Yes	10	13	2.31	0.17
No	7	21	Reference Value	
Had at least somewhat strong collaboration with mental health, substance abuse, OR occupational health in past year				
Yes	8	16	1.00	1.00
No	9	18	Reference Value	

Training

A total of 195 individual epidemiologists representing 179 FTE (two half-time positions equals one FTE) CDEs completed individual work sheets showing their level of academic achievement and their level of epidemiology training. The exact number of CDE FTEs working in state health departments in 2009 is unknown because only 70% of all epidemiologists completed individual work sheets, and response rates by topic area are unknown. A total of 92% had master's-level or higher degrees (Table 3). Among the 64 epidemiologists with doctoral-level degrees, 49 had PhD or DrPH degrees and 15 had medical or dental degrees.

Table 3. **Academic training of persons* working as chronic disease epidemiologists (N = 179) in state health departments, by level of academic training—2009 Epidemiology Capacity Assessment**

LEVEL OF ACADEMIC TRAINING	FULL-TIME EQUIVALENT, NO. (%)
MD, DO, DDS	15 (8.4)
DVM	0
PhD, DrPH, other doctoral	49 (27.4)
MPH, MSPH, other master's	100.5 (56.1)
RN, other nursing	0
BA, BS, other bachelor's	14.5 (8.1)
Associate or no post–high school degree	0
TOTAL	179.0 (100)

**Persons are expressed as full-time equivalent positions, resulting in fractions of persons whose positions are split between ≥ 2 program areas or are less than full-time.*

When examined by level of epidemiology-specific training, 55% had a master's level or higher degree (Table 4). The largest single group was those with master's-level epidemiology training, accounting for 37% of the total; 15% had no specific epidemiology training except that acquired on the job.

In state health departments, CDEs were more likely to have PhD-level epidemiology training than were other epidemiologists (12.0% vs. 7.3%, p = 0.03) but less likely to have a professional background with a dual degree in epidemiology (6.1% vs. 11.2%, p = 0.04) (data from 2009 core ECA and Table 4).

Table 4. Epidemiology training of persons* working as chronic disease epidemiologists (N = 179) in state health departments, by level of epidemiology training—2009 Epidemiology Capacity Assessment

HIGHEST LEVEL OF EPIDEMIOLOGY TRAINING†	FULL-TIME EQUIVALENT, NO. (%)
PhD, DrPH, other doctoral degree in epidemiology	21.5 (12.0)
Professional background (e.g., MD, DO, DVM, DDS) with a dual degree in epidemiology	11 (6.1)
MPH, MSPH, other master's degree in epidemiology	66 (36.9)
BA, BS, other bachelor's degree in epidemiology	1 (0.6)
Completed formal training program in epidemiology (e.g., EIS)	8.5 (4.7)
Completed some coursework in epidemiology	44 (24.6)
Received on-the-job training in epidemiology	24 (13.4)
No formal training in epidemiology (i.e., epidemiologist does not fit in any of the above categories)	3 (1.7)
TOTAL	179.0 (100)

**Persons are expressed as full-time equivalent positions, resulting in fractions of persons whose positions are split between ≥2 program areas or are less than full-time.*
†Training level is hierarchical with the highest level of epidemiology-specific training being the relevant category. For example, a physician completing Epidemic Intelligence Service (EIS) who has a master's in epidemiology will be listed as "MD + Master's," not "EIS or other formal program."

Chronic Disease Workforce Competency

Tier-Level Epidemiologist Perspective

The 2009 core ECA, for the first time, provided the opportunity for individual epidemiologists to assess their competency and training needs using the framework of the CDC/CSTE Applied Epidemiology Competencies (Tables 5–8) (*12*). Individual epidemiologists were asked to indicate the tier to which they belonged and then to assess themselves according to their tier's specific set of competencies. The four tiers are Tier 1—entry-level; Tier 2—mid-level; Tier 3a—senior-level supervisor or manager; and Tier 3b—senior scientist/subject area expert. Tier 1, 2, and 3b epidemiologists were assessed in 30 competency areas, Tier 3a in 31. A total of 186 CDEs completed the self-assessment, of whom nearly half were Tier 2 (91, 49%), with the rest approximately equally divided between the other tiers: Tier 1, 30 (16%); Tier 3a, 38 (20%); and Tier 3b, 27 (15%).

Tier 1 CDEs indicated four competencies in which at least 70% were competent: promoting ethical conduct in epidemiologic practice, maintaining databases, using effective communication technologies, and demonstrating ability to listen effectively when epidemiologic findings are presented or discussed. The average percentage competent for individual competencies was 41.7% (Table 9). Both measurements were higher for CDEs than for all state-based epidemiologists (no individual competency had at least 70% being competent, and the average percentage competent for individual competencies was 35% (6). For one competency—"use identified informatics tools in support of epidemiologic practice"— <20% were competent (13%). Compared with other

Tier 1 epidemiologists, fewer CDEs expressed competency in this area (13% vs. 20%). The competencies for which the largest percentage indicated they needed additional training were "describe how policy decisions are made within the agency" (40%), "apply appropriate fiscal and administrative guidelines to epidemiology practice" (37%), and "use identified informatics tools in support of epidemiologic practice" (37%).

At least 70% of Tier 2 CDEs said they were competent in 10 (33%) of the 30 competencies, and the average percentage competent for individual competences was 60% (Table 9). Both measurements were lower than for all epidemiologists (for 15 competencies, at least 70% were competent, with an average 63% for individual competencies) (6). For one competency area—"use of laboratory resources to support epidemiologic activities"—<30% of CDEs were competent (22%). A much higher percentage of all Tier 2 epidemiologists expressed competency in this area (52%). Despite their higher-level of overall competency, a higher percentage (based on the average of all competencies) of Tier 2 than Tier 1 CDEs indicated they needed additional training (28.8% vs. 23.4%). The competencies for which the largest percentage indicated needing additional training were "use of laboratory resources to support epidemiologic activities" (44%) and "establish cultural/social/political framework for recommendations or interventions" (43%).

The 38 senior-level CDEs with program management and/or supervisory responsibilities (Tier 3a) indicated 16 competencies (51.6%) in which at least 70% indicated they were competent, and an average percentage competent for individual competencies of 65% (Table 9). Both measurements were lower than for all epidemiologists (17 competencies had at least 70% being competent and an average percentage competent of 72%) (6). For two competency areas, <30% of Tier 3a CDEs reported being competent: "lead epidemiology unit in preparing for emergency response" (18%) and "ensure the use of laboratory resources to support epidemiologic activities" (16%). Much higher percentages of all Tier 3a epidemiologists expressed competency in these areas (49% and 63%, respectively). The average percentage need for training was 27.8%, also higher than for Tier 1 CDEs (23.4%) and for all Tier 3a epidemiologists (19%). The competencies for which a large percentage indicated needing additional training were "develop and manage information systems to improve effectiveness of surveillance, investigation, and other epidemiologic practices" (45%); "ensure evaluation of programs" (39%); and "create operational and financial plans for future epidemiologic activities" (39%).

The 27 senior scientist (Tier 3b) epidemiologists indicated 19 competencies (63.3%) in which at least 70% considered themselves competent, and the average percentage competent for individual competencies was 67% (Table 9). One measurement was higher than for all epidemiologists (only 16 competencies had at least 70% being competent) and one was lower (there was an average percentage competent of 71%) (6). For no competencies did <30% of Tier 3b CDEs indicate they were competent. The average percentage need for training was 17%, slightly lower than for all Tier 3b epidemiologists (19%). The largest percentage of CDEs indicated they needed additional training for "promote epidemiology workforce development" (33%) and "describe financial and budgetary processes of the agency" (33%).

Table 5. Entry-level epidemiologists' self-assessment of competence in the Tier 1 Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 30 chronic disease epidemiologists)

TIER 1 EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Promote ethical conduct in epidemiologic practice	22 (73)	6 (20)	2 (7)	0	5 (17)	5 (17)	14 (47)	6 (20)
Maintain databases	22 (73)	5 (17)	3 (10)	0	3 (10)	8 (27)	13 (43)	6 (20)
Use effective communication technologies	21 (70)	8 (27)	1 (3)	0	3 (10)	9 (30)	12 (40)	6 (20)
Demonstrate ability to listen effectively when epidemiologic findings are presented or discussed	21 (70)	6 (20)	3 (10)	0	2 (7)	6 (20)	16 (53)	6 (20)
Use analysis plans, and analyze data	18 (60)	6 (20)	6 (20)	0	7 (23)	8 (27)	9 (30)	6 (20)
Practice professional development	16 (53)	14 (43)	1 (3)	0	5 (17)	8 (27)	10 (33)	7 (23)
Prepare written and oral reports and presentations that communicate necessary information to agency staff	16 (53)	11 (37)	3 (10)	0	3 (10)	7 (23)	14 (47)	6 (20)
Identify key findings from the study	16 (53)	9 (30)	5 (17)	0	3 (10)	10 (33)	10 (33)	7 (23)
Apply knowledge of privacy laws to protect confidentiality, including Health Insurance Portability and Accountability Act (HIPAA) and applicable state and local privacy laws	16 (53)	5 (17)	8 (27)	1 (3)	4 (13)	4 (13)	16 (53)	6 (20)
Follow ethics guidelines and principles when planning studies; conducting research; and collecting, disseminating, and using data	15 (50)	8 (27)	7 (23)	0	5 (17)	7 (23)	11 (37)	7 (23)
Support the organization's vision in all programs and activities	15 (50)	7 (23)	7 (23)	1 (3)	5 (17)	10 (33)	8 (27)	7 (23)
Recognize the existence of a public health problem	14 (47)	9 (30)	7 (23)	0	6 (20)	8(27)	10 (33)	6 (20)
Collaborate with others inside and outside the agency to identify the problem	13 (43)	12 (40)	5 (17)	0	3 (10)	11 (37)	10 (33)	6 (20)
Identify surveillance data needs	12 (40)	14 (47)	4 (13)	0	8 (27)	9 (30)	7 (23)	6 (20)
Practice culturally sensitive epidemiologic activities	11 (37)	9 (30)	8 (27)	2 (7)	10 (33)	8 (27)	6 (20)	6 (20)
Define cultural/social/political framework for recommended interventions	11 (37)	8 (27)	11 (37)	0	10 (33)	5 (17)	9 (30)	6 (20)

Table 5. *Continued*

Entry-level epidemiologists' self-assessment of competence in the Tier 1 Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 30 chronic disease epidemiologists)

