

2009 NATIONAL ASSESSMENT OF EPIDEMIOLOGY CAPACITY

Findings and Recommendations

SUMMARY

The 2009 CSTE Epidemiology Capacity Assessment (ECA) aimed to complete the periodic enumeration and description of epidemiologists nationwide, to measure the current status of core epidemiology capacity, and to assess, for the first time, overall surveillance system technology capacity and substance abuse epidemiology capacity. Measures of capacity included total number of epidemiologists and self-assessment of the states' ability to carry out four of the 10 essential services of public health (ESPH):

1. Monitor health status to identify and solve community health problems.
2. Diagnose and investigate health problems and health hazards in the community.
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
10. Research for new insights and innovative solutions to health problems.

The final results comprise responses for all 50 states and the District of Columbia. In 2009, a total of 2,193 epidemiologists worked for the 51 jurisdictions, for a rate of 0.72 epidemiologists per 100,000 population (Table 1). This represents a 12% decrease from the 2,498 epidemiologists enumerated in 2004 and a 10% decrease from the 2,436 reported in 2006.

Four program areas showed progressive increases in substantial to full capacity from 2004 and 2006: maternal and child health, environmental health, injury, and occupational health (Figure 1). Bioterrorism/emergency response was the only program area with a progressive decrease in substantial-to-full capacity since 2004. Based on responses from 36 state epidemiologists, 1,490 additional epidemiologists (a 68% increase) are needed to achieve ideal epidemiology capacity (Figure 2).

TABLE 1. Number of epidemiologists and number per 100,000 population, by state size—2009 Epidemiology Capacity Assessment, 50 states and District of Columbia

STATE POPULATION	NO. STATES & DC	EPIDEMIOLOGISTS			EPIDEMIOLOGISTS PER 100,000 POPULATION		
		No.	MEDIAN	RANGE	No.*	MEDIAN†	RANGE†
Small**	17	275.5	11	4–62	1.35	1.41	0.19–4.05
Med††	17	817.8	35.8	20–107.5	1.16	1.1	0.43–2.77
Large °	17	1099.5	61	13.5–142	0.52	0.54	0.19–1.54
Total U.S.	51	2192.8	32	4–142	0.72	0.77	0.19–4.05

* Based on sum of all epidemiologists in category and total population of category.

† Based on state-specific numbers of epidemiologists and population.

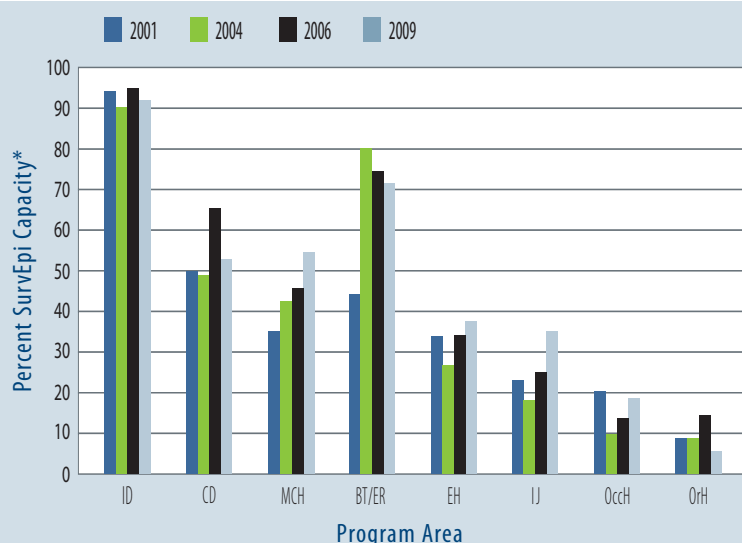
**(<2.65M). ††(>2.65 to <6M). °(>6M).

