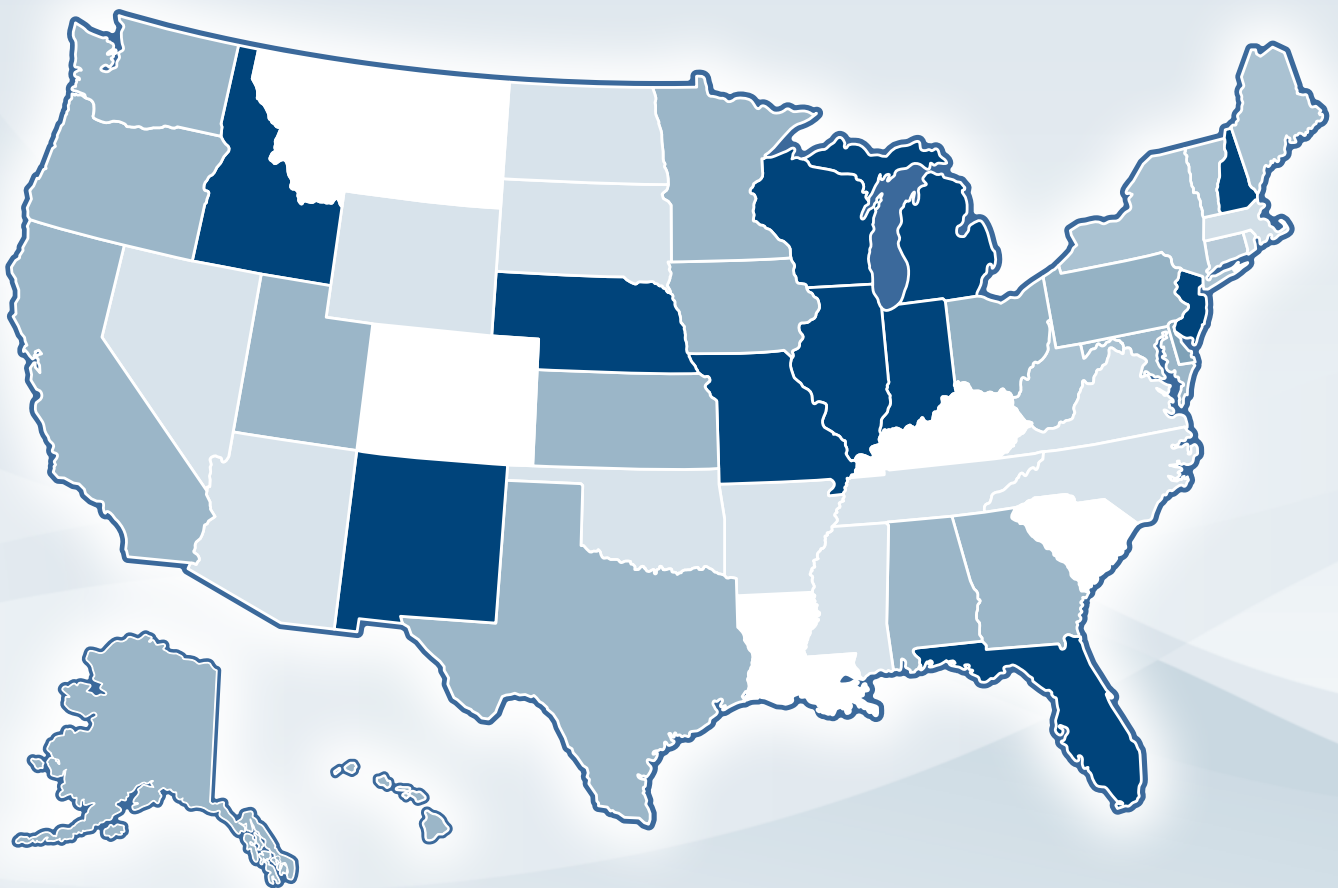


COUNCIL OF STATE AND TERRITORIAL EPIDEMIOLOGISTS

## 2010 FOOD SAFETY EPIDEMIOLOGY CAPACITY ASSESSMENT





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## ACKNOWLEDGMENTS

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For more than 5 decades, CSTE and the US Centers for Disease Control and Prevention (CDC) have collaborated to improve the public's health by supporting the efforts of epidemiologists working at the state, territorial, 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.

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# EXECUTIVE SUMMARY



# EXECUTIVE SUMMARY

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Foodborne pathogens cause a substantial burden of disease in the United States, with an estimated 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths attributable to these agents each year. Ensuring the safety of our food supply has become a national public health priority, and considerable resources at the federal, state, and local government levels have been directed toward improving national food safety capacity.

During 2001 and 2002, CSTE conducted a baseline food safety capacity assessment in state and territorial health departments. Results of that assessment were published in the CSTE technical report entitled *National Assessment of Epidemiologic Capacity in Food Safety Programs: Findings and Recommendations*. The findings formed the basis for a set of minimum performance/capacity standards designed to guide state and local foodborne disease control programs in four key areas: 1) epidemiologic surveillance capacity to identify sporadic and outbreak-related illness, 2) capacity to investigate and respond to outbreaks, 3) public health infrastructure necessary to support foodborne disease surveillance and response activities, and 4) legal authority.

CSTE and the Centers for Disease Control and Prevention (CDC) convened a workgroup to develop a follow-up national assessment of food safety capacity, which began work in 2009. The assessment focused on the effect and usefulness of these performance standards by state and local health departments, enumerate the current food safety workforce, and evaluate changes and improvements in national food safety capacity since the last assessment. The CSTE 2010 Food Safety Capacity Assessment also was designed to evaluate capacity to detect, investigate, and respond to foodborne disease/enteric illness.

## Methods

The 2010 Food Safety Capacity Assessment was developed by the CSTE Food Safety Workgroup, which comprised nine members from CSTE, CDC, and representatives of academic institutions. A pilot questionnaire was administered to four states in March 2010. The final questionnaire contained 41 individual questions about organizational structure, surveillance and information technology (IT) infrastructure, capacity for outbreak detection and response, and interagency collaboration and cooperation. The questionnaire also enumerated on and collected training/educational background information about persons who worked as foodborne disease epidemiologists, assessed use of the Council to Improve Foodborne Outbreak Response (CIFOR) *Guidelines for Foodborne Disease Outbreak Response*, and inquired about aspects of public health legal authority to detect, investigate, and respond to foodborne illnesses and outbreaks. The questionnaire was made available to states through a Web-based application, and all data collection was completed by April 30, 2010. The State Epidemiologist or designee in each state was the key informant. All 50 states responded to the CSTE food safety capacity assessment; their responses are included in the data analysis. In this document, “respondent” refers to state health departments, although actual assessment responses were generally provided by more than one person, including State Epidemiologists, foodborne disease/enteric illness epidemiologists, nurses, and communicable disease directors.



## RESULTS AND CONCLUSIONS

This report provides a comprehensive assessment of the current status of national food safety capacity in state health departments conducted in follow-up to the baseline assessment carried out by CSTE in 2002.

National foodborne disease epidemiology and surveillance capacity has increased since the last CSTE assessment in 2002, although critical gaps remain.

- The number of foodborne disease epidemiologist full-time equivalents (FTE) with an epidemiology degree working in state health departments increased 61.4% from 92 in 2002 to 148.5 in 2010.
- The levels of formal epidemiology education among persons working as foodborne disease epidemiologists, especially at the local level, were lower than those of the national epidemiology workforce.
- Respondents reported the need for an additional 304 FTEs, representing an approximate 38% increase over current staffing levels, to reach full foodborne disease/enteric illness program capacity at the state, regional, and local levels. The greatest reported need was for additional staff with an MPH or other master's level epidemiology degree.
- The level of formal epidemiology training and education was highest in state health departments, where 62% of all foodborne disease epidemiologists reported having a degree in epidemiology, followed by 48.2% and 26.5% at the regional and local levels, respectively.
- States' need for additional foodborne disease epidemiologists was further supported by reporting from most respondents that one of the most common barriers to successful completion of foodborne disease/enteric illnesses investigations is lack of adequate staff.
- Most states continued to report a lack of core capacity that has directly affected their ability to investigate and intervene in the control of foodborne disease/enteric illness.

The assessment clearly demonstrated a need for continued improvement and investment in public health IT infrastructure to adequately respond to foodborne disease/enteric illness.

- Investment in and development of electronic surveillance and reporting systems through federal preparedness funding has resulted in technology and infrastructure improvements.
- Most states continued to report a lack of core capacity that has directly affected their ability to investigate and intervene in the control of foodborne disease/enteric illness.
- Only one fourth of states reported using an electronic database for maintaining public health records on foodborne disease outbreaks at the local level.
- Delayed notification from reporting sources was the most common barrier to investigation of foodborne disease/enteric illness outbreaks (cited by approximately 80% of states).

States consistently reported full legal authority to detect, investigate, and respond to foodborne diseases/enteric illnesses; this authority is granted either under general state public health statutes and regulations or, less commonly, under statutes or regulations specific to foodborne disease/enteric illness. All states have legal authority to modify their states' notifiable diseases list.

# EXECUTIVE SUMMARY

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The legal barrier most commonly reported dealt with constraints to conducting a coordinated response across local/state boundaries and with federal agencies, which might be related to the need for prioritizing the improvement of interagency relations, including discussions of enabling legal authority across jurisdictions. All states reported individual-level confidentiality protections in place, and states reported customarily sharing this information only with substantial administrative limitation. States' policies were more liberal with regard to sharing information about businesses implicated in outbreaks of foodborne disease and almost half make the information available to the public.

Two other areas assessed include the initial distribution and uptake of the CIFOR *Guidelines* and the level of cooperation among food safety agencies.

## Recommendations

On the basis of these results, the central recommendations are the needs for additional staff, training of staff, and increased investment in health IT infrastructure.

### **1. Increase staff working in foodborne disease epidemiology and surveillance in state and local health departments.**

- CDC and CSTE should collaborate and provide leadership to develop mechanisms to increase support for additional foodborne disease epidemiology and surveillance staff in state and local health departments.
- To fully justify expansion of foodborne disease epidemiology and surveillance capacity, CSTE and CDC should document the potential benefit of such enhanced capacity, using states with high-level capacity as examples.
- State and federal agencies involved in response to foodborne disease outbreaks, including CDC, U.S. Department of Agriculture (USDA), Food and Drug Administration (FDA), CSTE, and Association of Public Health Laboratories (APHL), should foster ongoing discussions about gaps in national foodborne disease epidemiology and surveillance capacity and discuss strategies for overcoming them.
- In collaboration with the Association of Schools of Public Health (ASPH), marketing recruiting strategies should be developed to focus on attracting persons with formal epidemiology training/education, especially persons with an MPH in epidemiology, into the foodborne disease epidemiology and surveillance program area.