TIER 1 EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Assist in design of investigation, including creating hypotheses	11 (37)	7 (23)	12 (40)	0	7 (23)	9 (30)	7 (23)	7 (23)
Assist in evaluation of programs	10 (33)	11 (37)	9 (30)	0	10 (33)	10 (33)	4 (13)	6 (20)
Provide epidemiologic input for community planning processes	10 (33)	9 (30)	11 (37)	0	7 (23)	9 (30)	8 (27)	6 (20)
Implement new or revise existing surveillance systems and report key surveillance findings	10 (33)	9 (30)	11 (37)	0	10 (33)	8 (27)	6 (20)	6 (20)
Recognize the basic principles of risk communication	9 (30)	11 (37)	9 (30)	1 (3)	7 (23)	8 (27)	9 (30)	6 (20)
Assist in conducting a community health status assessment and characterizing investigative processes	9 (30)	7 (23)	14 (47)	0	9 (30)	8 (27)	7 (23)	6 (20)
Use knowledge of human and environmental biology and behavioral sciences and principles to determine potential biological mechanisms of disease	9 (30)	7 (23)	14 (47)	0	10 (33)	4 (13)	10 (33)	6 (20)
Describe human subjects research, and apply Institutional Review Board (IRB) processes, as directed	8 (27)	11 (37)	10 (33)	1 (3)	9 (30)	6 (20)	8 (27)	7 (23)
Apply understanding of human and environmental biology and behavioral sciences and principles to determine potential biological mechanisms of disease	8 (27)	8 (27)	14 (47)	0	10 (33)	5 (17)	9 (30)	6 (20)
Identify the role of laboratory resources in epidemiologic activities	8 (27)	7 (23)	13 (43)	2 (7)	9 (30)	6 (20)	9 (30)	6 (20)
Support evaluation of surveillance systems	7 (23)	10 (33)	13 (43)	0	7 (23)	9 (30)	7 (23)	7 (23)
Describe how policy decisions are made within the agency	7 (23)	7 (23)	14 (47)	2 (7)	12 (40)	8 (27)	4 (13)	6 (20)
Apply appropriate fiscal and administrative guidelines to epidemiology practice	6 (20)	8 (27)	13 (43)	3 (10)	11 (37)	7 (23)	5 (17)	7 (23)
Use identified informatics tools in support of epidemiologic practice	4 (13)	7 (23)	16 (53)	3 (10)	11 (37)	8 (27)	5 (17)	6 (20)

Table 6. Mid-level epidemiologists' self-assessment of competence in the Tier 2 Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 91 chronic disease epidemiologists)

TIER 2 EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Create analysis plans, and conduct analysis of data	74 (81)	12 (13)	2 (20)	3 (3)	20 (22)	23 (25)	34 (37)	14 (15)
Communicate epidemiologic information through giving oral presentations or contributing to the development of written documents to nonprofessional audiences	73 (80)	12 (13)	2 (2)	4 (4)	15 (16)	22 (24)	36 (40)	18 (20)
Collaborate with others inside and outside the agency to identify the problem and form recommendations	72 (79)	13 (14)	3 (3)	3 (3)	20 (22)	21 (23)	35 (38)	15 (16)
Define database requirements, and manage a database	72 (79)	12 (13)	4 (4)	3 (3)	18 (20)	24 (26)	33 (36)	16 (18)
Use critical thinking to determine whether a public health problem exists	70 (77)	16 (18)	0	5 (5)	15 (16)	27 (30)	32 (35)	17 (19)
Assist in the development of measurable and relevant goals and objectives	69 (76)	14 (15)	3 (3)	5 (5)	19 (21)	28 (31)	30 (33)	14 (15)
Articulate the need for further investigation or other public health action from literature review and assessment of current data	67 (74)	20 (22)	0	4 (4)	18 (20)	22 (24)	35 (38)	16 (18)
Follow ethics guidelines and principles when planning studies; conducting research; and collecting, disseminating, and using data	67 (74)	18 (20)	1 (1)	5 (5)	23 (25)	15 (16)	36 (40)	17 (19)
Design surveillance for a public health issue, and identify surveillance data needs	65 (71)	19 (21)	3 (3)	4 (4)	23 (25)	23 (25)	30 (33)	14 (16)
Promote ethical conduct in epidemiologic practice	64 (70)	15 (16)	8 (9)	4 (4)	24 (26)	19 (21)	35 (38)	13 (14)
Apply knowledge of epidemiologic principles and methods to make recommendations regarding the validity of epidemiologic data	63 (69)	22 (24)	3 (3)	3 (3)	26 (29)	18 (20)	30 (33)	17 (19)
Use scientific evidence in preparing recommendations for action or intervention	63 (69)	19 (20)	6 (7)	4 (4)	27 (30)	17 (18)	31 (34)	16 (18)

Table 6. *Continued*

Mid-level epidemiologists' self-assessment of competence in the Tier 2 Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 91 chronic disease epidemiologists)

TIER 2 EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Implement new or revise existing surveillance system, and identify key surveillance findings	63 (69)	17 (19)	4 (4)	7 (8)	21 (23)	23 (25)	31 (34)	16 (18)
Use effective communication technologies	59 (65)	26 (29)	2 (2)	4 (4)	24 (26)	23 (25)	32 (35)	12 (13)
Describe differences between public health practice and public health research	56 (62)	28 (31)	4 (4)	3 (3)	24 (26)	20 (22)	33 (36)	14 (15)
Assist in the design of an investigation, including hypothesis generation	56 (62)	24 (26)	8 (9)	3 (3)	32 (35)	18 (20)	26 (29)	15 (16)
Use current knowledge of causes of disease to guide epidemiologic practice	56 (62)	22 (24)	9 (10)	4 (4)	25 (27)	28 (31)	24 (26)	14 (15)
Apply knowledge of privacy laws to protect confidentiality, including Health Insurance Portability and Accountability Act (HIPAA) and applicable state and local privacy laws	55 (60)	22 (24)	9 (10)	5 (5)	24 (26)	19 (21)	35 (38)	13 (14)
Describe human subjects research, and apply Institutional Review Board (IRB) processes, as necessary	51 (56)	21 (23)	14 (15)	5 (5)	23 (25)	22 (24)	33 (36)	13 (14)
Assess the need for special analyses	48 (53)	34 (37)	7 (8)	2 (2)	31 (34)	21 (23)	24 (26)	15 (16)
Conduct evaluation of surveillance systems	48 (53)	26 (29)	13 (14)	4 (4)	34 (37)	20 (22)	25 (27)	12 (13)
Provide epidemiologic input for community planning processes	44 (48)	29 (32)	14 (15)	4 (4)	31 (34)	22 (24)	24 (26)	14 (15)
Assist in the development of program logic models and theories of action	41 (45)	32 (35)	14 (15)	4 (4)	29 (32)	20 (22)	29 (32)	13 (14)
Practice culturally sensitive epidemiologic activities	41 (45)	32 (35)	14 (15)	4 (4)	26 (29)	25 (27)	26 (29)	14 (15)
Conduct a community health assessment, and recommend priorities of potential public health problems to be addressed	41 (45)	25 (27)	21 (23)	4 (4)	35 (38)	16 (18)	24 (26)	16 (18)

Continued on the following page.

Table 6. *Continued*

Mid-level epidemiologists' self-assessment of competence in the Tier 2 Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 91 chronic disease epidemiologists)

TIER 2 EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Establish cultural/social/ political framework for recommendations or interventions	38 (42)	30 (33)	19 (21)	4 (4)	39 (43)	21 (23)	17 (19)	14 (15)
Demonstrate the basic principles of risk communication	38 (42)	27 (30)	21 (23)	5 (5)	32 (35)	21 (23)	27 (30)	11 (12)
Apply understanding of human and environmental biology and behavioral sciences and principles to determine potential biological mechanisms of disease	35 (38)	31 (34)	21 (23)	4 (4)	34 (37)	18 (20)	24 (26)	15 (16)
Apply appropriate fiscal and administrative guidelines to epidemiologic practice	30 (33)	27 (30)	28 (31)	6 (7)	34 (37)	22 (24)	22 (24)	13 (14)
Use laboratory resources to support epidemiologic activities	20 (22)	17 (19)	49 (54)	5 (5)	40 (44)	18 (20)	14 (15)	19 (21)

Table 7.

Senior-level supervisor or manager epidemiologists' self-assessment of competence in the Tier 3a Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 38 chronic disease epidemiologists)

TIER 3A EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Ensure identification of public health problems pertinent to the population	36 (95)	0	0	2 (5)	6 (16)	9 (24)	17 (45)	6 (16)
Ensure management of data from surveillance, investigations, or other sources	35 (92)	1 (3)	2 (5)	0	8 (21)	7 (18)	17 (45)	6 (16)
Evaluate conclusions and interpretations from investigations	34 (89)	3 (8)	0	1 (3)	6 (16)	13 (34)	13 (34)	6 (16)
Oversee surveillance activities	34 (89)	0	0	4 (11)	11 (29)	9 (24)	11 (29)	7 (18)

Table 7. *Continued*

Senior-level supervisor or manager epidemiologists' self-assessment of competence in the Tier 3a Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 38 chronic disease epidemiologists)

TIER 3A EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Ensure preparation of written and oral reports and presentations to professional and nonprofessional audiences, and ensure basic principles of risk communication are followed	33 (87)	3 (8)	0	2 (5)	7 (18)	7 (18)	18 (47)	6 (16)
Use basic public health sciences in epidemiologic practice	33 (87)	2 (5)	2 (5)	1 (3)	4 (11)	10 (26)	15 (39)	9 (24)
Model interpersonal skills in communication with agency personnel, colleagues, and the public	30 (79)	7 (18)	0	1 (3)	7 (18)	11 (29)	12 (32)	8 (21)
Enforce policies that address security, privacy, and legal considerations when communicating epidemiologic information	30 (79)	7 (18)	1 (3)	0	8 (21)	8 (21)	17 (45)	5 (13)
Evaluate analysis of data from an epidemiologic investigation or study	30 (79)	6 (16)	2 (5)	0	8 (21)	11 (29)	13 (34)	6 (16)
Promote collaborations, strong partnerships and team-building to accomplish epidemiology program objectives	30 (79)	5 (13)	1 (3)	2 (5)	7 (18)	10 (26)	16 (42)	5 (13)
Ensure study design and data collection, dissemination, and use of ethical and legal principles	30 (79)	0	0	8 (21)	8 (21)	7 (18)	15 (39)	8 (21)
Ensure investigation of acute and chronic conditions or other adverse outcomes in the population	29 (76)	8 (21)	1 (3)	0	10 (26)	10 (26)	11 (29)	7 (18)
Ensure application of principles of informatics, including data collection, processing, and analysis in support of epidemiologic practice	29 (76)	7 (18)	2 (5)	0	11 (29)	12 (32)	9 (24)	6 (16)
Use management skills	29 (76)	6 (16)	3 (8)	0	12 (32)	13 (34)	7 (18)	6 (16)
Promote the epidemiologic perspective in the agency strategic planning process	28 (74)	8 (21)	0	2 (5)	10 (26)	12 (32)	10 (26)	6 (16)
Determine evidence-based interventions and control measures in response to epidemiologic findings	28 (74)	6 (16)	3 (8)	1 (3)	10 (26)	12 (32)	10 (26)	6 (16)
Use performance measures to evaluate and improve program effectiveness	26 (68)	6 (16)	4 (11)	2 (5)	14 (37)	10 (26)	9 (24)	5 (13)

Table 7. *Continued*

Senior-level supervisor or manager epidemiologists' self-assessment of competence in the Tier 3a Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 38 chronic disease epidemiologists)