RESULTS

1. National epidemiology capacity has eroded since 2004, with the largest drop in the past 3 years.

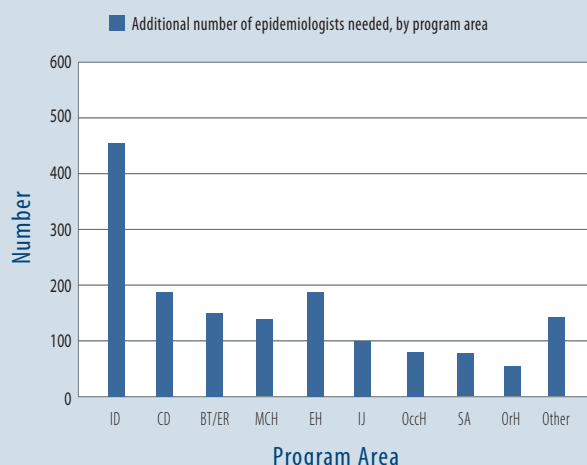
- After a reduction in the number of epidemiologists by 2.5% from 2004 to 2006, the number further decreased 10% from 2006 to 2009, and the number per 100,000 population decreased by 12%.
- For three of the four ESPH related to surveillance and epidemiology capacity, the percentage of states with at least substantial capacity decreased by 4 - 24 percentage points, whereas the percentage of states with minimal to no capacity increased by 4 - 10 percentage points.
- Capacity decreased in several program areas, most notably in bioterrorism/emergency response, for the second consecutive ECA, from a high of 80% of states having substantial or higher capacity in 2004 to 73% having that level of capacity in 2009 (Figure 1).

FIGURE 1. Surveillance and epidemiology capacity, by program area*—2001, 2004, 2006, and 2009 Epidemiology Capacity Assessments[†]



* ID: infectious diseases; CD: chronic disease; MCH: maternal and child health; BT/ER: bioterrorism/emergency response; EH: environmental health; IJ: injury; OcCH: occupational health; OrH: oral health.[†] N = 40 agencies in 2001; 54 agencies in 2004; 54 agencies in 2006; and 51 agencies in 2009

FIGURE 2. Additional number of epidemiologists needed & Number of responding epidemiologists working in each program area* — 2009 Epidemiology Capacity Assessment (N = 36 jurisdictions)



* ID: infectious diseases; CD: chronic disease; BT/ER: bioterrorism/emergency response; MCH: maternal and child health; EH: environmental health; IJ: injury; OcCH: occupational health; SA: substance abuse; OrH: oral health.

TABLE 2. Epidemiologic capacity to perform the epidemiology-related essential services of public health*—2009 Epidemiology Capacity Assessment, 50 states and District of Columbia

ESSENTIAL SERVICE	NONE No. (%)	MINIMAL No. (%)	PARTIAL No. (%)	SUBSTANTIAL No. (%)	ALMOST FULL No. %	FULL No. %
1. Monitor health status to identify and solve community health problems.	0 (0)	4 (7.8)	14 (27.5)	22 (43.1)	8 (15.7)	3 (5.9)
2. Diagnose and investigate health problems and health hazards in the community.	1 (2.0)	4 (7.8)	14 (27.5)	21 (41.2)	8 (15.7)	3 (5.9)
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.	3 (5.9)	13 (25.5)	28 (54.9)	2 (3.9)	3 (5.9)	2 (3.9)
10. Research for new insights and innovative solutions to health problems.	5 (8.9)	17 (33.3)	20 (39.2)	6 (11.8)	2 (3.9)	1 (2.0)

* Essential services given are related to epidemiology. Source: Public Health Functions Steering Committee. Public health in America: the essential public health services. Washington, DC: US Public Health Service, Public Health Functions Steering Committee; 1995.

2. A large percentage of states continue to have minimal to no capacity to carry out several ESPH and minimal to no capacity in a number of program areas to carry out basic surveillance and epidemiology function (Table 2).

- ESPH #1: 65% of states reported at least substantial capacity.
- ESPH #2: 63% of states reported at least substantial capacity.
- ESPH #9: 31% of states reported minimal to no capacity—the highest percentage to date—and only 14% reported at least substantial capacity.
- ESPH #10: 43% of states reported minimal to no capacity, and only 18% reported at least substantial capacity.

A higher percentage of the epidemiology workforce has formal academic training in epidemiology than in previous assessments and has higher competency ratings than in 2006.

RESULTS

3. Many states still do not have the technology capacity needed to move the way they conduct surveillance into the early 21st century, a preparedness and public health vulnerability.