### **2. Enhance epidemiology training opportunities for the existing workforce in the foodborne disease epidemiology and surveillance program area to promote a well-qualified public health workforce.**

- CSTE and CDC should continue to encourage increased access to continuing education and training by using tools, such as the CSTE/CDC Applied Epidemiology Competencies and the CIFOR *Guidelines* and accompanying Toolkit, for staff working in foodborne disease epidemiology and surveillance, especially those with no formal epidemiology training or education.
- Federally funded public health training programs (e.g., CDC-supported Preparedness and Emergency Response Learning Centers and Health Resources and Services Administration–supported Public Health Training Centers) should be actively solicited to offer more continuing education focused on enhancing skills foodborne disease epidemiology and surveillance.

- ASPH should encourage use of the CSTE/CDC Applied Epidemiology Competencies in the epidemiology courses offered in schools of public health. ASPH also should work to ensure an increase in the number and type of courses that actively incorporate public health practice and applied epidemiology to better prepare students for careers in government public health.

### **3. Increase investment in IT to realize greater improvements in capacity for the detection, reporting, investigation, and surveillance of outbreaks of foodborne disease/enteric illness.**

- As a component of public health preparedness, CDC should assist states in achieving full technology capacity in foodborne disease epidemiology and surveillance, including the following areas: electronic laboratory reporting, use of National Electronic Disease Surveillance System–compliant foodborne disease system, use of nontraditional data sources, Web-based provider reporting, and development of a database for case management in outbreak investigation.
- CDC and CSTE should collaborate on strategies that encourage state and local health departments to use electronic data capture of variables related to outbreaks of foodborne disease/enteric illness.

### **4. Develop strategies for further enhancing the relationship between state/local health departments and federal regulatory agencies (e.g., FDA and USDA) in collaborating on foodborne disease outbreak response.**

- Regular forums should be convened that permit discussion on improving federal–state interaction around foodborne disease/enteric illness and outbreak response.
- FDA and USDA should seek opportunities to make presentations at public health conferences on topics related to federal–state interaction in foodborne disease/enteric illness investigation and control.

### **5. Develop marketing strategies to increase awareness and use of the CIFOR Guidelines Toolkit.**

- CIFOR should develop a marketing strategy to increase use of the CIFOR Toolkit to assist state and local health departments with identifying gaps in their foodborne disease epidemiology and surveillance programs.
- Special efforts should be made to ensure epidemiologists at the local and regional levels receive copies of the *CIFOR Guidelines*.



**BACKGROUND**



## BACKGROUND

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Foodborne pathogens cause a substantial burden of disease, with an estimated 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths in the United States attributable to these agents each year<sup>1</sup>. Ensuring the safety of the food supply has become a national public health priority, and considerable resources at the federal, state, and local government levels have been directed at improving national food safety capacity<sup>2</sup>.

The Council of State and Territorial Epidemiologists (CSTE), in collaboration with the Centers for Disease Control and Prevention (CDC), has been at the forefront of efforts to assess and improve foodborne disease surveillance and outbreak response capacity in the nation's public health system. Those efforts were initiated with the launch of the National Food Safety Initiative (NFSI) by the federal government in 1997 to address the growing incidence of foodborne disease and decrease risk of disease. The principal intent of the NFSI was to improve surveillance for foodborne disease/enteric illness and enhance public health capacity to rapidly detect and respond to outbreaks of related illness. In support of this federal initiative, a collaborative workgroup comprising representatives from the CSTE, the Association of Public Health Laboratories (APHL), CDC, state and local public health departments, and other federal agencies convened later that year to produce the *Essential Epidemiology and Laboratory Components of a State Foodborne Disease Prevention and Control Program Report*<sup>3</sup>. This landmark report defined the programmatic and scientific/technical capabilities required to meet needed epidemiology and laboratory capacity for foodborne disease surveillance and outbreak response at the state and local levels.

In follow-up, CDC provided funding to support CSTE and APHL for national assessments of food safety capacity in their respective areas. Using the aforementioned report as a starting point, in February 2001, CSTE assembled a group of specialists, the CSTE Food Safety Standards Advisory Committee, to develop an assessment tool for conducting a national food safety capacity assessment of state and territorial health departments. The results of that national assessment were subsequently published in a CSTE technical report, *National Assessment of Epidemiologic Capacity in Food Safety Programs: Findings and Recommendations*<sup>4</sup>, in Sept 2002. The CSTE Food Safety Standards Advisory Committee then used findings from this national assessment as the basis for the development of minimum performance/capacity standards for state and local foodborne disease control programs<sup>4</sup> in four key areas: 1) epidemiologic surveillance capacity to identify sporadic and outbreak-related illness; 2) capacity to investigate and respond to outbreaks; 3) public health infrastructure necessary to support foodborne disease surveillance and response activities, and 4) legal authority.

To assess the effect and use of these performance standards by state and local health departments, enumerate the food safety workforce, and evaluate changes and improvements in national food safety capacity since the last assessment in 2002, in December 2008 CSTE and CDC convened a workgroup of members active in the food safety area to begin development of a follow-up national assessment. An updated evaluation of national capacity was rendered more important by the release, in July 2009, of the CIFOR report, *Guidelines for Foodborne Disease Outbreak Response*<sup>5</sup>, which provided comprehensive recommendations for critical elements of a more effective foodborne disease surveillance and outbreak response system.

## METHODS

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## METHODS

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A pilot questionnaire was administered in four states (South Dakota, Idaho, New Mexico, and New York) by using the Web-based application, *SurveyMonkey™*, in March 2010. The assessment was revised on the basis of pilot-site feedback and the assessment instrument was finalized. The final questionnaire had 41 individual questions, although many questions consisted of multiple component parts. State Epidemiologists or their designee were the key informants.

The questionnaire was divided into five sections, some with several subheadings as follows:

- Contact information (4 questions)
- Capacity to detect, investigate, and respond (23 questions)
  - o Organizational structure
  - o Surveillance and information technology (IT) infrastructure
  - o Capacity for outbreak detection and response
  - o Interagency collaboration and cooperation
- Enumeration and training of foodborne disease epidemiologists (2 questions)
- *CIFOR Guidelines for Foodborne Disease Outbreak Response* (3 questions)
- Legal authority (9 questions)

The assessment was made available to all states through a Web-based application during April 2010 with a stated deadline of April 20, 2010, for receipt of assessment responses; this deadline was eventually extended by 3 days. A follow-up reminder e-mail was sent to all states 2 days before the deadline, and an additional e-mail was sent to nonresponding states only after the extended deadline had passed. Multiple follow-up phone calls were then made to nonresponding states; data collection was completed by April 30, 2010.



## RESULTS

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## RESULTS

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All 50 states responded to the CSTE food safety capacity assessment and are included in the data analysis. In this report, “respondent” refers to state health departments, although actual assessment responses were generally provided by more than one person, including State Epidemiologists, foodborne disease/enteric enteric epidemiologists, nurses, and communicable disease directors. Although most states provided complete information to all questions in all assessment sections, response denominators for individual questions might vary.

### Personnel and Level of Epidemiology Training

Respondents reported a total of 787 full-time equivalents (FTE) currently working as foodborne disease/enteric illness epidemiologists at the state (240 FTE; 30.5% of total), regional (169; 21.5%), and local (378; 48%) health department levels (Table 1). Of this total, 617 (78%) either possess an epidemiology-related degree (i.e., epidemiology, nursing) or have completed at least some coursework in epidemiology, whereas 170 (22%) have only on-the-job training or no formal epidemiology training of any sort. Those with a degree in epidemiology or nursing and those who have completed at least some coursework in epidemiology constitute the category of those with a degree or formal training. The foodborne disease epidemiologists who lack a related degree or training include those with on-the-job experience only or no formal training in epidemiology. Of foodborne disease epidemiologists with a degree in epidemiology, most had an MPH or other master’s degree, with fewer having doctoral degrees or bachelor’s degrees in epidemiology. The level of formal education in epidemiology was highest at the state level where most foodborne disease epidemiologists working in this setting had a degree in epidemiology, followed by lower rates at the regional and local levels, respectively. Conversely, state health departments reported the lowest proportion of foodborne disease epidemiologists with only on-the-job experience or no epidemiology training of any type relative to the higher proportions of these employees at the regional and local levels. The proportion of employees working as foodborne disease epidemiologists with a nursing degree was higher at the local level than at the regional or state level.

Table 1. Level of education or training of food safety epidemiologists,\* by level of government (N=50)<sup>†</sup>

| LEVEL OF EDUCATION/TRAINING  | STATE NO. (%) | REGIONAL/DISTRICT NO. (%) | LOCAL NO. (%) | TOTAL NO. (%) |
|--|---------------|---------------------------|---------------|---------------|
| PhD, DrPH, other doctoral degree in epidemiology   | 14 (2)        | 7.5 (1)                   | 8.5 (1)       | 30 (4)        |
| Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology                  | 25.5 (3)      | 9 (1)                     | 18 (2)        | 52.5 (7)      |
| MPH, MSPH, MS, or other master's degree in epidemiology  | 93.5 (12)     | 54 (7)                    | 60.5 (8)      | 208 (26)      |
| BA, BS, or other bachelor's degree in epidemiology   | 15.5 (2)      | 11 (1)                    | 13 (2)        | 39.5 (5)      |
| RN, BSN, or other nursing designation or degree  | 29 (4)        | 37 (5)                    | 151 (19)      | 217 (28)      |
| Completed some coursework in epidemiology  | 25 (3)        | 11.5 (1)                  | 33 (4)        | 69.5 (9)      |
| Received on-the-job training in epidemiology   | 23.5 (3)      | 29 (4)                    | 44 (6)        | 96.5 (12)     |
| No formal training in epidemiology (i.e., epidemiologist does not fit any of the above categories) | 14 (2)        | 10 (1)                    | 50 (6)        | 74 (9)        |
| Proportion of all epidemiologists  | 240 (30)      | 169 (21)                  | 378 (48)      | 787 (100)     |

\*Epidemiologists are expressed as full-time equivalent positions, resulting in fractions of persons whose positions are split between  $\geq 2$  program areas.