TIER 3A EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Bring epidemiologic perspective in the development and analysis of public health policies	25 (66)	11 (29)	2 (5)	0	11 (29)	13 (34)	8 (21)	6 (16)
Develop and manage information systems to improve effectiveness of surveillance, investigation, and other epidemiologic practices	24 (63)	9 (24)	5 (13)	0	17 (45)	9 (24)	6 (16)	6 (16)
Practice culturally sensitive epidemiologic activities	23 (61)	13 (34)	2 (5)	0	11 (29)	10 (26)	11 (29)	6 (16)
Ensure the application of understanding of human and environmental biology and behavioral sciences and principles to determine biological mechanisms of disease	22 (58)	9 (24)	4 (11)	3 (8)	9 (24)	9 (24)	11 (29)	9 (24)
Ensure evaluation of programs	21 (55)	11 (29)	5 (13)	1 (3)	15 (39)	10 (26)	7 (18)	6 (16)
Lead the creation of the epidemiologic program's vision in the context of the agency's plan	20 (53)	13 (34)	5 (13)	0	9 (24)	15 (39)	9 (24)	5 (13)
Ensure professional development of epidemiology workforce	19 (50)	13 (34)	6 (16)	0	14 (37)	6 (16)	12 (32)	6 (16)
Create operational and financial plans for future epidemiologic activities	19 (50)	12 (32)	7 (18)	0	15 (39)	9 (24)	9 (24)	5 (13)
Formulate a fiscally sound budget that will support the activities defined in the operational plan and is consistent with the financial rules of the agency	19 (50)	6 (16)	10 (26)	3 (8)	14 (37)	8 (21)	10 (26)	6 (16)
Develop requests for extramural funding to support additional epidemiologic activities and special projects	18 (47)	7 (18)	9 (24)	4 (11)	14 (37)	7 (18)	8 (21)	9 (24)
Oversee implementation of operational and financial plans	16 (42)	11 (29)	9 (24)	2 (5)	13 (34)	9 (24)	9 (24)	7 (18)
Lead community public health planning processes	14 (37)	17 (45)	4 (11)	3 (8)	14 (37)	9 (24)	7 (18)	8 (21)
Lead epidemiology unit in preparing for emergency response	7 (18)	7 (18)	23 (61)	1 (3)	14 (37)	7 (18)	11 (29)	6 (16)
Ensure the use of laboratory resources to support epidemiologic activities	6 (16)	18 (47)	13 (34)	1 (3)	11 (29)	7 (18)	13 (34)	7 (18)

Table 8. **Senior scientist/subject matter expert epidemiologists' self-assessment of competence in the Tier 3b Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 27 chronic disease epidemiologists)**

TIER 3B EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Evaluate results of data analysis, and interpret conclusions	26 (96)	0	0	1 (4)	0	6 (22)	16 (59)	5 (19)
Evaluate data from an epidemiologic investigation or study	25 (93)	1 (4)	0	1 (4)	1 (4)	5 (19)	14 (52)	7 (26)
Validate identification of public health problems pertinent to the population	25 (93)	1 (4)	0	1 (4)	2 (7)	7 (26)	11 (41)	7 (26)
Organize surveillance	25 (93)	1 (4)	0	1 (4)	0	9 (33)	13 (48)	5 (19)
Organize preparation of written and oral presentations that communicate necessary information to professional audiences, policymakers, and the general public	25 (93)	0	0	2 (7)	2 (7)	6 (22)	14 (52)	5 (19)
Use basic public health sciences in epidemiologic practice	25 (93)	0	1 (4)	1 (4)	1 (4)	4 (15)	14 (52)	8 (30)
Manage data from surveillance, investigations, or other sources	25 (93)	0	0	2 (7)	0	3 (11)	17 (63)	7 (26)
Synthesize principles of good ethical/legal practice for application to study design and data collections, dissemination, and use	24 (89)	2 (7)	0	1 (4)	1 (4)	7 (26)	14 (52)	5 (19)
Model interpersonal skills in communications with agency personnel, colleagues, and the public	23 (85)	3 (11)	1 (4)	0	4 (15)	8 (30)	11 (41)	4 (15)
Design investigation of acute and chronic conditions or other adverse outcomes in the population	23 (85)	2 (7)	1 (4)	1 (4)	2 (7)	7 (26)	12 (44)	6 (22)
Apply principles of informatics, including data collection, processing, and analysis, in support of epidemiologic practice	22 (81)	4 (15)	0	1 (4)	8 (30)	6 (22)	11 (41)	2 (7)
Formulate new interventions on the basis of evidence, when available, and control measures in response to epidemiologic findings	22 (81)	4 (15)	0	1 (4)	1 (4)	10 (37)	11 (41)	5 (19)
Ensure application of understanding of human and environmental biology and behavioral sciences and principles to determine biological mechanisms of disease	22 (81)	2 (7)	1 (4)	2 (7)	4 (15)	6 (22)	12 (44)	5 (19)
Bring epidemiologic perspective in the development and analysis of public health policies	20 (74)	5 (19)	1 (4)	1 (4)	6 (22)	6 (22)	11 (41)	4 (15)

Table 8. *Continued*

Senior scientist/subject matter expert epidemiologists' self-assessment of competence in the Tier 3b Applied Epidemiology Competencies and additional training need—2009 Epidemiology Capacity Assessment (n = 27 chronic disease epidemiologists)

TIER 3B EPIDEMIOLOGY COMPETENCIES	STAFF ARE COMPETENT IN THIS AREA				ADDITIONAL TRAINING IS NEEDED			
	AGREE	NEUTRAL	DISAGREE	DON'T KNOW	AGREE	NEUTRAL	DISAGREE	DON'T KNOW
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Use performance measures to evaluate and improve program effectiveness	20 (74)	5 (19)	1 (4)	1 (4)	4 (15)	8 (30)	10 (37)	5 (19)
Promote ethical conduct in the epidemiology practice	20 (74)	4 (15)	2 (7)	1 (4)	4 (15)	7 (26)	12 (44)	4 (15)
Evaluate programs	19 (70)	6 (22)	1 (4)	1 (4)	6 (22)	5 (19)	9 (33)	7 (26)
Prepare proposals for extramural funding for review and input from mangers	19 (70)	6 (22)	1 (4)	1 (4)	6 (22)	5 (19)	11 (41)	5 (19)
Use skills that foster collaborations, strong partnerships, and team-building to accomplish epidemiology program objectives	19 (70)	4 (15)	2 (7)	2 (7)	4 (15)	7 (26)	10 (37)	6 (22)
Promote the epidemiologic perspective in the agency strategic planning process	18 (67)	6 (22)	2 (7)	1 (4)	6 (22)	6 (22)	11 (41)	4 (15)
Promote the organization's vision in all epidemiologic program activities	16 (59)	7 (26)	3 (11)	1 (4)	5 (19)	5 (19)	13 (48)	4 (15)
Promote epidemiology workforce development	16 (59)	7 (26)	3 (11)	1 (4)	9 (33)	4 (15)	10 (37)	4 (!5)
Practice culturally sensitive epidemiologic activities	15 (56)	8 (30)	2 (7)	2 (7)	8 (30)	6 (22)	8 (30)	5 (19)
Conduct epidemiologic activities within the financial and operational plan of the agency	15 (56)	7 (26)	4 (15)	1 (4)	6 (22)	7 (26)	9 (33)	5 (19)
Develop as-needed policies that address security, privacy, and legal considerations when communicating epidemiologic information	14 (52)	8 (30)	4 (15)	1 (4)	8 (30)	7 (26)	7 (26)	5 (19)
Prepare for emergency response	13 (48)	5 (19)	9 (33)	0	8 (30)	4 (15)	10 (37)	5 (19)
Implement operational and financial plans for assigned projects	12 (44)	10 (37)	3 (11)	2 (7)	6 (22)	10 (37)	6 (22)	5 (19)
Develop processes for using laboratory resources to support epidemiologic activities	12 (44)	8 (30)	5 (19)	2 (7)	6 (22)	6 (22)	10 (37)	5 (19)
Lead community public health planning processes	11 (41)	9 (33)	5 (19)	2 (7)	8 (30)	5 (19)	8 (30)	6 (22)
Describe financial and budgetary processes of the agency	10 (37)	9 (33)	7 (26)	1 (4)	9 (33)	7 (26)	8 (30)	3 (11)

In general, as tier level increased, so did the mean percentage of CDEs who indicated they were competent and a lower mean percentage indicated needing additional training. The exception was Tier 1 CDEs, who expressed an average need for competency-specific training that was slightly less than those in tiers 2 and 3a (23.4% vs. 28.8% and 27.8%, respectively) (Table 9).

Table 9. **Mean* and range in competency percentages and training needs of chronic disease epidemiologists, by epidemiologist tier—2009 Epidemiology Capacity Assessment**

TIER	NO. COMPETENCIES	AGREE THAT ARE COMPETENT		AGREE THAT NEED TRAINING	
		MEAN, %	RANGE, %	MEAN, %	RANGE, %
1	30	41.7	13–73	23.4	10–40
2	30	60.0	22–81	28.8	23–44
3a	31	64.9	16–95	27.8	11–45
3b	30	67.7	37–96	16.7	0–33

**The average from adding the percentages who agree they are competent from each individual competency (columns 2 and 6 in Tables 5–8) divided by the number of competencies. Tier 1 is entry level, tier 2 is mid-level, tier 3a is senior supervisor or manager, and tier 3b is senior scientist/subject matter expert.*

Staff Turnover, Retirement, and Retention

The core ECA assessment contained a measure of experience and anticipated turnover (Table 10). For this analysis, data from all 195 CDEs, comprising 179 FTEs, who completed the individual worksheets were examined. Overall, approximately two thirds of CDEs had at least five years' experience; those with the most training had the highest percentage with this level of experience. Nearly 13% planned to retire or change careers out of epidemiology in the next five years, with no difference by academic training level. CDEs and other epidemiologists did not differ significantly in their intent to retire or change careers.

Table 10. **Turnover of chronic disease epidemiology workforce in 2008 and projected in next five years—2009 Epidemiology Capacity Assessment**

EDUCATION LEVEL	TOTAL	NO. (%) WITH ≥5 YEARS EXPERIENCE	NO. (%) RETIRING OR CHANGING CAREER IN NEXT 5 YEARS
MD, DO, DDS	17	16 (94.1)	2 (11.8)
DVM	0	–	–
PhD, DrPH, other doctoral	54	44 (81.5)	5 (9.3)
MPH, MSPH, other master's	108	66 (61.1)	15 (13.9)
RN, other nursing	0	–	–
BA, BS, other bachelor's	15	8 (53.3)	3 (20.0)
Associate or no post–high school degree	1	0	0
TOTAL	195	134 (68.7)	25 (12.8)

Spectrum of Work

The spectrum of work performed by CDEs was examined (Table 11). Whereas most jurisdictions had performed epidemiologic disease–related work in the past 12 months in cancer (98%), diabetes (94%), heart disease (92%), asthma (90%), and stroke (86%), only about half of jurisdictions had performed work in arthritis (53%) and oral health (51%).

CDEs in greater than 90% of jurisdictions performed work in risk factor areas related to tobacco use, nutrition, obesity, hypertension, cancer screening, and physical activity. Although only a minority had performed work related to alcohol abuse (39%) and drug abuse (29%), epidemiologists in other program areas such as injury or substance abuse may have been doing work related to these issues.

Table 11. **Number and percentage of jurisdictions involved in the past 12 months in work related to selected chronic conditions and in chronic disease risk factors—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia**

VARIABLE	NO. (%)
Condition	
Arthritis	27 (52.9)
Asthma	46 (90.2)
Cancer	50 (98.0)
Diabetes	48 (94.1)
Heart disease	47 (92.2)
Oral health	26 (51.0)
Stroke	44 (86.3)
Other*	18 (35.3)
Risk factor	
Alcohol abuse	20 (39.2)
Cancer screening	46 (90.2)
Drug abuse	15 (29.4)
High cholesterol	37 (72.6)
Hypertension	47 (92.2)
Nutrition	46 (90.2)
Overweight/obesity	48 (94.1)
Physical activity	46 (90.2)
Tobacco use	49 (96.1)
Other†	15 (29.4)

**Chronic obstructive pulmonary disease, injury, and many others.*
†Social determinants (education, income, socioeconomic status), environmental risk factors, and breastfeeding.