- States lack necessary technology tools, resulting in less timely and less complete reporting, reduced ability to rapidly detect outbreaks, continued drainage of resources into the work of reporting, and reduced ability to expand surveillance to conditions with large numbers of affected persons.
- Electronic laboratory reporting is operable in only 53% of states, Web-based provider reporting in 41%, and cluster-detection software in 24%.

4. The need continues for a strong workforce development effort.

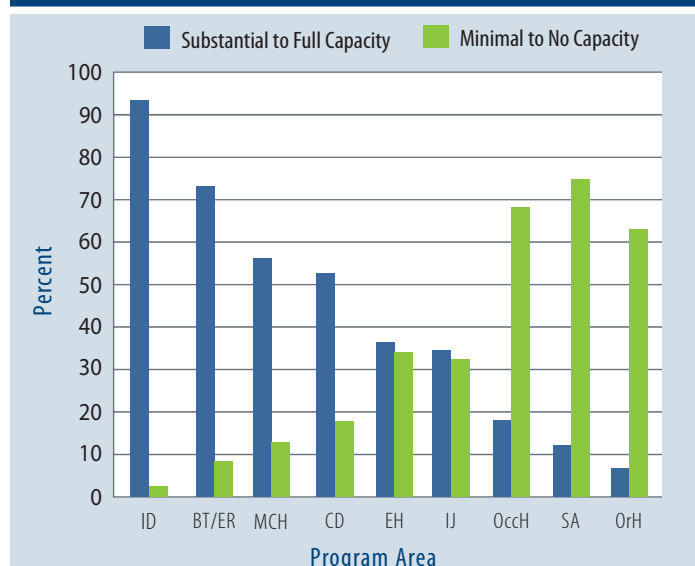
- More than 30% of states expressed a need for additional staff training for 23 of 27 applied epidemiology competencies assessed.
- The workforce is shrinking: 8.1% of the public health epidemiology workforce with masters or higher - level training left during 2008.
- Another 17% of the current epidemiology workforce anticipates leaving in the next 5 years.

DISCUSSION

Despite these challenges, the 2009 ECA provided some encouraging findings and additional insights into what can help achieve higher epidemiology capacity.

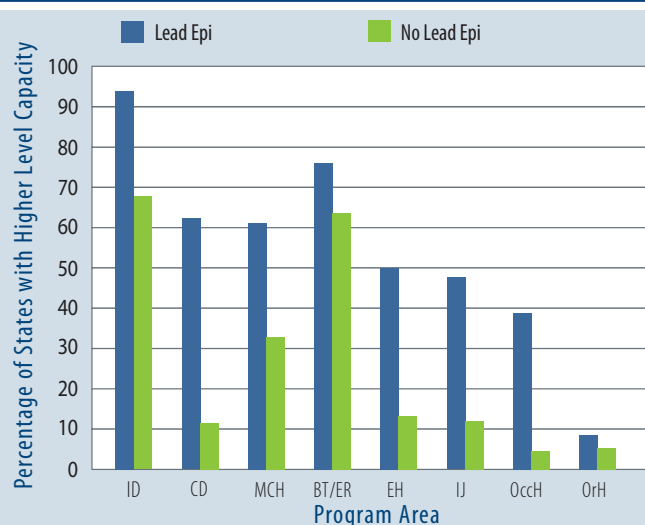
- The size of the state is critical in determining how many epidemiologists are needed at the state level, with the largest states both having and optimally needing less than half the number of epidemiologists per capita as the smallest states.
- A comparison of subject areas shows that infectious diseases, emergency response, maternal and child health, and chronic disease program areas continue to have relative high capacity compared to other program areas (Figure 3).
- A much higher percentage of states that have a lead epidemiologist assigned to a program area have substantial surveillance and epidemiology capacity compared with states that do not have a lead epidemiologist in that program area (Figure 4).
- Some program areas improved in surveillance and epidemiology capacity from 2006 to 2009, particularly maternal and child health (Figure 1).
- Only 60–100 additional epidemiologists are needed nationally in each of the four program areas with the least current capacity to achieve optimal capacity in those areas: injury, occupational health, substance abuse, and oral health (Figure 2).
- A higher percentage of the workforce has formal academic training in epidemiology than in previous assessments, a steady trend since 2001.
- The state epidemiology workforce has generally higher competency ratings than in 2006.
- Almost all state health departments collaborate with academic and health professional organizations to provide educational opportunities to employees and the developing workforce.