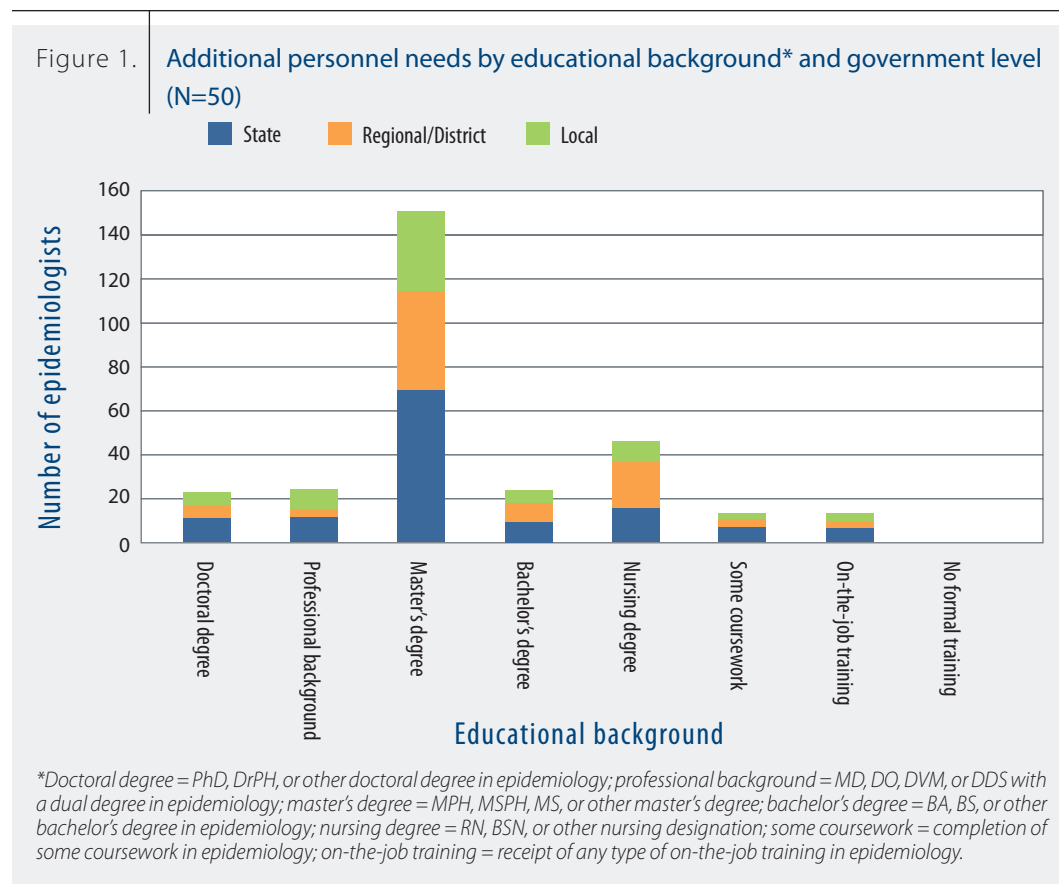
<sup>†</sup>Percentages may not equal 100 because of rounding.

## Additional Personnel Needs

Respondents reported needing a total of 304 additional FTEs or a 38.6% increase over current staffing at the state, regional, and local levels to reach full capacity in foodborne disease/enteric illness program areas. State health departments have the greatest need for additional staff in absolute number (136.5 FTE) and the proportional increase (56.9%) it represents over current staffing. The reported need for additional staff at the regional level was comparable (88; 52%) in terms of the proportional increase it represents with a lower need for additional staff reported at the local level (79.5; 21%). The greatest identified need at all government levels was for additional MPH or other master's-level epidemiologists (50% of total), followed by persons with a nursing degree (15.6%), dual professional/epidemiology degree (9.2%), bachelor's degree in epidemiology (8.6%), and doctorate in epidemiology (8.4%). The combined demand for additional staff with either some epidemiology coursework (4.6%) or on-the-job training only (3.5%) was low and held across all three levels of government public health (Figure 1).

By government level, the highest specific identified need was for additional staff with any epidemiology degree and was reported consistently across state, regional, and local health departments at 77%, 75.6%, and 76% of their respective totals. The reported need for additional nurses to work in the foodborne disease/enteric illness program area was low in state health departments (11.7%) and only slightly higher at the regional (18.8%) and local (18.9%) levels.

## RESULTS

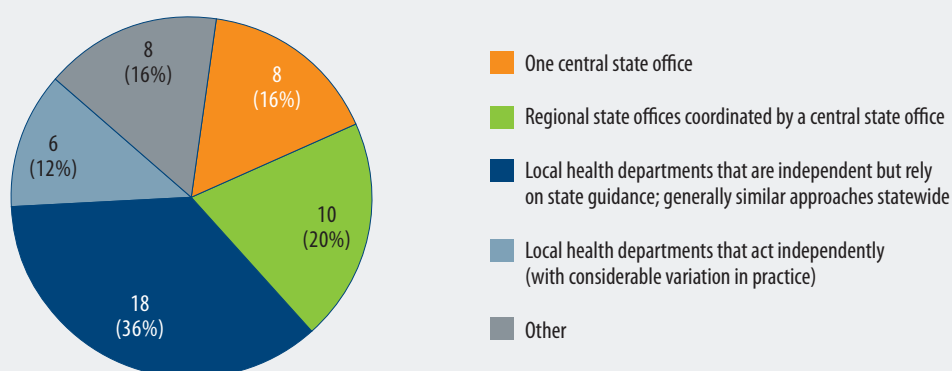


Providing continuing education and training opportunities for staff are important to building a well prepared public health workforce. States reported various training activities, and nearly 80% reported providing team training to facilitate partnership interactions. Fewer states reported providing onsite training for their own staff (70%) or epidemiology training to local health departments (70%), with slightly over half (55%) paying for formal training given outside their agency. Substantially fewer states reported including education/training objectives in individual performance reviews (38%), require staff to take continuing education courses (11%), or have internal staff position(s) to facilitate employee training (10%).

## Organizational Structure

The organizational configuration and placement of the states' offices tasked with primary responsibility for foodborne disease/enteric illness surveillance and epidemiology varied across states. Nearly half of respondents reported that local health departments act independently in foodborne disease response, constituting those that rely on the state health department for guidance and those that act independently of the state, with considerable variation in practice. In contrast, a smaller proportion of respondents reported that either one central state office oversees foodborne disease/enteric illness surveillance and epidemiology or regional state offices coordinated by a central state office. Another eight states reported an unspecified "other" organizational configuration for the foodborne disease/enteric illness program area (Figure 2).

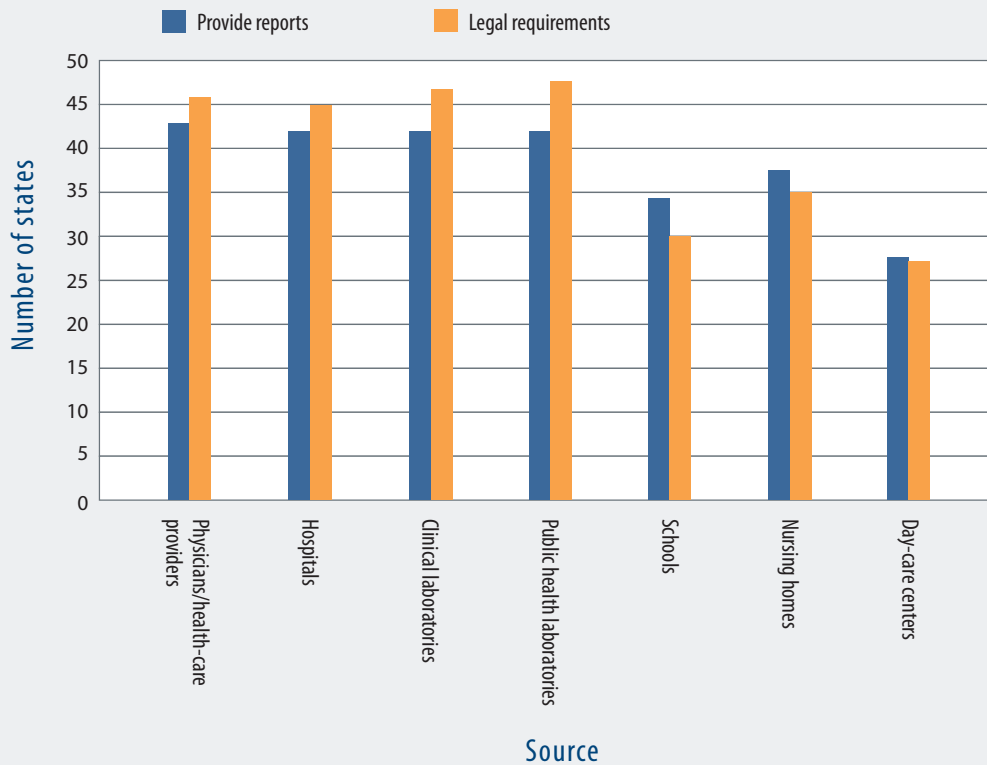
Figure 2. **State structure for foodborne disease/enteric illness surveillance and epidemiologic response (N=50)**



Public health surveillance for notifiable diseases, including those caused by foodborne/enteric pathogens, requires multiple and diverse reporting sources to be effective. All states reported that legal requirements exist that mandate reporting of foodborne illnesses by physicians/health-care professionals, clinical laboratories, public health laboratories, and hospitals, whereas fewer states have a legal mandate for reporting by schools, nursing homes, or day-care centers. The number of states that receive reports of foodborne diseases/enteric illnesses from different sites closely mirrors the number that require reporting, with the highest proportions of states receiving reports from physicians/health-care providers, hospitals, clinical laboratories, and public health laboratories. Lower proportions of states receive foodborne disease reports from the other sites, including schools, nursing homes, and day-care centers. Several states indicated that the latter sites characterized by lower reporting levels were sometimes not legally required to report but do provide notifiable disease reports for foodborne illnesses (Figure 3).

## RESULTS

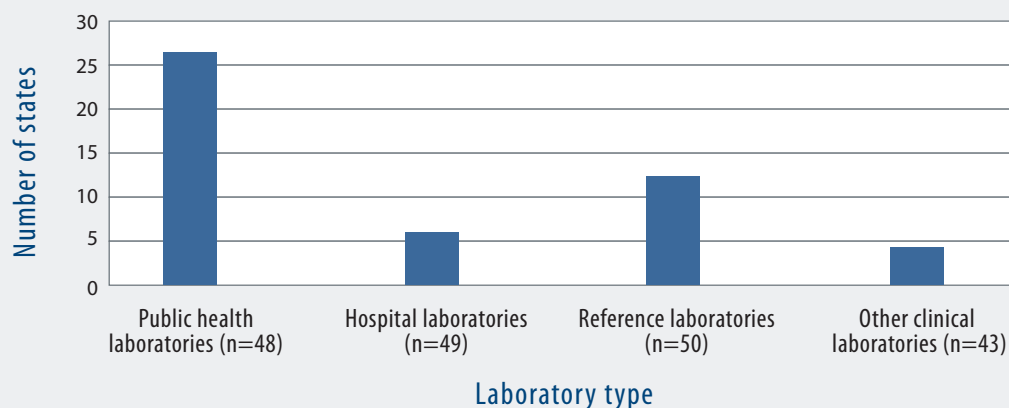
Figure 3. Number of states that provide reports of notifiable enteric disease and sources that are legally required to report enteric disease (N=45)