Access to Data and to Consultants

CDEs need ready access to selected data sets to conduct the full spectrum of chronic disease activity. The data sets to which at least 80% of chronic disease epidemiology programs reported having unfettered (direct) access are the Behavioral Risk Factor Surveillance System (BRFSS), cancer registry and hospital discharge data. At the other end of the spectrum, a minority of chronic disease epidemiology programs have unfettered access to emergency department (41%), Medicaid (35%), and Medicare (6%) data sets (Table 12).

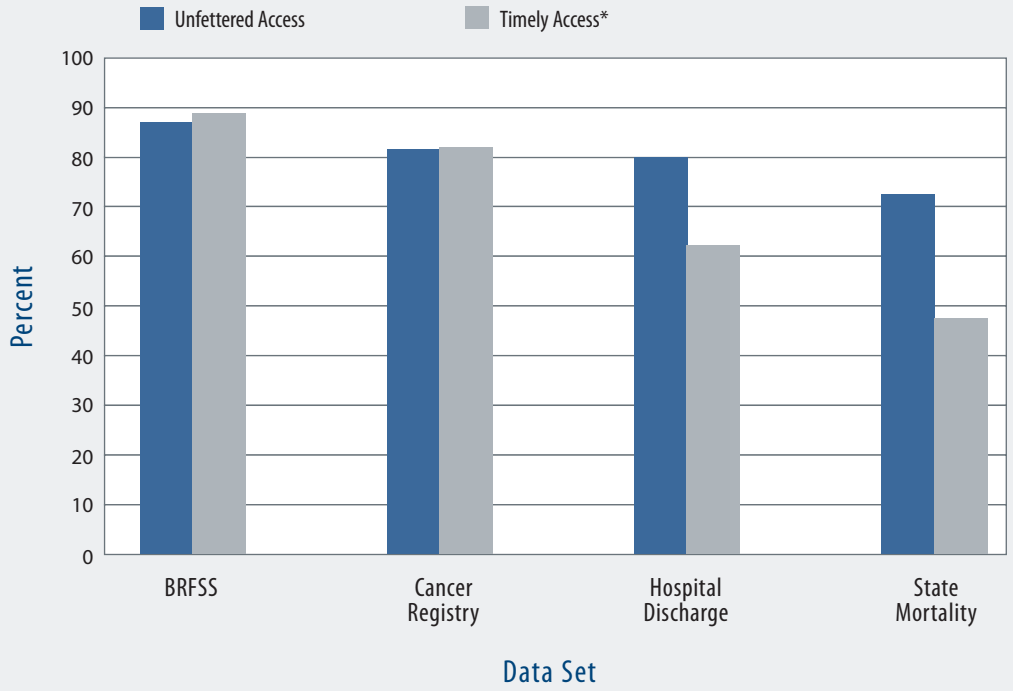
Table 12. Percentage of jurisdictions in which chronic disease epidemiologists have unfettered access to selected data sets—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

DATA SET*	ACCESS			
	YES	NO	DON'T KNOW	DON'T COLLECT
	NO. (%)	NO. (%)	NO. (%)	NO. (%)
State mortality	37 (72.5)	13 (25.5)	1 (2.0)	0
State hospital discharge	41 (80.4)	7 (13.7)	0	3 (5.9)
Cancer registry	42 (82.4)	8 (15.7)	1 (2.0)	0
State Medicaid	18 (35.3)	30 (58.8)	3 (5.9)	0
State Medicare	3 (5.9)	40 (78.4)	8 (15.7)	0
State BRFSS	44 (86.3)	7 (13.7)	0	0
State YRBS	33 (64.7)	15 (29.4)	1 (2.0)	2 (3.9)
State ED	21 (41.2)	21 (41.2)	5 (9.8)	4 (7.8)
State EMS	17 (33.3)	28 (54.9)	2 (3.9)	4 (7.8)

**BRFSS = Behavioral Risk Factor Surveillance System; YRBS = Youth Risk Behavior Survey; ED = emergency department; EMS = emergency medical services.*

Timing of unfettered access to selected data sets is important for timely analysis of data. Of the four data sets for which timeliness information was collected, BRFSS data were always or almost always available to CDEs within 6 months after collection in >88% of jurisdictions that had unfettered access, and cancer registry data were always or almost always available to CDEs within 24 months after collection in >83%. Hospital discharge and mortality data were always or almost always available within 9 months after collection in approximately two thirds and half of jurisdictions, respectively, in which access was unfettered (Figure 2 and Table 13).

Figure 2. Percentage of jurisdictions in which chronic disease epidemiologists have unfettered and timely access to selected data sets—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia



*"Timely access" is among those reporting unfettered access and is defined as always or almost always being available within 6 months after data collection for BRFSS, within 24 months for cancer registry, and within 9 months for hospital discharge and state mortality data. BRFSS = Behavioral Risk Factor Surveillance System.

Table 13. Percentage of jurisdictions with unfettered access to selected data sets that reported having timely access to the data—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

DATA SET	TIMELY ACCESS*				
	ALWAYS	ALMOST ALWAYS	RARELY	NEVER	DON'T KNOW
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
State mortality	7 (18.9)	10 (27.0)	11 (29.7)	7 (18.9)	2 (5.4)
State hospital discharge	10 (24.4)	16 (39.0)	5 (12.2)	6 (14.6)	4 (9.8)
Cancer registry	24 (57.1)	11 (26.2)	1 (2.4)	4 (9.5)	2 (4.8)
State BRFSS	23 (52.3)	16 (36.4)	4 (9.1)	0	1 (2.3)

*"Timely access" is among chronic disease epidemiologists reporting unfettered access and is defined as within 6 months after data collection for BRFSS, within 24 months for cancer registry, and within 9 months for hospital discharge and state mortality data. BRFSS = Behavioral Risk Factor Surveillance System.

Given that data analysis and study design can be complex for CDEs, programs were asked if they had established consultants for sampling and for data analysis. Slightly over half of jurisdictions had established consultants for each (Table 14). Whether jurisdictions with no consultants have an unmet need or are self-sufficient is unknown.

Table 14. Percentage of jurisdictions in which chronic disease epidemiologists have access to established consultation—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

CONSULTANT FOR	ACCESS		
	YES	NO	DON'T KNOW
	NO. (%)	NO. (%)	NO. (%)
Sampling	28 (54.9)	21 (41.2)	2 (3.9)
Data analysis	31 (60.8)	18 (35.3)	2 (3.9)

Data Analysis and Interpretation

The most common readily available analytic statistical software package in 2009 was SAS, with all 49 jurisdictions that needed it having ready access to it. Epi Info was the next most common readily available analytic statistical software package, with 73% of jurisdictions needing access and 95% of those needing it having it. The most important software packages needed by ≥10% of jurisdictions were GIS (needed by 94% but not available in 27% of those needing it), SUDAAN (needed by 71% but not available in 31% of those needing it), encryption (needed by 53% but not available in 26% of those needing it), and STATA (needed by 39% but not available in 35% of those needing it) (Table 15).

Table 15. Percentage of jurisdictions with ready access to selected software packages—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

SOFTWARE*	NEED SOFTWARE	HAVE READY ACCESS*	DO NOT HAVE READY ACCESS*
	NO. (%)	NO. (%)	NO. (%)
SAS	49 (96.1)	49 (100)	0
SPSS	34 (66.7)	29 (85.3)	5 (14.7)
STATA	20 (39.2)	13 (65.0)	7 (35.0)
SUDAAN	36 (70.6)	25 (69.4)	11 (30.6)
Epi Info	37 (72.5)	35 (94.6)	2 (5.4)
Encryption	27 (52.9)	20 (74.1)	7 (25.9)
GIS	48 (94.1)	35 (72.9)	13 (27.1)
Other†	10 (19.6)	7 (70.0)	3 (30.0)

**Among jurisdictions that need it.*
†Other software specified (1 each): Adobe writer and Visio; DBMS; EpiData; IMPLAN; LinkPlus (matching); WinCati & ci3 software; small odds ratio programs.

CDEs in nearly all jurisdictions (>90%) performed a variety of common epidemiologic calculations (Table 16). The calculations performed by the lowest percentages of jurisdictions were confidence intervals for mortality (death) rates (75%) and confidence intervals for BRFSS prevalence estimates (80%).

Table 16. Percentage of jurisdictions in which chronic disease epidemiologists commonly conduct selected analyses—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

ANALYSIS	YES	NO	UNKNOWN
	NO. (%)	NO. (%)	NO. (%)
Age-specific rates	51 (100)	0	–
Race/ethnicity-specific rates	51 (100)	0	–
Sex-specific rates	49 (96.1)	2 (3.9)	–
Sub-state rates	50 (98.0)	1 (2.0)	–
Confidence intervals for mortality rates	38 (74.5)	10 (19.6)	3 (5.9)
Confidence intervals for BRFSS† prevalence	41 (80.4)	6 (11.8)	4 (7.8)
Mortality comparison rate* commonly provided	48 (94.1)	2 (3.9)	1 (2.0)
BRFSS prevalence comparison rate commonly provided	47 (92.2)	2 (3.9)	2 (3.9)

**Comparison rate such as the U.S. rate, Healthy People 2010 target.*
†BRFSS = Behavioral Risk Factor Surveillance System.

Dissemination of Data

A total of 26 (51%) jurisdictions had a public access interactive or queriable online system that displays chronic disease data.

The Chronic Disease Supplement examined the extent to which CDEs used and disseminated their data in the past year. In most jurisdictions (78%–90%), CDEs helped prepare grant/cooperative agreement applications, produced technical reports using epidemiologic data, and presented at national meetings (Table 17).

Table 17. Percentage of jurisdictions in which chronic disease epidemiologists have disseminated data—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

DISSEMINATION FORMAT	YES	NO	UNKNOWN
	NO. (%)	NO. (%)	NO. (%)
Grant application	45 (88.2)	3 (5.9)	3 (5.9)
State "burden" report	46 (90.2)	4 (7.8)	1 (2.0)
State or national meeting	40 (78.4)	8 (15.7)	3 (5.9)

Outreach, Partnership, and Collaboration

Academic Organizations

In the 12 months preceding this assessment, state-level CDEs in 41 (80.4%) jurisdictions gave lectures and/or supervised students in collaboration with an academic center.

External Organizations

CDEs in many jurisdictions had opportunities in the past year to collaborate with external organizations on a project or publication. Most commonly, they collaborated with private volunteer agencies (82%) or with health-care professional organizations (57%), and less so with managed-care organizations (33%) (Table 18).

Table 18. Percentage of jurisdictions in which chronic disease epidemiologists collaborated closely on a project or publication with selected external organizations in the preceding 12 months—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

ORGANIZATION TYPE	YES	NO	UNKNOWN
	NO. (%)	NO. (%)	NO. (%)
Private volunteer	42 (82.4)	5 (9.8)	4 (7.8)
Managed care	17 (33.3)	27 (52.9)	7 (13.7)
Health-care professional	29 (56.9)	17 (33.3)	5 (9.8)

Collaboration with State Epidemiology Personnel in Other Program Areas

CDEs have the potential to collaborate with epidemiologists in most other program areas in a state health department. Program areas in which respondents in most jurisdictions indicated somewhat strong or strong collaboration were: MCH (71% of jurisdictions), injury (63%), environmental health (61%), and oral health (51%). Program areas with the lowest percentage of jurisdictions with at least somewhat strong collaboration were mental health (28%), substance abuse (31%), and public health preparedness (37%) (Table 19).