FIGURE 3. Epidemiology and surveillance capacity, by program area* — 2009 Epidemiology Capacity Assessment, 50 states and District of Columbia



*ID: infectious diseases; BT/ER: bioterrorism/emergency response; MCH: maternal and child health; CD: chronic diseases; EH: environmental health; IJ: injury; OccH: occupational health; SA: substance abuse; OrH: oral health.

FIGURE 4. Percentage of states with substantial to full epidemiology and surveillance capacity, by program area* and presence of a lead program area epidemiologist—2009 Epidemiology Capacity Assessment, 50 states and District of Columbia



* ID: infectious diseases; CD: chronic disease; MCH: maternal and child health; BT/ER: bioterrorism/emergency response; EH: environmental health; IJ: injury; OccH: occupational health; SA: substance abuse; OrH: oral health.

RECOMMENDATIONS

Epidemiologic capacity is essential for detection, control and prevention of major public health problems. In order to have as effective a public health system as possible, the U.S. needs to determine what level of epidemiology capacity is needed in each state and how to achieve it. CSTE recommends that state, federal and local agencies come together to address the downward trends and major gaps, develop a common vision for what capacity should be, and formulate strategies to achieve a robust, well-trained and competent workforce with the appropriate tools for the 21st century.

1. Develop a strategy to achieve optimal epidemiology capacity.

- The Centers for Disease Control and Prevention (CDC) and CSTE should collaborate on using data from the ECAs to establish numeric and structural goals for epidemiology capacity for state health departments. The current fiscal crisis in most states is likely to result in further erosion of capacity. Standards are needed as targets for rebuilding when rebuilding becomes feasible.
- All states should have a lead epidemiologist for each program area, including substance abuse.
- CSTE and CDC should develop documentation of the benefits of full capacity on the basis of examples provided from states with a high level of capacity.

2. Assist states to achieve selected surveillance-related technology capacities.

- As part of public health preparedness funding, CDC should support states in achieving fully functional technology capacity.
- CDC should actively encourage states to routinely match geocoded data with census data and to present descriptive epidemiologic data on selected characteristics of neighborhood of residence.

3. Maintain efforts to establish training standards for applied public health epidemiologists and to provide training to enable a sustained, qualified public health epidemiology workforce.

- Public health agencies should continue to aggressively promote the development and implementation of standards for applied epidemiology training using a competency-based model.
- CSTE and CDC should maintain the current direction in defining, measuring, and refining competencies.
- State health departments and schools of public health need to continue to support the full integration of recently and newly developed applied epidemiology competencies for public health epidemiologists..

4. Conduct future assessments.

- Future assessments should continue to monitor both functional and numeric epidemiology capacity.
- Future assessments also should continue to monitor key technology capacities because they are essential for public health preparedness-related monitoring and to enable access to a broader range of information for public health action.

ABOUT CSTE

CSTE is an organization of member states and territories and represents the perspective of epidemiologists working in state and local levels of government in matters related to the practice of public health.

CSTE is also a professional association of over 1150 public health epidemiologists working in states, local health agencies and territories. The organization was founded in 1951 to develop a systematic method to identify and define communicable diseases to be reported and included as nationally notifiable diseases.

CSTE members have surveillance and epidemiology expertise in a broad range of areas including occupational health, infectious diseases, immunization, environmental health, chronic diseases, injury, maternal and child health, and substance abuse.

Projects, consultations and assessments are undertaken to increase workforce capacity, monitor emergence and spread of disease, and improve public health practice.

CSTE is comprised of Active, Associate and Student members who represent federal, state and local epidemiology in all program areas.

Please visit www.cste.org for more information about CSTE.

RESOURCES

The full 2009 ECA results are available online at:
www.cste.org/2009ECA.pdf

The MMWR publication of the 2009 ECA is available at:
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5849a1.htm>