### Surveillance and Information Technology Infrastructure

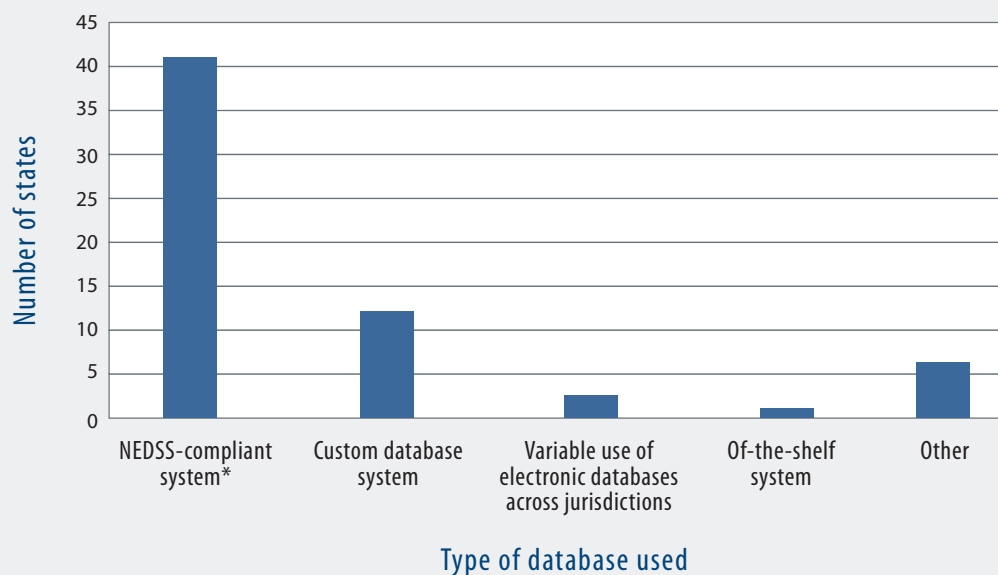
States using electronic surveillance systems has also increased the desirability and feasibility of using electronic laboratory-based reporting, especially because of its implications for enhanced timeliness of reporting. The number of respondents that reported substantial-to-full capacity to use electronic laboratory reporting for foodborne diseases/enteric illnesses by laboratory type was highest for public health laboratories and notably lower for other laboratory types, including hospital laboratories, reference laboratories, and other clinical laboratories (Figure 4).

Figure 4. Number of states reporting substantial-to-full capacity to use electronic laboratory reporting, by laboratory type (N=50)



States have been mandated to develop electronic surveillance systems for reporting communicable diseases as a requirement of federal preparedness funding. Most (86%) respondents reported using a National Electronic Disease Surveillance System (NEDSS)–compliant database for maintaining enteric illness cases. A smaller proportion reported using some type of custom database system, off-the-shelf system or other system (27%, 2%, 14%, respectively). Approximately 7% of respondents reported that the use of electronic databases varies across intrastate jurisdictions (Figure 5).

Figure 5. States' use of electronic database to maintain records for enteric disease cases (N=49)



\*NEDSS: National Electronic Disease Surveillance System.

## RESULTS

Focus has increased on development of electronic means for maintaining public health records, and respondents reported use of several different formats to keep records of foodborne disease/enteric illness outbreak investigations in their jurisdictions. For outbreak investigations, most (86%) states use an electronic database housed at the state health department; fewer reported use of an electronic database at the local level. Several states also reported maintaining nondatabase summaries at the state or summary reports in the form of spreadsheets, paper copies, or other non database means (Table 2). All respondents reported using CDC's eFOR/NORS system for reporting purposes.

Table 2. **Formats used by states for keeping records of outbreak investigations (N=49)**

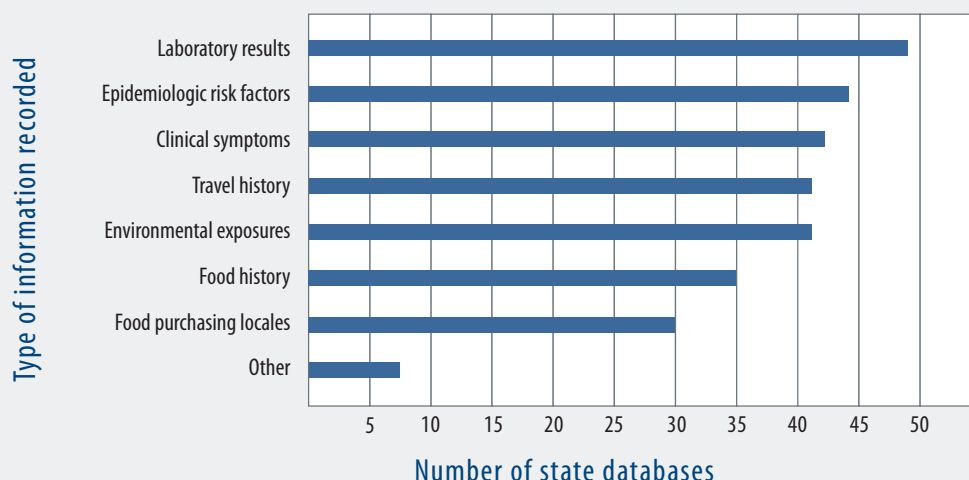
|  | STATES<br>NO. (%) |
|--|-------------------|
| <b>Records kept at state level</b>                                   |                   |
| Electronic database at state level                                   | 42 (85.7)         |
| Electronic database at local level                                   | 13 (26.5)         |
| Non-database summary at state  | 33 (67.3)         |
| Non-database summary reports   | 25 (51.0)         |
| Other  | 2 (4.1)           |
| <b>Use of CDC's eFOR/NORS system for reporting foodborne illness</b> |                   |
| eFOR/NORS  | 49 (100)          |

States were federally mandated to develop electronic communications/surveillance systems to increase the timelines with which health departments could communicate with key partners to address infectious diseases and other public health threats. A high proportion of states reported being able to communicate electronically in real time or near real time with most key partners, including hospital infection control practitioners (92%), hospital emergency departments (90%), local health departments (90%), physicians (81%), and other state health departments (81%).

States reported maintaining a comprehensive array of information about cases of foodborne disease/enteric illness in their electronic databases. Most states have the capacity for electronically recording numerous factors related to cases of enteric illness, including laboratory results, travel history, epidemiologic risk factors, clinical symptoms, environmental exposures, food histories, and food purchasing locales as separate elements of their enteric illness case files (Figure 6).



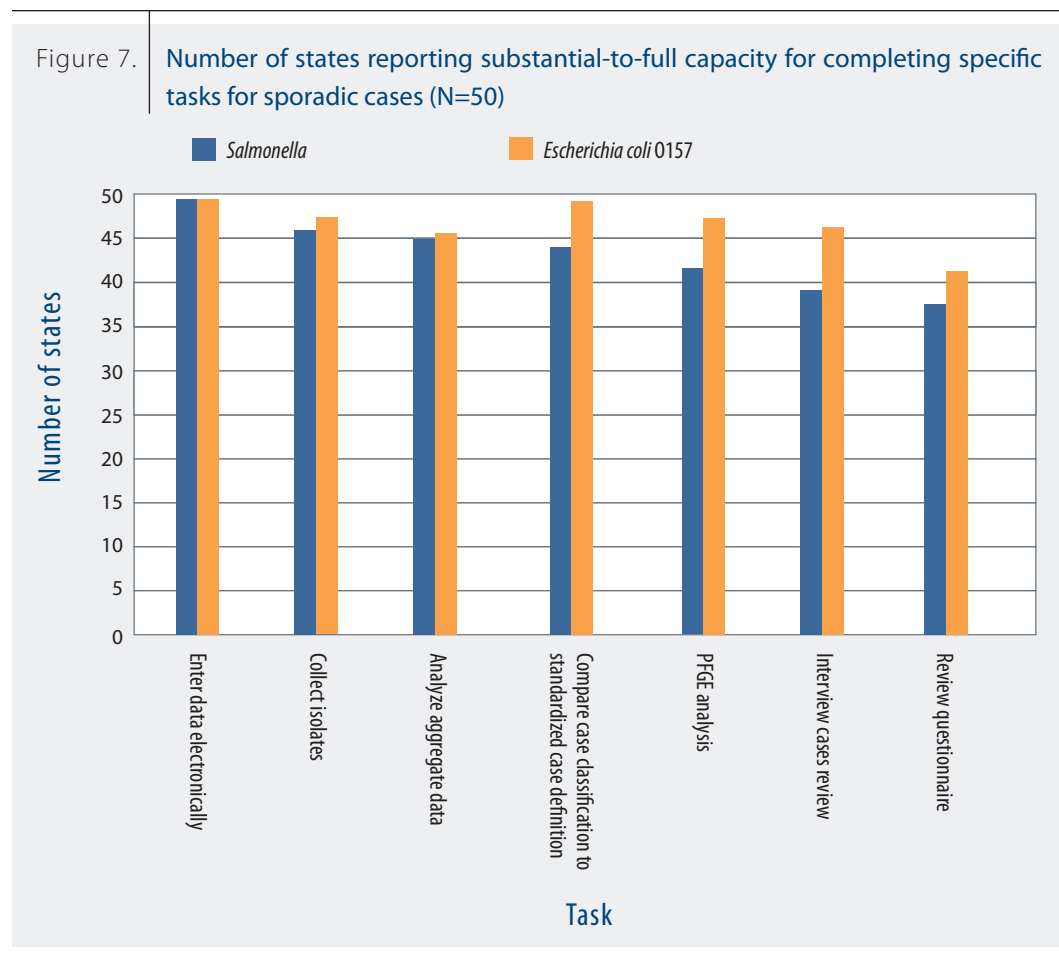
Figure 6. State report of information recorded by electronic database for enteric disease cases (N=50)



Improving the timeliness of communicable disease reporting has been central to enhancing public health preparedness in an era of increasing infectious disease threats. The proportion of clinical laboratory reports on foodborne illness that are timely varied substantially across states. Fewer than half (44%) of respondents reported the proportion of timely reports as “substantial” (i.e., 50%–74% of reports were timely) with an almost equal number of states (42%) reporting the proportion of timely reports as “almost full” (i.e., 75%–99% of reports were timely); only one state reported “full” capacity (i.e., 100% of reports were timely). Fewer states (12%) described the proportion of timely clinical laboratory reports as “partial.” No states reported that proportion as “minimal” or “none.”