Table 19. Degree of collaboration between chronic disease epidemiologists and epidemiologists in other program areas—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

PROGRAM AREA†	DEGREE OF COLLABORATION					
	STRONG	SOMEWHAT STRONG	VERY LITTLE	NONE	UNKNOWN	NOT APPLICABLE*
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Other CD	21 (41.2)	21 (41.2)	7 (13.7)	0	–	2 (3.9)
ID	15 (29.4)	8 (15.7)	20 (39.2)	7 (13.7)	1 (2.0)	–
PHP	12 (23.5)	7 (13.7)	15 (29.4)	9 (17.7)	1 (2.0)	7 (13.7)
Injury	18 (35.3)	14 (27.5)	9 (17.7)	4 (7.8)	–	6 (11.8)
Oral health	18 (35.3)	8 (15.7)	7 (13.7)	5 (9.8)	4 (7.8)	9 (17.7)
Mental health	11 (21.6)	3 (5.9)	11 (21.6)	8 (15.7)	2 (3.9)	16 (31.4)
Substance abuse	10 (19.6)	6 (11.8)	15 (29.4)	8 (15.7)	2 (3.9)	10 (19.6)
MCH	21 (41.2)	15 (29.4)	12 (23.5)	1 (2.0)	–	2 (3.9)
Environmental health	16 (31.4)	15 (29.4)	12 (23.5)	3 (5.9)	1 (2.0)	4 (7.8)
Occupational health	12 (23.5)	7 (13.7)	12 (23.5)	6 (11.8)	3 (5.9)	11 (21.6)
Other‡	13 (25.5)	2 (3.9)	1 (2.0)	2 (3.9)	7 (13.7)	26 (51.0)

**No epidemiologists in this program area in the responding jurisdiction.*
†CD = chronic disease; ID = infectious disease; PHP = public health preparedness; MCH = maternal and child health.
‡Tobacco use (3); Vital statistics (1).

Miscellaneous

Involvement with Electronic Medical Records

A total of 26 jurisdictions (51%) reported being actively involved with local medical groups to make electronic medical records useful for chronic disease surveillance, prevention, or control purposes.

Support Services

The Chronic Disease Supplement inquired about whether CDEs in each jurisdiction had adequate support in several areas. Nearly 75% had adequate IT support services and 65% had ready access to current journals. However, only 43% had adequate clerical support (Table 20).

Table 20. Percentage of jurisdictions with adequate selected support services for chronic disease epidemiologists—2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia

SUPPORT SERVICE	YES	NO	UNKNOWN
	NO. (%)	NO. (%)	NO. (%)
Ready access to current journals	33 (64.7)	18 (35.3)	–
Adequate clerical support	22 (43.1)	28 (54.9)	1 (2.0)
Adequate information technology services	38 (74.5	13 (25.5)	–

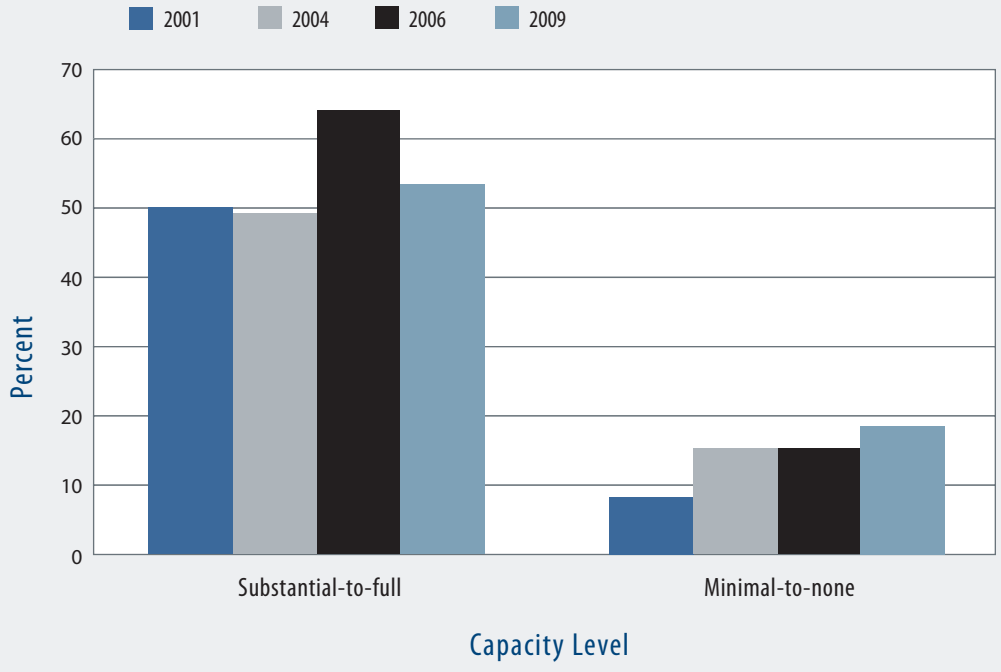
TRENDS, 2003 -2009

In 2001, 2004, 2006, and 2009, the ECAs asked a number of comparable questions about chronic disease epidemiology capacity. In 2001, 39 jurisdictions responded; all states and DC responded in 2004–2009. In addition, CSTE conducted a special chronic disease epidemiology capacity assessment in 2003, on which some questions in the 2009 Chronic Disease Supplement were based. A total of 46 states and DC responded to the 2003 assessment. These assessments provide an opportunity to examine trends in some areas by using data from the same respondents (51 jurisdictions for the 2004, 2006, and 2009 ECAs; 47 jurisdictions for the 2003 and 2009 chronic disease assessments).

Chronic Disease Epidemiology Functional Capacity (Core ECA)

The core ECA asked jurisdictions to specify the extent of the epidemiology and surveillance capacity they had in each program area, based on the percentage of the activity, knowledge, or resources they had, with percentages categorized into six categories ranging from none to full (100%). Figure 3 shows trends in the percentage of jurisdictions since 2001 that reported having at least substantial (≥50%) and minimal-to-no (<25%) capacity. With the exception of 2006, the percentage with at least substantial capacity has hovered around 50%, while the percentage with minimal-to-no capacity has slowly but progressively increased from 8% in 2001 to 18% in 2009.

Figure 3. Trends in percentages of jurisdictions with substantial-to-full and minimal-to-no chronic disease epidemiology and surveillance capacity, 2001–2009 —2009 Chronic Disease Epidemiology Capacity Assessment, 50 states and the District of Columbia



Training in Epidemiology

Examination of data from 2004 through 2009 found no striking trends in the make-up of the chronic disease epidemiology workforce. The percentage with master's-level or higher training in epidemiology was constant at 55%, except in 2006, when it rose to 63%, and the percentage with no previous training or only on-the-job training was constant at about 15% (Table 21).

Table 21. **Trends in level of epidemiology training of chronic disease epidemiologists—2004, 2006, and 2009 Epidemiology Capacity Assessments, 50 states and the District of Columbia**

TRAINING LEVEL*	2004 ECA	2006 ECA	2009 ECA
	NO. (%)	NO. (%)	NO. (%)
PhD, DrPH	36 (11.5)	57 (17.9)	21.5 (12.0)
MD, DVM, DDS + Master's	19 (6.1)	19.5 (6.1)	11 (6.1)
Master's in epidemiology	116 (37.1)	123.3 (38.7)	66 (36.9)
Bachelor's in epidemiology	11 (3.5)	3 (0.9)	1 (0.6)
EIS or other formal program	24 (7.7)	5 (1.6)	8.5 (4.7)
Some coursework	55 (17.6)	66.9 (21.0)	44 (24.6)
On-the-job training	42 (13.4)	37.6 (11.8)	24 (13.4)
None	10 (3.2)	6.5 (2.0)	3 (1.7)
Total	313 (100)	318.8 (100)	179 (100)

**Training level is hierarchical, with the highest level of epidemiology-specific training being the relevant category. For example, a physician completing EIS who has a master's in epidemiology will be listed as being a "MD + Master's," not "EIS or other formal program. EIS = Epidemic Intelligence Service.*

Spectrum of Work

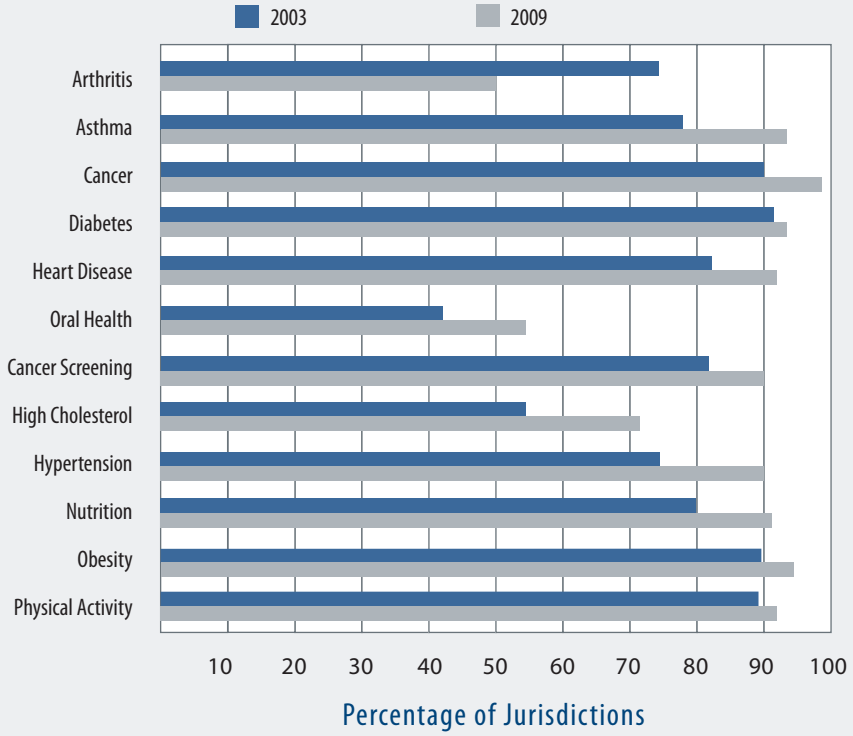
The percentage of the 47 comparable jurisdictions involved in selected areas of chronic disease epidemiology work in the previous 12 months was examined in the 2003 chronic disease capacity assessment (2003 chronic disease ECA) and the 2009 Chronic Disease Supplement (Table 22 and Figure 4). For most measured conditions, the percentage of jurisdictions with recent involvement increased. The one exception was arthritis, for which the percentage of jurisdictions decreased sharply from 73% to 51%. For all risk factors, the percentage of jurisdictions with recent involvement increased by 4–19 percentage points. Several important conditions and risk factors were not examined in the 2003 assessment including stroke, alcohol and drug use, and tobacco use.