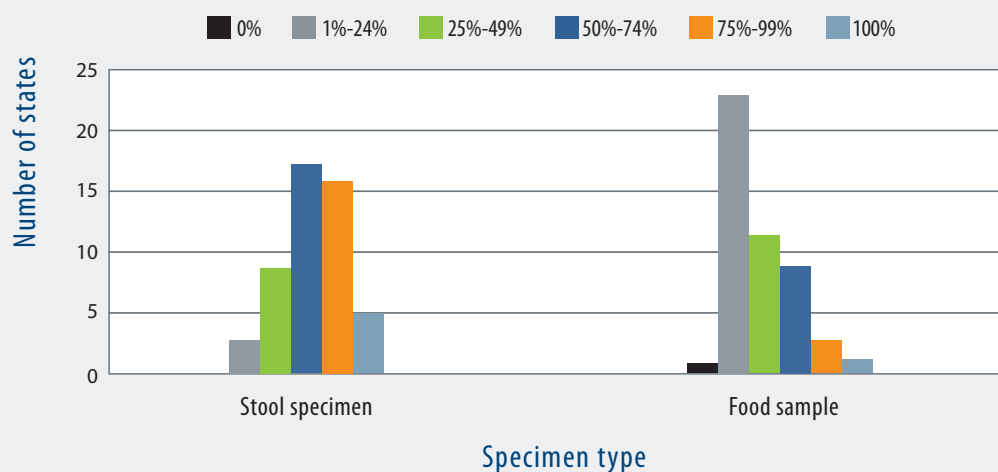
States might perform various tasks associated with any outbreak and those tasks often vary by etiologic agent. States reported variable capacity for carrying out specific tasks related to sporadic cases of enteric illness caused by *Salmonella* and *Escherichia coli* O157. Nearly all states reported enter case data electronically for both pathogens, although nearly all other tasks were somewhat more likely to be completed by states for *E. coli* O157 vs. *Salmonella*, including collection of specimens, pulsed-field gel electrophoresis analysis, analysis of aggregate data, comparison of case classification to standard case definition, interview of case-patients, and more intensive questionnaire review (Figure 7).

## RESULTS



Collection of either implicated food items or clinical specimens from ill persons can be an integral component of foodborne disease investigations. States varied substantially in their capacity to collect both food and stool specimens related to foodborne disease outbreaks, although they are more likely to obtain stool samples than food samples. A small proportion of states reported always collecting either or food specimens associated with foodborne disease outbreaks. More typically, stool specimens were collected in fewer than 50% of outbreaks in about one fourth of reporting states, and food specimens were collected in fewer than 50% of outbreaks in most states (Figure 8).

Figure 8. Proportion of foodborne disease outbreaks for which specimens were collected by specimen type (N=50)



### Capacity for Outbreak Detection and Response

Optimal public health preparedness necessitates that certain staff are on call and available around the clock to respond to public health emergencies. All states reported having a 24/7 on-call system to respond to foodborne disease outbreaks. Such on-call response systems were less likely to be present at the regional level (25%) or the local level (47%).

Standing outbreak response teams have become more common with the advent of greater attention to public health preparedness. More than half of respondents reported having standing response teams for foodborne disease/enteric illness outbreaks; these response teams might be in various organizational levels or at more than one level in a given state. Many standing response teams were reported to be at the state level, with fewer at the regional or district level or local health department level; several states reported that the existence of standing response teams is jurisdictional dependent. All 23 respondents who reported a lack of standing teams had the capacity to mobilize a response team when a foodborne disease outbreak or other related event occurred (Table 3).

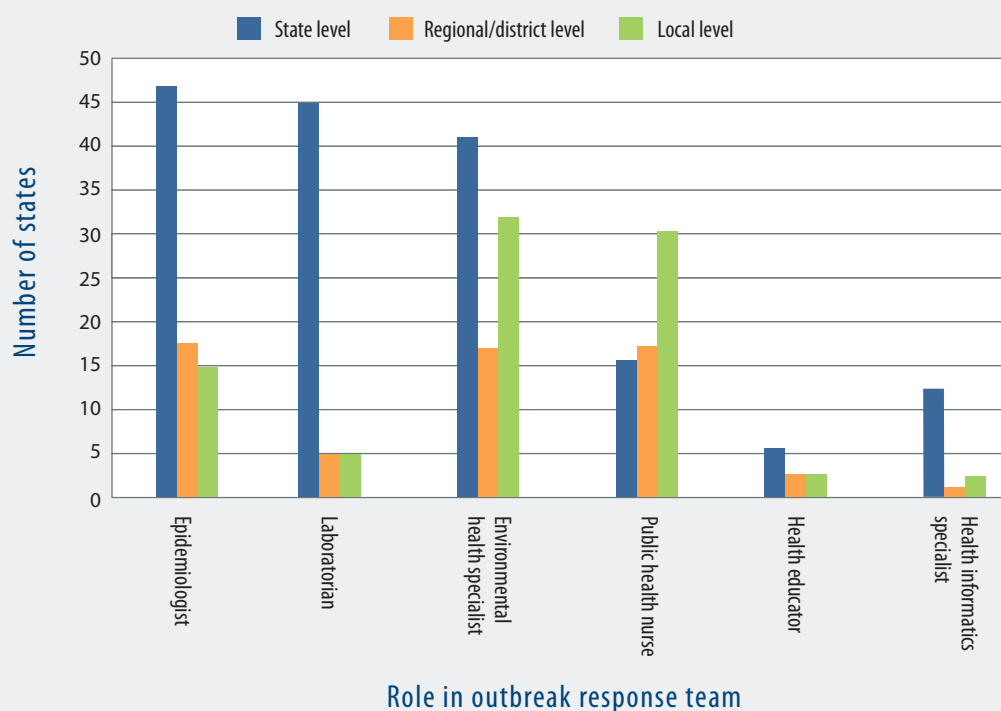
## RESULTS

Table 3. Presence of standing outbreak response teams (N=50)

| STATUS   | STATES NO. (%) |
|--|----------------|
| <b>Standing outbreak response team exists in some form in the state</b>                | <b>27 (54)</b> |
| State level  | 21 (42)        |
| Regional/district level  | 13 (26)        |
| Local level  | 9 (18)         |
| Varies significantly by jurisdiction   | 9 (18)         |
| <b>No standing team, but appropriate staff can be mobilized for outbreak responses</b> | <b>23 (46)</b> |

Outbreak response teams comprised several different public health professionals to adequately address the myriad responsibilities and tasks associated with successful control of foodborne diseases/enteric illnesses. At the state level, all respondents reported including an epidemiologist on outbreak response teams, and a high proportion reported also including a laboratorian (96%) or environmental health specialist (88%); fewer included a public health nurse (33%), health informatics specialist (27%), or health educator (13%). Regional outbreak response teams were uniformly less likely to incorporate any one of these professionals, with the exception of nurses, who were more commonly included at the local and regional levels than in state health departments. At the regional level, comparable proportions of states (38%) reported including epidemiologists, nurses, and environmental health specialists; fewer included laboratorians (10%), health educators (6%) or informatics specialists (2%) on the teams. Local-level outbreak response teams comprised environmental health specialists (69%), nurses (67%), epidemiologists (31%), laboratorians (10%), health educators (6%), and informatics specialists (4%) (Figure 9).

Figure 9. Composition of outbreak response teams, by government level (N=48)

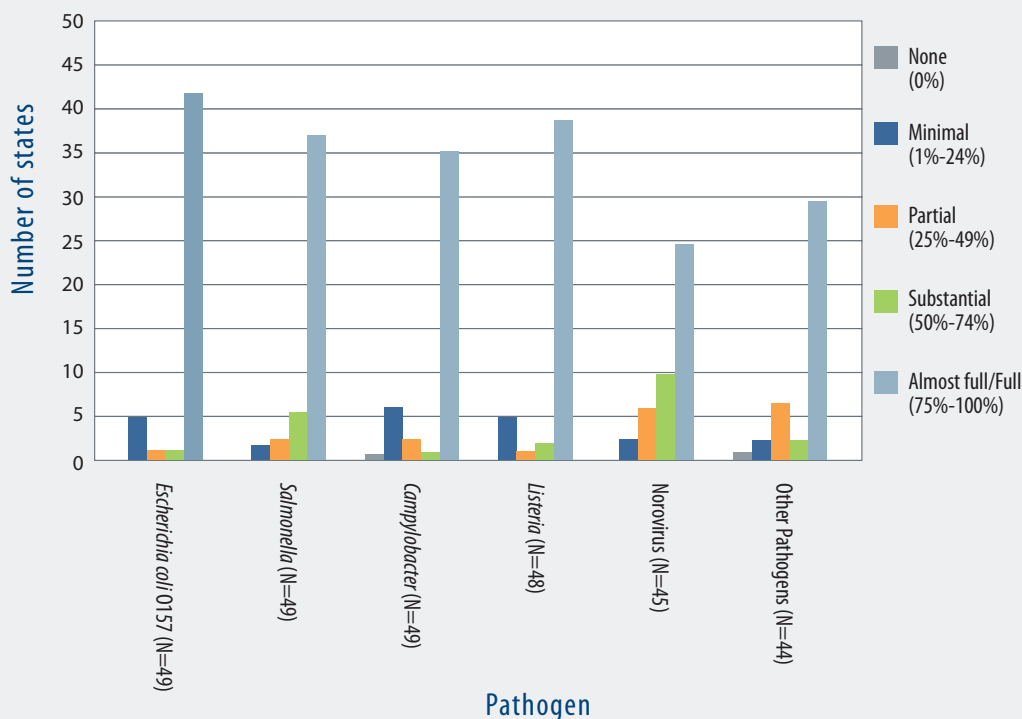


States use various nontraditional data sources for detecting outbreaks of foodborne disease. The most commonly used data sources reported by respondent states as “sometimes” or “often utilized” for outbreak detection were laboratory/PulseNet data (98%), public complaints (98%), and physician reports (98%). Other data sources less frequently used by states include emergency department chief complaint data (38%) and poison control center data (28%). Other data sources typically not received or received but not used by most states were over-the-counter sales (58%), BioSense (62%), and emergency medical systems data (58%). Few or no states reported sometime or often using these data sources.

All states investigate foodborne disease outbreaks caused by various pathogens, although the proportion of outbreaks caused by a given pathogen that are actually investigated varies by pathogen and state. The greatest proportion of states that reported investigating all outbreaks associated with a given pathogen were for outbreaks associated with *E. coli*, *Listeria*, and *Salmonella*, whereas fewer than half of states investigate all *Campylobacter*, norovirus, and other foodborne disease outbreaks. A minority of states reported investigating fewer than 50% of outbreaks caused by these pathogens; the percentage of states reporting investigating fewer than half of outbreaks for *E. coli*, *Salmonella*, *Listeria*, *Campylobacter*, norovirus, and other foodborne disease outbreaks was uniformly low (Figure 10).

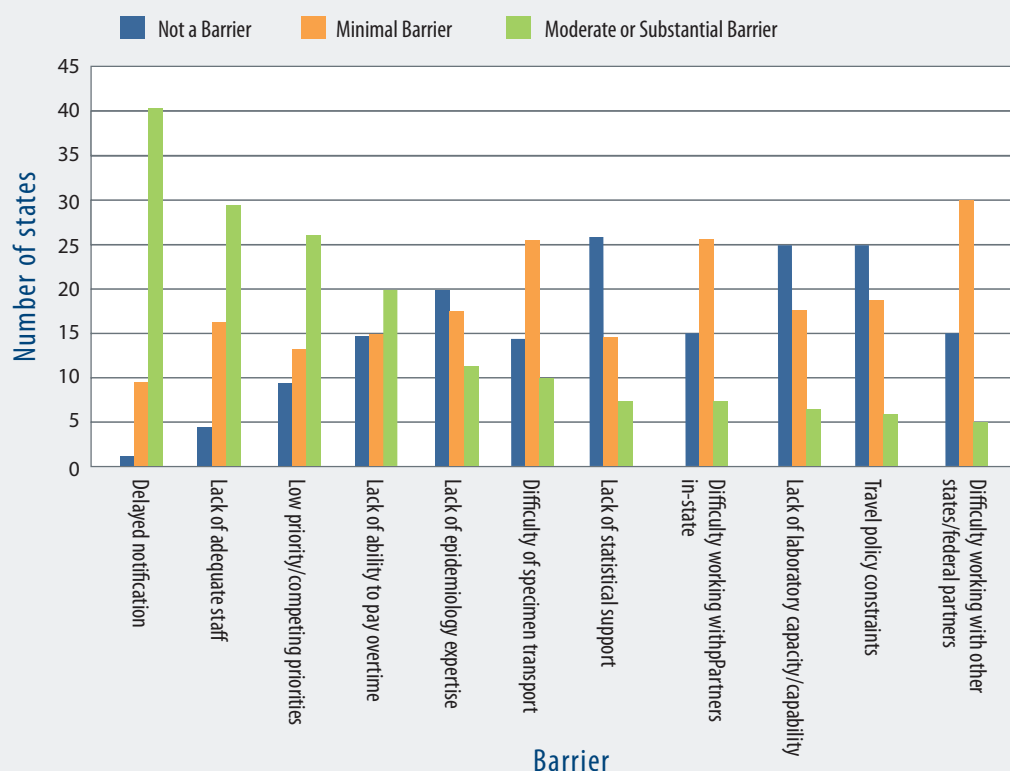
## RESULTS

Figure 10. Proportion of detected foodborne outbreaks, by pathogen



All respondents reported some barriers to investigating foodborne disease/enteric illness outbreaks, although the specific barriers faced by individual states differ. Barriers most likely to be reported as either moderate or substantial by a larger proportion of states were delayed notification of the outbreak (82%), lack of adequate staffing (58%), lower prioritization of investigations (55%), and lack of ability to pay overtime (41%). Those reported as nonbarriers or minimal barriers by most states included difficulties working with various partners, constraints related to administrative support, and lack of epidemiology expertise (Figure 11).

Figure 11. Number of states reporting barriers to investigation of enteric outbreaks during the last 3 years (N=50)



Most states reported statistical support capacity as “substantial,” “almost full,” or “full,” whereas other states characterize statistical support as “partial” or “minimal,” and certain states reported no statistical support capacity for their foodborne disease/enteric illness epidemiology program (Table 4).

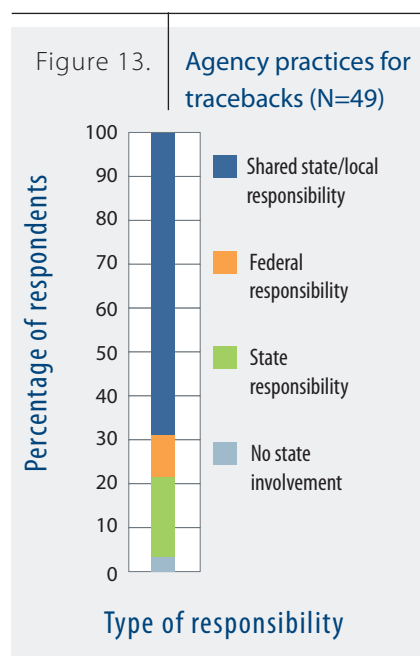
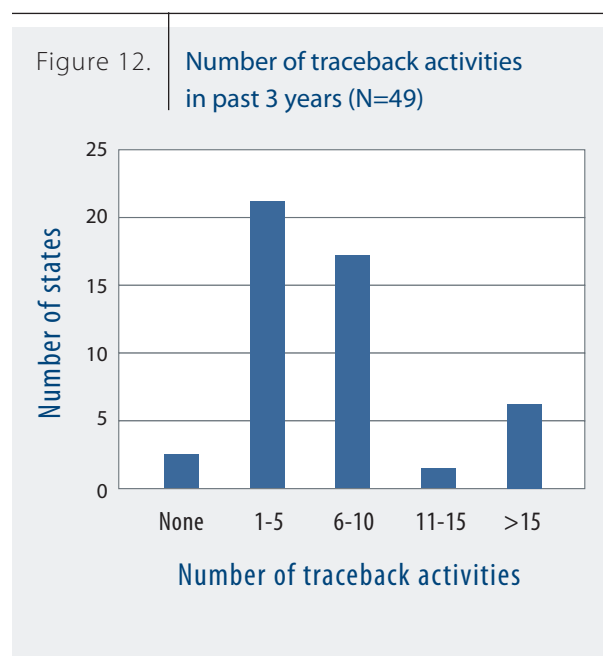
Table 4. Reported statistical support capacity in state foodborne disease/enteric illness epidemiology programs (N=49)

| LEVEL OF SUPPORT      | STATES NO. (%) |
|-----------------------|----------------|
| None (0%)             | 2 (4.1)        |
| Minimal (1%–24%)      | 6 (12.2)       |
| Partial (25%–49%)     | 7 (14.3)       |
| Substantial (50%–74%) | 13 (26.5)      |
| Almost full (75%–99%) | 13 (26.5)      |
| Full (100%)           | 8 (16.3)       |

## RESULTS

Tracebacks of commercial products often are an important component of a foodborne disease/enteric illness outbreak investigation. Approximately 80% of states reported having performed 1–10 tracebacks of commercial products in the last 3 years, with relatively few reporting conducting 11 or more tracebacks. Almost no states reported zero tracebacks of commercial products in the preceding 3 years as part of ongoing foodborne disease/enteric illness outbreak investigations (Figure 12).

Commercial tracebacks often involved collaboration among local, state, and federal public health agencies, although state practices varied. States reported that their agencies' practices for conducting tracebacks of commercial products were primarily a shared local and state responsibility in most states, but in some also can be primarily just a state responsibility, solely a federal responsibility, or might not include state involvement at all (Figure 13).

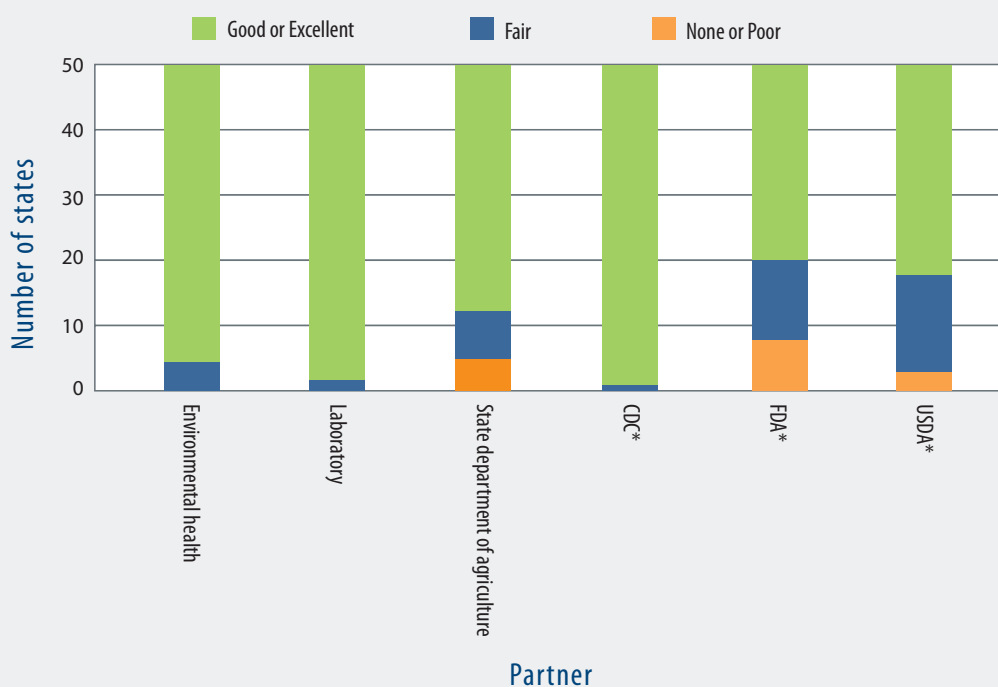




## Interagency Collaboration and Cooperation

State public health staff are required to interact with several local, state, and federal partners during the course of foodborne disease outbreak investigations. State public health staff were generally more likely to report their relationship in this context as good or excellent in partnering with more traditional public health partner organizations (i.e., laboratories, CDC, environmental health) and less so with non–public health agencies such as state department of agriculture, FDA, or USDA. Most states characterized their relationship during foodborne disease outbreak investigations as good or excellent with CDC, state and local laboratories, and environmental health, with a greater proportion of states likely to specifically categorize their relationship with the laboratory as excellent compared with any other organizational partner. Lower proportions of states reported their relationship as good or excellent with the state department of agriculture, USDA, and FDA. However, more states were likely to characterize their relationship as nonexistent, poor, or fair with FDA, USDA, and the state department of agriculture (Figure 14).

Figure 14. Quality of interaction between state agency and partners during foodborne/enteric investigations (N=46)



\* CDC, Centers for Disease Control and Prevention; FDA, Food and Drug Administration; USDA, U.S. Department of Agriculture.