Table 22. **Percentage of jurisdictions involved in the past 12 months in work related to selected chronic conditions and in chronic disease risk factors*—2003 and 2009 Chronic Disease Epidemiology Capacity Assessment, 46 states and the District of Columbia**

VARIABLE	2003		2009	
	NO. JURISDICTIONS	YES NO. (%)	NO. JURISDICTIONS	YES NO. (%)
Condition				
Arthritis	44	32 (72.7)	47	24 (51.1)
Asthma	45	35 (77.8)	47	43 (91.5)
Cancer	46	41 (89.1)	47	46 (97.9)
Diabetes	47	43 (91.5)	47	44 (93.6)
Heart disease	46	38 (82.6)	47	43 (91.5)
Oral health	41	17 (41.5)	47	26 (55.3)
Stroke	–	–	47	41 (87.2)
Risk Factor				
Alcohol abuse	–	–	47	18 (38.3)
Cancer screening	44	36 (81.8)	47	42 (89.4)
Drug abuse	-	–	47	14 (29.8)
High cholesterol	38	21 (55.3)	47	34 (72.3)
Hypertension	40	30 (75.0)	47	43 (91.5)
Nutrition	44	35 (79.5)	47	43 (91.5)
Overweight/obesity	45	40 (88.9)	47	45 (95.7)
Physical activity	46	40 (87.0)	47	43 (91.5)
Tobacco use	–	–	47	45 (95.7)

**For some conditions and risk factors, <47 jurisdictions responded.*

Figure 4. Percentage of jurisdictions involved in the past 12 months in work related to selected chronic conditions and in chronic disease risk factors—2003 and 2009 Chronic Disease Epidemiology Capacity Assessment, 46 states and the District of Columbia



Access to Data and to Consultants

The same questions were asked about unfettered access to selected data sets and to consultants in both the 2003 chronic disease ECA and the 2009 Chronic Disease Supplement. For the many data sets and for both aspects of consulting, no important changes occurred (<5% difference in percentage of jurisdictions with such access). However, unfettered access to state mortality data and to Medicare data decreased from 81% to 75% and from 19% to 6%, respectively. Unfettered access increased for hospital discharge data (68% to 83%), emergency department data (19% to 43%), and emergency medical services data (19% to 32%) (Table 23).

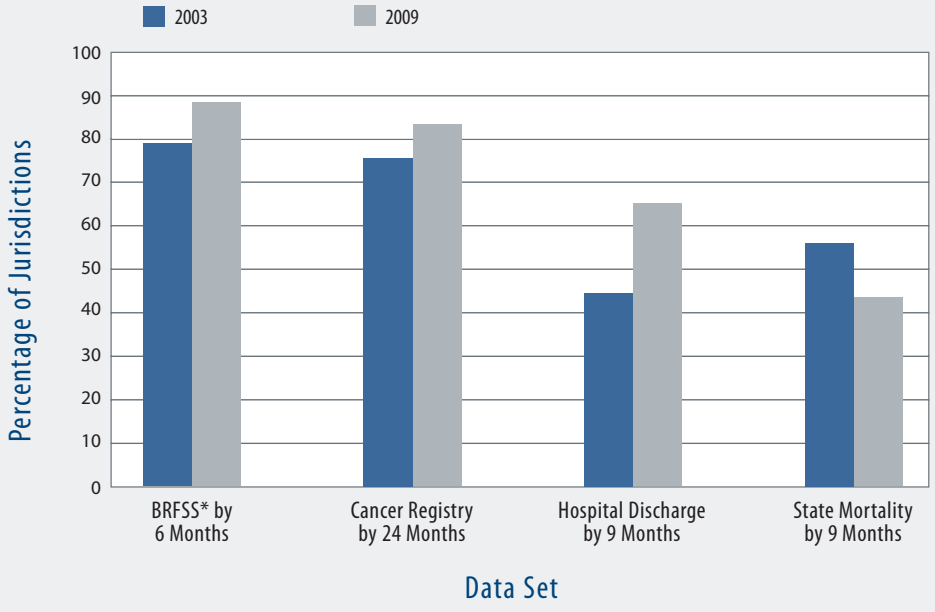
For three of the four data sets for which timeliness of access among jurisdictions with unfettered access was measured, the percentage of jurisdictions with timely access increased substantially from 2003 to 2009: BRFSS (78% to 88%), cancer registry (74% to 82%), and hospital discharge (44% to 64%) (Figure 5). However, timeliness decreased for state mortality data (55% to 43%). Access to consultants for sampling or data analysis issues did not change.

Table 23. Percentage of jurisdictions with unfettered access to selected state-level data sets and established consultants—2003 and 2009 Chronic Disease Epidemiology Capacity Assessment, 46 states and the District of Columbia

UNFETTERED ACCESS TO	2003			2009		
	YES	NO	UNKNOWN/ DON'T COLLECT	YES	NO	UNKNOWN/ DON'T COLLECT
	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)	NO. (%)
Data set*						
State mortality	38 (80.9)	9 (19.1)	0	35 (74.5)	11 (23.4)	1 (2.1)
State hospital discharge	32 (68.1)	12 (25.5)	3 (6.4)	39 (83.0)	5 (10.6)	3 (6.4)
Cancer registry	39 (83.0)	8 (17.0)	0	39 (83.0)	7 (14.9)	1 (2.1)
State Medicaid	16 (34.0)	30 (63.8)	1 (2.1)	17 (36.2)	28 (59.6)	2 (4.3)
State Medicare	9 (19.1)	34 (72.3)	4 (8.5)	3 (6.4)	37 (78.7)	7 (15.0)
State BRFSS	41 (87.2)	6 (12.8)	0	42 (89.4)	5 (10.6)	–
State YRBS	30 (63.8)	12 (25.5)	5 (10.6)	30 (63.8)	15 (31.9)	2 (4.3)
State ED	9 (19.1)	25 (53.2)	13 (27.7)	20 (42.6)	18 (38.3)	9 (19.1)
State EMS	9 (19.1)	29 (61.7)	9 (19.1)	15 (31.9)	26 (55.3)	6 (13.8)
Consultant for						
Sampling	29 (61.7)	14 (29.8)	4 (8.5)	28 (59.6)	18 (38.3)	1 (2.1)
Data analysis	31 (66.0)	13 (27.7)	3 (6.4)	31 (66.0)	15 (31.9)	1 (2.1)

**BRFSS = Behavioral Risk Factor Surveillance System; YRBS = Youth Risk Behavior Surveillance; ED = emergency department; EMS = emergency medical services.*

Figure 5. Percentage of jurisdictions with unfettered access to selected data sets with data available within 6–24 months of collection—2003 and 2009 Chronic Disease Epidemiology Capacity Assessments, 46 states and the District of Columbia



Data Analysis and Interpretations

The 2003 chronic disease ECA and the 2009 Chronic Disease Supplement asked about need for and access to selected software packages for data analysis. The one outstanding change is that SAS has clearly emerged as the most available and needed software package and that 100% of jurisdictions that need it have access to it. In contrast, in 2003, 86% of jurisdictions that needed it had it available. Although Epi Info is still popular, the percentage of jurisdictions in which it appears to be needed and possibly used by CDEs decreased from 89% to 72% (Table 24). Except for SAS, the percentage of jurisdictions with ready access to any given software package they needed did not improve markedly. In general, 25%–30% of jurisdictions did not have ready access to any given software package they needed, including GIS and encryption software, which were asked about for the first time in 2009.

Table 24. **Trends in level of epidemiology training of chronic disease epidemiologists—2004, 2006, and 2009 Epidemiology Capacity Assessments, 50 states and the District of Columbia**

SOFTWARE	2003		2009	
	NEED READY ACCESS	HAVE READY ACCESS*	NEED READY ACCESS	HAVE READY ACCESS*
		NO. (%)		NO. (%)
SAS	44	38 (86.4)	46	46 (100)
SPSS	37	32 (86.5)	32	28 (87.5)
STATA	16	9 (56.3)	19	12 (63.2)
SUDAAN	37	25 (67.6)	34	24 (70.6)
Epi Info	42	40 (95.2)	34	33 (97.1)
Encryption	–	–	26	20 (76.9)
GIS	–	–	44	33 (75.0)

**Of jurisdictions that need it.*

Comparisons were also possible from 2003 to 2009 about whether CDEs commonly conduct analyses of certain rates. In all instances, a higher percentage of jurisdictions in 2009 than in 2003 responded that CDEs commonly conducted these analyses. The largest changes were in calculating confidence intervals for mortality rates (60% to 75%), calculating rates for sub-state areas (83% to 98%), and commonly providing comparison rates (e.g., with national rate) for mortality rates (85% to 96%) (Table 25).

Table 25. **Percentage of jurisdictions in which chronic disease epidemiologists reported commonly conducting selected analyses—2003 and 2009 Chronic Disease Epidemiology Capacity Assessments, 46 states and the District of Columbia**

ANALYSIS*	2003	2009
	CONDUCT SPECIFIED ANALYSIS	CONDUCT SPECIFIED ANALYSIS
	NO. (%)	NO. (%)
Age-specific rates	44 (93.6)	47 (100)
Race/ethnicity-specific rates	44 (93.6)	47 (100)
Sex-specific rates	43 (91.5)	45 (95.7)
Sub-state rates	39 (83.0)	46 (97.9)
CIs—mortality rates	28 (59.6)	35 (74.5)
CIs—BRFSS prevalence	37 (78.7)	38 (80.9)
Mortality comparison rate† commonly provided	40 (85.1)	45 (95.7)
BRFSS comparison rate† commonly provided	41 (87.2)	44 (93.6)

** CI = confidence interval; BRFSS = Behavioral Risk Factor Surveillance System.*
†Such as the U.S. rate, Healthy People 2010 target.

The 2003 and 2009 chronic disease assessments asked several questions regarding availability of chronic disease data to the public and involvement of CDEs in several types of chronic disease data dissemination. In all instances, data were publicly available in more jurisdictions and more jurisdictions had CDEs participating in data dissemination activities in 2009 than in 2003 (Table 26). Most notably, the percentage of jurisdictions with interactive, queriable online data increased from 36% to 49%.

Table 26. **Percentage of jurisdictions in which chronic disease data were available or chronic disease epidemiologists presented data—2003 and 2009 Chronic Disease Epidemiology Capacity Assessments, 46 states and the District of Columbia**

MEANS OF DISSEMINATION	2003	2009
	NO. (%)	NO. (%)
Interactive/queriable online system for chronic disease data	17 (36.2)	23 (48.9)
Chronic disease epidemiology staff published "burden" or "epidemiology" report	40 (85.1)	44 (93.6)
Scientific presentations at state or national meeting requiring abstract submission by chronic disease epidemiologist	33 (70.2)	38 (80.9)

Collaboration

The two chronic disease assessments asked several questions about collaborations in preparing an application, designing or evaluating a program or intervention, or publishing a report between CDEs and nongovernmental health organizations. Collaboration with private voluntary organizations was common and remained stable, whereas collaboration with managed-care organizations was low and decreased (Table 27).

Table 27. **Percentage of jurisdictions in which chronic disease epidemiologists collaborated closely on a project or publication with selected health organizations in the preceding 12 months—2003 and 2009 Chronic Disease Epidemiology Capacity Assessments, 46 states and the District of Columbia**

NATURE OF COLLABORATION	2003	2009
	NO. (%)	NO. (%)
Private voluntary organizations	38 (80.9)	39 (83.0)
Managed-care organizations	19 (40.4)	14 (29.8)

Support Services

From 2003 to 2009, the percentage of jurisdictions in which CDEs had ready access to the medical literature improved by 5 percentage points to 66%. The percentage of jurisdictions with adequate clerical support for CDEs decreased from 57% to 43% (Table 28).

Table 28. **Percentage of jurisdictions with selected support services for chronic disease epidemiologists—2003 and 2009 Chronic Disease Epidemiology Capacity Assessments, 46 states and the District of Columbia**

SUPPORT SERVICE	2003	2009
	NO. (%)	NO. (%)
Ready access to current journals	29 (61.7)	31 (66.0)
Adequate clerical support	27 (57.4)	20 (42.6)
Adequate information technology services	–	35 (74.5)

DISCUSSION

DISCUSSION

Epidemiology capacity is essential for detection, control, and prevention of major public health problems. Epidemiology provides information needed to perform four of the 10 ESPH (5). Healthy People 2010 objective 23-14 calls for the United States to "increase the proportion of tribal, state, and local public health agencies that provide or ensure comprehensive epidemiology services to support essential public health services," so "they can quickly detect, investigate, and respond to diseases to prevent unnecessary transmission" (11). CSTE's periodic ECA is the major data source for measuring baseline and ongoing progress in this objective for state public health agencies.

In addition to overall state-level epidemiology capacity, assessment of epidemiology capacity within selected public health subject matter areas is important. Subject matter areas such as chronic disease and infectious disease differ not only in the nature of the conditions and risk factors they address, but also with methods of obtaining data, types of analysis used, and means of intervention. Chronic disease epidemiology depends on the availability of selected population-based data sets, such as mortality and hospital discharge data, and on staff who are skilled at analyzing data and have the statistical software to manipulate large data sets.

Advances in building chronic disease epidemiology capacity in state health departments have been substantial in the two decades since creation of the National Center for Chronic Disease Prevention and Health Promotion at CDC in 1988 and the announcement of federal funding for chronic disease initiatives shortly thereafter. As of 2009, >90% of jurisdictions had efforts directed at each of four major program areas (asthma, cancer, diabetes, and heart disease) and at each of five major chronic disease risk factors (tobacco use, hypertension, nutrition, obesity, and physical activity). The percentage of jurisdictions with programs to monitor stroke and high cholesterol were not far behind. The majority (53%) of jurisdictions had at least substantial chronic disease epidemiology and surveillance capacity. This level of capacity resulted in publishing and presenting data, program work that included seven major chronic disease risk factors (cancer screening, high cholesterol, hypertension, nutrition, obesity, physical activity, and tobacco use), and collaboration of CDEs with epidemiologists in three other major program areas that have overlapping interests (injury, MCH, and environmental health).

Although much of this progress was made during the 1990s, important advances also occurred in the past six years, especially in technology. The percentage of jurisdictions in which CDEs have unfettered access to selected data sets increased substantially for hospital discharge data (68% to 83%), emergency department data (19% to 43%), and emergency medical services data (19% to 32%). Timeliness of the availability of key data sets to CDEs also increased; the percentage of jurisdictions in which CDEs with unfettered access had timely access to a database once it was finalized increased for BRFSS (78% to 98%), cancer registry (74% to 97%), and hospital discharge (44% to 68%) data sets. The tools needed to take advantage of this enhanced data access also became more available; the percentage of jurisdictions that had readily available SAS software (the software used by nearly all jurisdictions for complex data analysis) increased from 86% to 100% and the percentage in which CDEs conduct standard and more sophisticated data analyses increased (e.g., calculating confidence intervals on mortality rates (60% to 75%), calculating rates for sub-state areas (e.g., regions, counties; 83% to 98%), and providing comparison rates (e.g., with national rate) for state-level mortality (death) rates (85% to 96%)). Finally, the percentage of jurisdictions also increased substantially in which CDEs shared information through public access queriable online data systems (36% to 49%), published reports of epidemiologic data (85% to 94%), and presented data at state or national meetings (70% to 81%).

The assessment identified important gaps and some disturbing trends. The percentage of jurisdictions with at least substantial epidemiology and surveillance capacity has changed little since 2001. The percentage with minimal-to-no capacity—which crept up progressively from 8% of jurisdictions in 2001 to 15% in 2004 and 2006 to 18% in 2009—is of concern. In 31% of jurisdictions, chronic disease epidemiology programs still lack ready access to GIS software. In 20% of jurisdictions, CDEs either do not calculate confidence intervals for BRFSS prevalence estimates or do not know whether they do. The percentage of jurisdictions in which CDEs have direct access to several potentially important data sets has decreased since 2003: state mortality data (81% to 75%) and Medicare data (19% to 6%). Furthermore, the percentage of jurisdictions in which mortality data are available within 9 months after the end of a calendar year to CDEs with ready access has decreased from 55% to 43%. Many jurisdictions do not have adequate support services: 55% lack adequate clerical support, a decrease of nearly 15 percentage points since 2003; 35% lack ready access to medical journals; and 25% lack adequate IT services. Finally, the total number of epidemiologists working in state health departments has decreased. Although this assessment did not directly measure the number of CDEs, the numbers are likely to have decreased in most program areas since 2006, given the huge budget shortfalls faced by nearly every state in the past year.

This assessment validated three key indices of chronic disease epidemiology capacity highlighted by CSTE in its report on the 2003 chronic disease ECA and again in its 2007 position statement on chronic disease capacity: having an epidemiologist position to coordinate and integrate chronic disease epidemiology activities (usually a "lead" epidemiologist), having at least one epidemiologist with doctoral-level training, and having at least five CDEs (3,6). Each was associated either with a higher level of chronic disease epidemiology and surveillance capacity or more directly with some of the benefits that capacity brings. In particular, having a coordinating epidemiologist and having at least five CDEs were strongly associated with having at least substantial epidemiology capacity, dissemination of epidemiologic information in various forms and having involvement in all chronic disease subject matter areas. Having a doctoral-level epidemiologist was most strongly associated with having stronger collaborative relationships with other epidemiology program areas including injury, MCH, environmental epidemiology, mental health, substance abuse, and occupational health. Continued monitoring of these measures of capacity should provide a reliable index of overall chronic disease epidemiology capacity.

The information in this report is subject to several limitations. First, as in past ECAs, information collected about perceived capacity is self-assessed data. Methods used by respondents to estimate this information may have been varied between and within jurisdictions over time. Second, the response rate to the individual work sheets was only 70%, and respondents might have differed from non-respondents. Furthermore, because of the <100% response rate to the work sheets, the numbers and percentages of jurisdictions with an epidemiologist with doctoral-level training and with at least five CDEs are likely to be underestimates, and we were unable to assess trends in these indices of capacity. Finally, the 2009 ECA and Chronic Disease Supplement measured epidemiology and chronic disease capacity only at the state level. Local health department–level epidemiology capacity was not assessed, including local-level capacity in large city health departments serving populations as large as in many jurisdictions.

Conclusions

- State-level chronic disease epidemiology capacity has increased substantially since 2003, with more jurisdictions having a lead CDE, having involvement in the seven major chronic disease program areas, having unfettered and more timely access to key data sets, and conducting more sophisticated data analyses.
- Jurisdictions that have a coordinating/lead CDE or that have at least five full-time CDEs have higher levels of chronic disease epidemiology capacity do than jurisdictions without them.
- Despite the advances since 2003, the epidemiology capacity glass is only half full and shows signs of leaking: Self-assessed overall chronic disease epidemiology capacity has not changed because while more quality work is being done, it is being done with the same or fewer epidemiologists; nearly half of all jurisdictions lack even substantial capacity (a percentage that has not changed since 2001), and a growing percentage (now nearly one in five jurisdictions) have minimal-to-no chronic disease epidemiology capacity. Furthermore, the total number of epidemiologists at state health departments has decreased in the past 5 years (finding from the 2009 core ECA), and the economic downturn is likely to result in decreased state funding to chronic disease prevention efforts.

RECOMMENDATIONS

Overall

- Chronic disease epidemiology and related technology capacity should be a specific part of the national dialogue about addressing the erosion of overall state-based epidemiology capacity identified in the core ECA and ensuring that jurisdictions have the capacity needed to provide essential data for public health action.
- Improving capacity in jurisdictions that currently have minimal-to-no chronic disease epidemiology capacity should be a priority. At a minimum, every state should have a lead CDE to oversee and coordinate data gathering, analysis, interpretation, and translation to public health practice.
- Continued monitoring and identification of gaps in chronic disease epidemiology capacity are critical, particularly as needs increase from increasing life expectancy and a shift toward a higher percentage of the U.S. population in older age groups.
  - CSTE should continue to routinely assess state health departments about chronic disease epidemiology capacity, ideally every two years, and further clarify elements that are most likely to be useful for ongoing surveillance.
  - CSTE should build on the findings of the 2009 ECA and Chronic Disease Supplement to develop or modify the list of indicators for chronic disease epidemiology capacity that correspond to the capacity domains described in the 2004 white paper on essential functions of chronic disease epidemiology (4).

Program specific

- Many of the areas for which recommendations were made in the 2003 CSTE chronic disease ECA and reaffirmed in the 2007 CSTE chronic disease capacity position statement need continued work. CDC and CSTE should develop a specific plan to increase the number of epidemiologists and the access and use of tools to support their work so that all state-level chronic disease epidemiology programs:
  - have a designated coordinating/lead CDE and a minimum of five full-time CDEs, one of whom should have doctoral-level training;
  - have unfettered, timely access and ability and technical support to analyze key data sets, including state mortality data, hospital discharge data, cancer registry data, BRFSS data, emergency department and EMS data, and Medicare data. Special attention should be given to access to mortality and Medicare data because both have recently been decreasing, as has the timeliness of the availability of mortality data;
  - calculate confidence intervals for BRFSS prevalence estimates and death rates; and
  - have easy and ready access to medical journals and adequate IT and clerical support services.
- Given technologic advances since 2003, all state chronic disease epidemiology programs should have access to GIS software and, as personnel capacity permits, use GIS software in analyzing spatial aspects of chronic disease, including putting systems in place for routine geocoding of population-based chronic disease data that lends itself to geocoding beginning with birth and death data.

- State CDEs should build partnerships to collaborate with substance abuse, mental health, and public health preparedness epidemiologists similar to the partnerships in many jurisdictions with injury, environmental health, and MCH. In the absence of state-level substance abuse and/or mental health surveillance capacity, chronic disease programs should consider incorporating substance abuse and mental health surveillance into their surveillance activities. Chronic disease and mental health are major public health issues during times of natural and human-made disasters, and CDEs should be prepared in advance to assist in a public health emergency.
- State-level chronic disease programs should work to build partnerships to collaborate among state health agencies and with local academic agencies to efficiently and effectively use resources, conduct surveillance, and plan and implement evidence-based strategies for chronic disease prevention and health promotion.
- Those involved in training the public health workforce, including CDC and schools of public health, should be sure that training programs include training in competencies identified by practicing CDEs as needing additional focus. The most prominent needs for training were in use of informatics and information systems and in fiscal issues.