## RESULTS

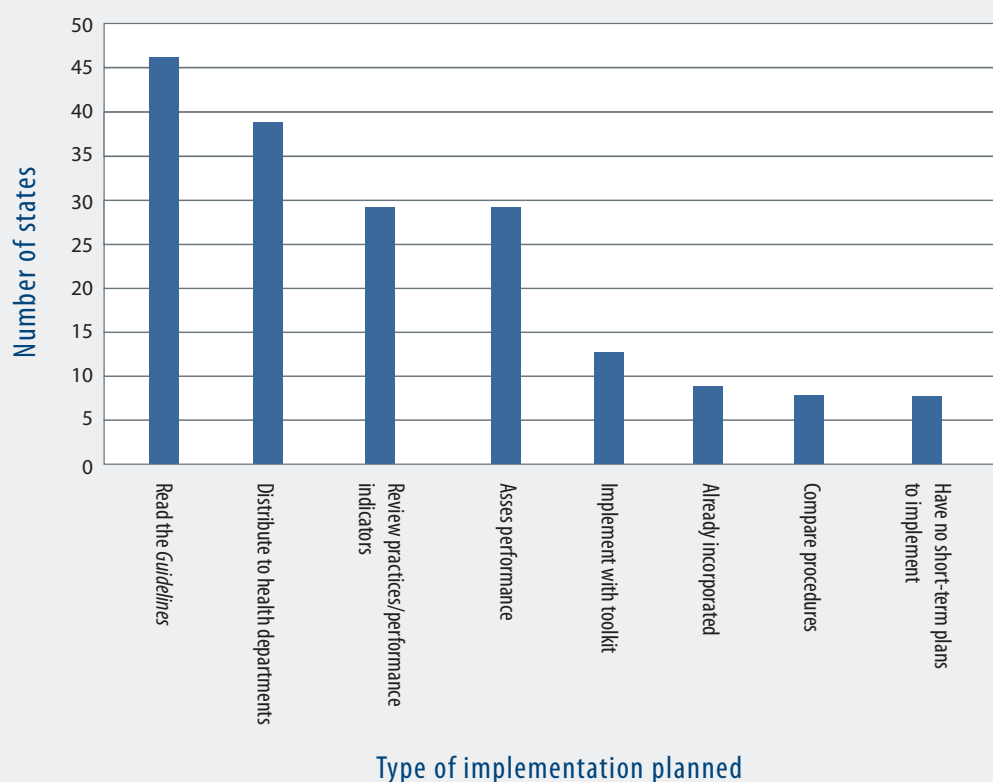
### *CIFOR Guidelines for Foodborne Disease Outbreak Response*

In 2009, CIFOR distributed its *Guidelines for Foodborne Disease Outbreak Response* to all states. Respondent states reported that professional staffs at the state level were generally more likely to receive the *Guidelines* than were professionals working at the local level. All states reported that the state health department epidemiologists received the *Guidelines*, and most states reported that state health department environmental health specialists had received the *Guidelines*. However, approximately half of states reported local health department epidemiologists and approximately the same number reported local health department environmental health specialists received these same guidelines; few states reported other professional classifications as CIFOR *Guidelines* recipients (Table 5).

| Table 5.   | <b>Recipients of the Council to Improve Foodborne Outbreak Response<br/><i>Guidelines for Foodborne Disease Outbreak Response</i> (N=49)</b> |
|--|--|
| RECIPIENT  | STATES NO. (%)   |
| State health department epidemiologists                  | 49 (100)   |
| State health department environmental health specialists | 40 (82)  |
| Local health department epidemiologists                  | 28 (57)  |
| Local health department environmental health specialists | 27 (55)  |

The CIFOR *Guidelines* were intended to improve outbreak response, and states have made various uses of the *Guidelines*; other states have planned for their use. Most (96%) states reported plans to read the guidelines, and several will distribute them to local health departments in their state. Fewer (59%) states reported planning to review their practices relative to CIFOR performance indicators or will assess their performance against these indicators. Substantially fewer reported planning to implement the guidelines by using the CIFOR Toolkit, incorporate the *Guidelines*, or compare their operating procedures against the *Guidelines*. Despite the small proportion of states actually implementing or incorporating the *Guidelines*, only 16% of states reported that they have no short-term plans to implement the CIFOR *Guidelines* (Figure 15).

Figure 15. State health department utilization of Council to Improve Foodborne Outbreak Response *Guidelines* (N=49)



# RESULTS

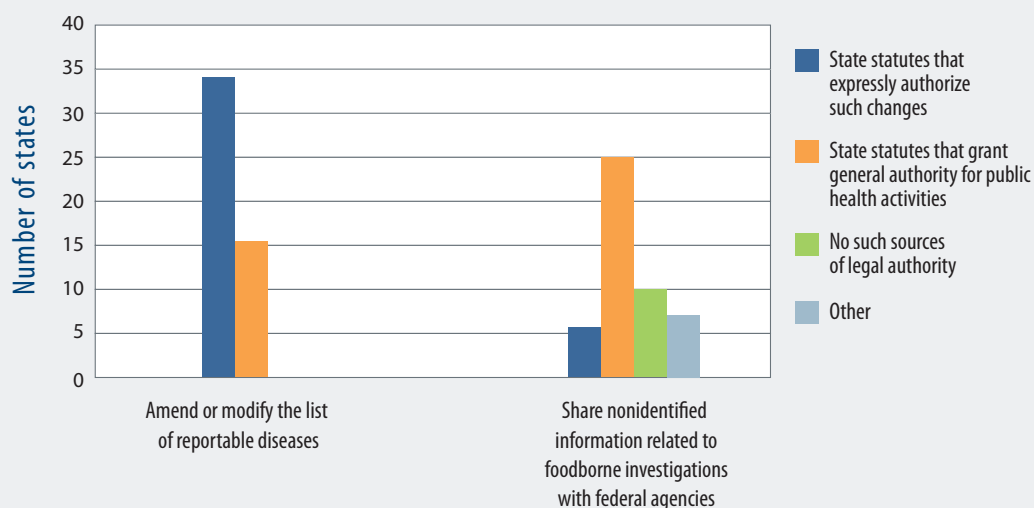
## Legal Authority

The legal authority to conduct foodborne disease investigations principally resides at the state level. Most states reported this authority exists in general state statutes, and/or some states reported this exists as state regulations. Approximately half of states reported that legal authority to conduct foodborne disease investigations resides in state regulations expressly authorizing foodborne disease investigations or in state statutes expressly authorizing such. A substantial proportion of states reported that foodborne disease investigative authority is found in local ordinances or regulations (Table 6).

| Table 6.   | <b>Sources of legal authority to conduct foodborne disease investigations (N=49)</b> |                |
|--|--|----------------|
| SOURCE   |  | STATES NO. (%) |
| State statutes that grant general authority for public health activities           |  | 42 (85.7)      |
| State agency regulations that grant general authority for public health activities |  | 31 (63.3)      |
| State agency regulations that expressly authorize foodborne disease investigations |  | 25 (51.0)      |
| State statutes that expressly authorize foodborne disease investigations           |  | 21 (42.9)      |
| Local government ordinances/regulations  |  | 18 (36.7)      |
| Other  |  | 2 (4.1)        |

The recent emergence of infectious pathogens, combined with recognition of several nonfood agents with bioweapons potential, has necessitated more frequent modification to the notifiable diseases list in certain states. Two thirds of states reported that legal authority to revise the notifiable illness resides in state statutes that explicitly authorize such changes, and the remaining states indicated such legal authority is provided under state statutes that grant general authority for public health. Conversely, more respondents reported that legal authority to share nonidentified information related to foodborne disease investigations with federal agencies exists under state statutes that grant general public health authority; 12% of states reported that authority resides in state statutes that expressly authorize sharing. Twenty percent of states reported that no legal authority exists for sharing data of this nature with federal agencies (Figure 16).

Figure 16. Sources of legal authority in states (N=49)



The legal authority to perform specific activities related to the detection and control of reported cases of foodborne disease/enteric illness varied across states, although they are legally supported in most states. Most states reported legal authority to perform environmental inspections, exclude ill food handlers from work, embargo or condemn implicated food items, close a facility, collect reports of suspected cases, collect information about clinical symptoms of ill persons, and require submission of enteric isolates by private laboratories to the public health laboratory, although approximately half guarantee chain of custody for food environmental specimens (Table 7).

Table 7. Existence of legal authority to perform activities for reported cases of foodborne disease/enteric illness (N=49)

| ACTIVITY   | STATES WHERE LEGAL AUTHORITY EXISTS<br>NO. (%) |
|--|--|
| Collect reports on suspected enteric disease cases versus probable or confirmed cases                  | 46 (93.9)                                      |
| Collect reports of clinical symptoms   | 43 (87.8)                                      |
| Perform on-the-spot emergency environmental inspections  | 49 (100)                                       |
| Embargo or condemn implicated food   | 48 (97.9)                                      |
| Close a food service facility  | 48 (97.9)                                      |
| Exclude sick or infected workers from food handling duties   | 49 (100)                                       |
| Require submission of certain enteric isolates from private laboratory to the public health laboratory | 38 (77.6)                                      |
| Guarantee chain of custody for food environmental specimens  | 25 (51.0)                                      |

## RESULTS

States identified several legal gaps or ambiguities that are barriers to foodborne disease outbreak response, although only a minority of states reported any one of these as substantial barriers. The barrier most commonly reported (36%) concerns constraints to conduct a coordinated response across local and state boundaries and with federal agencies. Fewer states reported constraints on accessing information about implicated persons or businesses as a barrier (31%) or constraints on sharing information across agencies as a substantial legal barrier (28%).

As with most diseases under public health surveillance, policies regarding release of information about cases of enteric illness were treated sensitively and subject to intense scrutiny to ensure appropriate patient protections and maintenance of confidentiality. Virtually all states classify individual case information about persons with enteric illness as confidential, although the qualifiers attached to the classification vary. A small proportion of states reported considering this information strictly confidential and do not share it under any circumstances; other states share confidential case information but with substantial administrative safeguards in place; and most states (83.7%) share confidential case information for legitimate purposes. No state reported it will release individual case information to the public on request or otherwise make it available to the public.

States consider business entities differently from individual persons in the context of release of information; policies with respect to businesses generally are less rigid and more open to release to the public. Only one state reported that information about enteric illness related to a business entity is treated as strictly confidential; 40% reported that this information is confidential but could be shared for legitimate purposes; and others (4.2%) indicated that this confidential information could be shared, but with some administrative difficulty. Unlike individual case information, a substantial proportion of states reported that they will provide information about businesses to the public on request or make this information available to the public even without a specific request (Table 8).

| Table 8. Policies regarding release of information about cases of enteric disease                                      |                       |                             |
|--|-----------------------|-----------------------------|
| POLICY   | INDIVIDUALS<br>(N=49) | BUSINESS<br>ENTITIES (N=48) |
|  | NO. (%)               | NO. (%)                     |
| Strictly confidential: individual identifiers are not shared with other agencies.                                      | 5 (10.2)              | 1 (2.1)                     |
| Confidential: individual identifiers may be shared with other public health agencies with administrative difficulty.   | 2 (4.1)               | 19 (39.6)                   |
| Confidential: individual identifiers may be shared with other public health agencies if there is a legitimate purpose. | 41 (83.7)             | 2 (4.2)                     |
| Considered public information, identifying information released after request for information is received.             | --                    | 14 (29.2)                   |
| Considered public information, identifying information made available without request.                                 | --                    | 7 (14.6)                    |
| Other  | 1 (2)                 | 5 (10.4)                    |

Most states reported having timely access to expert legal advice for foodborne disease outbreak responders to resolve attendant legal questions. Few (4%) states reported no such access; 10% reported not knowing whether such legal services are available to outbreak responders in their state.

Continuing education about the legal aspects of public health has been made available to government public health workforce. Most (67%) states reported that they provide opportunities for their outbreak responders to receive relevant training in such subjects such as legal authorities supporting outbreak response, use of proprietary information, protection from legal liability or other specific legal topics. Thirty-three percent of states reported a lack of any training opportunities in this area (Table 9).