REFERENCES

REFERENCES

1. Frey CA, Remington PL, Lengerich E. Evaluation of the Centers for Disease Control and Prevention's chronic disease state-based epidemiology for public health program support (STEPPS) program. J Public Health Manag Pract 2003;9:266–74.
2. CSTE. Position statements 2000. Development of nationwide state-based chronic disease epidemiology capacity. Available from http://www.cste.org/ps/2000/2000-cd-01.htm. Accessed May 21, 2010.
3. CSTE. National assessment of epidemiologic capacity in chronic disease: findings and recommendations. September 2004. Available at http://www.cste.org/dnn/LinkClick.aspx?fileticket=A%2flteXZ47NY%3d&tabid=175&mid=716. Accessed July 15, 2010.
4. CSTE. Essential functions of chronic disease epidemiology in state health departments. September 2004. Available at http://www.cste.org/dnn/LinkClick.aspx?fileticket=z%2fe66IM10%2bs%3d&tabid=175&mid=716. Accessed May, 21, 2010.
5. Public Health Functions Steering Committee. Public health in America: the essential public health services. Washington, DC: Public Health Service, Public Health Functions Steering Committee; 1995. Available at http://www.health.gov/phfunctions/public.htm. Accessed May 21, 2010.
6. CSTE. Position statements 2007. State-level chronic disease epidemiology capacity. Available at http://www.cste.org/PS/2007ps/2007psfinal/cd/07-CD-01.pdf. Accessed May 21, 2010.
7. CSTE. 2009 national assessment of epidemiology capacity: findings and recommendations. December 2009. Available at http://www.cste.org/dnn/LinkClick.aspx?fileticket=%2bS%2fEifgcbmM%3d&tabid=36&mid=1496. Accessed May 21, 2010
8. Last JM, Spasoff RA, Harris SS, Thuriaux MC, eds. A dictionary of epidemiology. 4th ed. New York: Oxford University Press; 2001.
9. CSTE. 2004 National assessment of epidemiologic capacity: findings and recommendations. Available at http://www.cste.org/dnn/LinkClick.aspx?fileticket=AY1F5brMfy0%3d&tabid=175&mid=716. Accessed May 21, 2010.
10. CSTE. 2006 National assessment of epidemiologic capacity: findings and recommendations. Available at http://www.cste.org/pdffiles/2007/2006CSTEECAFINALFullDocument.pdf. Accessed May 21, 2010.
11. US Department of Health and Human Services. Public health infra¬structure. Objective 23-14: (Developmental) Increase the proportion of tribal, state, and local health agencies that provide or assure compre¬hensive laboratory services to support essential public health services. Healthy people 2010 (conference ed, in 2 vols). Washington, DC: US Department of Health and Human Services; 2000. Available at http://www.healthypeople.gov/document/html/volume2/23phi.htm. Accessed December 11, 2009.
12. CDC, CSTE. CDC/CSTE Applied epidemiology competencies—toolkit. Available at http://www.cste.org/dnn/ProgramsandActivities/WorkforceDevelopment/Competencies/tabid/174/Defalt.aspx. Accessed May 21, 2010.

2009 CHRONIC DISEASE EPIDEMIOLOGY CAPACITY ASSESSMENT MODULE

Enter Email: _____

I. Chronic Disease Epidemiology Workforce

1. Does the health department have at least one chronic disease epidemiologist who is responsible for coordinating/integrating chronic disease epidemiology activities across categorical programs?
   ❑ Yes ❑ No

2. During the past 12 months have your CDEs done CDE work related to:

CONDITIONS		RISK FACTORS	
Arthritis	❑ Yes ❑ No	Alcohol Abuse	❑ Yes ❑ No
Asthma	❑ Yes ❑ No	Cancer Screening	❑ Yes ❑ No
Cancer (incl. registry)	❑ Yes ❑ No	Drug Abuse	❑ Yes ❑ No
Diabetes	❑ Yes ❑ No	Hypercholesterolemia	❑ Yes ❑ No
Heart Disease	❑ Yes ❑ No	Hypertension	❑ Yes ❑ No
Oral Health	❑ Yes ❑ No	Nutrition	❑ Yes ❑ No
Stroke	❑ Yes ❑ No	Overwight/Obesity	❑ Yes ❑ No
Other Diseases (specify)	❑ Yes ❑ No	Physical Activity	❑ Yes ❑ No
		Tobacco	❑ Yes ❑ No
		Other risk factor (specify)	❑ Yes ❑ No

II. Access to Data and Consultants

Does one or more of the CDE staff have unfettered access to the following data sets? *("Unfettered access" means that the epirdemiologist has immediate access using his/her own computer to the data set plus the coding and variable descriptions necessary to understand the structure and meaning of the data.)*

1. State mortality data (not via WONDER)
   ❑ Yes ❑ No ❑ Don't Know

   1b. Are state mortality data available by October 1 of the following year (e.g., 2007 data available by Oct 2008)?
   ❑ Always ❑ Almost Always ❑ Rarely ❑ Never ❑ Don't Know

2. State hospital discharge data
   ❑ Yes ❑ No ❑ Not collected in our state ❑ Don't Know

   2b. Are state hospital discharge data available by October 1 of the following year (e.g., 2007 data available by Oct 2008)?
   ❑ Always ❑ Almost Always ❑ Rarely ❑ Never ❑ Don't Know

3. State-wide cancer registry data

❑ Yes ❑ No ❑ Not collected in our state ❑ Don't Know

3b. Are state cancer registry data available within 24 months after the end of the year (e.g., 2005 data available by Jan 2008)?

❑ Always ❑ Almost Always ❑ Rarely ❑ Never ❑ Don't Know

4. State Medicaid data

❑ Yes ❑ No ❑ Don't Know

5. Medicare data for your state

❑ Yes ❑ No ❑ Don't Know

6. State BRFSS data (not via CDC web site)

❑ Yes ❑ No ❑ Don't Know

6b. Are data available for your chronic disease epidemiologists by July 1 of the following year (e.g., 2007 data available by July 2008)?

❑ Always ❑ Almost Always ❑ Rarely ❑ Never ❑ Don't Know

7. State YRBS data (or YRBS equivalent)

❑ Yes ❑ No ❑ Not collected in our state ❑ Don't Know

8. State emergency department data

❑ Yes ❑ No ❑ Not collected in our state ❑ Don't Know

9. State EMS data

❑ Yes ❑ No ❑ Not collected in our state ❑ Don't Know

10. Does the CDE staff have an established consultant if they have questions about the most appropriate sampling scheme?

❑ Yes ❑ No ❑ Don't Know

11. Does the CDE staff have an established consultant if they have questions about the most appropriate analytic method?

❑ Yes ❑ No ❑ Don't Know

III. Data Analysis and Interpretation

1. Do all CDEs who need the following software packages have ready access to them:

SAS	❑ Yes ❑ No but needed ❑ No, not needed
SPSS	❑ Yes ❑ No but needed ❑ No, not needed
STATA	❑ Yes ❑ No but needed ❑ No, not needed
SUDAAN	❑ Yes ❑ No but needed ❑ No, not needed
EpiInfo	❑ Yes ❑ No but needed ❑ No, not needed
Encryption software	❑ Yes ❑ No but needed ❑ No, not needed
GIS (geographic information system)	❑ Yes ❑ No but needed ❑ No, not needed
Other software (specify): _____	❑ Yes ❑ No but needed ❑ No, not needed

2. When appropriate, does the CDE staff commonly calculate:

Age-specific rates?	❑ Yes ❑ No but needed ❑ No, not needed
Race/ethnicity-specific rates?	❑ Yes ❑ No but needed ❑ No, not needed
Sex-specific rates?	❑ Yes ❑ No but needed ❑ No, not needed

3. Do the CDEs commonly provide sub-state (e.g., region- or country-specfic) rates?
   ❑ Yes ❑ No ❑ Don't Know

4. Do the CDEs usually calculate confidence intervals for mortality rates even if they do not always show them in text, tables, and graphs?
   ❑ Yes ❑ No ❑ Don't Know

5. Do the CDEs usually calculate confidence intervals for BRFSS prevalence rates even if they do not always show them in text, tables, and graphs?show them in text, tables, and graphs?
   ❑ Yes ❑ No ❑ Don't Know

6. Do the CDEs commonly provide a comparison rate, such as the US rate, HP2010 objectives, or state-generated objectives when they present your state's mortality rates?
   ❑ Yes ❑ No ❑ Don't Know

7. Do the CDEs commonly provide a comparison rate, such as the US rate, HP2010 objectives, or state-generated objectives when they present your state's BRFSS prevalence rates?
   ❑ Yes ❑ No ❑ Don't Know

IV. Dissemination

1. Does your state have a public access interactive or queriable online system that displays chronic disease epidemiology data?
   ❑ Yes ❑ No ❑ Don't Know

2. In the past 12 months, have grant or cooperative agreement applications been submitted where CDE staff prepared "burden" or "epidemiology" sections or where a CDE was the primary preparer?
   ❑ Yes ❑ No ❑ Don't Know

3. In the past 12 months, have CDE staff published one or more state "burden" or "epidemiology" reports on a chronic disease-related topic?
   ❑ Yes ❑ No ❑ Don't Know

4. In the past 12 months, have scientific presentations or posters at state or national meeting requiring abstract submission been given by state chronic disease epidemiologists?
   ❑ Yes ❑ No ❑ Don't Know

V.Outreach/Partnership/Collaboration

1. In the past 12 months, have state CDEs given university lectures, supervised student internships or theses, or had other important collaborations with an academic center?
   ❑ Yes ❑ No ❑ Don't Know

2. In the past 12 months, have state CDEs collaborated closely on projects (e.g., publications of report, preparations of an application, design or evaluation of a program or intervention) with one or more:

Private voluntary organizations (e.g., American Heart Assocation)?	❑ Yes ❑ No ❑ Don't Know
Managed care organizations?	❑ Yes ❑ No ❑ Don't Know
Healthcare professional organizations (e.g., state medical society, hospital assocation)?	❑ Yes ❑ No ❑ Don't Know

3. Which of the following best characterizes the current level of collaboration among CDEs working on different categorical chronic disease program areas (cancer, physical activity, obesity, etc.)? *(please choose one)*
   ❑ Strong ❑ Somewhat Strong ❑ Very Little ❑ No collaboration at this time
   ❑ Only one CDE in state, so not applicable ❑ Don't know

4. Which of the following best characterizes the current level of collaboration betweens CDEs and epidemiologists in other state health department areas?

	STRONG	SOMEWHAT STRONG	VERY LITTLE	NO COLLABORATION AT THIS TIME	DON'T KNOW	NO EPIDEMIOLOGISTS IN THIS PROGRAM AREA IN OUR STATE
Infectious Disease	❑	❑	❑	❑	❑	❑
Public Health Preparedness	❑	❑	❑	❑	❑	❑
Injury	❑	❑	❑	❑	❑	❑
Oral Health	❑	❑	❑	❑	❑	❑
Mental Health	❑	❑	❑	❑	❑	❑
Substance Abuse	❑	❑	❑	❑	❑	❑
Maternal & Child Health	❑	❑	❑	❑	❑	❑
Occupational Health	❑	❑	❑	❑	❑	❑
Environmental Health	❑	❑	❑	❑	❑	❑
Other Diseases (specify)	❑	❑	❑	❑	❑	❑

VI. Miscellaneous

1. Do the CDEs have access to current medical, epidemiologic, and public health journals through either a conveniently located major science library, or a service that provides full-text electronic or hardcopy articles?
   ❑ Yes ❑ No ❑ Don't Know

2. Do chronic disease epidemiologists have access to adequate clerical support?
   ❑ Yes ❑ No ❑ Don't Know

3. Do CDEs have access to adequate IT infrastructure and services (e.g, adequate hardware, server space, virus protection, back-up mechanisms, timely technical support)?
   ❑ Yes ❑ No ❑ Don't Know

4. Is your state actively involved in work with local medical groups to collaborate on making electronic medical records useful for chronic disease surveillance, prevention, or control purposes?
   ❑ Yes ❑ No ❑ Don't Know

VII. Organizational placements

1. Where are the majority of CDEs located within the state health agency (please choose one) ?
   - ❑ Individual CDEs are embedded within separate categorical chronic disease program units (e.g., diabetes unit)
   - ❑ In a CDE Unit within a Chronic Disease Program unit
   - ❑ In a CDE Unit within an epidemiology or population health unit (unit that includes other epidemiologists such as infectious disease or MCH epidemiologists)
   - ❑ Other unit (Specify: _____)

VIII. Comments

How do you think we could better measure the chronic disease epidemiologic capacity of your state health department? What should have been covered but was not? What was covered but not in enough depth? What was covered that could have been omitted? What would you have done differently?

COUNCIL OF STATE
AND TERRITORIAL
EPIDEMIOLOGISTS

National Office

2872 Woodcock Boulevard

Suite 303

Atlanta, Georgia 30341

t 770.458.3811

f 770.458.8516

www.cste.org