Table 9. **Availability of legal training for foodborne disease outbreak responders (N=49)**

| AVAILABILITY  | STATES<br>NO. (%) |
|---|-------------------|
| No training   | 16 (32.7)         |
| General training in the legal authorities supporting outbreak response                  | 23 (46.9)         |
| Training in use of individually identifiable, confidential, and proprietary information | 20 (40.8)         |
| Training in responders' protection from legal liability                                 | 7 (14.3)          |
| Training in other topics  | 5 (10.2)          |





## DISCUSSION/CONCLUSIONS



## DISCUSSION/CONCLUSIONS

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This report provides a comprehensive assessment of the current status of national food safety capacity in state health departments conducted in follow-up to the baseline assessment carried out by CSTE in 2002. These data are self reported and represent the participation of all 50 states.

Although national foodborne disease epidemiology and surveillance capacity has increased since the last CSTE assessment in 2002, critical gaps remain. The number of foodborne disease epidemiologist FTEs with an epidemiology degree working in state health departments increased 61.4% from 92 in 2002 to 148.5 in 2010. However, the levels of formal epidemiology education among persons working as foodborne disease epidemiologists, especially at the local level, were lower than that of the national epidemiology workforce<sup>6</sup> with foodborne disease/enteric illness staff less likely to possess an epidemiology degree and more likely to have only on-the-job-training or no formal training in epidemiology than the national workforce. Nurses constitute substantial proportion of staff working as foodborne disease epidemiologists primarily at the local level, with much smaller proportions at the regional and state level, and most have not had any formal epidemiology education or training. Despite the need for more training and educational opportunities for foodborne disease epidemiologists, states have inconsistently provided such, and few require continuing education or incorporate training/education into personnel performance reviews. Respondents reported the need for additional FTEs to reach full foodborne disease/enteric illness program capacity at the state, local, and regional levels. Most of the demand for additional staff in the foodborne disease/enteric illness program area is for persons with an epidemiology degree with less a demand for public health nurses. Although the availability of standing outbreak response teams in most states is encouraging from a staffing perspective, states' need for additional foodborne disease epidemiologists is further supported by the majority, who reported that one of the most common barriers to successful completion of foodborne disease/enteric illness investigations is lack of adequate staff. Other metrics in this assessment that support the reported staffing shortage in foodborne disease/enteric illness safety capacity are those that are personnel-intensive and would, therefore, be adversely affected by an inadequate number of staff. For example, the finding that most state health departments have conducted fewer than 10 tracebacks of commercial products in the last 3 years is surprising given the documented frequency of national outbreak of foodborne diseases and enteric illnesses. Equally unexpected is the finding that only about two thirds of states investigate all outbreaks of *E. coli* O157, an enteric pathogen known to be associated with serious morbidity and mortality, and the related findings that less than half of states collected stool specimens and only one quarter of states collected implicated food specimens in most (i.e., >50%) foodborne disease outbreaks in their jurisdiction. This variability in states' ability to complete critical tasks related to investigation and control of foodborne diseases/enteric illnesses might result from a lack of personnel to complete them.

This assessment also indicates an unmistakable need for continued improvement and investment in public health IT infrastructure to adequately respond to the burden of foodborne disease/enteric illness. Several years' emphasis on states' development of electronic surveillance and reporting systems through federal preparedness funding has resulted in improvements (i.e., an increase in the use of electronic laboratory reporting to state health departments from 31 states in 2002 to 36 states in 2010). Nonetheless, most states continue to report a lack of core capacity that has directly affected their ability to investigate and intervene in the control of foodborne diseases/enteric illnesses. Although most states reported use of a NEDSS-compliant system, only about half of public health laboratories have substantial-to-full electronic laboratory reporting capacity, and this reporting capacity is substantially lower in clinical, hospital, and reference laboratories. The data sources for

## DISCUSSION/CONCLUSIONS

reporting foodborne diseases/enteric illnesses continue to be those commonly identified in the past: physicians, PulseNet, and public complaints. Certain states reported regular use of more nontraditional reporting sources, such as BioSense, over-the-counter sales, emergency medical systems, and poison control centers, despite encouragement from CDC to make more use of syndromic surveillance during the last several years. Data elements considered key to routine surveillance for foodborne diseases are inconsistently collected across states that use electronic means, whereas nearly two thirds reported the ability to capture a food history in an electronic database. Even fewer states collect information electronically on food purchasing locale, which is central to most investigations of foodborne diseases/enteric illnesses. The lack of adequate IT infrastructure is also demonstrated by states' report of "lack of timely notification" as the single most common barrier to completion of foodborne disease investigations. This barrier would seem to relate directly to the capacity of surveillance systems to collect this information rapidly, which has been a key objective of national improvements to public health IT infrastructure.

Foodborne disease outbreaks are often multijurisdictional and frequently cross state lines. Consequently, the quality of interagency relationships in the conduct of the foodborne disease outbreak investigations is important to their successful resolution. Most states seem to have effective working relationships with key agency partners. However, definite differences were evident in states' working relationships in foodborne disease/enteric illness investigations with environmental health, laboratories, and federal partners such as CDC, which are all reported as good or excellent in comparison with working relationships with regulatory agencies such as FDA, USDA, and state agriculture agencies. The interaction and interdependence of public health and agricultural agencies at the state and federal levels is likely to grow, given the increasing incidence of zoonotic diseases and foodborne disease/enteric illness outbreaks directly linked to food animal production practices. Therefore, improvement in these interagency relationships should be a national public health priority; these relationships will be key in the increasingly complex investigation and response to large-scale foodborne disease/enteric illness outbreaks originating in food animal processing or agricultural practices.

States consistently reported full legal authority to detect, investigate, and respond to foodborne diseases/enteric illnesses granted either under general state public health statutes and regulations or less commonly under statutes or regulations specific to foodborne disease/enteric illness. All states have legal authority to modify their states' notifiable diseases list; otherwise, some variability exists across states in the specific investigative activities that are legally supported under statute or regulation, although activities that would be considered essential were provided for in most states. Specific legal barriers or ambiguities regarding investigation of foodborne disease/enteric illness were reported by one third or fewer states. That legal barrier most commonly reported dealt with constraints to the conduct of a coordinated response across local/state boundaries and with federal agencies, which might be related to the need for prioritizing improvement of interagency relations, including discussions of enabling legal authority across jurisdictions. All states reported individual-level confidentiality protections in place, and this information is customarily shared only within significant administrative limitation. States have a more liberal policy with regard to sharing information about businesses implicated in foodborne disease outbreaks and almost half make the information available to the public.

## DISCUSSION/CONCLUSIONS

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The CIFOR *Guidelines* was developed through a local/state/federal collaboration and intended to assist with standardization of foodborne disease investigations across agencies and states. Key state health department personnel, including all State Epidemiologists and most state environmental health specialists, have received the *Guidelines*. Dissemination to local health departments was not as successful and might indicate the need for a renewed effort to ensure these guidelines are distributed to local government partners. CIFOR has developed a Toolkit that is intended to enable public health officials to easily identify specific recommendations in the CIFOR *Guidelines* that will aid their current program structure and function; however, only about a quarter of respondents have thus far used the Toolkit. As the foreword of the CIFOR *Guidelines* notes, the guidelines will be only as good as implementation. On the basis of states' response, implementation remains a challenge. Many states have not yet put the *Guidelines* into practice; doing so may require a more intensive national effort to help states make more active use of these guidelines.

## RECOMMENDATIONS

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# RECOMMENDATIONS

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## **1. Increase staff working in foodborne disease epidemiology and surveillance in state and local health departments.**

- CDC and CSTE should collaborate and provide leadership to develop mechanisms to increase support for additional foodborne disease epidemiology and surveillance staff in state and local health departments.
- To fully justify expansion of foodborne disease epidemiology and surveillance capacity, CSTE and CDC should document the potential benefit of such enhanced capacity, using states with high-level capacity as examples.
- State and federal agencies involved in response to foodborne disease outbreaks, including CDC, USDA, FDA, CSTE, and APHL, should foster ongoing discussions about gaps in national foodborne disease epidemiology and surveillance capacity and discuss strategies for overcoming them.
- In collaboration with ASPH, marketing strategies should be developed to focus on recruiting persons with formal epidemiology training/education, especially persons with an MPH in epidemiology, into the foodborne disease epidemiology and surveillance program area.

## **2. Enhance epidemiology training opportunities for staff working in the foodborne disease epidemiology and surveillance program area to promote a well-qualified public health workforce.**

- CSTE and CDC should continue to encourage increased access to continuing education and training by using tools, such as the CSTE/CDC Applied Epidemiology Competencies and the CIFOR Guidelines and accompanying Toolkit, for staff working in foodborne disease epidemiology and surveillance, especially those with no formal epidemiology training or education.
- Federally funded public health training programs such as the CDC-supported Preparedness and Emergency Response Learning Centers and HRSA-supported Public Health Training Centers should be actively solicited to offer more continuing education offerings focused on enhancing skills in foodborne disease epidemiology and surveillance.
- ASPH should encourage utilization of the CSTE/CDC Applied Epidemiology Competencies in the epidemiology courses offered in schools of public health. ASPH also should work to ensure an increase in the number and type of courses that actively incorporate public health practice and applied epidemiology to better prepare students for careers in government public health.

## **3. Increase investment in IT to realize greater improvements in capacity for the detection, reporting, investigation, and surveillance of outbreaks of foodborne disease/enteric illness.**

- As a component of public health preparedness, CDC should assist states in achieving full technology capacity in foodborne disease epidemiology and surveillance, including the following areas: electronic laboratory reporting, use of NEDSS-compliant foodborne disease system, use of nontraditional data sources, Web-based provider reporting, and development of a database for case management database development.
- CDC and CSTE should collaborate to develop strategies that encourage state and local health departments to undertake comprehensive electronic data capture of critical variables related to foodborne outbreaks and enteric illness.

## RECOMMENDATIONS

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**4. Develop strategies for further enhancing the relationship between state/local health departments and federal regulatory agencies (e.g., FDA and USDA) in collaborating on foodborne disease outbreak response.**

- Regular forums should be convened that permit discussion on improving federal–state interaction around foodborne disease/enteric illness and outbreak response.
- FDA and USDA should seek opportunities to make presentations at public health conferences on topics related to federal–state interaction in foodborne disease/enteric illness investigation and control.

**5. Develop marketing strategies to increase awareness and use of the CIFOR *Guidelines* Toolkit.**

- CIFOR should develop a marketing strategy to increase use of the CIFOR Toolkit to assist state and local health departments with identifying gaps in their foodborne disease epidemiology and surveillance programs.
- Special efforts should be made to ensure epidemiologists at the local and regional levels receive copies of the CIFOR *Guidelines*.





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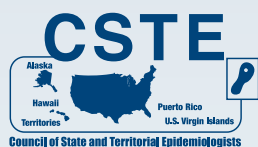
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COUNCIL OF STATE  
AND TERRITORIAL  
EPIDEMIOLOGISTS

National Office

2872 Woodcock Boulevard

Suite 303

Atlanta, Georgia 30341

t 770.458.3811

f 770.458.8516

[www.cste.org](http://www.cste.org)